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Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 1

PRODUCTIVITY AND INCOMETHE AUSTRALIAN STORY3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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Key points

- Productivity is often spoken about as something desirable, but like sustainability, can mean very different things to different people. It is not about working longer hours, rather it is about making the most of the resources we have available. Productivity grows when we produce more outputs for the same or fewer inputs.
- The focus of policy makers on productivity is well justified. Realising productivity growth improvement in the efficiency of resource use over time — is the most sustainable way of growing incomes, and supporting the consumption of the goods and services desired by the community. This broad approach to productivity includes the ability of the economy to adapt as community desires change (for example with an ageing population), and as resources become more scarce (for example land in cities).
- Australia is over five times as productive as we were a century ago this means that every day, we generate five times as much wealth, on average, for the same amount of input. Within the past 30 years, productivity has more than doubled. This has delivered substantial growth in people's average incomes and, through both wages growth and one of the most progressive tax and transfer systems in the world, the benefits have been broadly shared across the income spectrum.
- Australia has not experienced recession since 1991. But we have benefited from strong terms of trade growth, which has pushed up the value of our exports compared with what we buy from abroad. And while the terms of trade has reversed since 2012, it remains well above long-term historical levels. We have also had strong growth in both the population and in the stock of capital, and the recent trends in per capita income growth paint a less rosy picture. Importantly, productivity growth outputs per unit inputs has been flat, on average, for over a decade.
- The expansion in the mining industry has brought many benefits since the mid-2000s, but it employs relatively few workers, and much of the capital is foreign owned. Other trade-exposed industries have had to face high exchange rates that eroded their external competitiveness. Those that have survived should have emerged stronger, yet there is little sign of the general pick-up in productivity growth that should have emerged. The Australian economy remains vulnerable to external shocks, with domestic markets affected by a heightened perception of risk after the global financial crisis, and looking forward, it is subject to structural pressures from an ageing population, and an unsustainable fiscal trajectory.
- Governments exert significant influence on productivity outcomes through laws, regulations and other institutional 'rules of the game'. These rules affect the incentives facing businesses and individuals to work and invest. Governments also provide, or influence, much of the necessary infrastructure, including social infrastructure such as education, that provides the services needed to support business. Getting these rules and investments right will help build productivity, getting them wrong can hamper the ability of business to deliver productivity growth.

Productivity and income: the Australian story

1 Background

The productivity slowdown observed across much of the developed world has raised concerns about the future drivers of income growth. While domestic factors such as the recent mining investment boom have driven much of Australia's productivity performance of late, Australia has not been immune from broader global, and longer term, trends. Across the world, the gains that have come from the opening of economies to trade and globalisation have slowed, in part due to their success, and in part the rise in more protectionist sentiments following the global financial crisis. Moreover, developments in digital and other technologies, while holding out the promise of productivity growth, have yet to deliver. As a relatively small, open and capital importing country, how these developments continue to unfold, and governments' responses to them — including our own — will have a strong bearing on Australia's productivity potential.

This supporting paper tells the story of productivity growth in Australia. It focuses mainly on the market sector of the economy — the 16 industries where output and inputs can be measured reliably, which comprise about 80 per cent of GDP.¹ The conclusions serve a reminder of the need for ongoing reform efforts by governments. Government policies, through institutions, laws and regulations, and investments have a fundamental influence on the capacities and opportunities for individuals and businesses to respond to new technologies, and to contribute to new forms of growth. As the push and pull of global trends and new technologies continue to affect Australia, continued reforms to policy settings are crucial, if not fundamental, to enabling businesses to deliver growth in the 21st century.

The coverage of this review overlaps with the Commission's annual Productivity Update publication. Given this, it is proposed that each successive 5 yearly Productivity Review includes the Productivity Update material. The Update will be published as a separate report in the interim years.

The remainder of this paper is structured as follows. Section 1.2 discusses the drivers of productivity growth and explores trends in Australia's productivity performance, and international trends. Section 1.3 discusses some explanations for the observed international productivity slowdown, and section 1.4 draws implications of recent productivity performance, and international trends, for income and wages growth, and inequality.

¹ Supporting Paper 2 explores the challenges in measuring productivity in the non-market sector.

2 Australia's productivity trends

Productivity growth is a key source of long-term economic and income growth, and as such, is an important determinant of a country's average living standards. Conceptually, it seeks to quantity how efficiently resources, such as capital and labour, but also land, energy, environmental services, and other unpriced public goods, are used to produce output — the goods and services we choose to consume every day. In a measured sense, growth in productivity represents growth in outputs over and above the growth of inputs (box 1 outlines the key measurement concepts).

Over the long-term, productivity growth supports the additional consumption of the goods and services desired by the population. Tax and transfer policy settings that tilt the distribution of income to support the less well-off mean that all members of society can benefit from productivity growth. Moreover, productivity improvements that increase the demand for low skilled workers mean higher wages and employment opportunities for those who have fewer skills. For example, if new technologies complement the skills of care workers so that they can provide more services per hour worked, government funding will stretch further and could see an increase in the demand for these workers as the value of their service rises. Productivity growth at this end of the skill spectrum that grows the market reduces the need for welfare payments, to the benefit of these workers and the public budget.

Importantly, productivity growth is essential for sustainable growth, as it is only by delivering more output — the goods and services we consume every day — for less inputs that living standards can rise without eroding the quality of the environment. By making production processes inherently more sustainable, productivity growth improves the intergenerational equality of consumption opportunities.

Productivity growth should *not* be considered the end policy objective, particularly in the short-term. Policies that, for example, reduce unemployment or enable greater labour force participation could well reduce productivity per hour (because, by definition less productive workers are being brought in, and reducing the *average* productivity of the labour force), but this clearly represents a socially desirable outcome. It also entails more output *per capita*. In that broader sense, making better use of the total resources of a society can also be interpreted as a productivity improvement.

The broad definition of productivity is what matters. Skills built through employment increase the quality of the labour force, contributing to higher productivity. And while using natural resources in an unsustainable way can boost productivity growth in the short run (as firms save costs by not having to put environmental management strategies in place), in the long run this will sap productivity growth. Hence using all our resources with a view to long-term productivity will contribute to improved living standards over time through wage and income growth. This is of primary importance to the Australian population and needs to be the focus of continued reform efforts by governments.

Box 1 Measured productivity – key concepts

Labour productivity (LP) (output produced per unit of labour input) measures the efficiency of labour. In practice, measured LP growth reflects not only changes in the efficiency of labour in isolation but also the value added from additional capital investment (e.g. equipment, machines and information and communications technologies used in production). Growth in the ratio of (quantities of) capital to labour, termed capital deepening, improves the productivity of labour because capital and labour are complementary inputs to production. However, LP also captures any improvements to the *quality* of inputs or the efficiency with which they are combined (referred to as multifactor productivity).

Multifactor productivity (MFP) (output produced per unit of combined inputs of labour and capital) measures how efficiently both labour and capital inputs are used. It can be thought of as a weighted average of labour productivity and capital productivity. Measured MFP growth reflects changes in output (value added — gross output less intermediate inputs) occurring for reasons other than increases in the *quantity* of labour and capital. This may include new management practices that allow capital and labour to be combined more effectively, more advanced technology embedded in new capital, and a more skilled or educated workforce. It is thereby an indicator of technological change.

MFP will also capture any mismeasurement of labour or capital inputs, or of outputs. This includes the contribution of 'free inputs' such as rainfall. Unsurprisingly, MFP in agriculture falls during droughts. Annual MFP also reflects changes in the rate of utilisation of capital (due, for example, to fluctuations in cyclical economic conditions). As a result, productivity trends are best measured using productivity cycles, which measure average annual MFP growth between cyclical peaks. For manufacturing this cycle is the business cycle, while for agriculture the best measure is over the weather cycle.

Total factor productivity (TFP) is conceptually similar to MFP but, in addition to capital and labour, includes all other intermediate inputs, such as utility services like energy, as inputs to the production process. Hence TFP measures the ratio of gross output to all inputs, and is the measure that comes closest to the underlying concept of technological progress.

The ABS does produce experimental gross output-based TFP indicators for the market sector industries with a lag. However, given an interest in current performance, long-run trends, and comparability across industries and countries, analysis is generally reliant on indicators of LP and MFP. Furthermore, LP is of interest because of its relationship with growth in wages and therefore people's average incomes, as discussed in section 1.3.

Sources: Gordon, Zhao, and Gretton (2015); PC (2016b). Note that the EU- and World-KLEMS projects do not produce current TFP data for Australia, instead pointing to the ABS MFP statistics.

Over the short to medium term, growth in productivity is only one source of improvement in living standards. Over the course of the mining boom, strong growth in Australia's terms of trade (ToT) — the prices of products exported relative to the prices of products imported — has supported increased incomes. This is despite a relatively lacklustre productivity growth performance over the same period. But Australia has little control over the ToT. Its rise reflected the good fortune of having resources that were in high demand in the rest of the world — and what goes up can come down. Hence the continued need for a focus on productivity by policy makers.

The income growth driven from the rise in the ToT illustrates a key distinction between productivity and economic efficiency. Allocative efficiency improves when people, capital and physical resources move to the businesses and industries that value them most. As relative prices change, resources shift to where they earn a higher rate of return, raising income. For example, the mining boom drove up wages in mining so that labour shifted, along with capital, into mining and supporting industries. This raised Australia's income but, for reasons to do with long project lead times and the costs of greenfield developments, lowered its productivity growth. Yet, not allowing resources to move would have reduced the growth in income in Australia.

Social and environmental factors also come into play. Governments play a central role in providing social and health insurance, reducing income inequality, and providing opportunities for people through the education system. Notwithstanding that taxes must be raised to fund such activities (with the adverse impacts that taxes can have on investment and labour supply), these investments are important to promote productivity overall. Some such investments can, however, be misdirected and public funds wasted. Ensuring good returns on public investment in health and education are themes pursued in the Productivity Review. This Review does not recommend subordinating a nation's social and political values to raise productivity at all costs — such a policy focus would misunderstand what matters for community wellbeing. In considering policy reforms, this Productivity Review recognises that productivity is just one of many factors, albeit a critically important one, that contributes to growing national welfare.

CONCLUSION 1.1

Productivity improvements are essential to achieving growth in average incomes and living standards over time. Doing more with the available resources, and reinvesting back in these resources, helps to improve social and environmental, as well as, economic outcomes. Policy frameworks that focus solely on a narrowly defined view of productivity (outputs per unit inputs) risk operating at the detriment of optimal resource allocation and the broader social and environmental domains, which all contribute strongly to community wellbeing.

Drivers of productivity growth

The drivers of productivity reflect not only policy settings, but also a mix of deeper historical and path-dependent factors, many of which governments are unable to affect. PC (2009) outlines a framework for conceptualising the immediate, underlying, and fundamental causes of productivity growth.

• *Immediate* causes have close and tangible links to input/output relationships in production, often at the level of businesses or the individual. They may be necessary to bring about productivity improvement, but they may be difficult to engender without policy change at the other levels.

- *Underlying* factors can have an indirect effect on productivity by promoting the immediate causes. They help to determine the extent to which the immediate causes change and bring about an improvement in productivity.
- *Fundamental* influences involve deeper policy, social and institutional factors that affect productivity in very general and indirect fashion. They set the 'environmental' conditions that can affect productivity, especially over the long term.

Productivity improvements from *immediate causes* reflect technological advances, such as better products and bringing into operation better production techniques. The accumulation of physical capital and human capital (the health, education and skills of the workforce) and accumulation of knowledge (such as through research and development and learning by doing) are seen as central and interrelated in the development, application and refinement of new technologies (innovation). Specialisation in production (economies of scale and scope) are also important in bringing about improvements to productivity by, for example, allowing more efficient technologies to be adopted. Not just new technologies improve productivity. Improvements in firm organisation, management practices and work arrangements can be a major source of productivity improvement. Continuous review processes, improvement of production systems and supply arrangements (like procurement), inventory management, quality assurance, team-based work and other elements of organisational structure are investments by firms to improve productivity. Immediate causes are generally the domain of businesses and individuals, but also apply to government-provided services in the non-market sector.

The general feature of the *underlying factors* — competition, openness of the economy to trade and investment, and demand and supply conditions — is that they help to condition the extent to which the immediate causes of productivity growth come into play. A change in firm organisation might not happen without the incentive provided by competition. Access to overseas technologies and management expertise may not be possible without openness to foreign trade and investment. Inaccurate price signals and other distortions to labour demand and supply outcomes can impede the accumulation of human capital. Regulations can inhibit the adoption of different production methods and new technologies. Better resource allocation through competition (for example, facilitating the entry of new innovative businesses or the exit of 'unproductive' ones) can improve productivity through reallocating resources to more productive activities. These underlying causes generally interact with government policy and policy reforms.

Fundamental factors condition productive potential and its long-term realisation. The emphasis given by policy makers to different economic objectives affects the development of productivity-enhancing capabilities, such as investment in education and infrastructure. The stability of policy settings affects the risks involved in making long-term investment decisions. Formal and informal institutional 'rules of the game' affect the costs of coordinating production activities and conducting business. These rules influence, and sometimes limit, the incentives that firms and individuals have to raise productivity. Cultural and social factors also shape the orientation of people toward change of the kind

required to achieve further development. For example, new technology always comes with risks, so the risk appetite of the community will affect the rates of adoption.

Measures of productivity at the aggregate and industry level are useful to provide an *ex post* indication of what is likely to have contributed to shifts in productivity performance at the macroeconomic level. For example, broad trends in capital deepening, human capital development, and technological progress can often be discerned. However, measured aggregate productivity indicators — which is a residual (growth in aggregate output less growth in aggregate inputs) — means that little, if anything, can be discerned about the *immediate* or *underlying* drivers of productivity. At the microeconomic level, these are drivers like skills development, innovation, research and development, managerial practises, and so on. Ultimately, any policy relevant observations or recommendations based on judgements about productivity must also consider the theoretical drivers of productivity analysis to illuminate some of these factors, and in particular, to determine how the theoretical drivers matter in practice and how this may differ across firms and industries.

Policy's impact on productivity levels and growth rates

Policy changes that improve the settings in which businesses and individuals make decisions (including decisions on the function and actions of governments themselves), can permanently increase the *level* of productivity. The gains in income from a higher level of productivity are enduring and result in a higher level of income than would otherwise be the case. However, it is possible that policy reform could sometimes permanently improve productivity *growth*, relative to what it would otherwise be. For example, reforms that indelibly increase the propensity of businesses to innovate can structurally improve productivity growth because successive innovations should, over time, continuously raise the level of output able to be produced from existing labour and capital resources (PC 2009).

The desirability of MFP versus capital deepening - what role for investment?

Both MFP and capital deepening are desirable sources of LP growth. MFP growth is particularly desirable because, unlike capital deepening, it does not require consumption to be forgone. That is, capital deepening brought about by investment requires expenditure on capital, which could have been spent on other consumables, whereas MFP growth ultimately requires no such trade-off. Furthermore, MFP growth over the long-term usually signals advancement in technology and overall economic efficiency.

This is not to say that investment is not needed to drive advances in technology. Investment in R&D, skills and new capital can be critical. The key is that these investments return far more than their cost. And even moving closer to the frontier by adopting the technologies developed elsewhere is not costless, often requiring organisational change. Again, the key is that the return exceeds the cost of the investment required. Hence investment, widely construed to include education and facilitating infrastructure, can be inextricably linked to productivity growth. Low investment can be the death knell for MFP growth.

As the appreciation of the exchange rate associated with the improvement in the ToT lowered prices for imported consumption goods, less consumption was forgone to support the higher aggregate capital deepening through the mining boom (and as much of this expansion in capital was funded with foreign capital inflow, domestic consumption was little affected). The subsequent decline in commodity prices and the depreciation of the exchange rate have contributed to lower rates of income growth. This serves as a reminder that large amounts of capital investment, which respond to cyclical factors, cannot be relied upon as a sustained source of income growth. Large capital inflows from overseas can raise national income in the short term, but may detract from resources available to other sectors of the economy, potentially lowering output in the longer term.

More generally, whether productivity growth in the future improves through capital deepening and investment-driven innovation will depend on the prudence of the investment decisions and subsequent management of assets — that is, whether investments have been based on sound judgment of net benefits, and whether the new capacity is used efficiently over the lives of the assets. For example, infrastructure capacity that is poorly utilised will, all else being equal, detract from productivity (and income) growth. As discussed in chapter 4 in the main report and supporting paper 9, there are continuing instances of poor, major, investment decisions. Any improvement in the selection and use of infrastructure will, other things equal, increase output and average incomes in Australia.

Policy settings that encourage investment at the firm level can also have positive productivity impacts that are difficult to measure. Capital investments that embody new technologies can be a catalyst for improvement where they drive more innovative ways of doing things. In a dynamic setting, if the return on capital exceeds the cost of capital, the gains will be captured in measured MFP growth. Policy ought not to skew decision making away from capital investment where there are expected net benefits to the firm taking into account the risks inherent in the investment. It is difficult to imagine, for example, how business processes today would have evolved, were it not for the gradual adoption of new and untested information and communication technologies in the 1980s and 1990s (many of which have been superseded).²

² While estimates of the effects of ICT on productivity and output differ, there is a general view that its contribution is positive. For a review of the impact of ICT investment on productivity, see (PC 2004) and (Tisdell 2017). Also see Shahiduzzaman, Layton and Alam 2015 for a more recent econometric analysis of the relationship and complementarities between ICT investment, ICT and non-ICT capital deepening, and LP and MFP growth in Australia.

Private and public capital investment decisions also interact in crucial ways. Governments have a key role in the provision (and regulation) of key infrastructure like transport (such as roads and rail) and utilities (for example gas and water pipelines, sewerage and electricity transmission networks) on which most businesses and individuals rely. Public capital investment decisions can also affect the investment decisions of firms. The current debate on energy costs and their impact on businesses' viability is a case in point. Beyond the initial capital deepening effect that large public investments provide, they can also facilitate access to, or lower the cost of, intermediate or factor inputs. For example, effective transport and communications systems can lead to reduced freight and business travel costs, allowing greater production with the same inputs.

Public infrastructure projects may also have broader economic effects. For example, the proximity of workers to jobs can improve labour market matching, and increase labour force participation. Greater effective proximity of suppliers, customers and competitors can also lead to more competitive markets, while generating knowledge spillovers from the application of technology. Businesses and individuals can also benefit from infrastructure even if they do not use it. For example, a business might not use a new road, but nonetheless benefits from reduced congestion on the part of the network they do use. Where public infrastructure decisions are poorly planned, the net benefits of these investments can be negative. This emphasises the need for robust settings to determine public infrastructure investment priorities, rigorous analysis of project business cases, and the sound management of assets over time.

CONCLUSION 1.2

Governments can exert influence on both MFP performance and capital deepening over time, both of which are desirable sources of productivity growth. Governments can aid productivity growth by supporting education and skills development, updating regulatory settings over time so as not to impede private sector investment, and ensuring the wider benefits of public infrastructure are realised through prudent project selection and sound asset management.

Productivity growth – what do the measures tell us?

The long-run view

Over the long term, Australia's labour productivity (LP) has improved significantly, growing by a factor of over five in the last century, and more than doubling over the course of the last 30 years (figures 1 and 2), significantly driven by increases in capital deepening (investment). This has translated into higher wages, and income growth, which has been broadly shared across the income distribution (Greenville, Pobke and Rogers 2013). However, the data also suggest that annual LP growth in the fifty years after 1890 was less than 1 per cent — proof that it is possible to have protracted periods of sluggish productivity growth (figure 2), and that too translates to poor growth in measures like gross domestic product (GDP) per capita (figure 3). Multifactor productivity (MFP), has more

recently exhibited periods of lacklustre growth, namely in the 1970s and again in the 2000s. An exception to this was the 1990s, a period in which MFP grew strongly.



^a 12-industry market sector (ANZSIC Divisions A to K and R). The latest cycle remains incomplete and therefore may be subject to changes in capacity utilisation. ^b The 12 industry MFP series is used as the 16 industry series has only been calculated since 1994-95.

Source: ABS (2016d), *Estimates of Industry Multifactor Productivity, 2015-16,* Cat. no. 5260.0.55.002, December 2016, and Productivity Commission estimates.

Much of the marked MFP growth during the 1990s has been attributed to the macroeconomic and microeconomic reforms of the 1970s and 1980s, combined with the adoption and effective use of information and communications technologies (ICT) (Parham 2004).

These reforms included movement toward medium-term frameworks for monetary and fiscal policy (namely the shift to inflation targeting, and aiming for budget balance over the cycle through more prudent taxation and spending decisions), floating the exchange rate, liberalisation of capital market flows and removal of interest rate controls, reductions in industry assistance measures and tariffs, reform of taxation, privatisation of government business enterprises, the shift away from centralised wage determination to enterprise bargaining, and other elements of regulatory and competition policy (Banks 2005).

Among other things, these reforms opened up the economy to overseas resources and competition, improved the efficiency and flexibility of domestic industries, and delivered much greater macroeconomic stability (Australian Treasury 2009).



^a The series diverge from that presented above due to different methods for interpolating data, though the results are not markedly different for the overlapping time periods.

Source: Bergeaud, Cette and Lecat (2016).

Figure 3 **The long view: productivity and capital intensity**^a Indexes, 1964-65=100



^a Data relates to year ending June of each year. Labour productivity in the market sector is market sector value-added divided by hours worked. The 'whole economy' data series involves assumptions about the relationship between hours worked and employment.

Sources: ABS 2008 and 2016, Australian System of National Accounts, Cat. no. 5204.0; Butlin (1977) and Foster (1996).

About two-thirds of annual LP growth (or 1.5 per cent per year) has been historically attributable to capital deepening and the remainder to MFP growth (figure 4). Between 1993-94 to 1998-99, however, at about two-thirds of annual LP growth, the contribution of

MFP growth was significantly greater than historical averages. LP growth averaged 3.9 per cent a year during this period.



 a 12-industry market sector (ANZSIC Divisions A to K and R). The latest cycle remains incomplete and therefore may be subject to changes in capacity utilisation.

Source: ABS (2016d), *Estimates of Industry Multifactor Productivity, 2015-16,* Cat. no. 5260.0.55.002, December, and Productivity Commission estimates.

LP growth during the 1990s was led by service sector industries, such as wholesale trade, business and financial services that drew on new advances in ICT to transform the way they did business. This was supported by continued productivity growth in industries like telecommunications and utilities. As a result, productivity levels in these industries rose towards international best practise (Dolman and Gruen 2012).

'The nothing era' and more recent performance

After the 1990s, aggregate productivity performance was determined by different sets of underlying forces. In the early 2000s, Australia entered the largest ToT boom in its history. This has had a number of fundamental impacts on the economy, including strengthening the exchange rate, lowering the cost of imported goods and boosting the purchasing power of Australian incomes. It also gave rise to rapid growth in mining investment, and strong growth in a range of related domestic services industries. Conversely, manufacturers and other export-competing industries came under pressure from competitors in China and other emerging markets as a result of the high exchange rate (Dolman and Gruen 2012). In addition, surviving manufacturers took advantage of the exchange rate to import capital, but subdued demand limited its utilisation, further reducing productivity growth in the sector (Barnes et al. 2013).

The impact of mining investment (which rose from approximately 2 per cent of GDP in 2002-03 to over 9 per cent in 2012-13) on measured productivity has been profound. There is often a lag between capital investment and output growth for large lumpy investments. This is particularly the case for capital investment in the mining industry, where new projects, such as developing new iron ore mines, can involve lengthy construction periods before any output is generated. High commodity prices witnessed during the boom also created incentives for firms to pursue more marginal reserves of commodities, which further reduced measured productivity (Topp et al. 2008).

However, the fall in productivity growth over the first half of the 2000s was not only observed in the mining sector, with multiple observers highlighting the 'broad-based' nature of the decline. There is no single explanation for why productivity performance levelled off across industries. It likely reflects a number of industry specific factors. For instance, the contribution of ICT technologies in services industries that make significant use of them, began to ebb (Connolly and Gustafsson 2013; Jorgenson, Ho and Stiroh 2008). The early to mid-2000s also saw a prolonged period of drought, which affected production in much of the agriculture industry (PC 2005). This was also a time of significant investment in the utilities sector, which is characterised by long and 'lumpy' investment cycles with capital-output lags similar to those in mining (Topp and Kulys 2012).

More broadly, it has been suggested that the impact of the reforms of the 1970s and 1980s themselves amounted to a level shift in productivity in the 1990s (Dolman 2009; Eslake 2011). Australia had fallen well behind other countries in terms of productivity and the reforms forced firms, and public sector providers, to 'catch-up'. While some expected the higher growth rates of the period of catch-up to be permanent, logic suggests that rates of productivity growth would fall back to the rate at which advanced countries are expanding productivity at the frontier.

Unfortunately, productivity growth slowed in the developed countries well before the onset of the global financial crisis (GFC) in 2007, worsened during the GFC, and has only recently has begun to rebound (Fernald 2014a). Domestically, the GFC had the impact of reducing the utilisation of capital and labour as businesses waited for better conditions to return. Overall, the effect of the GFC on global productivity growth is likely still playing out, and it remains an active area of economic research (these issues are further explored below).

Over the productivity cycle from 2003-04 to 2007-08, measured MFP growth was, on average, zero and the LP growth that was observed in aggregate was entirely due to capital deepening (figure 4). Recent observations are, however, somewhat more encouraging. Since the beginning of the most recent (and incomplete) productivity cycle in 2007-08, average annual LP growth for the 12-industry market sector, at 2.2 per cent, is close to its

long-term average of 2.3 per cent a year.³ Accelerating output from the mining sector explains a large share, reflecting the rise in the utilisation of mining capital. As such, average MFP growth in the market sector is currently around its long-run average (table 1).

Summary productivity statistics^{a,b,c} Table 1 12-industry market sector Long-term growth Last complete cycle Period since last Last five years rate cycle 1973-74 to 2003-04 to 2007-08 to 2010-11 to 2015-16 2007-08 2015-16^ 2015-16 Output (GVA) 3.0 4.0 2.4 2.9 Total inputs 2.2 4.0 2.2 2.1 Labour input 0.8 2.4 0.2 0.1 4.2 5.8 4.3 4.3 Capital input Labour productivity 23 16 22 ົງຊ

1.5	1.6	2.0	2.0
		2.0	2.0
0.8	0.0	0.2	0.8
3.5	3.4	4.1	4.1
nnual growth nd R. Exclu	n rates in designated peri des Divisions L Rental, hi	ods. Cycles refer to ring and real estate	productivity services; M
al services; are exclud	N Administration and s led from the analysis due	to their shorter av	nd S Other vailable time
1	0.8 3.5 nnual growth ind R. Exclu al services; s are exclude	0.8 0.0 3.5 3.4 nnual growth rates in designated perior ind R. Excludes Divisions L Rental, hi al services; N Administration and s is are excluded from the analysis due	0.80.00.23.53.44.1nnual growth rates in designated periods. Cycles refer to ind R. Excludes Divisions L Rental, hiring and real estate al services; N Administration and support services; a s are excluded from the analysis due to their shorter average time again or a logar time again

span. Also the 12-industry market sector has a longer time-series. ^c Capital deepening is the change in the ratio of capital to labour, weighted by the capital share of market sector income. Labour productivity growth equals the sum of the growths of MFP and capital deepening. [^] This cycle is incomplete and may be subject to changes in capacity utilisation.

Source: ABS (2016d) *Estimates of Industry Multifactor Productivity*, 2015-16, Cat. no. 5260.0.55.002, December 2016, and Productivity Commission estimates.

LP growth has recently been supported by MFP growth across most industries, with 9 of the 16 industries for which MFP is reliably measured experiencing positive average MFP growth over the period *since* the most recent aggregate productivity cycle (i.e. 2007-08 to 2015-16, table 2). This contrasts with the previously broad based nature of the productivity slowdown. Strong growth has been seen in agriculture, rental, hiring and real estate services, financial services, and wholesale trade industries, while improvements are further expected in mining (discussed in the next section).

A number of industries have made strong contributions to productivity growth in the market sector on average in recent years. Financial services and construction (both large sectors of the economy) have seen growth in inputs outpaced by growth in gross value

³ As measured by the 12-industry market sector. The long-term (30-year) average annual growth rate for the whole economy is 1.6 per cent. Trends in LP growth are similar regardless of the industry aggregation.

added, partly reflecting the response of housing lending and construction to lower interest rates. Other services sector industries, including transportation and administrative services, have generally seen lacklustre productivity growth recently, which reflects strong input growth in both labour hours and capital services relative to gross value added.

	•	•	• •		
	Labour p	roductivity	Multifactor productivity		
	Long-term growth	2007-08 to 2015-16	Long-term growth	2007-08 to 2015-16	
Agriculture	3.5	2.9	2.3	1.8	
Mining	1.1	0.7	-1.0	-2.5	
Manufacturing	1.8	0.9	0.5	-0.1	
Utilities	0.5	-1.6	-0.7	-2.0	
Construction	1.7	2.1	0.8	0.8	
Wholesale trade	3.7	3.2	2.4	2.2	
Retail trade	2.5	2.3	1.4	1.2	
Accommodation					
services	0.8	-0.1	0.4	-0.1	
Transport	1.8	0.3	1.0	-0.8	
Telecommunications	4.7	4.0	1.4	1.2	
Financial services	3.9	1.9	2.4	1.4	
Rental, hiring and real estate	1.0	4.5	-1.6	2.9	
Professional services	0.7	0.7	0.3	0.3	
Administrative	0.7	0.7	0.0	0.0	
services	0.0	-2.6	-0.3	-2.7	
Arts and recreation	0.2	0.3	-0.7	-0.3	
Other services	1.7	1.7	0.2	0.5	
12-industry MS	2.3	2.2	0.8	0.2	
16-industry MS	2.2	1.9	0.7	0.3	
Whole of economy	1.6	1.4	-	-	

Table 2Recent versus long-term productivity growth by industry

Long-term versus the period since the last complete productivity cycle

^a Multifactor productivity estimates for the non-market sector of the economy, and the economy as a whole, are not published by the ABS. ^b Long-term growth rates for the 12 selected industries are from 1989-90 to 2015-16, and for the four additional services sector industries (Divisions L, M, N and S) are from 1994-95 to 2015-16. The long-term growth rates for the whole economy are 30 year averages. ^c Green numbers relate to positive growth, while red figures relate to negative growth.

Sources: ABS (2016d) Estimates of Industry Multifactor Productivity, 2015-16, Cat. no. 5260.0.55.002, December 2016, and ABS (2016a) System of National Accounts 2015-16, Cat. no. 5204.0, October 2016, and Productivity Commission estimates.

Looking beyond the mining boom

The impact of the mining investment boom is unwinding and, in the most recent annual results, is no longer contributing to negative MFP growth (figure 5). With output from

mining likely to rise over the course of the next few years relative to input growth as mines come into full production, the industry's MFP growth is expected to be relatively strong in the near term. However, this effect will be transient and, as highlighted by Plumb et al. (2012), there is a greater share of foreign ownership in the resource sector relative to previous ToT booms.⁴ This reduces the growth rate of national income (the return to domestically owned factors of production) relative to that of GDP, as a large share of the return on mining flows back to the foreign owners of the capital. Similarly, while the responsiveness of investment to commodity prices remains as ever uncertain, the contribution from capital deepening to overall LP growth will eventually fall.



^a Based on the 16-industry market sector (Divisions A to N, R and S). MFP includes a contribution from human capital development ('labour composition'). ^b Growth rates are estimated as 5-year weighted moving averages, so will not align with ABS annual estimates.

Source: ABS (2016d), *Estimates of Industry Multifactor Productivity, 2015-16,* Cat. no. 5260.0.55.002, December 2016, and Productivity Commission estimates.

As the total contribution of mining to LP growth continues to revert toward a historical norm, LP growth will again be determined predominantly by the non-mining sector (the sum of the blue columns in figure 5). While non-mining MFP growth has recently

⁴ Compared with previous commodities booms in Australia, proportionately less of the income accruing from higher commodities prices will accrue to residents. The foreign ownership share in mining has previously been estimated at 80 per cent (Connolly and Orsmond 2011). While this estimate does not account for Australian ownership of *foreign* mining assets, and therefore the income gain accruing to residents from a shift in *global* commodities prices, it nonetheless indicates that a large share of the gains from improvements in *Australian* commodities prices will flow offshore.

improved somewhat, the contribution from non-mining capital deepening remains notably below its observable average, having roughly halved since the turn of the century. Were this to continue, the outlook for LP growth, and therefore growth in incomes, would also be lower than what people have recently become accustomed to.

CONCLUSION 1.3

Periods of sluggish productivity growth have been observed in Australia in the past, leading to sustained periods of weak income growth. It is likely that the contributions to income growth of past major reforms and the mining investment boom are largely behind us. Looking ahead, it is growth in the non-mining sector that will largely determine prospects for income growth.

Capital investment

The picture of business investment in Australia over the past 15 years is striking. Total business investment (that is, excluding housing investment), rose to almost 23 per cent of real GDP in 2012-13 (figure 6, panel a). This increase was overwhelmingly driven by mining. However, growth in investment also occurred in mining-related industries (reflecting additional demand for services and other inputs to the mining industry itself). As mentioned above, industries like manufacturing also took advantage of a high exchange rate to import capital goods. Overall investment in the non-mining sector rose from 10 to 15 per cent of real GDP from the start of the boom in 2002 until the GFC in 2008.

While the recent fall in investment is again being driven predominantly by the mining industry, it is notable that non-mining investment has been falling as a proportion of GDP, and there has not been significant growth in volume terms since 2009-10 (figure 6, panel b). This amounts to the most prolonged stagnation in non-mining investment activity in recent history, with sustained falls in growth only matched during the 1990s recession. Part of this reflects the unwinding of the previously strong exchange rate and weakness in business conditions in the resource-rich states of Queensland and Western Australia (RBA 2017b). However, it remains notable that rates of investment have, on average, fallen in the other states relative to what they were prior to the GFC. To the extent that non-mining investment was linked to the mining boom itself, some further weakness could be expected. Overall, business investment as a proportion of GDP is coming off record highs, and remains well above its historical average. Some continued reversion is likely, particularly from within the mining sector.

With the majority of falls in mining investment likely to have already occurred, the contribution from further falls in mining investment is set to wane (Australian Government 2017; RBA 2017b). Nonetheless, overall prospects for business investment in the near term remain subdued. Surveys of capital expenditure intentions currently imply significant falls in investment the current period (2016-17), with reductions of 29.4 and

1.5 per cent in the mining and non-mining sectors, respectively (or negative 13.1 per cent in total) over 2016-17 (ABS 2017a).⁵



^a Excludes ownership of dwellings and ownership transfer costs. ^b GFCF refers to gross fixed capital formation.

Source: ABS (2016a), Australian System of National Accounts, 2015-16, Cat. no. 5204.0, October 2016, and Productivity Commission estimates.

As noted in the Australian Government's 2017-18 Budget (2017), non-mining business investment remains a key uncertainty in the outlook for growth. Notwithstanding some expected degree of weakness as the effects of the GFC linger, and the downside of the mining boom, the muted responsiveness of business investment to improved business conditions and lower interest rates remains somewhat of a puzzle. Indicators of business confidence and conditions, and capacity utilisation have generally been above average in recent years. Such indicators of business sentiment can be seen as necessary but insufficient conditions for investment.⁶ As noted by Kent (2014), among others, 'hurdle' rates of return required for investments to go ahead have neither increased nor decreased in recent years, despite significant falls in interest rates and hence in businesses' weighted average cost of capital. A growing gap between the hurdle rates and the average cost of capital implies a reduction in businesses' appetite for risk. This suggests businesses are likely to be waiting for improved demand conditions (and the accompanying output price growth it brings), before significant new investments are made.

⁵ Adjusted according to long-run observed realisation ratios for the current period estimate of capex.

⁶ See Lane and Rosewall (2015) for a discussion of these indicators, how different businesses interpret surveys, and what this may imply for overall investment.

One way of assessing prospects for investment is to contrast industries' observed investment rates (the ratio of new investment to the industry capital stock) with the sum of industry specific depreciation rates and output growth. That is, the overall rate of investment in an industry should broadly account for depreciation of existing assets, and the rate of growth in that industry to keep up with competitors. While this relationship ought not correlate perfectly in the short run, it provides an indication of any significant deviation in aggregate investment activity from an implied trend.⁷ On this basis, current investment positions indicate that demand conditions may currently be insufficient to spur additional investment (figure 7). This implies limited scope for a turnaround in the near term. Notwithstanding some encouraging recent quarterly investment results in the non-mining sector, when current investment intentions are scaled conservatively, they imply an investment shortfall relative to what would otherwise be required to return to projected average rates of economic growth over five years.⁸

There are other structural explanations for subdued investment activity. One is that the composition of the economy is changing toward sectors that are less capital intensive in production, namely services sectors, which are more reliant on skilled labour. To the extent that the economy continues to shift toward services, it could imply structural reductions in overall rates of capital investment relative to GDP (Elias and Evans 2014). These industries also tend to invest more in intangible capital, such as research and development and software, which have relatively higher rates of depreciation than physical capital assets.

Following work by Corrado, Hulten and Sichel (2005, 2006), there is also evidence that measured capital investment in national account collections fails to account for many forms of intangibles investment, such as computerised information, brand equity and organisational capital, which ultimately affect businesses' productivity and output. Studies estimating intangible capital in Australia have found that it is significant. Barnes and McClure (2009) estimated that intangible investment was almost half the size of tangible investment in the market sector of the Australian economy; that 80 per cent of such investment is not treated as investment in the national accounts; and that average annual growth in intangible investment was about 1.3 times that of tangibles since 1974-75.

⁷ Analysis of trend versus actual investment positions provides a picture of where current rates of investment are, compared with a theoretical benchmark, and is indicative only. That actual and trend investment should track each other over time assumes that the ratio of the capital stock to output is constant, and that investment will account for the rate of economic growth in a given industry and the rate of depreciation on currently held assets.

⁸ Indicative estimates of this shortfall are about \$40 billion in 2016-17. This is based on a projection framework that assumes a return, over the five years from 2015-16, to the productivity and output growth rates witnessed on average over the last 30 years. It assumes reversion to a constant aggregate capital-output ratio, and allows investment (gross fixed capital formation) to fall out as a slack variable from a projection of the implied aggregate net capital stock. It assumes constant depreciation at the rates observed in 2015-16. The implied shortfall in 2016-17 is based on a conservative scaling of the ratio of whole of economy investment to that implied by the capex survey, acknowledging that some reversion of its industry coverage is likely in the years ahead.



^{**a**} Trend investment (green lines) are the summation of real industry specific depreciation rates (δ) and smoothed real GVA growth (g). GVA is smoothed using a HP-filter (λ =50). Actual investment (blue lines) are the ratio of industry real gross fixed capital formation to industry net capital stocks.

Source: ABS (2016a), Australian System of National Accounts, 2015-16, Cat. no. 5204.0, December 2016, and Productivity Commission estimates.

Updates to this work generally find that the ratio of intangible to tangible investment has fallen somewhat since the early to mid-2000s. Elnasri and Fox (2014) found that the ratio of intangibles to tangibles increased continuously from 0.29 in 1974-75 to 0.53 in 2004-05; however, it decreased to 0.38 by 2012-13. Bucifal and Bulic (2016) also found that the ratio of organisational capital stock to aggregate machinery and equipment capital stock peaked around the early 2000s and subsequently declined to 2012-13. These results suggest that intangible investment is underpinned by technological disruption in a complementary way. This is consistent with theories suggesting that the productivity potential of ICT is only realised when matched by complementary organisational and managerial changes (OECD 2013).

However, this is not to suggest that the importance of intangibles has decreased over time. Elnasri and Fox (2014) found that between 1974-75 and 2012-13, the total stock of intangibles grew at an average annual growth rate of 5 per cent, while the real tangible capital stock over the same period grew at an average annual growth rate of 3 per cent. Intangible investment increased in importance relative to tangible investment over this period. The percentage of intangible capital in total capital grew from 9 per cent in 1974-75 to 14 per cent in 2012-13, about 55 per cent of which is currently accounted for in the national accounts. Bucifal and Bulic (2016) also suggest that organisational capital investment in the Australian market sector as a whole is sizable and growing at above the rate of investment in tangible capital (machinery and equipment). Furthermore, given the aggregate nature of these studies, aggregate *tangible* investment figures are significantly

influenced by the extraordinary rates of mining investment over the same period, suggesting that the importance of intangible investment at a sectoral level is likely to be understated.

Looking forward, continued capital investment is crucial to realising economic growth. As one indicator, the cumulative real value of (whole of economy) investment required from 2016-17 to 2059-60 is about \$40 trillion (in real terms). This is roughly four times the real value of investment made in the preceding comparable period between 1969-70 and 2015-16.⁹ The size of this investment emphasises the importance of policy settings conducive to prudent investment in both the public and private sectors.

CONCLUSION 1.4

Current rates of investment are likely to be driven partly by cyclical factors. However, industry structural change toward (less capital intensive) services industries, weak growth in demand (and with this little pressure on output prices), changes in the investment choices of businesses themselves, and enduring perceptions of risk from the GFC are also likely to be affecting the rates of measured capital investment. Thus, while rates of investment should ultimately adjust somewhat and help support output and LP growth, the adjustment period may continue for some time.

The impact of structural change on productivity

Structural change, or the change in industry composition over time, can affect productivity growth, depending on the distribution of resources in the economy and the level of productivity in each industry. As noted above, Australia has seen a long-term shift of economic activity toward more labour-intensive service sectors, which on average have a lower level of productivity (figure 8).

With the end of the investment boom in mining, labour has begun shifting back to industries that have lower levels of productivity. This compositional change towards more labour-intensive industries is likely to reduce LP growth during the adjustment period. Looking longer term, shifts in industry composition are a major factor influencing the Commission's current modelling reference case, which projects that the contribution from aggregate LP to real GDP growth to 2059-60 will be lower, at 1.3 percentage points on average, than the historical average from 1974-75 to 2013-14 of 1.7 percentage points (Gabbitas and Salma 2016).¹⁰

⁹ Based on the projection framework described in footnote 7 above.

¹⁰ It is worth noting that historical average rates of productivity growth capture a period in which a number of large one-off productivity enhancing reforms clearly influenced measured productivity growth at the industry level. It is difficult to explicitly quantify the impact these reforms had at an industry level. If, having moved closer to the frontier, Australia's relative position has remained constant, the level shift in productivity that such reforms delivered is unlikely to be repeated.



^a Shares prior to 1989-90 have been backcast.

Sources: ABS (2016a), Australian System of National Accounts, 2015-16, Cat. no. 5204.0, December 2016, and PC VUMR Modelling Reference case, 2009-10 to 2059-60 (Gabbitas and Salma 2016).

This lower projected contribution primarily reflects compositional change in the structure of the economy, namely a continuation of the long-term trend away from industries in the traded-goods sector, which have higher measured LP, towards those in the less capital-intensive non-traded service sector, which have lower measured LP.¹¹ Thus, over time, industries with lower measured LP growth account for more economic activity. This trend is seen across the developed economies as the share of services rises, and partially explains the decline in the rate of investment as less capital is used per unit of output.

CONCLUSION 1.5

Continued compositional changes toward lower productivity services industries in Australia is projected to detract from long-run labour productivity growth in future.

¹¹ Industries that have a higher capital to labour ratio need a higher level of LP to remain profitable, as they have to fund their capital. Hence, the level of LP reflects capital intensity, and is neither inherently good nor bad. This is why the focus is on the growth of LP, and more generally why MFP is a better measure of productivity.

Where does Australia's productivity stand internationally?

As a small open economy and net importer of technology and other innovation, Australia's productivity growth has been strongly influenced by international developments.¹² Aside from instances where Australian industries are global leaders (such as in mining), it is technological progress in other countries that largely determines Australia's potential productivity — that is, it sets the frontier for Australian firms and industries. Given this, Australia's position relative to international peers tells us how much higher our productivity could be if we get our policy and business settings right.

This section considers Australia's productivity performance relative to the international frontier, both in aggregate and at the industry level. It concludes that Australian productivity largely follows the broad trends in productivity growth at the frontier observed across comparable countries.

The international productivity frontier

Frontier analysis is a way of identifying and comparing performance against the most productive countries or industries internationally. Businesses in countries behind the frontier can seek to catch up by emulating practices of the best-performing businesses in their own country or in other countries, or at least move with the frontier as it shifts outwards. The United States has long been considered a reasonable proxy for the international productivity frontier, as it has consistently had one of the highest levels of aggregate labour productivity in the world.¹³ It is also a desirable comparator for Australia due to its institutional and cultural similarity and its similar industrial composition.¹⁴

Australia underwent a sustained period of catch up to the international frontier in the post-war era (even though this process was less rapid than in some other countries). As depicted in figure 9, from the early 1950s to the late 1970s, the ratio of Australian to US labour productivity rose from around 70 to 80 per cent. Strong labour productivity growth among advanced economies over this period has been attributed to the use of technologies not fully exploited during the Great Depression and World War II, and economies becoming open to trade, investment and diffusion of technology (Maddison 2001).

In the 35 years since, this ratio has fluctuated around 80 per cent, within a band of a few percentage points. In this period, there have been three distinct periods of rise in the ratio

¹² There are reasons, such as distance from markets and the small size of our domestic market, which mean that Australia is unlikely to be able to be at the frontier of every industry.

¹³ Other countries with higher measured labour productivity tend to have skewed industrial compositions (e.g. oil production in Norway).

¹⁴ Comparison of countries that are compositionally similar implies less of a role for allocative efficiency gains through resource redistribution, and more of a role for technological progress within industries in driving further relative productivity gains. GGDC KLEMS data generally indicate a high correlation between industrial compositions in Australia and the United States. Other countries that have similarly high correlations tend to have lower labour productivity levels (e.g. the United Kingdom).

— the late 1970s to early 1980s, the early 1990s to 2000, and the most recent few years to 2017 (figure 9).

The rise in the early 1990s to 2000 has generally been attributed to the structural reforms implemented in Australia over the 1980s and 1990s, combined with the adoption and diffusion of new ICTs in Australia. During this period, US productivity growth was quite strong, but Australia's was even stronger, implying this was a period when Australia underwent a period of technological 'catch up'.

However, there are limits to how much can be inferred from aggregate frontier analysis, particularly in the short run, as it reflects changes in both US and Australian LP growth, including over business cycles that are not necessarily aligned across countries. For instance, the most recent period of relative catch up has coincided with weaker growth in US productivity, itself a byproduct of strong growth in hours worked driven by a cyclical recovery in employment post the GFC. This does not represent an improvement in Australia's underlying progress.



^a GDP per hour worked, in millions of 2016 US\$ (using 2011 EKS PPPs). *Source*: The Conference Board (2017) *Total Economy Database*, May 2017.

What is the scope for catch up?

Past studies have attributed a large part of the persistent productivity gap of around 20 percentage points to differences in historical and geographic circumstances. These include Australia's large and sparsely populated land mass and geographic distance from the global centres of trade, which limit opportunities to specialise and to access economies

of scale. Battersby (2006), for example, suggests that these factors could explain around 40 per cent of the observed gap in productivity. By their nature, the effect of these factors is unlikely to change materially over time.

Dolman, Parham and Zheng (2007) noted that differences in industry *composition* appear to explain little of the observed difference in aggregate productivity levels between Australia and the United States.¹⁵ It is therefore instructive to compare industry productivity levels, and to analyse international trends in MFP.

Using the US as a benchmark, international data at the industry level imply a large spread of industry performance, implying that there is likely to be scope for advances in several Australian industries that remain at some distance from international best practice (figure 10).¹⁶

More detailed industry-level data are unavailable, but data presented in figure 10 nonetheless suggests there may be scope for technological catch up, particularly in areas of telecommunications, distribution activities, wholesale and retail trade, and transport. This result mirrors analysis by the IMF (2015), which highlighted that improvements to Australia's 'distribution' sector, covering transport and domestic trade, could generate significant gains by moving to international best practice.

Although some Australian industries, notably mining, are among the most productive internationally, the evidence suggests that there is likely to be scope for catch-up among others. However, attaining the US aggregate labour productivity level is an unrealistic ambition. In the long run, and in many industries, Australia's prospects for productivity growth will be determined by advances in technology at the frontier (be that in the United States, Australia, or elsewhere) and its diffusion. There is also a clear role for policy in enabling businesses and industries to become more productive by removing regulatory impediments and incentivising more efficient resource use.

¹⁵ They note that Australia's industry composition is similar to that of the US, and to the extent that there are differences, they offset each other. For example, Australia had a larger share of employment in some below average productivity industries such as agriculture and construction, but this was offset by its larger share of employment in industries like mining. This point is also made in Davis and Rahman (2006).

¹⁶ While these data are dated, they provide indicative evidence of whether, and to what extent, Australia may be able to improve its performance relative to the frontier.



^a Classification based on the 10-sector ISIC. Market sector aggregate excludes public administration, education and health. Telecomms includes electrical and optical equipment, post and telecommunications. Other production includes mining, utilities, construction and agriculture. USA industry data is based on the NAICS. ^b USA = United States, SWE = Sweden, GER = Germany, AUS = Australia, NLD = Netherlands, DNK = Denmark.

Sources: GGDC EU-KLEMS Benchmark 1997 matched with the 2005 extrapolation, from Inklaar and Timmer (2009).

Has expansion in the international frontier slowed down?

Growth in MFP is a reasonable proxy for technological progress over long periods of time.¹⁷ Australia has not been alone in experiencing a MFP slowdown. As noted in PC (2016b), negative rates of MFP growth have been observed across a number of advanced economies in the post-GFC period. For some economies, this may reflect a process of recovering from the GFC. While the effect of the GFC on productivity growth has been notable, there are nascent signs of a rebound (table 3). The extent of this rebound indicates that a large portion of the slowdown experienced over the late 2000s is likely to have been driven by lower rates of capacity utilisation during that period.

¹⁷ MFP growth will also reflect changes in the real cost of production, which is affected both by the rate of technical progress, and changes in quality of any unpriced (natural resource) inputs.

	Period average growth rates			Percentage point changes in growth rates			
	2000–05	2005–10	2010–16	2000–05 to 2005–10	2005–10 to 2010–16		
Canada	0.00	-0.90	0.13	-0.91	1.03		
United States	1.16	-0.04	0.02	-1.20	0.06		
Australia	0.04	-0.81	-0.01	-0.85	0.80		
Japan	-0.15	-0.49	0.22	-0.34	0.71		
Denmark	0.28	-0.70	0.15	-0.98	0.85		
Finland	0.89	-0.66	-0.57	-1.54	0.08		
France	0.22	-0.56	-0.08	-0.78	0.48		
Germany	0.01	-0.16	0.52	-0.17	0.68		
Italy	-0.75	-1.13	-0.28	-0.38	0.86		
Netherlands	0.15	-0.26	0.16	-0.40	0.41		
Sweden	1.38	-0.36	0.33	-1.74	0.70		
United Kingdom	1.19	-0.72	0.10	-1.91	0.82		

Table 3 MFP growth for selected advanced countries^a Average annual growth rates

^a MFP growth estimated as a Tornqvist index. Output is in millions of 2016 US\$ (converted to 2016 price level with updated 2011 EKS PPPs). Green numbers relate to positive figures, red numbers relate to negative figures.

Sources: The Conference Board (2017) Total Economy Database, May 2017.

In addition to the common pattern across advanced economies, the slowdown predates the GFC, implying that it is not a purely cyclical phenomenon. Across the OECD, with the exception of Australia, LP growth was lower in the decade to 2017 than in any decade from $1950.^{18}$

The fall in productivity growth among advanced economies, including Australia, is observable over several decades (Bergeaud, Cette and Lecat 2016; Carmody 2013). Even accounting for the impact of the GFC, and differential capital intensities of different economies, the rate of expansion in the international technological frontier (as measured by MFP growth) has been notably slower in recent years than in preceding decades (figure 11). The low, zero, or indeed negative rates of MFP growth observed across countries in recent years represents something of a puzzle, because it implies that, at least in aggregate, these economies have not become any more efficient, or may have become less efficient in producing output. This is notwithstanding significant technological changes — especially in areas that exploit information technologies — such as mobile technologies, machine learning, and artificial intelligence (chapter 1 in the main report).¹⁹

¹⁸ Based on data from the Conference Board Total Economy Database (adjusted version), May 2017 for the 22 OECD countries where there is a full record of GDP per hour (in PPP terms) from 1950 to 2017.

¹⁹ Obtaining a grasp on the diffusion of such technologies is difficult. One indicator is the number of internet searches for products and services that embody such technologies. As an illustration, the rise in internet searches for Hadoop, a program often used for machine learning rose spectacularly from June 2004 to June 2017 (based on PC analysis of data from Google Trends).

This raises questions about the pace of global technological change — a concern for Australia given our reliance on others' technological advances.

A number of ideas have been put forward as potential reasons for the observed secular slowdown. These are explored in section 3.



^a Converted to US price levels with 2010 \$USD PPPs. Data are filtered using a Hodrick-Prescott smoothing parameter of λ =500 in line with Bergeaud, Cette, and Lecat (2016).

Source: Long Term Productivity Database from Bergeaud, Cette, and Lecat (2016).

CONCLUSION 1.6

Notwithstanding some recent improvements in productivity growth internationally, advanced economies globally have seen a slowdown in productivity growth dating back to before the global financial crisis. While this may partly reflect a number of structural factors, there remains scope for Australian businesses and industries to leverage international best practice to move closer to the productivity frontier for their industry.

3 Explanations for the productivity slowdown

This section summarises the predominant explanations for the observed slowdown in productivity growth internationally.

Measurement issues

There has been some recent debate over whether measurement issues can explain at least a part of the observed productivity slowdown. If national accounts frameworks used to

measure real output fail to adequately capture output attributable to new products and technologies that have emerged since the turn of the century, such as cloud computing and other digital services, then this could explain at least some of the measured slowdown. There are two possible explanations. The first is that an increasingly smaller share of the utility these products provide is embodied in their prices (that is consumer surplus is rising, and this is not captured in national accounts). The second, and related, explanation is that the price deflators used for these goods do not adequately reflect improvements in their quality, so output measures understate quantity growth as they are derived from nominal sales data adjusted for the effect of changes in prices (which are typically falling).

However, there is a growing body of evidence that measurement issues are not able to explain the full extent of the slowdown (Albrizio and Nicoletti 2017). For example, Bryne et al. (2016) found no evidence that such errors have worsened since the 1990s. Syverson (2016) suggests there is reasonable *prima facie* argument, based on the timing and scale of observed effects, that much of the slowdown is indeed real, as opposed to a byproduct of mismeasurement.

There is also a question as to whether measurement issues matter in the context of national accounts collections given that many of the digital services driving consumer benefits (like map services in smartphones, or vehicle sharing schemes) pertain to the use of non-market time or resources. Even if consumer surplus is rising, the gain is in the household sector of the economy, rather than in measured production. Another potential explanation (explored further below) is that it may simply take time for new technologies to translate into measurable productivity improvements. If this is true, it would take time for output growth to respond to large and swift technological changes such as has occurred in the last decade or so, as businesses need time to assess risks, develop complementary processes and develop human capital to take advantage of them. This is not a measurement problem, and suggests that it is the rate at which (and how) technologies diffuse through an economy that should be of interest to policy makers.

That said, the importance of measurement issues to productivity statistics will likely grow on account of continued shifts in economic activity toward sectors of the economy where the measurement of real output is more problematic, namely the non-market and services sectors. These sectors both make more intensive use of intangible capital in production and produce more intangible outputs, on average. Accordingly, the ABS is working to improve several aspects of non-market sector productivity measurement (supporting paper 2).

Technology diffusion between frontier and non-frontier firms

The diffusion of new technologies and business practices from the most productive firms globally to the most advanced firms nationally, and then on to other domestic firms, is a key source of productivity growth (Conway 2016; OECD 2015). As identified in the Commission's inquiry into Business Set-up, Transfer and Closure, the uptake of previously introduced goods, services and processes facilitates the diffusion of new ideas and efficient business practices across the economy (PC 2015a). However, the diffusion of innovations

at the global frontier to domestic economies by national frontier firms, and onwards within a country to non-frontier firms, does not happen immediately, nor in fact, inevitably. (OECD 2015). This is important, because as the OECD notes, '... future growth will depend on harnessing the forces of knowledge diffusion, which propelled productivity growth for much of the 20th century' (OECD 2015).

Internationally, frontier firms are those firms that are the most productive firms in their industry year by year. Domestic frontier firms, the most productive firms by industry, adapt global frontier technologies to the specific circumstances of their country, and these are subsequently diffused throughout the local economy. Frontier firms are typically: larger; more profitable; more likely to be part of a multinational group; more capital-intensive; patent more intensively; and younger (although they are getting older) (Andrews, Criscuolo and Gal 2015).

Some recent microeconomic analysis suggests that the way in which frontier and non-frontier firms interact may have changed. Evidence at the firm level suggests that productivity growth among international frontier firms has remained robust through the 21st century, while that for other firms has generally been low (Andrews and Criscuolo 2015). This raises questions about the availability of technologies and knowledge developed at the frontier to other firms, as well as the effectiveness of firms in adopting new technologies.²⁰

The OECD posits that the recent productivity slowdown reflects a slowing of the pace at which innovations spread throughout the economy. They describe this as a 'breakdown of the diffusion machine', which has seen the gap between high productivity firms and the rest increasing over time (OECD 2015). This is problematic in the sense that such a 'breakdown' could imply a growing tail of relatively poorly performing firms, which would have direct implications for aggregate productivity growth, and may also exacerbate inequality to the extent that a growing proportion of workers may see only marginal productivity improvements, and therefore low wage growth. The OECD also find that the growing dispersion of wages appears related to the dispersion of productivity itself, with workers in high productivity firms receiving higher wages (a finding that holds over all industries).

²⁰ The precise *extent* of this effect is not actually clear from the Andrews and Criscuolo analysis. Firms tend not to stay at the global frontier. In fact, only about half of global frontier firms remain at the global frontier after 5 years. The authors estimate the frontier as the top 5 per cent of firms by productivity level within each industry and each year. This enables 'churn' of firms into and out of the frontier group. The observed divergence of firm productivity levels and/or the pace at which individual firms transition into or out of the frontier group, as well as managerial decisions (such as to reduce capacity utilisation during a period of poor demand conditions).

There is other compelling evidence that a significant share of Australian businesses have poor management practices, and while this is true for all countries, Australia lags behind the leading countries (figure 12).



^a Data mainly relate to 2008. Grey lines relate to various other countries. ^b Pooled data from 2004 to 2014. AU is Australia.

Sources: PC calculations based on World Management Survey (http://worldmanagementsurvey.org/) and Bloom et al. (2016).

There are, of course, some businesses for whom this may not warrant a policy response. The motives and expectations that underpin starting a business are many and varied. At one end of the spectrum are businesses that are highly innovative, have ambitious growth expectations and a desire 'to change the way things are done'. At the other end are those businesses that satisfy a lifestyle choice and/or primarily seek to provide stable employment and income for the owners and their families (PC 2015a).

Nonetheless, any slowing or reduction in the diffusion of good ideas, technologies and practices between businesses is clearly a concern for policymakers. A rising gap between high productivity firms and other firms raises key questions about the obstacles that prevent all firms from adopting seemingly well-known and replicable innovations (the role of government regulation in the digital age is discussed in supporting paper 13).

Other commentators have made similar observations on the nature of production and technology in the digital era, and characterise such changes as new forms of excludable and tacit intellectual capital, implying a structural reduction in technology diffusion in the form of capital-embedded technological change. For example, Brynjolfsson and McAfee (2014) contrasts Instagram, which was started by 14 people, required no unskilled labour and very little physical capital, and was sold after only a year and a half for about

\$1 billion USD, with the contemporaneous bankruptcy of Kodak, which at its peak, employed around 145 000 people and held billions of dollars in capital assets globally.

There are also a number of recent studies that analyse market governance structures, contending that they may have reduced the value to firms in engaging in activities that generate positive spillovers to other firms (box 2).

These issues all raise the importance of better understanding the microeconomic drivers of productivity performance. However, unfortunately little is known in Australia about firm-level productivity dynamics because of data limitations. Better policy design requires that these limitations be resolved through more concerted and well-targeted data collection and analysis. Better data are needed to discover the causal links between individual policies, business and individual behaviour or incentives, and measured productivity and living standards.

As noted in chapter 5, new tools like the Business Longitudinal Analysis Data Environment (BLADE) will help to make more comprehensive evaluations of the effectiveness of industry programs and other policies, including those aimed at stimulating innovation. The Australian Government provided additional funding in the 2017-18 Budget toward data-related initiatives, including BLADE, which should help facilitate improvements in development of firm level databases going forward.

As is the case in New Zealand, greater availability of data could usefully be accompanied by a coordinated body designed to shape and resource a productivity research agenda across government, academia and interested non-government parties. The New Zealand model, known as the 'Productivity Hub', serves as a potentially useful model for such a body in the Australian context (NZPC 2013).

New Zealand's Productivity Hub is a partnership of public sector agencies that aims to improve the contribution of policy to improving productivity growth by connecting people, shaping research agendas, and sharing research. The Hub Board comprises representatives from the New Zealand Productivity Commission, the Ministry of Business, Innovation and Employment, Statistics New Zealand and the New Zealand Treasury, with secretariat functions in the New Zealand Productivity Commission.

CONCLUSION 1.7

Understanding the microeconomic drivers of productivity performance is important to improve policy design. Recent improvements in data collections in Australia are an important first step in improving the evidence base. The Australian Government could further consider a coordinated approach to productivity research to leverage new data, as seen in New Zealand.

Box 2 Some explanations for poor productivity growth

Recent papers have sought to link the productivity slowdown to an evolution in market governance that has eroded competition and reduced the value to firms of generating positive spillovers.

- Bartlett (2015) argues that the shift in focus to shareholder value has undermined any implicit social contract that had been in place between joint stock firms and the community in exchange for limited liability. But forgoing this social contract has also not delivered on shareholder value. Rather, power has been concentrated in the hands of management, with a consequent focus on short-term rather than long-term returns. This, encouraged further by differential tax treatment of stock options, has made share price the target, reducing the payment of dividends. Share buy-backs have reduced scope for the market to allocate capital efficiently and lowers the dynamism of the market.
- Lazonick (2014) calculated that in the United States 54 per cent of earnings form the top 500 S&P companies (\$2.4 trillion) was used to buy back their own stock over the period 2003 to 2012, while only 37 per cent was paid out as dividends. He made the case that firms had adopted a 'downsize and distribute' model, as management extracts value from the firm rather than reinvesting in employees and new capital. Hence, in rewarding the financial interests, value creation is harmed. Rule changes in the United States in 2003 that allow safe harbour on share repurchases below 25 per cent appear to have enabled this trend.
- Erixon and Weigel (2016) suggest that the passive behaviour of the large pension funds, which look for and reward stable returns at the firm level, reduces the incentive of joint-stock firms to take risks. This results in a mismatch of the incentives facing firm management and those that would provide overall benefits to the broader community.
- Berger (2014) attributed much of the downsizing of manufacturing in the United States to changes in corporate structures. These involved a move away from vertical integration to single business lines in response to the pressures from the financial market. Berger explained the reduced resilience of manufacturing firms to external events as a reflection of loss of vertical integration, which had formerly allowed firms to control the entire value chain when scaling up innovation through production to market. The separation of R&D and manufacturing has been facilitated by digital technologies, which Berger acknowledges has been highly rewarding for the United States. But her point is that it was vertically integrated firms that created more spillovers by providing 'semi-public goods through apprenticeships, basic research, funding to bring innovation to scale, and diffusion of new technologies to suppliers. The downsized firms 'could not keep these activities in house or pay for them'. (p. 5)
- Azar, Schmalz and Tecu (2017) also point to the effects of financial markets in lowering
 productivity, but through reduced competition. Their contention is that firms owned by
 overlapping sets of investors have reduced incentives to compete. Profits are higher in
 industries where there is higher ownership concentration and price competition is weaker.
 For example, the authors estimate that 44 per cent of shares in the airline industry in the
 United States are owned by just five investors, and fares are 3-5 per cent higher than they
 would be if ownership were more diverse.

Sources: Bartlett (2015), Lazonick (2014), Erixon and Weigel (2016), Berger (2014), Azar, Schmalz and Tecu (2017).
The effects of globalisation on industry composition

The integration of global input and product markets has seen the development of global value chains (GVCs), which are a significant source of structural adjustment in many advanced economies. Improvements in telecommunications, logistics and transport technologies have reduced the significance of geographical distances as a factor determining production methods or access to consumption goods. Among other things, this means that producers have been able to take advantage of lower-cost production in developing economies.

On one hand, closer international integration can facilitate the diffusion of innovations at the global frontier to national frontier firms through trade openness, participation in GVCs and the mobility of skilled workers. However, a number of studies have found that access to overseas (input) markets creates downward pressure on employment in the tradeable sector of advanced economies, which tends to have higher measured productivity on average (Bassanini and Manfredi 2012). In the United States, for example, Hlatshwayo and Spence (2014) found that nearly all employment creation since 1990 has occurred in the non-tradeable sector of the economy. In New Zealand since the late 1970s, much of employment growth has been in the 'non-measured' sector of the economy; and employment growth in the measured market sector over the entire period averaged only 0.1 per cent a year (Conway, Meehan and Parham 2015).

In Australia, as in other advanced economies, globalisation is likely to have contributed to a shift in employment from manufacturing activities to services. Further compositional shifts away from lower- to medium-skilled manufacturing activities are likely to continue to take place in Australia because of continued development in lower-cost economies. These structural changes in industry composition can also partly explain lower rates of capital investment. Services industries are, on average, less capital intensive, and require less capital per unit of labour to produce a given unit of output. As services grow as a proportion of the economy, this places further downward pressure on rates of investment over time (Elias and Evans 2014).

However, as discussed in PC (2016a), this particular aspect of globalisation may have reached, or may soon reach, its peak. As production becomes more automated and specialised, relative labour costs across countries will factor into production decisions less, with potential implications for the extent and value derivable from GVCs. With lower or zero labour costs, moving production centres closer to consumers will help to minimise transportation and storage costs. While this could benefit consumers in some countries, there are considerations for employment and future forms of international economic development in yet to be industrialised countries that beg consideration.²¹

²¹ See the discussion of 'premature deindustrialisation' in Rodrick (2015). While this process is beyond the scope of this inquiry, the process also has implications for employment prospects in advanced countries.

Investment in knowledge-based capital

MFP growth is underpinned by innovation, which in turn, is underpinned by investment in different forms of knowledge-based capital (or KBC, otherwise termed intangible investment, including R&D, intellectual property, new organisational processes and systems, and so on). Benefits flowing from investment in KBC often spill over to other firms over time. However, there has been some concern that productivity performance has suffered recently because of lower rates of KBC investment. For example, lower rates of KBC accumulation have been linked with lower rates of productivity growth among ICT-intensive industries in the United States (Fernald 2014b).

The overall impact of KBC investment on productivity, while significant, is however, neither simple to isolate nor necessarily unidirectional. Rates of KBC investment are likely to accompany broad technological shifts that also necessitate other changes in organisational and management practise for firms to compete and survive. Some reduction in KBC investment rates and productivity growth is therefore unsurprising in the post-ICT revolution era, as most firms are likely to have adapted (to the extent required) and invested in digital technologies. For example in 1997-98, 29 per cent of Australian businesses made use of the internet. By 2015-16, this had grown to over 95 per cent (ABS 1999, 2017b).²² It may be that there are diminishing returns to productivity associated with such investments in ICT — particularly in industries making significant use of ICTs.

This being the case, future rates of KBC investment should broadly correspond to new forms of general-purpose technologies as they become available. Exactly what form these technologies will take is uncertain, but because of the intangible nature of most KBC, certain policy settings in the fields of taxation, innovation, competition, and intellectual property need to be updated. Specific enabling roles for the government are clear, such as policies that enable the exploitation of data as an economic asset. However, the rising importance of KBC also suggests that policy frameworks applicable to, for example, education, will also be crucial in facilitating the abilities and competencies of future workers to generate the forms of KBC and innovations valued by an ever-evolving and complex economic environment.

Ensuring the robustness of competition and intellectual property frameworks is crucial in facilitating spillovers of knowledge between firms. This is important because some studies have linked falls in MFP growth to declining KBC investment over the past two decades. This is based on a decline in rates of business start-ups and dynamism (Andrews and Criscuolo 2015), and at least in the United States, a declining proportion of employment in so-called 'advanced' industries that generate domestic and international spillovers (Muro et al. 2015).

²² For many industries in 2015-16, the saturation of internet access/use is closer to 100 per cent. Certain industries bring the average down, namely Accommodation and Food Services (at 84 per cent, up from 14 per cent in 1997-98), and Agriculture (at 91 per cent, up from 11 per cent in 1997-98).

Changes in the nature of technological progress

Technological advances interact with productivity performance in different ways. In and of themselves, new technologies are insufficient to drive productivity growth — they must be diffused and used through the economy. For example, Syverson (2013) notes that productivity gains from electrification (initially mass produced and consumed from the late 19th century) were considerable throughout the first half of the 20th century, and showed multiple decades-long waves of slowdown and acceleration on account of their general purpose nature. The United States also saw an earlier acceleration in productivity from electrification than other countries because of their more rapid diffusion of electricity-based general-purpose technologies in production (Ristuccia and Solomou 2002).

This is true of many forms of technology that disrupt or change common ways of doing things, as was the case with the ICT revolution of the 1990s.²³ Adoption and utilisation of ICT technology, such as computers, boosted productivity growth in Australia in the 1990s (Parham 2004). But exactly where productivity performance is at and how it relates to various technological shifts occurring at any given point in time is difficult to know with precision. It is evident that many of the major technological discoveries in the 20th century constitute 'one-offs' that cannot be repeated, or at least cannot materially be improved upon, such as near-instantaneous global telecommunications technology, installation of widespread electrification and plumbing systems, transcontinental transport networks, and indeed the internet.

On the basis that further technological innovations are likely to be more marginal in nature, Gordon (2012, 2014, 2015) contends that technological progress is unlikely to yield the sorts of productivity gains as it has in the past (an issue compounded by a number of supply-side 'headwinds' including environmental challenges, economic inequality, and demographic changes). In a similar vein, Cowen (2011) propounds a process of diminishing returns from previous sources of growth, including from mass-education of the population, the application and spread of large one-off technological breakthroughs, and the exploitation of largely free land, implying more incremental growth in future.

Prognostications about the future of technology, and its impact on growth, are ultimately a matter of judgment. There are equally optimistic assessments of the effects of future technological developments on productivity and people's living standards. Brynjolfsson and McAfee (2014), for example, suggest there is significant growth potential stemming from advances in digital technologies (like machine learning, artificial intelligence, robotics, and networked communication) that are simply yet to be seen. This would imply that what may be nascent technologies today could result in large (measured or unmeasured) productivity gains in future.

²³ Syverson (2013) also notes that the pattern of labour productivity gains from ICT exhibit remarkably similar patterns to that of electrification almost a century earlier.

An explanation for the prevailing productivity growth slowdown is therefore that we are simply at the end of one technological revolution (i.e. ICT), and that the benefits from new technologies are just yet to materialise in any widespread fashion. Part of the optimism attributed to the Brynjolfsson and McAfee worldview rests on an assumption that new technologies will benefit consumers through lower prices and/or greater leisure time.²⁴ This assumes that policy settings that facilitate competition feed through to lower prices, that technology is diffused, and that capital income is redistributed (that is, that the owners of new capital-embodied technologies will be taxed on the capital income they generate). Such optimism about the capacity of policy and taxation to adapt to technological shifts is not shared by Robert Gordon, and other technological 'pessimists'.

That many new areas of technological development are characterised by increasing degrees of complexity and excludable intellectual property pose a challenge for policy makers. However, this is not mutually exclusive with the idea that future discoveries could be revolutionary (as opposed to evolutionary or more marginal) in nature. The confluence of nanotechnology and biomedical sciences is one example where frequent and significant advances are being made (for example, see the review in Chan and Xu (2016)).

Macroeconomic environment

Beyond the thesis of supply-side limitations proposed by the likes of Gordon (2012, 2014) and Cowen (2011), a number of additional theories have been proposed to explain the prolonged malaise experienced in advanced economies. These include deleveraging following an excessive buildup of private and public debt (Reinhart, Reinhart and Rogoff 2012; Reinhart and Rogoff 2010); the ramifications of a global savings 'glut' emanating from developing economies (Bernanke 2007); the presence of a 'liquidity trap' (Krugman and Eggerston 2012); and the effects of a long-run increase and decrease in the propensity to save and invest, respectively, coined 'secular stagnation' (Summers 2016).²⁵

These theories differ in important ways, including the extent to which low growth can be attributed to domestic versus international factors (for example, foreign savings and international capital flows), and to structural factors (such as population ageing) versus policy settings. The IMF has also observed that the prolonged period of uncertainty and sluggish private investment after the Global Financial Crisis has further held back productivity growth, especially in advanced economies, and that this slow growth is likely to make challenges such as population ageing harder to address (IMF 2017). In the

²⁴ If indeed technological progress does translate to greater leisure, it is notable that wellbeing will rise rather than GDP, but wellbeing will only rise in aggregate if this leisure is voluntary and widespread across the population.

²⁵ As in periods of abnormal economic conditions, theories (both new and old) abound as to an explanation. The theories of a liquidity trap and secular stagnation, for example, both date to the Great Depression of the 1930s, initially propounded in the classic works of John Maynard Keynes (1936) and Alvin Hansen (1938, 1939), respectively.

Australian context, a further major factor that may affect medium-term growth is the mining investment boom and associated increases in Australia's terms of trade and exchange rate, which made it uneconomic to invest in non-resources sector industries for a time.

Monetary policy has been accommodative in most advanced economies, including Australia. It remains part of the arsenal (along with prudential safeguards and fiscal interventions) to support investment and growth, though it has had limited impacts over the past 10 years.

4 Implications of productivity for wages and incomes

Income growth

Exactly how future technologies, policy settings and investment activity interacts to drive productivity is open to debate. However, if expectations of income growth are guided by the experience of the recent past, it is clear that productivity growth will need to play a significant role.

The main sources of national income growth are growth in productivity (from improved MFP and capital deepening), changes in the prices of goods and services we trade with other countries (that is, the ToT), changes in output from increased labour utilisation (due to lower unemployment, higher participation, and reduced underemployment), growth in net foreign income, and any change in the amount of income needed to replace depreciated capital. Figure 13 shows the contribution of each of these sources to growth in real net national disposable income per person in Australia over the past half century.

In the most recent year, 2015-16, annual per capita disposable income growth fell by 1.3 per cent, which contrasts with the positive average annual income growth since the 1960s. The main contributor to the negative growth was the falling ToT, while depreciation also contributed to a decline in real disposable income growth per capita. The growth of net foreign income and MFP were positive but more than offset by the deterioration in the ToT and depreciation.

In the Australian economy, periods of negative income growth have been infrequent. However, per capita incomes have declined in four consecutive years since 2012-13 due to large declines in the ToT. In 2015-16, the ToT was still 10 per cent above its long-term historical average. If the ToT continues its current downward trend, it will exert further pressure on Australians' incomes and place greater emphasis on increasing productivity in the decades ahead (PC 2016b).



^a Measured as average annual per capita real net national disposable income growth. MFP based on 12 selected market industries (Divisions A to K and R). The contributions of MFP have been scaled from the 12-industry to the whole economy and are therefore different from the figures above.

Looking ahead, the ToT cannot be relied upon as a source of income growth. The 2017-18 Australian Government Budget forecast that despite higher commodity prices in 2016-17, the ToT will fall in 2017-18 and 2018-19, and eventually return to its 2005 level from 2020-21. This implies continued falls over the medium term from its current level (Bullen, Kouparitsas and Krolikowski 2014).

Net foreign income inflows depend on the past balance between saving and investment (which in any year determines how much Australia relies on foreign borrowing) and on the relative returns on these two-way investments. The inflow can increase for any net debt position (for example, if the dividend and interest income from investments held by Australians abroad rise relative to the return on investments in Australia held by foreigners). While the inflows have been positive (but modest) in recent years, Australia has continued to rely on financing of investment from overseas, which suggests future negative inflows.

Growth in capital inputs has been the most consistent factor behind growing per capita incomes over time. However, depreciation offsets, in part, investment's influence on incomes. Future contributions from capital investment will depend, in part, on the quality of investment decisions, how fast the assets depreciate, and how well long-lived assets are

Sources: ABS (2016a), Australian System of National Accounts, 2015-16, Cat. no. 5204.0 and ABS (2016d), Estimates of Industry Multifactor Productivity, 2015-16, Cat. no. 5260.0.55.002, December 2016.

managed. It will also depend on the extent of investment itself. Compositional shifts to less capital-intensive industries suggest, if anything, some downside risk to capital input growth in future. Investment in human capital however, through education, training, and learning by doing, can complement capital and other KBC investment and contribute to higher productivity.

Labour inputs can vary over time (increasing, for example, through longer working hours per employee, lower unemployment or higher participation rates). Notwithstanding cyclical variation in average hours and unemployment, average incomes have generally grown significantly as labour force participation has increased in Australia (particularly for females). However the ageing population implies that, overall, more of the population will be in age brackets where participation rates are lower (as a higher share of people are in retirement), suggesting that population ageing will, on average, reduce per capita income growth (Australian Government 2015). This is already beginning to play out as labour input has had a negligible role in income growth in recent years. Future reductions in labour inputs per capita appear inevitable, with associated negative income effects.

CONCLUSION 1.8

Productivity improvement will be the primary determinant of income growth in the future. In the absence of material improvement in productivity performance, the prospects for income and wage growth remain subdued, given likely reversion of the terms of trade, and population ageing.

Wages and aggregate demand

Falling rates of average income growth are also directly captured in lower growth in peoples' wages. Nominal wages growth (that is, growth in take-home pay) is currently the lowest since records began in 1998, at 1.9 per cent in the most recent year (figure 14, panel a). When adjusted for growth in the prices of consumables, *real* wage growth has also been low, growing on average by 0.2 per cent over the last three years (figure 14, panel b).

LP growth is not sufficient for growth in real wages. For LP improvements to translate to improved real wages, it must be the case that there is some overall increase in output prices (inflation) to compensate producers for higher labour input costs, *and* that workers have the capacity to bargain with employers for increases in remuneration in line with observable productivity improvements.

If output prices do not rise, including due to non-wage related factors, this can place downward pressure on wage increases.²⁶ Company profits can, however, still be

²⁶ A hypothetical rate of nominal wage growth of 3.6 to 4.6 per cent, with growth in labour productivity at its 30 year average of 1.6 per cent, implies that labour costs would be rising 2 to 3 per cent, and if labour

maintained if the cost of capital (the other main input to production besides labour) is low or falling. This has generally occurred in Australia in recent years with the assistance of lower domestic (and global) interest rates.

A key question therefore remains about whether there is scope for a significant pick up in the rate of growth in output prices. There are, of course, numerous drivers of prices over time. Wages growth itself is obviously a key determinant, but it is also driven by factors like competition (domestic and international), market structure, government regulations, fluctuations in the exchange rate (for those businesses operating in the traded sector), as well as advances in technology that make production processes cheaper by lowering the cost of capital inputs over time.

Capital and labour input prices can have important impacts on employers' choices about how much capital and labour to employ in production, particularly in instances where they are substitutes for each other (rather than complements). For example, advances in technology that enables automation of production lines have seen marked disruption in employment in automotive manufacturing and retail distribution. This is not to say however, that advances in technology are incompatible with growth in employment.



^a Nominal wages have been deflated using RBA year-ended inflation excluding volatile items.

Sources: ABS (2017c), Wage Price Index, Australia Cat. no. 6345.0, and RBA (2017a) Consumer Price Inflation (table G1).

income costs are stable as a share of overall income, this implies prices overall would be rising at 2 to 3 per cent, consistent with the RBA's inflation target. However, core inflation and nominal wages growth remain notably below these rates.

Previous waves of technological advance, for example during the Industrial Revolution, have tended to ultimately improve both labour productivity and employment (via the creation of new markets and opportunities that did not formerly exist). This suggests that current technological change may create as many or more jobs than it destroys. This idea is supported by a number of theoretical and applied analyses. For example, in a theoretical framework, Acemoglu (2011) finds that the short-run and long-run impacts of technological advances on wages typically differ and that there is no tension between technological changes that increase wages and technology being strongly labour-saving. Recent evidence on the impact of robotics on employment reaches similar conclusions. In a study of 17 countries over 1993 to 2007, Graetz and Michaels (2015) find that the use of robots increases growth, wages, and total factor productivity. However, there can be distributional effects, and they found that growth in hours worked and wages of low- and middle-skilled workers may have suffered from 'robot densification'. In a similar vein to the impacts of globalisation, further technological advance (in areas such as robotics and artificial intelligence) would seem to imply structural changes in employment composition towards areas of the economy that are comparatively high-skilled, or that require innately human traits like adaptability, creativity and common sense (Frey and Osborne 2013).²⁷

Of course, discussion of the impact of technology on the nature of work (including unemployment, but also the quality and quantity of work itself) is not new. However, recent concerns reflect a view (which may or may not be subject to cognitive biases) that individuals, firms, entire regions, and indeed governments (vis-à-vis policy settings) are insufficiently adaptable to the pace of current technological change. Some see this change as greater than in the past and with the potential for large unforeseen impacts (see, for example, the discussion in Hajkowicz et al. (2016)).

While the extent of this mismatch cannot be known with precision, there is likely to be, as ever, some degree of frictional unemployment arising from reductions in the costs of capital (relative to wages) over time. Any faster pace of technological change could, however, risk frictional unemployment transmuting to long-term unemployment. As indicated by past experience in Australia during the 1990s recession, delayed policy response (even in the absence of technological factors) heightens the risk of lasting damage to individuals' job prospects, reducing the probability of being matched to a vacant job (Chapman and Kapuscinski 2000). Workers unemployed for longer might see a deterioration of their skills and productivity (Ljungqvist and Sargent 1998; Pissarides 1992) or be regarded as less employable, reducing their chances of finding further employment (Blanchard and Diamond 1994). This emphasises the need for policy settings to ensure that such workers are able to have their skills recognised and be able to transfer them to new fields of work (see chapter 3 in the main report and supporting paper 8).

²⁷ The work by Frey and Osbourne (2013) has met some criticism as it does not account for future jobs and work that may be created *because of* technology, which are currently not known (and not necessarily predictable), and thus may overstate the potential risk of unemployment.

CONCLUSION 1.9

Technology creates jobs at the same time as it makes others redundant. To the extent that technological shifts require more advanced or new skills from workers, there is a role for government to ensure education and labour market policy settings enable upskilling and retraining.

Labour's share of income

Over the course of the 1990s and 2000s, the *aggregate* labour income share (LIS) fell by about 4 percentage points, with most of this occurring during the 2000s.²⁸ This implies that the share of income accruing to capital owners in the form of profits rose by a commensurate amount. This has given rise to some degree of concern about a 'decoupling' of real wages and labour productivity, for example in Cowgill (2013), and most recently in Cooney (2016), who both examined trends in the LIS up until around the peak of the mining boom. However, income shares, and their interpretation, can be skewed by structural changes in the economy, particularly when they occur quickly and on a large scale, as they did during the boom (box 3). And the LIS has risen in recent years to be close to its long-term average.

As noted in Parham (2013), the period of apparent decoupling evident in aggregate measures was almost entirely driven by additional capital income from strong mining-related investment over the 2000s, as opposed to lower labour incomes. Updated analysis reveals that in the period since (to 2016), the *aggregate* LIS has strongly reversed its downward trend. Moreover, excluding the mining industry, the LIS has on average been flat (figure 15, panel b), and actually rose slightly over the period 2010–16.

A shift-share decomposition of the LIS also confirms that mining has overwhelmingly contributed to its movements, both on the up- and downside of the boom. This reflects the shift in the composition of economic activity back to sectors of the economy that are less capital intensive, and thereby have higher labour income shares (figure 16). The decomposition also suggests that recent improvements in the LIS were driven by *within*-industry growth in the majority of industries.

²⁸ In an income accounting framework, labour's share of income includes income from compensation of employees (or COE; a function of hourly wages and hours worked, plus employers' social contributions (or superannuation)), and an imputed income for the self-employed (proprietors) called gross mixed income (GMI). The capital share of income represents gross operating surplus (or GOS; namely profits).



^{**a**} Dotted lines are income shares in 2015-16. COE = compensation of employees, GOS = gross operating surplus, GMI = gross mixed income. ^{**b**} GMI for all 19 industries has been apportioned to labour in line with ABS practise (including the three non-market sectors for which less detailed data on factor incomes is available).

This suggests, *prima facie*, that the 'decoupling' hypothesised by Cowgill (2013) and Cooney (2016), which *has* been observed in the United States, is unlikely to reflect a structural reduction in the capacity for real wage growth to reflect improvements in labour productivity in Australia. This partly reflects that wage setting institutions and regulations in Australia have generally prevented real wages from falling in any sustained fashion.²⁹

The framework of looking at income shares does not, however, convey anything about the *distribution* of labour incomes that generate it, or the consequences of substitution of labour for capital, which could come about because of further technological advances lowering prices for capital inputs relative to wages.

Sources: ABS (2016a) System of National Accounts, 2015-16, Cat. no. 5204.0 and ABS (2016d) Estimates of Industry Multifactor Productivity, 2015-16, Cat. no. 5260.0.55.002 and PC calculations.

²⁹ The efficacy of minimum wage setting practices in Australia remains an area of debate. While small minimum wage increases are unlikely to have measurable employment impacts during 'good economic times', and are an important component of the incomes of the lowest paid, there are interactions between the minimum wage and other tax/transfer settings which should be considered in wage determinations and more broadly in the consideration of tax/transfer policies (PC 2015c).

Box 3 Productivity, real wages, the LIS and RULCs

The neoclassical growth accounting framework proposed in Solow (1956) and Swan (1956) is useful to analyse the drivers of the labour income share, productivity and real wages. Assuming a Cobb Douglas production function, constant returns to scale and competitive factor markets, output grows according to the following production function.

$$Y = A. f(K, L) = A. K^{\alpha}. L^{(1-\alpha)}$$

Where the partial derivatives with respect to K and L give their respective real prices – the rental price of capital and the real producer wage.

$$\frac{\partial Y}{\partial K} = \propto \frac{Y}{K} = r$$
 and, $\frac{\partial Y}{\partial L} = (1 - \propto) \frac{Y}{L} = w$

A key interpretation of the above is that the real producer wage w will grow in proportion to labour productivity Y/L, assuming that labour's share of income $(1-\alpha)$ (the LIS) remains roughly constant. Rearranging the above, we find that:

$$\propto = r.\frac{K}{Y}$$
 and, $(1-\propto) = w.\frac{L}{Y}$

Note the right hand side of the latter equation represents the cost of labour per unit of output. Growth in $(1-\alpha)$ is therefore equivalent to growth in real unit labour costs (RULCs). Another result can be shown by rearranging the above, and expressing in growth terms. We find that:

$$(\widehat{1-\alpha}) - \widehat{\alpha} = \left(\frac{\widehat{W}}{r}\right) - \left(\frac{\widehat{K}}{L}\right)$$

In this equation, the left hand side is equal to zero, given that the capital and labour shares sum to one. For this condition to hold for the right hand side of the equation, changes in capital intensity must be matched by changes to the relative prices of capital and labour. This result stems from an assumption that K and L are perfectly substitutable. Persistent falls in the LIS can be explained in this framework. This can arise, for example, when technology manifests in a lower rental price of capital, which incentivises capital investment. In this case, capital intensity rises due to lower relative costs of capital, and this is offset by a commensurate fall in the LIS.

Since the mining boom, RULCs have risen in aggregate, as activity shifted back to industries with higher RULCs. The relevance of changes in RULCs for policy is not always clear. As in Australia's case in recent years, the fall and subsequent rise in the LIS can be a natural development reflecting structural changes in the economy. In other situations, it could be driven by the erosion of bargaining power of employees placing persistent downward pressure on real wages. This might stem from labour market laws, declining unionisation, or simply competition from lower wage countries. Some suggest this partly explains the situation in the United States, and that restoration of employee bargaining powers may ameliorate inequality there.

To reiterate, standard growth theory predicts that growth in RULCs should average out to zero. The reversion in the LIS over recent years toward its historical average should not be considered a problem. Provided higher RULCs are not accompanied by increased unemployment, they can be in the national interest, as (in Australia's case) they represent shifts in employment composition, and the attainment of allocative efficiency in labour markets. Domestically, this emphasises the importance of labour market flexibility, rather than concerns over international competitiveness, in the interpretation of recent RULC developments.

Sources: Solow (1956) and Swan (1956).



^a For a description of the methodology, see Parham (2013), appendix A, section A.4.

Sources: ABS (2016a) System of National Accounts, 2015-16, Cat. no. 5204.0 and ABS (2016d) *Estimates of Industry Multifactor Productivity*, 2015-16, Cat. no. 5260.0.55.002 and Productivity Commission estimates.

Inequality, productivity, and incomes

Inequality and fiscal sustainability

Australia has performed well on various indicators of inequality. A number of studies have found that measures of inequality have not significantly changed over recent years (Dollman et al. 2015; Fletcher and Guttman 2013; Greenville, Pobke and Rogers 2013; Wilkins 2016, 2017). This is because Australia's tax and transfer system has generally been successful in redistributing income to support those on low incomes, and that growth in wage income for those on low incomes has generally been strong compared with growth in other countries (OECD 2011).

That the tax and transfer system has successfully supported those in genuine need is undeniably positive. However, it can potentially distract from observable increases in wage income inequality in Australia (that is, a function of the wage rate and hours worked, taken before tax and not including transfers) (figure 17). Such inequality is not necessarily problematic if those on low incomes continue to experience growth in real incomes (either as a function of growth in wages, or average hours) and the tax and transfer system itself is *sustainable*.



^a Average weekly earnings represent average gross (before tax) earnings of employees and do not relate to average award rates nor to the earnings of the 'average person'. Estimates of average weekly earnings are derived by dividing estimates of weekly total earnings by estimates of number of employees.

Sources: Leigh (2013), ABS (2016c) Employee Earnings and Hours, Australia (various issues), Cat. no. 6306.0.

The ability of the transfer system to continue to support those on low income rests on the ability and willingness of the community to continue to support the system. The cost of the system is determined by the individual policy settings dictating eligibility for different kinds of government transfers (provided either as direct cash transfers or in kind), the size of those transfers, the progressive nature of the taxation system, and the broader revenue raising capacity of governments.

Despite, or perhaps because of, significant growth in average incomes over the past two decades, the goods and services provided by governments have grown (recent examples include the National Disability Insurance Scheme and increases in school funding).³⁰ This, in addition to the demand for health services with an ageing population, imply a transfer system that will continue to grow faster than output (Parkinson 2012). If this occurs, either expectations will have to be adjusted or output and productivity will need to grow to fund public services (including welfare transfers). It may even require both given the need for otherwise significant outperformance of growth on its own.

³⁰ Total government payments to households and individuals from 1995 to 2014 (the period over which consistent data are available) grew at roughly 1.21 times the rate of income growth (as measured by GDP). This excludes transfers relating to active labour market programs and unemployment benefits.

The transfer system will of course continue to perform a key function in supporting those on low incomes in Australia, providing social insurance to all members of the community. But inevitable constraints on revenue are at odds with funding the growing cost of providing social insurance — something has to give. The best path out of this growing problem is to raise income growth — both overall (raising revenue), and at the bottom end of the income spectrum (reducing need). This highlights the importance of policy settings that facilitate wage earnings growth at all points of the income spectrum (either through growth in wages and/or hours). This will help to reduce reliance on income redistribution for working age households on low incomes. It also emphasises the importance of honing transfer eligibility settings to ensure that they are targeted to recipients in genuine need.

CONCLUSION 1.10

Governments must confront a mismatch between revenue growth and the community's expectations on government services provision. Income growth at all points in the income spectrum is key to fiscal sustainability as it contributes to government revenue and reduces the need for social assistance.

Inequality and productivity

The focus on inequality is not just relevant from the perspective of the sustainability of the transfer system. Following the widespread impacts of the GFC on employment and growth, there has been increasing interest in the interaction between economic inequality, and overall productivity and economic growth. Not only does improved productivity increase the scope for income growth across all household income groups, there is evidence that higher levels of inequality can adversely affect productivity growth (OECD 2011, 2016b; Ostry, Berg and Tsangarides 2014). This is not to suggest primacy of an economic over a social outcome, but simply to recognise that, in many cases, the barriers to realising greater productivity are also those contributing to widening inequalities.

Importantly, the observed rise in wage inequality appears to partly reflect the increasing dispersion in average wages paid across firms, suggesting that raising the productivity of laggard firms could promote improvements in wage equality (OECD 2015). This points to the importance of policy settings that assist individuals, firms, industries and regions to adapt to new technologies and opportunities, as well as preventing them from falling into a position of low-growth and/or disadvantage, which aggravates both inequality and the potential for future productivity growth.

Another channel through which inequality directly effects productivity is that it undermines opportunities for education and human capital development of disadvantaged individuals, lowering their productive potential, and hampering skills development. In this sense, combating any inequality in educational attainment could potentially reverse the supposedly exhausted labour supply gains posited in Cowen (2011).

Appendix A: International productivity data — which measure to use?

There are several sources of productivity data for Australia, including from international datasets. The four analysed in this review are:

- the Australian Bureau of Statistics (ABS) System of National Accounts
- the Organisation for Economic Cooperation & Development (OECD) *Productivity Database*
- The Conference Board (TCB) Total Economy Database (TED), and
- Bergeaud, Cette and Lecat's Long Term Productivity Database (LTPD).

While ABS data are the authoritative source on productivity trends for Australia taken in isolation, it is often useful to compare productivity between countries, including over longer time frames. In such cases, additional data are needed to measure productivity across countries in a consistent and comparable way. The sources listed above each employ different assumptions, which can give rise to different productivity indicators for each country. Key differences include how the measures adjust (or do not adjust) for price levels between countries and how they measure labour and capital inputs. This appendix provides a brief overview of the logic for adjusting for prices, the methodologies of the different sources, as well as some guidance for what measures to use and when.

The need to adjust for prices

To make valid comparisons of productivity across countries, both in terms of productivity levels and their growth rates, nominal estimates of output need to be adjusted for the impact of price movements (inflation) both *within countries across time*, and differences in price levels *between countries*. Differences in prices between countries matter because the quantity of (real) goods and services you can consume with a given unit of currency (for example \$1 USD) is different in different countries. As such, comparisons of productivity between countries are only valid if the measure of output both removes the impact of inflation (changes in the price level within a country), and the difference in purchasing power between the countries (differences between the price levels across countries).

There are a number of ways of correcting for prices between countries. These are often based on market exchange rates or purchasing power parity (PPP) conversions. For international comparisons of *productivity*, PPPs are preferred because market exchange rates tend to fluctuate for reasons other than underlying price movements, such as interest rate differentials, and currency speculation (ONS 2012). Market exchange rates also fail to account for price movements in the non-traded sector, which generally comprises a large proportion of final consumption expenditure for households.

The process of calculating PPPs across countries involves collecting significant volumes of data on the individual prices of products constituting final demand (according to expenditure classes that are comparable across countries), and using them to produce ratios of prices, with which the GDPs and component expenditures being compared are deflated to obtain real expenditures. The process of using PPPs to deflate nominal output of each country therefore provides an estimate of output for which a unit of currency in all countries in the sample has the same purchasing power.

Reflecting the administrative complexity of such a task, calculation of PPPs tend to be conducted at intervals. The joint Eurostat-OECD PPP Programme (OECD 2016a) (for a subset of countries) is one of the main sources of PPP data, which feed into the (global level) World Bank International Comparison Program (World Bank 2014). The most recent ICP round was in 2011, and prior to that 2005. The ICP round is just at one point in time, and by definition, a measure of the growth of productivity across time must measure a change in the ratio of a volume measure of output to a volume measure of inputs over time. In order to do this, TCB use PPPs based on the World Bank-ICP 2011 round, but dynamically adjust them each year using the change in countries' national implicit GDP deflator, relative to the US implicit GDP deflator. This provides a measure of output that can be used to analyse volume estimates both across countries and time, facilitating comparisons of productivity growth rates in addition to levels.

The 2011 ICP round indicates Australia's aggregate price level was about 1.6 times the aggregate price level of the United States (price level index value of 155.9/100). A consequence of PPP adjustment for Australia is therefore that aggregate nominal output values are adjusted downwards when converted into USD. Because this reduces the quantity of output relative to inputs, productivity *level* estimates will be lower than implied by ABS statistics. If, however, the PPP adjustment is constant (or does not change significantly over time), it will have no (or little) effect on growth rates. Differences in implied productivity growth rates therefore tend to reflect other differences in the methodologies employed in different data sources (see next section).

Different productivity data for Australia

A summary of the assumptions and methods of the four main international data sources — those including aggregate level data for Australia — is presented in table 4, and the implied MFP growth rates for each are in figure 18. The methods for measuring output in the four different measures are similar, indicating that any significant difference in productivity *growth* is more an artefact of input measurement. As shown in figure 18, MFP growth rates across the ABS, OECD and LTPD are similar, whereas the TED data imply systematically lower MFP growth rates.

Databases that include aggregate indicators for Australia							
	Output (Y)	Capital (K)	Labour (L)	Sectoral coverage	Periodicity	PPP adjusted?	
Australian Bureau of Statistics (ABS): System of National Accounts	Gross value added (GVA) at basic prices [†] (for the market sector industries), and GDP at market prices [†] (whole of economy)	Detailed industry specific asset breakdown (PIM method, hyperbolic age-efficiency, and a mix of exogenous and endogenous rate of return)	Hours from the ABS Labour Force Survey	Market sector (12 or 16 industry), and whole of economy (19 industry plus ownership of dwellings and net taxes)	Fiscal year (1 July to 30 June)	No, expressed in domestic currency	
Organisation for Economic Cooperation & Development (OECD): Productivity Database	GDP at market prices [†] (whole of economy)	Internationally harmonised 8-way asset breakdown, ICT deflators, age efficiency profiles (exogenous rate of return).	Hours from the OECD National Accounts Database (adjusted from the ABS Labour Force Survey)	Whole of economy (19 industry plus ownership of dwellings and net taxes)	Calendar year (1 January to 31 December)	No, expressed in domestic currency	
The Conference Board (TCB): Total Economy Database	GDP at market prices [†] (whole of economy)	Internationally harmonised 3-way asset breakdown (PIM method, geometric age-efficiency, endogenous rate of return)	Hours are adjusted from the ABS Labour Force Survey	Whole of economy (19 industry plus ownership of dwellings and net taxes)	Calendar year (1 January to 31 December)	Yes, expressed in 2016 US dollars (EKS PPPs based on 2011 World Bank-ICP round)	
Bergeaud, Cette, and Lecat (2016): Long Term Productivity Database	GDP at market prices [†] (whole of economy from OECD). Historical data from Bolt and van Zanden (2013) updating Maddison (2001)	Internationally harmonised 2-way asset breakdown (simple age efficiency and depreciation). Historical data from Mitchell (1998) and Butlin (1977).	Hours are from TCB and the OECD. Historical data from Huberman and Minns (2007) and Clark (1957)	Whole of economy (19 industry plus ownership of dwellings and net taxes)	Calendar year (1 January to 31 December)	Yes, expressed in 2005 US dollars (PPPs based on 2005 Penn World Tables)	

Table 4 Summary of international productivity data sources^a

^a Excludes GGDC data because the EU-KLEMS project is no longer running. [†] Basic prices do not take into account net taxes (taxes less subsidies) on production of goods and services, while market prices include the additional cost attributable to net taxes – that is, market prices are the actual prices people pay for goods and services.

Sources: ABS (2016b), OECD (2017a), The Conference Board (2017), and Bergeaud, Cette, and Lecat (2016).



^a The ABS 'implied' series has been derived from national accounts data on a whole of economy basis for consistency with how the other measures are calculated.

Sources: OECD (2017b) Productivity Database, The Conference Board (2017) Total Economy Database – May 2017, Long Term Productivity Database from Bergeaud, Cette and Lecat (2016), ABS (2016a, 2016d) Estimates of Industry Multifactor Productivity, 2015-16, Cat. no. 5260.0.55.002 ABS *Australian System of National Accounts, 2015-16*, Cat. no. 5204.0, and Productivity Commission estimates.

Conceptually, systematically lower MFP growth rates implied by TCB data are due to methodological assumptions that have the overall effect of raising the rate of input growth relative to output growth. The TCB make a number of assumptions that differ from the other measures. These include explicitly accounting for human capital (or labour quality) in the measurement of hours worked, and different treatment of ICT capital goods (that they depreciate at a faster rate, implying a higher rate of capital services for the ICT capital stock). TCB also directly estimate labour's share of income by assuming the wage rate of the self-employed is equal to that of other employees, meaning the labour (and capital) income shares are different from those measured by the ABS.

What measure to use and when

In international comparisons of productivity performance, dynamically PPP-adjusted measures such as TCB TED are most suitable, given that they facilitate comparisons of productivity levels and growth rates both across countries and through time. As such, the Commission generally presents the TCB TED data in instances where international comparisons are being made, such as the Productivity Update. However, it is useful to bear

in mind TCB's methodology for measuring capital and labour inputs, and the impact this has on implied productivity growth rates relative to ABS measures.

For longer-run analysis, databases such as the LTPD compiled by Bergeaud, Cette and Lecat (2016) are a useful starting point, although the assumptions inevitably needed to enumerate the historical components of data series of that length introduce more uncertainty into the estimates. The authors note, nonetheless, that their results are consistent with other analyses usually produced on one or a limited number of countries, and over shorter periods. Indeed their MFP growth estimates in figure 19 are not dissimilar in trend terms from ABS estimates.

In any domestic-level analysis, ABS statistics are the authoritative source, though again, it is useful to bear in mind the impact of the ABS' principal methodology for estimating capital and labour inputs on productivity statistics. The ABS produces a number of additional experimental productivity estimates that explore the effect of different methodological assumptions.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 2

NON-MARKET SECTOR PRODUCTIVITY 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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Key points

- The productivity of the non-market sector the health care and social services, education and training, and public administration and safety industries is not measured under the existing national accounts framework.
 - Although it is likely that both outputs and inputs to the non-market sector have grown in recent years, the changing ratio between them — their productivity growth — remains unknown.
 - The crux of the problem is the lack of price information for the predominantly government-subsidised services.
- Measuring the productivity of the non-market sector is important, as it can provide an aggregate measure of the extent to which performance in the different industries has been improving and taxpayers have been getting increasing value-for-money.
 - The sector also forms a large and growing part of the economy, increasing the relevance of measuring and monitoring its performance.
 - Its inclusion in the national accounts is also necessary to ensure a complete picture of the Australian economy and to adhere to global standards for national accounts reporting.
- There has been some global progress to develop a methodology for measuring non-market sector productivity through direct output measures.
 - Although the methodology differs between countries, it generally involves directly identifying the output of the different industry sectors, adjusting that output for changes in quality over time and aggregating different outputs into a single weighted index.
- The Australian Bureau of Statistics is currently working towards measuring the output of the health care sector by calculating health output on the basis of diseases-treated, although there are ongoing methodological issues and data limitations.
- However, information on non-market sector productivity in the national accounts may not be detailed enough to provide much guidance for policy purposes.
 - Many of the most important government choices occur at a micro-level, particularly those that lead to better outcomes for people (such as the best teaching methods, diffusion of good practice between service providers, market stewardship and the allocation of funding). More detailed indicators of non-market performance are needed for many of these choices.

Measuring productivity in the non-market sector

1 Productivity and the non-market sector

As part of the terms of reference for this inquiry, the Commission has been asked to analyse Australia's productivity performance in both the 'market' and the 'non-market' sectors. A range of different measures outlining Australia's productivity already exist, with their performance trends examined in chapter 1 of the main report.

However, the most commonly used measure of productivity — the Australian Bureau of Statistics (ABS) estimates of multifactor productivity (MFP) in the national accounts (a statistical summary of the economy and its components) — is confined to a subset of the economy referred to as the *market sector*. This measure of Australia's productivity does not include the performance of the vitally important *non-market sector* — consisting of the health care and social services, public administration and safety, and education and training industries.

Why is non-market productivity not measured?

The main reason for the different treatment of the non-market sector relates to the availability of price data.

In the market sector, the exchange of goods and services takes place at observed, market-determined prices. The observability of prices is important because first, it ensures that the productivity relates to a 'good' that is actually good — that is, people only pay for things they value. In addition, prices solve another problem because they allow aggregation of heterogeneous goods and services into meaningful composites (box 1).

However, the goods and services provided by the health care and social services, public administration and safety, and education and training industries are often free of charge or heavily subsidised due to significant government involvement.¹ Lacking prices in the

¹ In practice, there are elements of the non-market sector that have private sector components (such as private schools), as well as elements of the market sector that are heavily subsidised (for example, public transport). However the three industries comprising the non-market sector are those where the effects of government subsidies are felt most strongly, as many of the observed 'prices' in the non-market sector are still artificially low, making output difficult to measure (ABS, sub. 42, p. 4).

non-market sector, the natural basis for aggregation into composite output measures also disappears, and with it, easily calculable productivity measures.

Box 1 The importance of prices

As an example of why observable market prices are important, consider a factory producing only 100 expensive SUVs and 100 cheap hatchbacks per year, but where prices are unknown.

In trying to meaningfully measure what the factory produces, it would not be correct to simply add up the *number* of cars produced and say that their production is 200 units, as consumers value SUVs and hatchbacks differently. For instance, if the factory decided to focus only on producing 200 SUVs and no hatchbacks, then the number of units produced would remain at 200, even though consumers would value the factory's output more.

Prices solve the problem of trying to aggregate different types of goods and services into a single output measure by providing guidance on the relative value of different products. Thus, if the price of an SUV is three times that of a hatchback, then the factory's output would have increased in value by 50 per cent from swapping to produce only SUVs.

Because of these difficulties, output estimates in the non-market sector have traditionally been based on the total cost of production (that is, the total cost of inputs, also known as an 'output = input' model). By definition, this means measured productivity growth is zero, as output growth is determined directly by growth in inputs (Dunleavy 2016; PC 2016).

There are also challenges in measuring the inputs to the non-market sector, such as adequate quality adjustment for labour inputs, difficulties measuring the actual value of capital services used and accounting and definitional differences that affect data collection. However, none of these difficulties are unique to non-market industries.

A range of other economic activities are also not measured within productivity statistics (box 2). However, for the purposes of this inquiry the discussion of the 'non-market sector' is confined to only those industries defined by the ABS as non-market and where governments set zero or highly regulated prices — namely, the health care and social services, public administration and safety, and education and training industries. Governments also control most of the levers shaping productivity in this sector in their role as purchasers, providers and regulators — making it readily amenable to policy action.

Why does it matter? - the importance of productivity measurement

Despite measurement difficulties, productivity in the non-market sector is important.

First, as many of the inputs to the non-market sector are funded by Australian taxpayers, productivity measures are important to demonstrate that taxpayers are obtaining good value for their money through the greatest possible output (Australian Government 2007; Gruen 2012).

Box 2 Unmeasured, but not unimportant

Within the national accounts, the ownership of dwellings — measured as the housing services provided by dwellings — is another 'industry' that is also excluded from most productivity analysis. This is because the output of this 'industry' resembles the flow of services that is obtained from a durable good, involving no employment and hence no labour productivity.

Outside the national accounts, unpaid home production and volunteering are also not included in productivity measures, as they generally occur beyond the 'production boundary' and are not included in other national accounts measures either (such as GDP and GNI). Within this area (comprising activities such as childcare, community services, meal preparation, gardening, housework, and shopping) labour is unpaid and largely unobserved. For many people, the hours spent in such unpaid activities significantly exceed those spent in market production — this pattern is particularly prominent for women with child-caring responsibilities and people aged over 65 years. For example, a woman in a couple with children spends about 55 hours in unpaid work and just over 20 hours in paid work, on average, each week (Wilkins 2014).

It is difficult to measure the value of unpaid work given the absence of market-determined wages, but the evidence suggests that unpaid work is a profoundly important source of economic activity. In 2014, the ABS estimated that the market value of unpaid work, including time spent volunteering, was equivalent to between 40 to 60 per cent of GDP in 2006, depending on the method of estimation (ABS 2014).

The measurement of the productivity of unpaid work is even more challenging than obtaining approximate indicators of its value. Nevertheless, there is compelling evidence — both direct and indirect — that labour productivity has improved in many unpaid activities over the past century, due to the spread of labour-saving household appliances such as dishwashers and washing machines. However, the gains (at least in the United States) seem largely confined to the period preceding the 1980s.

While the contribution of home production activities to the economy has been historically undervalued in economic statistics, the growing trend of households outsourcing these activities to the market sector as female workforce participation increased has brought some of them into measures of the observed economy (most notably the increase in formal childcare).

In addition to home production, some new types of products can also be difficult to measure — most notably the provision of free digital services, such as social media sites or web search functions — as well as activities that are uncounted because of their illegal nature (for example, illicit drug production and the cash economy).

Sources: ABS (2000, 2014, 2016b), Baxter (2002), Bridgman (2016), Wilkins (2014).

Second, measures of productivity and other performance metrics can be used to help identify the drivers of efficiency and the subsequent policy levers that can systematically improve outcomes for users of any given resources. This information can be used to improve outcomes for the consumers of government services, such as improved medical interventions, teaching in schools or fire services (box 3). While governments will undoubtedly increase funding for critical services like health as the population ages, obtaining better outcomes for a given amount of resources the adverse effects of any rationing of funding.
Box 3 Fire and rescue service productivity

Fire and rescue services across Australia — part of the public administration and safety industry — deliver rapid and reliable help in fire and accident emergencies, as well as protecting the population from hazardous materials, providing community education facilities and investigating and researching the causes of fires.

These outputs have genuine value to the community, but fire and rescue services generally do not charge a price for their services, commonly providing them free of charge with funding sourced indirectly, such as from state or local governments or from mandatory insurance or property levies. As the value of much of this funding (that is, their inputs) is currently used as a measure of their output (under the 'output = input' model), it is difficult to determine if the services provided are value for money or if they can be improved.

As an example, consider two similar fire stations, one of which decides to invest in a new fire truck to improve response times, while the other invests the same amount of money in additional specialised training for its firefighters.

Unless information was collected about outputs (such as response times or injury rates) and outcomes (such as measures of fire security in the community or of property, environmental and personal losses from fires), it is difficult to assess the additional benefit — if any — from the taxpayer-funded investments in each station. Observers would only know that the new fire truck and the additional training increased the inputs of the fire stations, but not whether their fire and rescue capabilities actually improved.

Furthermore, if other fire stations were interested in knowing which investment (new fire trucks or additional training) had a greater effect on improving fire and rescue services for the community, there would be no way to objectively determine this without productivity statistics.

Sources: ABS (2013), SCRGSP (2016).

Third, the non-market sector is also a driver of productivity for other parts of the economy. For example, education increases people's skills (human capital), improving their subsequent job prospects, productivity and wages in the market sector.

Finally, the non-market sector is both large and growing, and so the resource costs of low productivity are very large. The non-market industries form a vital part of the economy, contributing over \$280 billion to industry production in 2015-16, making up 20.3 per cent of total production.² This is up from 17.2 per cent of total industry production in 1990 (figure 1), with the recent strong growth projected to continue. This is particularly true for the health care and social services sector, due to Australia's ageing population and increased demand for health services as Australians get wealthier. These drivers will continue to increase the relative size of the non-market sector over the coming decades (ABS 2016a; Australian Government 2015).

² Measured by industry gross value added (GVA) at current prices, including 6.4 per cent for public administration and safety, 5.8 per cent for education and training and 8.1 per cent for health care and social services, based on shares of current price total industry GVA, excluding ownership of dwellings.



^a Measured by chain volumes. ^b Measured in current value terms.
Sources: ABS 2016, Australian System of National Accounts, 2015-16, Cat. no. 5204.0, October (table 5);
ABS 2016, Australian Demographic Statistics, Jun 2016, Cat. no. 3101.0, December (table 1).

2 Inputs and outputs have been rising

A starting point for any investigation of non-market sector productivity is to examine trends in output and input measures — it is changes in the *ratio* between them that determines productivity growth.

Labour inputs

Employment within the non-market sector has risen since the early 1990s, increasing from approximately 1.7 million people (21 per cent of total employment) in 1990 to over 3.2 million (27 per cent of total employment) in 2016. Growth in employment was strongest in the health care and social services sector, which more than doubled its workforce over the past 25 years (figure 2). Average hours worked per employed person in the non-market sector fell, a trend in common with the broader economy. The best overall measure of labour inputs — total hours worked — shows much the same pattern as employment numbers (ABS 2016d).



Source: ABS 2017, Labour Force, Detailed, Quarterly, Cat. no. 6291.0.55.003, May (tables 6, 11).

Capital inputs

As with employment, capital inputs have been rising in the non-market sector, evidenced by strong growth in gross fixed capital expenditure and growing net capital stocks (figure 3), the latter of which more than doubled from 1990-91 to $2015-16.^3$

Industry-level output trends

Australia has experienced uninterrupted population growth and increases in economic prosperity over the past 25 years. These factors alone have increased the total demand for non-market services, as more people, with more money to spend, have demanded more health care, education and public administration services. In addition, an ageing population has further increased demand for health care and social services. Decreased growth in demand for education and training — as there are proportionally fewer school-age children

³ In the market sector, the ABS measures capital inputs as the weighted average of chain volume measures of the productive capital stock of different asset types, using rental prices for weights. In figure 3, the capital stocks are the ABS's measure of the total capital stock for each sector (which, absent measures of rental prices for the non-market sector is the only data that allows comparisons between sectors).

— provided only a small offset to this broader trend, in part because of considerable growth in the tertiary education sector (Australian Government 2015).



^a Measured by chain volumes.

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Source: ABS 2016, Australian System of National Accounts, 2015-16, Cat. no. 5204.0, October (table 58).
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There have also been major technological improvements and cumulative increases in knowledge over this period, which should have increased the value of the non-market sector's output. Although evidence of increased quality in the education and public administration sectors is difficult to identify, the quality of health care provision has advanced immensely in recent decades.

Health care and social services outputs

In health care and social services, the quantity of outputs across a wide range of industry activities has grown rapidly over recent years:

- The number of procedures undertaken in hospitals has increased from nearly 11 million in 2000-01 to over 20 million in 2014-15 (AIHW 2017a).
- Emergency department presentations at public hospitals rose from 5.7 million per year in 2008-09 to 7.4 million in 2014-15 (AIHW 2013, 2015).
- Individual services accessed under the Medicare Benefits Scheme (such as GP or specialist consultations) rose from 147 million in 1990-91 to 384 million in 2015-16,

with the proportion of the population accessing such services also increasing from 85.9 per cent to 89.3 per cent (DoH 2016a).

- Total Pharmaceutical Benefits Scheme (PBS) prescription volumes increased from 155 million in 2001-02 to 208 million in 2015-16 (DoH 2003, 2016b).
- The number of permanent clients in residential aged care facilities rose to 235 000 in 2015-16, up from 137 000 in 1994-95 (SCRGSP 1997, 2017).
- The total number of ambulance incidents has increased to over 3.4 million in 2015-16, up from about 2.5 million in 2005-06 (SCRGSP 2016, 2017).

Quality in the health care sector, with its myriad array of medical advances over past decades, has increased rapidly as well. The improved quality of care provided to patients is suggested by measures of life expectancy at birth, which between 1990 and 2013 rose by 5.8 years for males and 3.9 years for females (AIHW 2017b).⁴ While this significant increase is also a result of factors other than the contribution of the health care sector (including a cleaner environment and reduced smoking rates), improvements in the quality of medical care are nevertheless an important contributor (Atkinson 2005; Schreyer 2008).

Other select indicators of improvements in the quality of health care services include decreased age-standardised mortality rates (from 604 per 100 000 people in 2007 to 545 in 2014), reduced rates of perinatal deaths within 4 weeks of birth (from 9.9 per 1000 births in 2004 to 7.9 in 2015) and a decline in the proportion of patients waiting more than 365 days for elective surgery (from 4.6 per cent in 2005-06 to 1.8 per cent in 2014-15, although median wait times remain largely unchanged) (SCRGSP 2016, 2017).

The magnitude of the improvements in health care quality over recent decades is perhaps best illustrated by an anecdote from former US Treasury Secretary Larry Summers (2015), who asked an audience whether they would rather have 2015 health care at 2015 prices, or 1980 health care at 1980 prices. After the majority of the audience chooses the 2015 option, he concludes that, although difficult to measure, health care productivity has thus probably increased over the period, through rapidly rising quality and better outcomes.

Education and training outputs

In the education sector, there are also indications that output quantity has increased, with the total number of full-time equivalent students in primary and secondary schools rising from 3.3 million in 2001 to 3.8 million in 2016 (ABS 2017). Student numbers in universities have also increased to over one million equivalent full-time student loads (EFTSL) in 2015, up from approximately 650 000 in 2003 (DET 2005, 2016).

Changes in the *outcomes* and *quality* of education provided in Australia are more difficult to observe, as adequate indicators are harder to find. Student test results that are designed

⁴ Life expectancy at birth was 80.1 years for males and 84.3 years for females in 2013.

to be comparable across time, such as the OECD's Programme for International Student Assessment (PISA) — which tests 15 year-olds around the world on mathematics, science and reading — show continued decline on average educational outcomes, with average student results dropping from 530 points in 2000 to 502 in 2015. This decline has not occurred to the same extent in most other OECD countries (OECD 2016; Thomson, De Bortoli and Underwood 2016).

By contrast, results from the annual National Assessment Program – Literacy and Numeracy (NAPLAN) examinations, which tests students in years 3, 5, 7 and 9 on their reading, writing, spelling, grammar/punctuation and numeracy skills, are mixed. Students in year 3 have shown consistent improvement across all topics since testing began in 2008. However, there have been no substantive changes in average literacy results for other grades, although their numeracy test results have improved marginally (ACARA 2016).

Public administration and safety outputs

In significant parts of the public administration and safety industry (which covers a wide range of community and government provided services) measures of total output quantity have fallen. This is particularly prevalent in the emergency services, where improved prevention has generally resulted in fewer emergencies. For example, fewer fire emergencies has meant that the total number of non-bushfire incidents attended by fire service organisations has fallen from 63 068 in 2005-06 to 55 754 in 2014-15. Although this represents a decrease in *direct* output from fire and rescue services, fewer emergencies is undoubtedly a good outcome for the community, with the number of fire deaths each year falling from 188 in 1985 to 97 in 2015. Similarly, improved road safety has resulted in fewer road crash extrications by fire and rescue services — down from 9940 in 2005-06 to 7668 in 2015-16 — while community outcomes have improved through a substantially lower number of road traffic deaths — falling from 3001 in 1986 to 1257 in 2015 (SCRGSP 2016, 2017).

For the policing and justice systems, outputs can often be difficult to measure, and of those that can be measured, the story is quite mixed. For instance, while the number of legal defendants whose cases were finalised by the court system remained largely stagnant between 2010-11 and 2014-15, the total number of prisoners in Australia's prison system increased markedly over the past decade, from nearly 26 000 in 2006 to almost 39 000 in 2016 (ABS 2016c, 2016e).

Community perceptions of the quality of policing services provided in Australia are also mixed. In the National Survey of Community Satisfaction with Policing, the proportion of people who were very satisfied with the services provided by the police increased from 20.6 per cent in 2010-11 to 28.9 per cent in 2015-16, while the proportion who felt unsafe at home alone during the night fell from 5.8 per cent in 2010-11 to 4.8 per cent in 2015-16. However, over the period from 2009-10 to 2015-16, the proportion of people who felt safe in public places during the night fell — from 59.8 per cent to 51.7 per cent when walking alone and from 29.5 per cent to 24.3 per cent on public transport (SCRGSP 2017).

3 The workaround: using direct output measures

Given the importance of the non-market sector, considerable work has been undertaken on a number of levels, both internationally and within Australia, to attempt to overcome the difficulties of measuring the output of the non-market sector.

Generally, the favoured approach has been the 'direct' method — where the volume of different (heterogeneous) goods and services are counted and aggregated, with weights based on their relative prices. This method is distinguished from the 'indirect' method used for market sector estimates in the national accounts — where the total nominal revenue (the market value, a combination of price and volume) of the industry's output is known for each year and changes in prices over time are removed, leaving only volume measures.

Progress in developing output measures in the non-market sector has been slow. The need to address measurement problems was recognised almost 25 years ago and there have been a number of attempts to make progress, internationally and by individual countries, on the issue:

- In 1993, the United Nations supported by the Commission of the European Communities, the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD) and the World Bank adopted a new System of National Accounts (SNA), which recommended that countries move away from the 'output = input' methodology where possible, and instead seek to directly measure the output of the non-market sector (UN 1993).
- In 2001, the European Commission developed a detailed handbook on price and volume measures in national accounts, with a special emphasis on direct measures of the outputs of services (including non-market services) (Eurostat 2001).
- In 2005, an independent review in the United Kingdom (the Atkinson Review) examined the measurement of government inputs and outputs and recommended that the scope of collected data be expanded and more analysis be done to determine government sector productivity (Atkinson 2005).
- In 2010, the OECD published a handbook to provide guidance for the measurement of health and education services across jurisdictions (Schreyer 2010).

The methodology of direct output measures

Despite recent progress, the direct measurement of non-market sector outputs faces several challenges before it can be used to estimate MFP growth alongside measures for market sector goods in the national accounts.

Identifying an output

The use of direct measures of output is only possible where the government-provided services in the non-market sector have an identifiable output. Atkinson (2005) Lee (2008) differentiate non-market services between:

- individual services that are rivalrous (consumption by one consumer prevents consumption by others) and excludable (it is possible to prevent people having access to it) with an identifiable output; and
- collective services that are non-rivalrous and non-excludable, are delivered simultaneously to many consumers and that generally do not have an identifiable output.

Although the distinction between the two service types is not always clear, an example of an individual service could include a doctor's appointment, where the provider can refuse to provide the service (excludable) and provision to one consumer at a given time prevents provision to another (rivalrous). By contrast, the peculiar aspect of collective services (such as national defence or government policy-making) is that all people consume the same amount of these services.

The key issue is the value each person places on this consumption. Not only is measuring this difficult in its own right, but measures of the total value of a good are not equivalent to the price determined in a market for a good (most people pay less for a good than the value they place on it — otherwise they would not buy it).

Most research efforts to develop a direct output measure have focused on the health care and education sectors, as these sectors more often provide individual services, and so are more easily measured and tallied. Comparisons of providers of individual services also offer significantly more scope to identify a range of meaningful performance indicators for each provider — such as the productivity of hospital theatres for given surgical procedures. This information can be used in a myriad of ways to gauge value for money and effectiveness of parts of the non-market sector and improve outcomes and cost-effectiveness (SP 3).

Conversely, there has only been limited analysis of the public administration and safety industry, in part because providers tend to supply monopolistic collective services. However, some aspects of the public administration and safety industry may be measurable — for example, Dunleavy (2016) suggests that the output of tax or welfare agencies could be measured by the number of products (different taxes or benefits) provided to or received from each client. In practice though, output in the industry generally continues to be measured by the 'output = input' method instead, which Diewert (2011) describes as an acceptable indicator of output where a lack of information makes other methods impossible or impractical.

The type of direct measures of non-market sector output needed depends on the particular industry and the nature of the goods and services it provides. For example, in the health

care industry, Lee (2008) identifies the best unit of output as the 'health care pathway', which is all of the parts of treatment provided to a person with a specific diagnosis. Where this is difficult to determine due to disparate information sources, individual health care activities provided during that pathway can be used instead.

For the education sector, by contrast, Lee (2008) suggests that the ideal measure of output quantity across the entire sector is the number of pupil-hours or full-time equivalent students (although this fails to capture any element of quality — see below).

Aggregating outputs across industries

A major challenge is to aggregate the disparate services provided by an entire industry into a single, meaningful output index. For example, consider the difficulty of combining together the very different types of output provided by hospitals and aged care facilities, in order to create a single index for the output of the health care and social services industry.

In the market sector, different outputs can largely be expressed in monetary terms with market prices reflecting their relative importance to consumers, and so forming the 'weights' by which outputs are aggregated. This is not possible in the non-market sector due to the lack of prices as an indicator of value. Instead, output measures are generally weighted using one of two methods: based on the relative costs of inputs — relying on competitive market conditions (where marginal cost equals marginal value) within the government-dominated industries — or using price-weights from the private sector provision of similar non-market services — assuming that there are comparable private providers and the quality of private and public provision is the same (Douglas 2006).

Incorporating changing service quality

The measurement of non-market sector output is further complicated by changes in the nature of the goods and services produced over time. From a productivity point of view, any improved *quality* of services provided by the non-market sector could be as equally desirable as any increased *quantity* of services delivered. That is, consumers value the improved nature of goods and services, not just having more of them, so quality change should be captured by indicators of output value. For example, although more surgeries (increased output *quantity*) for a given level of inputs would be a productivity improvement for a hospital, the output value of those surgeries is also improved when they have a higher survival rate or reduced recovery times (improved output *quality*).

The issue of quality adjustment in productivity measures is also a problem for the *market* sector as changes to the nature of products that are difficult to reflect in output indexes occur across the entire economy. However, the issue is arguably more acute for the non-market sector, as it generally produces services rather than goods (so the nature of their output is inherently less observable) and there are no prices that have already incorporated quality changes (Dunleavy 2016; Schreyer 2008).

To account for ongoing quality improvements in direct measures of non-market sector output, the volume measures can be adjusted for quality in several different ways. Methods include:

- capturing part of the quality change by differentiating as many qualities of a product as possible. This results in products of different quality being treated as entirely separate products, such that a shift to the higher quality product versions can be observed.
- taking into consideration the effect of the service on the marginal outcome of the consumer, particularly with relation to its degree of 'success' (Atkinson 2005; Eurostat 2001; Schreyer 2010).

Quality adjustment for health care

For the health care sector, one suggested measurable unit of service is the 'quality-adjusted numbers of completed treatments of particular diseases or of activities to prevent a disease' (Schreyer 2010). Another suggestion incorporates a range of quality adjustment indicators for the 'health care pathway' output measure, including:

- differentiation between different activities (such as division into specific diagnosis related groups for hospital care)
- post-treatment health status and survival rates
- process quality indicators (for example, vaccination take-up rates or at-risk patient monitoring in primary care)
- patient experience indicators (for example, timing and convenience of appointments or cleanliness of hospitals) (Lee 2008).

Implementing such measures still faces considerable information challenges and there is an ongoing debate about the most practical way to measure health care services: by the volume of health care activities (such as the number of hospital procedures or GP visits) or the volume of 'health care pathways' provided (such as the number of cancer or cardiac arrest patients treated). This latter approach is also known as the 'diseases-managed' approach, and has a range of advantages and disadvantages, discussed in box 4.

Box 4 Diseases-managed vs. activities-provided methods

The major difference between the activities-provided and diseases-managed methods of directly measuring non-market output is in the way that substitution between different types of treatment for the same disease affects the estimates of productivity. Under the activities-provided model, moving a patient out of high-cost treatment methods (such as in-patient hospital facilities) and onto low-cost methods (such as drug treatments administered by a GP) would generally not be recognised as a productivity gain, only as a change in the demand for each service. By contrast, under the diseases-managed approach, moving from a high-cost to a low-cost treatment method is a substantial productivity gain, as the cost of the treatment is reduced, while the patient presumably receives a similar or better level of service.

For similar reasons, the diseases-managed methodology can better account for the changing utilisation of treatments (the number of activities during an episode of care). As an example Aizcorbe (2013) discusses a reduction in the number of procedures needed to treat an ear infection. Under the activities-provided method, this would count as reduced output, whereas the diseases-managed methodology would treat it as reduced cost of a single output.

An additional difference between the methodologies is that the activities-provided method does not use any information about the particular disease being treated, although the extent to which a particular health care service is productive depends on the condition being treated. Aizcorbe, Retus and Smith (2008) cite the example of an additional night in hospital for a patient who has had a routine appendectomy; that extra night would generally be more beneficial for a patient who has had quadruple bypass surgery, as their risk of post-surgery complications is greater.

Another area where the diseases-managed methodology and the activities-provided methodology also differ is the management of service costs where the patient suffers from more than one illness (such co-morbidities are relatively common and can be particularly prevalent among the elderly). The activities-provided methodology is not affected by this issue. By contrast, the diseases-managed method has to assign co-morbidity spending to disease categories by relying on a 'primary' diagnosis, which can create varying and subjective outcomes. An example used by Aizcorbe, Retus and Smith (2008) is the difficulty of allocating the cost of a GP visit among different disease categories for a diabetic who also suffers from heart disease.

A related difficulty of the diseases-managed approach is that it is heavily reliant on adequate data sources to allocate spending and identify diseases across patients. This is simpler in the US health care system (where private insurance companies track insured patients closely) than in Australia, where services can be provided through a range of different private and public systems, with only limited communication between them. However, the continued rollout of the My Health Record system across Australia will help to remedy this issue (chapter 2 of the main report).

Sources: Aizcorbe (2013), Aizcorbe, Retus and Smith (2008), Dunn, Rittmueller and Whitmire (2015).

Quality adjustment for education

Similar to health care, quality in the education sector can be accounted for through differentiation, such as by accounting for different types or levels of schooling (that is, differentiating between primary, secondary and tertiary level students) (Lee 2008).

However, adequate measures of the 'success' of education and training output are problematic. Intuitively available indicators, such as improved exam scores or smaller class sizes, are often uncorrelated with actual education quality, unless other factors can be controlled for (ABS 2001).

Test scores in particular are subject to a range of factors well beyond the control of teachers (such as innate ability, effort and parental influence). Further, many exams — such as tertiary entrance exams — are not intended for comparison across time, only across a given cohort, as the content of an exam changes from year to year meaning that changes in average performance may simply be a result of an easier or harder exam that year.

Similarly, by themselves, smaller class sizes are an inadequate quality measure because their benefits depend on the age and disadvantage of the child, the teaching methods used by teachers, and the subject matter — as discussed in the meta-analysis of Whitehurst and Chingos (2011) and Zyngier (2014). For example, even if the benefits are weak or nonexistent for the 'average' student, there is reasonable evidence that smaller classes for disadvantaged children in the first four years of school produce good outcomes when supported by pedagogies that make use of smaller class sizes. Accordingly, evidence of positive, negative or no impacts of class size for students on average is uninformative about policy-relevant effects for some sub-groups. In effect, there are multiple markets for which school sizes have relevant impacts.⁵

4 From theory into practice: existing non-market sector estimates

Progress in Australia

The ABS has undertaken substantial work on measuring the non-market sector's productivity over recent years. This is part of a long-term goal to further develop the national accounts and create a more reflective and robust measure of the economy. The development of productivity estimates began in the wake of the 1993 SNA, leading to the publication of experimental MFP estimates for each of the 12 market sector industries in 2005. These MFP estimates are now published alongside the other national accounts data and since 2010 have been expanded to include four additional industries — rental, hiring and real estate services, professional, scientific and technical services, administrative and support services, and other services — following the introduction of the new industry classifications in ANZSIC 2006 (ABS 2007, 2010, 2016b; Zheng 2005).

⁵ Whether or not it is worth investing in smaller classes, even in the context in which they have some beneficial outcomes, is another matter, and depends on whether better outcomes could be achieved through alternatives. It is important to distinguish between the measurement of quality improvements in productivity analysis and the policy question of whether such quality improvements should be sought.

Direct non-market output estimates

For the non-market sector, the ABS started collecting and aggregating direct volume measures of output for health and education in 2001 (with a time series back to 1993-94). Although these direct volume measures are unpublished and not used as a direct output measure for any productivity analysis (due to their lack of adjustment for quality changes), they are used to determine growth in volume for the health and education industries, helping to refine the 'input = output' methodology.

The direct output measures of health care come from a range of sources to cover the entire health care portion of the health care and social services industry (but there are no output measures for the social services portion, which remains input-based). These (unpublished) measures include:

- an average-cost-weighted index of the number of episodes (separations) for **hospitals**, classified by over 660 different Australian National Diagnostic Related Groups, but not including outpatient episodes provided by hospitals (due to data limitations)
- a cost-weighted index of the number of patient-days categorised by level of care is used for **nursing homes**
- a fee-weighted index of the numbers of attendances for **GPs and medical specialists** (for example, in obstetrics, anaesthetics, diagnostic imaging and surgical operations)
- a fee-weighted index of the number of tests conducted is used for **pathologists**
- administrative data deflated by relevant price indexes are used for **dental**, **optometry**, **community health**, **paramedical**, **veterinary and ambulance services**.

Output estimates for education reflect the different aspects of the education sector. Estimates are mainly based on annual full-time equivalent student enrolments, weighted together by the cost of service provision, while university research is estimated by weighting together data for the number of publications and student research completions. Due to data limitations, output measures for pre-schools and 'other' education services are still derived using the traditional input-based methodology.

The effect of using direct output measures compared with input-based methods was a sizable change in the growth of measured output for the industries (figure 4). While the gross value added of the health care and social services industry had grown by an average of 1.6 per cent per annum between 1993-94 and 1999–2000 under the input-based method, this was revised to a much higher growth rate of 4.0 per cent after the changes in output measurement. Similarly, the growth rate of gross value added in the education sector between 1993-94 and 1999–2000 increased modestly with the new methodology, from 1.5 per cent to 1.9 per cent per annum (ABS 2001; Douglas 2006).



Source: ABS 2001, Australian National Accounts: National Income, Expenditure and Product, March 2001, Cat. no. 5206.0.

The ABS separately investigated output volume measures for the justice sector, including police, justice services, and corrective centres, and constructed a range of experimental indexes. Output of justice services was measured by the number of cases finalised, broken down by court level and jurisdiction. Corrective centre output was measured by the number of prisoner days in various kinds of detention programmes. The output measure of police services was based on estimates of the number of investigations completed. However, because of significant difficulties with obtaining adequate data, particularly for police services, the paper concluded that input-based measures should remain for the justice sector, pending improved data sources (Northwood et al. 2001).

In an attempt to measure the output of the public administration and safety industry, the ABS also produced unpublished estimates of volume output measures for the Australian Taxation Office (ATO) and Centrelink in 2003. The new measures were based on the individual services that each organisation delivered to governments, businesses and the community. For example, the services of the ATO included minutes and briefings for government and the registration and processing of business and individual tax claims. Similarly, the outputs of Centrelink were the processing of customer's claims for welfare benefits and providing ongoing services to benefit recipients. While the initial results were reportedly promising, the data sources were underdeveloped and required a longer period of examination before they could be published (Trewin 2004).

Reinvigorated efforts to develop direct non-market measures

More recently, the ABS has been engaged in renewed efforts to deliver improved output measures across the non-market sector. In particular, the ABS plans to develop output estimates for the health care sub-industry, before moving onto the education industry and then the social services sub-industry.⁶

For the health care sub-industry, the ABS is currently working towards a measure of health output calculated on the basis of completed courses of treatment (the diseases-managed approach), rather than the current practice of summing up the number of procedures administered (an activities-provided approach). This approach includes identifying potential data sources (such as state administrative health data), allocating health care expenditure between diseases, constructing price indexes and determining output estimates by disease. The stated aim of these output measures is to facilitate the development of productivity statistics alongside the national accounts, in order to 'assist policymakers to better understand the nature of increases in health expenditure in terms of quantity growth or pure price growth ... [and] support more effective targeting of government resources for Australia's health industry.' (ABS, sub. 42, pp. 10–11)

Much of the ABS's recent work was motivated by continued international developments, as well as a 2010 House of Representatives Standing Committee on Economics report into raising productivity growth in Australia. This report recommended that the ABS investigate ways to develop better service sector MFP estimates, including for the non-market sector (Standing Committee on Economics 2010).

International estimates

Several other jurisdictions have made considerable progress in the past few years towards publishing estimates on non-market sector productivity, using a variety of different methods.

United Kingdom

Following the release of the Atkinson Review in 2005, the United Kingdom has made substantial progress towards developing direct measures of output for the non-market sector. The Office of National Statistics (ONS) has published experimental estimates of public sector productivity alongside the UK national accounts data, with 90 per cent of the health care industry and 75 per cent of education now covered by a range of direct, quality-adjusted output measures. Basic quantity output measures are also estimated for public order and safety, adult social care, social security administration, 40 per cent of

⁶ The ABS has 'no current plans' to develop public administration and safety industry output estimates in the near future, due to the inherently difficult nature of that industry (ABS, sub. 42, p. 10-11).

children's social care and the remainder of the education sector, but these measures are not adjusted for quality (ONS 2017a, 2017b).

Initial results from the UK analysis show mixed productivity improvements. Average annual health care productivity growth (using the mostly quality-adjusted measures) was 0.9 per cent each year between 1997 and 2014, while for education there was no net productivity gain over the same period because inputs and outputs grew in lockstep (ONS 2017a). Productivity growth for the entire public sector (when measured by direct quality-adjusted output) was close to zero over the period from 1997 to 2013 (figure 5).



New Zealand

Following developmental work over the previous decade, in 2013, Statistics NZ published initial estimates of productivity for the education and health care industries using select direct measures of output, such as the number of cost-weighted equivalent full-time students (EFTS) for education output. These estimates indicated that productivity in the education industry fell by about 1.5 per cent annually between 1996 and 2011, while growing at an average annual rate of 0.8 per cent in the health care industry. Although the direct output measures used by Statistics NZ were largely unadjusted for quality and may not have been relevant to some activities, the experimental estimates form a foundation for further development (Statistics NZ 2010, 2013).

United States

The United States has also been moving towards new measures of non-market sector productivity, with a particular focus on the US health care industry, estimated to be worth 17.4 per cent of US GDP in 2013. In 2015 the Bureau of Economic Analysis (BEA), in collaboration with the National Academy of Sciences and the Bureau of Labour Statistics, launched a 'health care satellite account' (HCSA) to test new methods for analysing health care statistics before adding them to the core national accounts. The BEA's methodology uses the diseases-managed approach to measure the output of the health care system on the basis of how many diseases are treated (Dunn, Rittmueller and Whitmire 2015; Washington, Jackson and Wasshausen 2015).

5 The direction and applications of future work

Productivity estimates in the national accounts are good to know ...

Historically, the national accounts have been used to summarise economic events and analyse an economy's wealth and component factors to provide useful information for the formulation of macroeconomic policy (ABS 2016b). Improvements in measures of outputs and productivity for the non-market sector would (imperfectly) plug a gap in the national accounts and help to provide a better understanding of the Australian economy and how it functions. Better measures would also provide a 'rough and ready' indicator that the sector's performance was improving. Conversely, sustained low growth in productivity might reflect sluggish technological progress and weak diffusion of best-practice — which would warrant close policy attention (as has occurred for the MFP slowdown in the market sector).

Australia also needs to catch up to progress made elsewhere, particularly in the United Kingdom and New Zealand, in order to adhere to international standards for best-practice national accounting.

... but not vital to improve outcomes

While creating MFP estimates as part of the national accounts is important for understanding the state of the economy and to identify trends that should be further investigated, such measures have limitations. Besides the methodological flaws discussed above, more critically, MFP estimates for each of the non-market sectors in the national accounts have very limited policy applications. In particular, they would likely be too broad to provide decision-makers with the insights they need to improve outcomes for consumers and taxpayers. As a result, such estimates would not be able to drive productivity improvements, as they do not provide enough detail to identify the specific areas that need to be improved within each industry. More granular indicators of productivity and other performance metrics (for example, outcome effectiveness, value-for-money, marginal effects of more or fewer resources) are much better suited to identify specific areas that need to be improved in the non-market sector (SP 3).

This distinction between measuring productivity for national accounts purposes and measuring it for the purpose of improving performance and service delivery outcomes was acknowledged in the OECD's 2010 handbook on measuring non-market sector productivity (Schreyer 2010). Similarly, in the United Kingdom, Atkinson (2005) recognized that no single number, however carefully constructed, can fully capture the performance of complex public services with multiple objectives, so it is not only necessary to estimate a single aggregated figure for each of the non-market sector industries, but also to measure outputs in sufficient detail to determine the outcomes from individual decisions and policy changes.

Further, the two goals — productivity measurement at the macro-level through the national accounts and at a more micro-level through performance metrics — are not necessarily mutually exclusive. A proliferation of high quality data and research relating to the inputs, outputs and productivity of individual non-market service providers can lead to greatly improved measures of sector-wide productivity in the national accounts, as the more detailed picture of micro-level performance can help to inform an industry-wide estimate.

CONCLUSION 2.1

Development of better measures of the output and productivity of the non-market sector at the national accounts level would improve the understanding of the state of the economy and help identify any troubling trends in performance that would warrant further investigation. However, more granular indicators of productivity and performance in specific parts of the non-market sector are needed to inform policy choices.

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SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 3

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Key points

- Although many government-funded service providers report their performance against internally-established benchmarks, the use of provider-level comparative performance reporting as a tool to inform and better incentivise performance is in its relative infancy.
- Comparisons between like providers can enhance competition, help consumers make more informed choices and, by identifying better performers, help providers to recognise best-practice methods and aid governments in dealing with poor performance.
- There has been some effort to develop comparative performance platforms in major service delivery areas, for example, the *My Hospitals* and *My School* websites. Experience here and overseas suggests the following lessons:
 - while the jurisdiction that collects the performance data depends on the role of different levels of government in different sectors, having a single national authority publish the data enhances accessibility and discoverability.
 - more granular data (down to specific facilities or individual professionals) is better, but only where performance can be reasonably attributed to that level.
 - the potential benefits of performance data are difficult to know ex ante, so should be made public by default, with other arrangements (including 'trusted-user' provisions or private feedback) where there are strong privacy or confidentiality concerns.
 - as the client base for services varies greatly between providers, risk-adjustment (or value-added) treatment of performance data is needed for valid comparisons.
 - to measure performance comprehensively, it is necessary to include qualitative factors among the reported indicators (not just quantitative factors), such as self-appraised consumer outcomes.
 - the fewest possible easily-understood performance indicators would have the most value, but care is needed to ensure indicators actually relate to government objectives and that they do not distort provider behaviour.
 - publishing provider prices (costs) alongside other performance indicators would also add value where prices are opaque and can differ substantially within the sector.
 - utilising data from existing sources (such as administrative data) helps to reduce costs, although new data sources (such as improved consumer surveys) may be needed where there are clear and important gaps in information.
 - while performance-based financial incentives (such as performance pay for teachers, activity-based funding for hospitals or social impact bonds) can be used, they have had mixed results in the past, generally depending on their context and design.

Comparative performance indicators

1 Measuring provider-level performance for government-funded services

Historically, much of the analysis of Australia's productivity performance has been focused on macroeconomic measures of productivity, reported as part of the national accounts. These accounts help to provide a summary of economic events and a stocktake of an economy's production and wealth (and the component factors). They are important for understanding the economy before formulating macroeconomic policy — including, for example, the Reserve Bank's interest rate decisions or broad fiscal policy settings.

However, in some areas of the economy, productivity is difficult to measure. In particular, multi-factor productivity (MFP) estimates are not available for industries in the 'non-market' sector — health care and social assistance, education and training and public administration and safety. Government provision, consumer subsidies and sometime mandated consumption (as in school education) mean that there are no market determined prices and quantities for most of the services in these industries. This means there is a computational barrier to estimating MFP in these industries and hence across the whole economy (see SP 2).

To ensure the national accounts provide a more complete picture of how the entire economy is performing (not just part of the economy), the Australian Bureau of Statistics (ABS) is currently developing measures of non-market MFP for the national accounts. This work is beyond the timeline for this inquiry, but will help to provide a more accurate productivity performance, picture of Australia's and guidance on how government-dominated industries are performing over time and whether taxpayers are getting improved value for their money. More importantly for government, these macro-level measures of an industry's productivity can act as a 'canary in a cage', detecting manifest failures in the performance of government services.

However, such aggregate data are not very useful for consumers, providers, funders or policymakers concerned about individual services. The information they seek on performance requires more granular data on the costs, outputs and outcomes of individual providers and the systems they operate in. More specifically, additional granular data on the nature of resources used by firms (inputs), their rates of change, the resulting goods and services produced (outputs) and their value to consumers (outcomes) can provide a basis for:

• improving information to support consumer choice and provide feedback to providers

- reviewing and assessing government programs
- designing government policy
- managing government contracts and external service providers
- identifying influences on productivity, which along with performance data feed into improving policy and program design.

The value of disaggregated, provider-level productivity analysis has already been widely recognised for industries outside the non-market sector, with a range of recent international studies using firm level data to provide distributional analyses of firm productivity in the market economy (see Andrews, Criscuolo and Gal 2015; Conway 2016; McGowan, Andrews and Millot 2017). Although none of this work has yet been widely replicated in Australia,¹ the analysis has nonetheless provided useful insights on market dynamics in other economies, including the characteristics of the most and least productive firms and the level of competition within industries.

Information on provider-level productivity in the non-market sector would allow similar insights about the drivers of firm-level productivity in the sector. Importantly, it would also enhance government accountability and transparency, as most of the non-market sector is funded (at least in part) by taxpayers, and its outputs (the services to be delivered, and the price, quality and/or quantity of those services) are substantially regulated by governments. That is, the public has a right to know details of where their money is going, whether it is achieving meaningful results, and if they are getting the best possible value (DoF 2016).

This principle applies not only to services that are directly provided or (effectively) guaranteed by government (such as public hospitals, emergency services, public transport, and water and sewerage services). It also applies to services that are delivered and funded *indirectly* by governments, such as through the use of grants, subsidies or contracts to private sector organisations — examples include subsidised private education and health care, contracted employment services, and grants for creative and performing arts activities. Although none of these services are conducted directly by government, they are still funded by taxpayers. Some of these taxpayer-funded services are also in the market sector, rather than non-market sector. As such, indicators of government-funded performance are important for both the market and non-market sectors.

In addition, detailed information on the productivity of different service providers can help guide the development of productivity-enhancing reforms. Many of the most effective policy levers available to governments are microeconomic, relying on an understanding of the structure and dynamics of markets (such as regulations, individual tax and transfer policies and specific government programs) (Atkinson 2005; Schreyer 2010). As such, more detailed indicators of performance can help to identify patterns in underperformance

¹ The ABS and the Department of Industry, Innovation and Science have developed a firm level database (BLADE) that will allow such analysis to be undertaken in the future (see chapter 5 in the main report).

and high performance, providing insights for policies that encourage the latter and discourage the former.

Taxpayers and policy makers are also interested in performance metrics beyond strict estimates of productivity, so they can better assess whether governments are achieving their broader policy goals. In part, this reflects the difficulty in capturing improvements in service quality in the measured productivity of government-sponsored activity (given the absence of or small role played by price signals). To form a more complete picture of government performance, productivity indicators should be considered alongside other measures, such as whether quality, equity and access standards have been met, consumer perceptions of quality, and financial indicators.

Absolute and comparative performance indicators

Many indicators of the performance of government-funded service providers are already collected and reported on a regular basis — primarily to improve their accountability and transparency. Much of that performance reporting focuses on changes over time in a particular entity's performance and the degree to which they meet internally-established goals. For instance, at the Commonwealth level, the *Public Governance, Performance and Accountability Act 2013* aims to improve the line of sight between what was intended and what was delivered by Commonwealth government-owned entities, requiring Annual Performance Statements from each entity in their annual reports (DoF 2016). The States and Territories generally operate similar systems. For example, Western Australia requires each agency to report annually against a range of Key Performance Indicators (KPIs) under their Outcome Based Management system (WA DTF 2004).

Similar levels of reporting are often also required from contracted private providers of government-funded services. For example, Transport for NSW (TfNSW) publishes a Guideline for Construction Contractor Performance Reporting to 'enhance contractor performance via a continuous improvement process and recognition of good performance' (TfNSW 2014).

While such reporting frameworks are valuable in assessing some aspects of an entity's *absolute* performance, they do not provide consumers or taxpayers with any measure of its performance relative to its peers. For example, consider the different management imperatives that would be triggered by information indicating that a hospital's unplanned readmission rates had been improving (suggesting a good outcome), and information that demonstrated that its readmission rate was still more than twice as high as other comparable hospitals (an indicator that performance needs further improvement).

The value of performance comparisons

The analysis of comparative measures of performance between providers of government-funded services plays an important role in informing and incentivising

performance. Beyond the benefits of better policy development and enhanced taxpayer accountability and transparency, comparative performance measures can help to overcome a lack of adequate market information, which in turn drives improved outcomes for consumers.

Improving outcomes for consumers

By encouraging individual choice ...

The publication of comparative performance indicators for government-funded services allows individual consumers to make better-informed choices between services and service providers if they choose (and are able) to exercise choice. In turn, this creates competitive pressures on suppliers to improve their services, to the potential advantage of all consumers (Berwick, James and Coye 2003).

In the health care area², there are, however, some subtleties in linking the availability of (high quality) performance indicators, choice and outcomes:

- The evidence that public divulgence of performance metrics *per se* makes a significant difference is relatively weak. In the United States, provision of high quality information to consumers has been identified as a strong determinant in the choice of high quality-rated health plans (Faber et al. 2009). However, a review of the few rigorous trials of the outcomes from public divulgence of performance data did not find substantial effects (Ketelaar et al. 2011).
- The existence of better performance indicators and a capacity to choose does not necessarily result in many people deciding to exercise that choice. In the case of health care, there is some evidence that proximity is a major basis for choice, and that published information has secondary impacts over advice from their GP or friends and family (Barratt 2011). Nevertheless, the international evidence suggests that patients strongly support the option of choice, and appear more likely to exercise it when it is likely to affect the outcomes of care (Dixon et al. 2010). For example, people tend to shift away from what they perceive as a poor local hospital for elective surgery. There is some evidence that people exercising choice have had better outcomes, at least in waiting times (Jones and Mays 2009; Ringard and Hagen 2011; Ringard, Saunes and Sagan 2016; Vrangbaek et al. 2007).
- There should be no presumption that choice only relates to the selection of a provider. Performance indicators that measure the efficacy and impacts of different treatment choices are also important, and some believe far more so than the choice of practitioner (Coulter 2010).

² Of the three industries in the non-market sector, considerably more research and experience on performance indicators has been accumulated in health care than in education or public administration. As such, much of this paper is reliant on insights from the health care industry.

- Patients need sufficient health literacy (as noted in chapter 2 of the main report), and it can take time for people's behaviour to change.
- If supply constraints are high, then suppliers face lower risks from a failure to improve as patients may be unable to find alternative suppliers with spare capacity.
- Health practitioners' behaviours and assumptions about patient capabilities can encourage or thwart choice (Harding et al. 2014).
- Weak governance arrangements that bail out underperforming providers or that fail to discipline senior decision-makers reduce the potential impacts of information provision and choice on improving consumer outcomes.

... revealing comparative performance issues ...

Although comparative performance indicators can improve competitive incentives, there are limits to how much competition can be introduced into many areas of government-funded services. This is especially true in areas where there are artificial or natural barriers to consumer choices. For example, choice between government schools can be hindered by artificial regulations restricting students to the school district they reside in, as well as natural barriers (such as poor transport links) between districts. There are also limits on competition where there are government-run monopolies that do not have to compete.

In cases where competition between providers is impractical, it is still possible to use comparative information to create pressures similar to those that might exist in a competitive environment. More specifically, relative performance indicators can make providers more accountable to the communities they operate in and give them incentives to improve (AIHW 2017; Berwick, James and Coye 2003). In addition:

- Funders and regulators already use benchmarking to determine efficient prices for services in utilities and in hospitals (under activity-based funding).
- Poorly performing entities may be forced to remove their CEOs or boards.
- There may be circumstances where there is sequential competition *for* a regional market (such as through an infrequent tender for monopoly provision of services in a given area), which still provides scope for benchmarking against other regions to determine value for money in service tenders and, hence, whether an entity should be allowed to extend its temporary monopoly over government-funded services.

Indicators can also reveal to providers areas of poor performance, which may have been previously unknown. Many of the professions that dominate government-funded services — including nurses, doctors, teachers, police officers, magistrates, firefighters and policy advisers — are characterised by high levels of altruism and considerable regard for community service, so publication of comparative information may provide, in some cases, a sufficient prompt and pointers toward improvement. Of course, the incentives for and

extent of actual improvement may be affected by other constraints on change, whether these are resource, time, political or regulatory constraints.

... assisting the diffusion of best-practice services ...

In the market economy, the diffusion mechanism generally occurs organically, as firms on or near the frontier of productivity attract more resources and expand, while lagging firms are forced to improve, lest they shrink or exit.³ However, the diffusion of best-practice service delivery in areas where governments fund or provide services is often more problematic. This reflects the lack of price signals and that governments often cannot close or reduce the size of a poorly performing entity because they must guarantee supply. The lack of any market-based diffusion mechanism therefore has to be addressed through policies that encourage — and allow — service providers to continually improve consumer outcomes.

Transparent provision of performance indicators that identify leaders and laggards on a like-for-like basis can assist the diffusion of best-practice service delivery. Absent transparent indicators *and* incentives to act, large-scale inefficiencies can persist (AIHW 2017). Decision-makers can also use indicators to estimate the net gains from lifting the performance of laggards, which can prioritise the areas of reform.

Comparative indicators are only one component of creating performance disciplines and diffusion. Equally important is the diagnosis of *why* some entities perform much worse or better than others — because that information is the basis for providing specific advice on what must be diffused to lift performance. Handwashing in hospitals to manage avoidable infections is an exemplar (OECD 2017). Another well-known example is the use of surgical safety checklists to avoid adverse outcomes (such as 'Wrong-Site Surgery') (Bergs et al. 2014; Haugen et al. 2015; Lyons and Popejoy 2014; Panesar et al. 2009). Yet adoption across hospitals in Australia and other countries of checklists has been variable (Ragusa et al. 2016; Rajendram 2016; Swan 2015), suggesting that its effective diffusion should be a target for policy. Although it may not be ideal to force this through mere administrative fiat, in National Health Service (NHS) hospitals in the United Kingdom, uptake was improved by administrators refusing to allow surgery teams to take a patient to a recovery room after surgery unless the full World Health Organisation (WHO) Safe Surgery Checklist had been completed.

The 'checklist' example highlights why information about comparative performance is a necessary, but not sufficient, basis for achieving diffusion. This is apparent in widespread (and persistent) deviations from best practice in the health care industry (box 1).

³ Although there are indications that the market sector diffusion mechanism may have weakened in many OECD countries — see Andrews, Criscuolo and Gal (2015) and Conway (2016).

... and providing a basis for the selective use of financial incentives

Performance indicators are a prerequisite to using financial incentives to improve provider performance — and indeed the development of indicators is often motivated by this function. Financial incentives can either involve payments (or provider retention of financial savings) if a provider achieves a higher level of performance or involve the withdrawal of funding or the imposition of penalties if the provider deviates too far from some acceptable benchmark. Although there are concerns about the adequacy of some performance metrics and the environment in which they are used (see discussion in section 4 below), a necessary precursor to establishing any financial incentives is to create informative performance metrics.

Box 1 Evidence of diffusion problems in health care

A broad array of research provides evidence that the adoption of best-practice methods in the health care sector is less extensive than it could be:

- Runciman et al. (2012) found that 43 per cent of a sample of Australian adults had received inappropriate care in their recent health care encounters, according to evidence-based and consensus-based guidelines.
- The Australian Commission on Safety and Quality in Health Care's 2015 *Atlas of Healthcare Variation* showed dramatic unexplained variations in procedures and prescribing, and the use of procedures for which there is no favourable clinical evidence (ACSQHC 2015).
- A 2007 study by the Commonwealth Fund found that 15 per cent of Australians reported undergoing unnecessary repeat imaging (Russell and Doggett 2015).
- Western Australian researchers found that 23 of 47 medicines commonly dispensed to over 100 000 different pregnant women from 2002 to 2005 were associated with some form of birth defect (Colvin et al. 2010).
- The former National Institute of Clinical Studies (2003, 2005) identified gaps between evidence and practice in areas such as advising on smoking cessation, screening for lung cancer, and vaccinating against influenza.
- In 2013-14, about 30 per cent of people presenting to general practitioners in Australia for acute upper respiratory tract infection the 'common cold' were prescribed antibiotics, even though antibiotics are ineffective for treating viral infections (SCRGSP 2015).
- Paracetamol is commonly recommended and prescribed for back pain in Australia. However, a recent randomised trial of paracetamol for the treatment of acute lower back pain found no benefit versus a placebo (Carpenter et al. 2014).
- Approximately 6.5 per cent of separations in public hospitals in 2012-13 were associated with 'adverse events' — where patients are harmed during hospitalisation — in part due to poor practice methods, including injuries from falls, adverse drug effects and surgical errors (SCRGSP 2015).

Sources: PC (2013, 2015).

Social impact bonds are an example where the development of performance measures — at the outcome level — is essential. These bonds aim to attract finance to fund human services on the bases that the bond holder receives a bonus if the service achieves a

specified set of outcomes. The aim is to create incentives for the service provider to deliver real improvements over an agreed baseline, with the bondholders providing oversight of performance. Several social impact bonds have been undertaken in Australia in recent years, including a bond to tackle homelessness in South Australia, one focusing on drug and alcohol treatment programs in Victoria, and one to reduce recidivism in New South Wales.

The structure of social impact bonds requires agreement on the outcome measures — the baseline and the expected improvement required to trigger the returns. As measurement is central to the success of such bonds, efforts have gone into developing reliable and accepted measurement frameworks (see for example, Deloitte Access Economics 2016). However, such outcome measurement can also become excessive, with concerns recently that the reporting and measurement requirements of some social impact bonds are preventing take-up and hindering their benefits (Edmiston and Nicholls 2017).

Overcoming information gaps

In conventional (reasonably competitive) markets, prices often convey quality. However, such price signals are typically not present for many government-funded services as they are either provided free of charge or heavily subsidised. Equally, there is no equivalent in most government services of 'warranties', which, in the commercial sphere provide signals about the qualities of services.

This creates a greater imperative for information provision to consumers that provides them with some understanding of the variation in the quality of providers/services. Consumers can express their satisfaction or dissatisfaction with services formally (such as through complaint lines) and informally (such as through online forums), but these may not be representative of all users' views or provide clear or very useful information. Provision of meaningful information that genuinely gives consumers some agency is non-trivial. This reflects that many governments services have effects that take years to surface (for example, there is considerable uncertainty about future earnings and employment prospects from different types of education) or involve complex technical matters (for instance, in making choices between various clinical procedures).⁴ As such, well-curated comparative information is needed, although, as discussed below, governments need not always themselves provide the curation service.

Examples of existing performance reporting

The Productivity Commission undertakes annual comparative performance reporting of many government services — on behalf of the Steering Committee for the Review of Government Service Provision (SCRGSP) — through the Report on Government Services (ROGS). These

⁴ Moreover, people often need sufficient technical capability ('literacy') in a given service area to make use of much of the information provided. For example, as discussed in chapter 2 of the main report, most Australians have poor health literacy, so may struggle with some measures of health care performance.

reports include performance indicators for services funded by the Commonwealth, States and Territories (such as emergency management, health, justice, community services, education and housing and homelessness) and measure their equity, effectiveness and efficiency across different states and territories (SCRGSP 2017).

Commonwealth, State and Territory governments have also progressed a range of different platforms for reporting and comparing the performance of different government-funded service providers (box 2).

Box 2 Existing performance reporting platforms

- My Hospitals The My Hospitals website, currently managed by the Australian Institute of Health and Welfare (AIHW), was established in 2010 to ensure easy access to nationally consistent and comparable performance information for individual public and private hospitals. Examples of the types of performance indicators that are currently published for hospitals on the My Hospitals website include emergency department waiting times, the number of admissions by type, surgery length of stay and waiting time by different surgery types, the number of healthcare-associated Staphylococcus aureus infections, and expenditure per National Weighted Activity Unit (a common unit of hospital activity that accounts for differences in the complexity of conditions or procedures) (AIHW 2016c).
- **My School** Launched in January 2010, the *My School* website contains performance data and other information on approximately 9500 public and private schools and is managed by the Australian Curriculum Assessment and Reporting Authority (ACARA). School-level information available on the site includes the type of school, student and staff numbers, student attendance rates, results from national literacy and numeracy tests, student demographic profiles, and school-level financial information (ACARA 2016; DET 2016a).
- Quality Indicators for Learning and Teaching (QILT) The QILT website, maintained by the Social Research Centre and funded by the Commonwealth Government, provides prospective tertiary education students with information about Australian higher education institutions through the use of survey data from recent students and graduates. This includes surveys on student experiences (engagement, support, teaching quality, skills development), graduate employment (employment rates and median salaries) and graduate satisfaction, with surveys of employer satisfaction currently being trialled (DET 2015; SRC 2016).
- **My Healthy Communities** Launched in 2013 and managed by the AIHW, the *My Healthy Communities* website compares a variety of health indicators between geographic areas around the country. Depending on the level of geographical detail chosen (from Primary Health Networks, to Medicare Local areas, Level 3 Statistical Areas (SA3) or individual postcodes), local data are available on life expectancy at birth, immunisation rates, GP attendance rates, the proportion of bulk-billed GP attendances, primary health expenditure per person and survey results of GP treatment quality (AIHW 2016b).
- My Child The My Child website, run by the Commonwealth Government, can be used to find local child care service providers and shows information on their fees, available services, vacancies and quality — including educational practices, children's health and safety, the physical environment, staffing arrangements and more, as determined by the Australian Children's Education and Care Quality Authority and the National Quality Standard (Australian Government 2015; DET 2016b).
- *Know Your Council* The Victorian Government established the *Know Your Council* website to improve the transparency and accountability of council performance to ratepayers through the regular reporting of 66 measures of service performance, including on animal management, waste collection, financial performance, library services and many others. Users can benchmark and compare each of Victoria's 79 local councils to councils that are similar in size and scope (Local Government Victoria 2015).
Although the considerable progress that has been made on many of these 'My Service' type sites is promising, most of them remain incomplete, with new data sources, performance indicators and providers still planned to be added by their managing organisations, as well as ongoing enhancements to the user interface.

The existing comparator sites are also not comprehensive in their reach across government-funded services, with significant gaps in public administration (particularly in the justice and emergency services sectors), primary health care and local government (outside Victoria).⁵

2 A basis for developing comparative performance indicators

The old computer adage 'garbage in, garbage out' equally applies to comparative performance data. Useful performance measures have seven characteristics: they should be relevant, valid, reliable, accurate, interpretable, accessible and cost-effectively collectable and storable. An exhaustive treatment of all of these aspects is beyond the scope of this paper, but there are several important general observations worth making, particularly in light of the ongoing development of comparative indicators in Australia.

Comparisons work best across the widest possible sample

Since a provider's performance is relative, the most valuable performance indicators would cover the widest possible sample of comparable providers. This means comparative performance indicators should ideally seek to cover all comparable service providers across the widest catchment practicable (such as all public and private hospitals in Australia, as in the case of the *My Hospitals* website). This facilitates benchmarking and ensures that all consumers will have access to data that are relevant to their choice set.

There are several models that can support a national evidence base for government services, which will vary according to the context:

- collaborative models between jurisdictions or entities that use common definitions, consent provisions, methodologies and collection methods to assemble a national database
- a single body most likely a Commonwealth agency that collects the data (from the jurisdictions or directly) and builds it into an accessible database.

The desirable holder and disseminator of the data will also vary, depending on the form and nature of the use of the data. In many instances, comparative performance information

⁵ See SP 16 on local government administration.

is built up from micro information that should not be publicly available in an identified form. For example, data on comparative school performance needs to take account of the characteristics of students, since much of the variation in performance across schools reflects factors outside the school's control (PC 2016b). Such information — combined with other information about schools (their teaching methods, links to the community, teacher quality, and facilities) — can inform 'what works' to improve school performance, which is one of the key goals of gathering comparative information. Such micro data cannot be available publicly because of the need to protect privacy, but should be available to any research institution that has the capabilities to protect the data (see below).

There is a distinction between a database that contains all the comparative information and the platform that disseminates information to *consumers*. In the latter case, it would be usually desirable for Australian governments to agree to have only one point of access by consumers to comparative data (hence *My Hospitals*, not eight jurisdictionally-based portals for access to data on hospitals). This reduces confusion between the various portals and eliminates the costs of duplication.

The availability of a single government platform for informing consumers does not mean that national data should be reported only through that vehicle. Indeed, it would be desirable that other parties — for example, a consumer advocacy group — could add value to the data from such a platform, through analysis, data augmentation, interpretative tools and more accessible interfaces.

National comparisons (for benchmarking purposes) are less likely to be useful where there are substantive differences between jurisdictions that make comparisons difficult — one such example is local council performance reporting, as councils perform different tasks in different states. In these instances, where differences cannot be overcome, duplicated reporting frameworks between jurisdictions (with individual databases and access portals for each state or territory) are generally justified.

The level of performance granularity

The benefits of performance measurement for government-funded service providers vary depending on how a 'provider' is defined and, more particularly, how close the defined provider is to the unit or entity actually delivering the service. Comparisons can occur at the level of entire states and territories down to individual professionals providing government-funded services (box 3) — their value will depend on how closely reported results can be attributed to those deemed 'providers'.

More granularity is better, until it isn't

For many government services, more detailed data provide a better idea of how performance varies between different providers. Reporting data at higher levels can mask considerable performance differences between providers. For example, while secondary schools in Queensland may perform at a similar level to other states *on average*, this may be hiding considerable differences between the comparatively wealthy Brisbane and Gold Coast communities and the remote areas of Far North Queensland. Even within the Brisbane area, there are likely significant differences between the performance of individual schools, while individuals teachers at a given school can also vary greatly in their comparative performance.

Box 3 Different levels of performance reporting

State and territory level reporting — One way to compare performance is at the level of entire states and territories — comparing, for example, the overall performance of Victoria's correctional facilities with those of South Australia. This is the approach taken in the Productivity Commission's Reports on Government Services. At this level, the provider of the services is taken to be the entire state or territory, which is most useful when there are monopoly or largely undifferentiated oligopoly providers and the actions of these providers can reasonably be viewed as those of the jurisdiction's as a whole — such as some public transport and utility service providers.

Local level reporting — Some jurisdiction-wide services report indicators by local geographic area. As an example, this already occurs for much of the health care sector on the *My Healthy Communities* website, which compares performance data between local areas (from Primary Health Networks down to individual postcodes). This level of performance granularity is most appropriate where there are monopoly providers for specific areas, such as individual police precincts or Centrelink offices.

Facility level reporting — Reporting at the level of individual facilities, organisations or firms — depending on what is appropriate for the relevant sector — can provide a further detailed picture of how government-funded services are performing. Existing examples include the *My School* and *My Hospitals* websites. Facility-level reporting can extend to particular teams or units working within a particular facility, where that team's work is sufficiently separate from others.

Individual level reporting — The most granular picture of performance possible defines a 'provider' as the individuals providing government-funded services (such as specific surgeons, GPs or teachers), rather than the facilities or institutions they work for. Public performance reporting at such a detailed level does not currently occur in Australia, but has existed for many years in some fields in the United Kingdom and United States, including to assess individual surgeon performance (PC 2016a).

Higher-level performance reporting can thus lead to distorted or dulled incentives, as good providers may know that the national- or state-level statistics do not apply to them, while bad providers know that their performance is camouflaged and not identifiable (Dunleavy 2016).

Although this would imply that individual level performance reporting is the ideal goal of comparative performance reporting, different reporting levels have different uses. As such, higher-level performance reporting is not mutually exclusive with lower-level reporting — there is often space for reporting at a variety of different levels through a range of different mechanisms. Higher-level monitoring (such as the annual ROGS reports compiled by the

Commission) can still hold governments and service providers to account, as well as improve transparency in performance.

In addition, higher-level indicators (such as comparisons between states and territories) have generally also been a first step towards more detailed future comparisons. For instance, the ROGS reports have been around for 22 years (although it took many years to achieve widespread recognition of their inherent value, given concerns and misgivings about how the data could be misused), whereas the *My School* and *My Hospitals* websites were not launched until 2010. Higher-level performance reporting can be particularly valuable through encouraging better and more timely data collection from different jurisdictions and service providers, prior to lower levels of granularity being developed.

Indeed, no Australian performance data are currently reported at the individual level (such as by individual surgeons, GPs or teachers). This is due in part to the significant challenges involved, including the cost of the additional data collection, the technical difficulties of ensuring comparisons are valid (discussed below) and concerns about the privacy of the individuals (also discussed below).

Individual-level performance indicators are also not practical for many professions, particularly where the outputs and outcomes of the individual are highly dependent on the performance of a team (fire and rescue workers being an obvious example). In these circumstances, performance measurement at the team level may therefore be more appropriate — as argued by RACS (2016) — although the existence of *any* team-related work should not be used as an excuse to avoid *all* individual reporting.

It is also sometimes claimed that public reporting at the individual professional level is unreliable due to typically small caseloads and the variations in the characteristics of customers. For instance, a recent New Zealand Government review concluded that the typical caseload of medical specialists is too small to have enough statistical power to identify poorer performers (HQSCNZ 2016). Some professional associations accordingly object to the publication of such data (RACS 2015). Clinician comparison websites, such as *Physician Compare* in the United States, has been met with considerable concern by physicians (Lowes 2015).

However, data at the clinician level may be more reliable for some areas of health — such as cardiologists or GPs — where the casemix is less variable. This is especially true where the data are combined over several years. Nor does the data necessarily need to relate to mortality or complications, but can also apply to the practices of physicians — such as their use of evidence-based diagnostics, like screening for osteoporosis for women aged 65 years and older (CMS 2016).

Warts and all? — reporting publicly

Unless there are strong counter-arguments, the default for disclosure of performance data should be full public transparency. When combined with consumer capabilities,

transparency allows informed choice. Regardless, sunlight has a cleaning effect because most parties do not want to be publicly exposed as poor performers.

If full public reporting is not possible, then other reporting should still take place

Where full public disclosure is not feasible for all data, this should not preclude its availability to some parties. Other parts of government, trusted third-party researchers and intermediaries often have a capacity to analyse the data, link it to other available information, experiment with it and discover new and valuable relationships between outcomes — all at little cost to government. Limits on access thus undermine any potential improvements to the diffusion of best-practice service delivery. In the health care sector for example, this can mean that patients receive ineffective (or even harmful) care, adverse effects of drugs go undetected, or significant money is spent on interventions that do not improve health outcomes (PC 2010a, 2015).

Where sensitive data are provided to third parties, there are a series of now well-known methods for ensuring that access is not abused, since trust is an important aspect of making data available. De-identification, perturbation of data, secured data storage, agreements about the scope of use, secure server access and 'trusted user' arrangements are all part of the repertoire of methods (PC 2017).

The power of private feedback

The incentives for improvement created by public disclosure could also be partially achieved if service providers or facilities were simply told of their own comparative performance, without public disclosure — for example, allowing an individual police station to know how its performance compared with that of similar stations over several time periods. Similarly, in health care, information provided to a clinician that indicated that they had the highest rate of post-operative complications among their peers allows the clinician to assess whether this reflected chance, the riskiness of their client base, or deficiencies in their practices. Many suppliers — as organisations or individuals — want to improve because of a strong belief in the public good goals of their activities or through a competitive spirit (both of these being cited as factors affecting the behaviour of clinicians in some of the Commission's consultations).

Similarly, intermediaries (particularly funders) have strong interests in using individual performance metrics to improve consumer outcomes because these often also reduce costs.

Limited disclosure before full public disclosure can also be employed to ensure that new measures provide meaningful performance measures, as well as winning support from the entities or individuals concerned.

Measuring performance comprehensively

Similar to the quality-adjustment issues that exist for measures of productivity in the national accounts (see SP 2), there are many aspects of a provider's services that affect their performance, some of which are more difficult to measure and quantify. In particular, fuzzier notions of the *quality* of services provided can often not lend themselves to easy measurement. For example, in the education sector, although the nature of what makes a particular teacher 'better' can be difficult to identify, most people would recognise that it involves more than maximisation of test results, but also the development of students' broader analytical capabilities, non-cognitive skills and a positive ethos of learning (PC 2016b).

Given the difficulties of measuring these more intangible aspects, some comparative performance indicators may simply not include aspects of service quality, or may use imperfect proxies that are quantifiable instead. Where quality is not measured or proxy measures are poorly chosen, a focus on a narrow range of quantifiable indicators can create a risk that some providers will neglect unreported aspects of care or try to 'game' the metrics that are reported.

More broadly, some measures of performance can also mask considerable variation between providers — for example, the use of quality indicators based only on whether a provider is meeting required service standards does not allow for differentiating between providers who excel and those who only just achieve the standard.

To mitigate these issues, governments creating and administering platforms for indicators of comparative performance should also incorporate consumer views of service quality into the performance measures (including through surveys or feedback mechanisms that account for consumer experiences with individual service providers). There is hostility to consumer feedback in some settings — exemplified by the mixed views about the value of student evaluations of teacher performance.⁶ However, opposition in some quarters should not imply that consumer feedback mechanisms are wrong-headed. Context matters in many studies (is it a school or a university, how many students filled in the survey and over what period, what is the nature of student assessment questionnaire, what is the goal of the assessment, what is the subject?). More might need to be done to refine and interpret the tools in their various settings, but the notion that feedback from students has no value should not be accepted uncritically. The same applies to the feedback from the customers of other government services. Similarly, contextual information from service providers on significant extraordinary factors that have skewed performance is also important for interpretation.

⁶ The literature on student evaluations ranges from negative (Stroebe 2016; Uttl, White and Gonzalez 2017), to positive (Benton and Ryalls 2016; Hativa 2014; Marsh and Roche 1997), with many in between, depending on context and settings (Kelly 2012; Kornell and Hausman 2016; Ottoboni, Boring and Stark 2016; Spooren, Brockx and Mortelmans 2013; Stark and Freishtat 2014).

Valid comparisons — risk-adjusted and value-added measures

Comparisons between providers also need to be valid. For example, students in selective schools perform on average better than non-selective schools, which might suggest that high-ability students should move to selective schools. However, the empirical evidence suggests that high-ability students actually perform worse than they would have, had they not moved (Marsh and Hau 2003). The key problem is selection bias — schools perform differently, but much of it is due to the different traits of their students, which are outside the control of the school. A similar concern applies to the interpretation of the differences in outcomes for, say the crude exam scores of a wealthy, private metropolitan school with a remote school in a disadvantaged region — the two facilities have large disparities in their available resources and the inherent characteristics of their students and families.

One partial remedy is to adjust performance indicators to remove the key factors that affect performance, but that are outside the control of any given provider. These 'risk-adjusted' measures aim to control the part of the different outcomes explained by the underlying risk characteristics of the client group (for example, people receiving treatment for disease Y who also have disease X, compared with those with disease Y and no co-morbidity). In essence, risk-adjustment measures the effectiveness of any provider in achieving an outcome after controlling for the different characteristics of the population.

While mostly used in contexts outside health care — particularly in schooling — the concept of 'value-added' adjustment is very similar, but with adjustments for expected outcomes and growth over time. In particular, value-added analysis focuses on the value that a provider has given to consumers, over and above what would be expected given their backgrounds and prior circumstances. For schooling, value-added outcomes are most commonly measured through the equivalent years of education achieved each school year — thus students who achieve more than one year's worth of learning in a given year are likely being taught well, even if their overall test scores are comparably worse (Kim and Lalancette 2013; PC 2016b).

Risk-adjusted or value-added measures are intended to simulate the outcome of randomised-control trials, assessing the impacts of any given service provider (school, hospital, physician and so on) as if customers were randomly assigned to them. Without proper risk-adjustment in published performance data, providers may have perverse incentives to 'cherry-pick' the easiest customers in order to influence their results. For example, surgeons may choose to avoid treating more complex cases (Fung et al. 2008; PC 2015; Totten et al. 2012). Examples of how risk-adjustment occurs on the *My Hospitals* and *My School* websites are in box 4.

However, such adjustment is imperfect for many reasons. First, some of the factors that affect performance are not easily observable. Second, a 'like with like' comparison only relates to average performance outcomes, whereas many customers want to know how a particular service will perform for them. For instance, the fact that school A produces better outcomes on average than school B after controlling for the influences of the characteristics of the students, does not answer the question relevant to a parent: 'How well

will *my* child do at this school rather than that one?' Sophisticated performance measures would take into account the nature of the customer, producing bespoke comparisons. It may be that the application of data analytics will ultimately head in this direction, but such an approach is still a way off for those services where it is most likely to apply (such as education or career advice). In the meantime, imperfect risk adjustment, appropriately interpreted, is probably the best that can be done.

Box 4 Risk-adjustment in practice

For schools, some risk-adjustment already occurs on the *My School* website through the use of the index of community socio-educational advantage (ICSEA). The index, developed by Australian Curriculum, Assessment and Reporting Authority (ACARA), accounts for characteristics such as the geographic location of the school, and the occupations and education of students' parents. The average value of ICSEA scores is set at 1000, with lower scores denoting greater disadvantage. Test results on the *My School* website are then typically compared with the group of 60 schools that have the closest ICSEA values.

For hospitals, the New South Wales Bureau of Health Information (BHI) has developed a 30-day Risk-Standardised Mortality Ratio (RSMR) indicator to highlight outlier hospitals in the state. The measure calculates a ratio of expected deaths (based on condition specific indicators, including gender, age and co-morbidities) to the deaths that were actually observed in the 30-days following hospital admission for selected conditions (including acute myocardial infarction, ischaemic stroke, haemorrhagic stroke, pneumonia, and hip fracture surgery).

In health care more broadly, a hospital's performance can also be adjusted for differences in the mix of patients treated (including their demographics, procedure type, length of stay and other factors, known as the 'casemix') in order for results to be comparable across providers and across time. As a basic example of this adjustment, the Australian Institute of Health and Welfare (AIHW) publishes rates of cancer incidence and mortality that are age-standardised over time (rather than just crude rates) to reflect Australia's ageing population and that cancer incidence and mortality strongly depend on age.

Sources: ACARA (2015); AIHW (2016a); NSW BHI (2013).

Measure things that matter for people

Outcomes often lie on a continuum. Hip replacements provide an illustration. Reporting only the complete restoration of mobility following a hip replacement would conceal many other outcomes that people regard as worthwhile, such as improved mobility or the ability to undertake an especially valued activity (such as walking upstairs). Although the ability to deliver complete restoration of mobility may be correlated with other good outcomes, such a relationship is not perfect and likely overlooks many partial, yet beneficial, outcomes. In addition, other measures of the impact of service delivery (such as haemoglobin A1C in the case of a diabetes patient) might not correspond to a person's assessment of their own health status, but both are equally relevant for their ongoing treatment (Chen 2016, p. 17).

Accordingly, performance measures should take account of people's own appraisals of the impacts associated with service delivery, including their experiences of that delivery. The concept is most advanced in health care, where Patient-Reported Outcome Measures (PROMs) and Patient-Reported Experience Measures (PREMs) are now commonplace, including in England, the Netherlands and Sweden (Williams et al. 2016). PROMS ask patients for their assessment of how interventions have affected their quality of life, capacity to undertake activities, symptoms of pain, distress levels, and other aspect of their health (for which there already well-developed instruments, such as WHODAS 2.0). PREMS relate to people's perceptions of their health care — such as waiting times, involvement in decision-making, the quality of communication, and the support they receive to manage a long-term condition (Verma 2015).

Not only can PREMs and PROMs serve to provide better information on performance, but they can also involve the patient as a more active participant in their own health care. However, Australia has largely not adopted PREMs or PROMs. This is likely to change, as the NSW and Victorian Governments are currently running pilot programs to collect this data (see SP 5).

The balance between too many and too few indicators

There can often also be a balance between reporting too many indicators and reporting too few. Providing consumers and users with too many indicators can greatly increase compliance costs for providers and potentially make it difficult for consumers to determine (on balance) which provider is better or worse across an array of different performance measures.

On the other hand, however, limiting performance reporting to only one or two indicators for a given sector can be problematic if the measured areas do not provide an adequate sense of performance. This can also create incentives for service providers to focus unduly on those aspects of service delivery where performance is measured, resulting in perverse and unintended outcomes. For instance, hospitals may discharge patients too early to free up hospital beds as a way to improve performance against narrow waiting-time criteria, while neglecting the effect this has on patient outcomes (Dunleavy 2016; PC 2015).

Ideally, well-designed performance measures would be few enough in number to be comprehensible to consumers, but also broad enough to cover every important aspect of performance. Ongoing consultation with the providers and the trial and testing of new data variables can be useful in discovering the key factors relevant to judgements about performance.

Make prices as well as performance indicators visible

Providing performance metrics to consumers so they can exercise informed choice loses some of its potency if consumers are ex ante unaware of the magnitude of any payments they may need to make when choosing between the various service providers. This reflects that, like all goods and services, people have trade-offs between prices and quality. To put it simply, a consumer choosing between a '5 star' provider and a '4 star' provider based on some performance metric would not necessarily choose the former if their cost was several times that of the latter. For instance, in the United Kingdom, the National Institute for Health and Care Experience provides advice on treatment options covered by the NHS, based on incremental cost effectiveness ratios (which are quality-adjusted life years obtained from a treatment — a performance metric — *per dollar*) and not just on QALYs alone.

For some government-funded services, pricing uncertainty for consumers is minimal or unlikely to present many problems:

- parents make co-contributions to private schools, but the prices are clearly posted
- where a person goes to a GP who does not bulk bill, patients may not know the fee charged beforehand. However, as GP services are usually repeat services, prices for standard consultations (the most common service) are revealed over time. In most Australian locations, competition in general practice is also relatively strong (as suggested by high bulk billing rates), which helps to limit premiums above the scheduled fee.

However, there are likely to be significantly greater problems associated with consumer uncertainty about co-payments for medical specialists (Sivey 2016). Most people do not see the same specialists frequently or for the same service, so there is little scope for learning about prices. Moreover, GPs are often the gatekeepers for specialist services and may not know the co-payments that patients will face with different specialists, and neither patients nor GPs may want to discuss this as part of clinical consultations. This could affect the genuine exercise of choice and, because uncertainty itself acts as a cost, may deter people from undergoing diagnostics or treatments. Further difficulties also arise because the specialist market is not as competitive as the GP market and the share of services with an out-of-pocket cost are much higher (Hillis et al. 2017).⁷ Further, the variations between out-of-pocket costs are very large and generally vary by specialty (see figure 1).

There are no websites that compare prices, as there are for many other consumer goods, a gap that some have recommended filling (McRae and Gool 2017; Sivey 2016; Taylor 2015). An editorial in the Medical Journal of Australia argued that:

Easier access to information may induce greater competition. Patients have little opportunity to verify claims of higher quality care by medical specialists, and it is difficult to shop around to find the best price. Unverified quality claims can lead to extensive price variation, despite there being little evidence that quality is correlated with price. (McRae and Gool 2017, p. 162)

⁷ The Australian Medical Association reports that in 2012-13, while only 18.9 per cent of GP attendances involved an out-of-pocket cost, this was 71.3 per cent for specialist attendances and 90.8 per cent for anaesthesia (AMA 2014).

While the analysis above applies to health care specialists, the general principle is that the public availability of performance indicators should be accompanied by transparency in pricing in any government-subsidised service where payments are expected from consumers and pricing variation between providers is significant.



3 Data availability and accessibility

The development of comparative performance indicators for individual government-funded service providers is a data-intensive task, requiring a range of different variables to be reported, collated, cleaned and published for each of thousands of service providers around Australia. As such, issues with the data sources underlying the performance indicators affect the quality of the indicators themselves.

Generally, issues with the underlying data fall in two camps: insufficient access to existing sources of data to determine specific indicators; and inadequate existing data sources (because they are not collected, are of low quality or are not comparable across suppliers or jurisdictions).

Making greater use of existing administrative data sources ...

Commonwealth, State and Territory Governments already collect vast quantities of information as by-products of its administrative functions. These data are collected for regulatory requirements (such as financial information for vocational education and training providers), program administration (for example, Centrelink and Medicare payments, school, university and vocational enrolments and completions, and hospital admissions) or as a byproduct of transactions (such as a purchase of health care services or fines and fees in the public administration system) (PC 2013, 2017).

Administrative data can be a rich vein of information because it is typically longitudinal and generally covers the full population of service-users instead of a sample, as well as largely avoiding non-response rates for individuals, participant attrition over time and many forms of under-reporting.⁸ Automated systems and routine collection also lower the cost of administrative data collection compared with standard labour-intensive survey methods (PC 2013).

There remain problems with such data for the development of performance indicators, mainly reflecting that the data are collected for administrative rather than evaluative purposes. Respondents and data collecting agencies make errors — so data requires cleaning to be usable. Data collections vary over time as policies and programs change. Variables are not always well-defined or documented (PC 2015). Administrative data also suffers from an inability for researchers to specify the scope of data that are collected in advance, as many crucial datasets for government-funded services are designed for purposes other than performance analysis. Their usefulness is therefore a welcome byproduct, but not always a planned outcome (PC 2015; Schreyer 2010).⁹

Further, different jurisdictions (particularly the states and territories) frequently have different definitions and collection standards, making the development of comparable performance indicators difficult — for example, there is considerable variation in the way hospitals code information about patient deaths (NHPA 2016).

Nevertheless, such data are a promising source of evidence on performance, and becomes more so if linked (by client or provider) across datasets. Arguably, the most significant barrier to the use of administrative data are accessibility — an issue that was a central concern of the Productivity Commission's inquiry into Data Availability and Use. While there is a need to meet privacy and confidentiality expectations of the community, Australian governments have tended to be overly risk-averse in providing access to administrative data, even on a private basis between government agencies or trusted users.

⁸ However, non-service-users are generally not included in administrative data (for example, the consumers of GP services are probably going to be less healthy than the general population), possibly limiting the usefulness for policy evaluations.

⁹ As discussed below, for example, MBS payments do not necessarily say much about the purpose of the visit to the GP.

Under one measure of accessibility, Australia's provision of open access data lags that of comparable countries with similar governance structures — such as the United States, the United Kingdom and Canada. All outperform Australia in collecting and releasing health care data, including performance data on hospitals and administrative data on the use of health services (PC 2010a, 2013, 2015, 2016b, 2017). The United States government currently releases datasets containing over 100 measures of performance for over 4000 hospitals, ranging from operational measures to patient survey information, with nothing comparable existing in Australia (PC 2017).

Despite these challenges, there have been some improvements in utilising existing data sources. In particular, governments have gotten marginally better at ensuring that data collected by third-party, private providers of government-funded services are passed back to the regulating or contracting agency for further analysis (PC 2017). This largely occurs through standardised data sharing arrangements in contracts (such as under the guidelines published by TfNSW, noted in section 1).

However, further progress could be made, as agencies frequently collect large amounts of performance-related information from contractors, but only make use of a small portion when assessing performance and providing feedback. As this data collection can create considerable reporting burdens for contractors, there is room to improve through more accurate targeting of performance reporting requirements — collecting less data overall, but making better use of what is collected (PC 2010b). There are also concerns that excessive measurement and reporting requirements are hindering the benefits of social impact bonds (Edmiston and Nicholls 2017).

... while also covering gaps in data collections

There are also a range of areas where performance-related data either do not exist or the quality of what is collected is too low to be of any value. In health care, one such area is the nature of patient encounters in the primary health care sector (such as during GP consultations — box 5). For the education sector, there is also a lack of information about the characteristics of the education workforce and the student-level learning outcomes from early childhood education and the first year of primary school (PC 2016b).

Although additional data across the non-market sector would be useful, a key constraint of greater data collection is cost. To publish performance-related data for each individual service provider across the sector requires data to be collected from all of them. Often, doing this will not be practical or cost-effective — this is especially true for the collection of large-scale, time-consuming survey data to measure quality outcomes. Additional data collection requirements can also be seen as disruptive to the core activities of the service providers themselves, such as preventing doctors from attending to their patients or teachers from educating their students (PC 2017).

However, while governments often perceive additional data collection activities to be expendable relative to other functions, the savings can prove illusory when weighed against the gains through better outcomes for consumers and greater cost-effectiveness for taxpayers. As such, increasing data collection may still be worthwhile in select, high-priority areas where the gains are likely to be large and outweigh the costs of collection, even if those costs may be considerable (PC 2010a). These cost constraints also mean that there is a need for careful consideration as to what sorts of information will be most useful for improving service delivery to customers, including what is most likely to inform policy design or prompt behavioural change.

Box 5 The black box of primary health care

In primary health care (such as visits to GPs and specialist clinics), there is very limited information available on the treatment and diagnostic details of individual patient encounters. This includes details of why an individual was visiting their primary health care professional, what their symptoms and diagnoses were, what treatment was prescribed, what the outcome was and whether follow-up treatments were needed. In 2008, the AIHW concluded that existing data sources in primary health care were severely limited and there was a pressing need for additional data collection to build a more comprehensive picture of activity to drive outcome improvements.

Although the Australian Government generally provides Medicare benefits for most patient encounters, there is no information collected on the contents of the encounter. Other data sources mostly rely on limited survey samples that are not broad enough to provide a comprehensive picture of primary health care activity and develop performance indicators for individual providers.

While there are genuine patient confidentiality concerns to be considered, many of the issues instead relate to individual health care providers maintaining their own siloed record-keeping arrangements and not sharing data. Historically, this has been exacerbated by the slow take-up of computerised patient records by the health care sector.

Further, since July 2016 one of the major datasets that shone a light on activities in the primary health care sector — the BEACH (Bettering the Evaluation and Care of Health) program — was discontinued after 18 years. The BEACH program randomly surveyed 1000 GPs a year on the details of 100 patient encounters, resulting in a dataset of 100 000 GP-patient encounters each year. Although not comprehensive enough to cover all GP encounters (about 127 million occur each year) and enable the development of robust performance indicators, the program nonetheless provided a sizable database of evidence in an otherwise largely unreported sector.

Despite these challenges, one area of recent progress for primary health care is the expansion of national eHealth records. Although adoption has been sporadic and there is not yet much existing research based on the data, the reinvigorated My Health Record system (see chapter 2 in the main report for further details) is likely to assist with providing additional details on primary health care treatments in coming years. In particular, as new patients sign up for the service and it becomes more widespread, it will become an increasingly useful source of data in the primary health care sector, as well as in hospitals and other health care areas more broadly.

Sources: AIHW (2008), Department of Health (2016a), FMRC (2016a, 2016b), PC (2017).

Use of technology can help to support the provision of credible information (as discussed in SP 13), particularly by minimising collection costs. For example, electronic online surveys are vastly cheaper to collect than paper ones (although response rates can be lower), while automated email or text message notifications following interactions (such as through the MyGov portal once Medicare benefits are claimed for a GP appointment) can ensure low-cost delivery and notification (Couper 2011; Schuster and Perez Brito 2011). However, care is needed to ensure that such collection approaches do not result in a biased sample, that could led to inferences that were not applicable to segments of the population for whom these collection methods do not apply.

Presentation and accessibility

Comparative performance indicators for use by consumers should be easily accessible. Recent New Zealand work recommended that the context of performance indicator publications must be explained, while results should be presented in a range of different formats to ensure that the information is not misinterpreted due to a failure to address different levels of technical literacy (HQSCNZ 2016). The *NHS Choices* website in the United Kingdom is an exemplar of a simple and accessible information source intended to provide informed choice (box 6).

As noted earlier, ready access to granular data should also be provided to third-party researchers (with the usual protections to ensure confidentially and ethical use) so as to enable them to test and form their own conclusions.

Box 6 On Her Majesty's Surgical Service

NHS Choices provides information on health care services in England, including a complete list of all NHS providers across the country. This enables users to search for facilities that offer particular services nearby, such as accident and emergency departments, GPs, hospitals, dentists, pharmacies, specialists and care homes.

Besides general information on the listed providers — including their contact details, opening hours, services offered at the facility, available amenities (such as disability access and nearby parking) and the name of staff members (for GP clinics) — the *NHS Choices* site also provides details on the provider's performance based on survey responses and other metrics. For example, GP clinics are rated on whether patients would recommend the clinic to others, using results from the biannual National GP Patient Survey. The survey results are reported as a percentage rate, alongside a comparative score indicator, where the bottom 25 per cent of clinics are rated as 'among the worst', while the top 25 per cent are rated 'among the best'.

Another survey reports the proportion of hospital staff who would recommend their own facility, while others report on waiting times and convenience at GP clinics. Hospital ratings include measures on a procedure-by-procedure basis, such as waiting times and the results from Care Quality Commission inspections.

Source: NHS (2016).

4 Links to financial incentives

Adequate performance measures are a pre-requisite to payment-based incentives, such as financial rewards or penalties. The use of performance-based financial incentives has a long and chequered history, with a range of different types available, depending on the nature of the sector and the outcomes desired. Performance indicators linked to incentives do not necessarily have to be comparative indicators — creating financial incentives based on a provider's performance against a given benchmark, rather than against competitors, can be equally useful (although under a basic design this can lead to uncontrolled costs, as the number of providers receiving payments is unknown ex ante¹⁰).

Experience in linking performance measures with financial incentives has been mixed, with some positive results, some negative, and a lot depending on context and design.

A key issue in the use of financial incentives linked to performance is the extent to which providers are motivated by financial rewards or sanctions. Much of this depends on the nature of the 'business' and market, governance structures, and what the financial rewards can be used for (such as personal income, spending to improve the work environment, or reinvestment in the business?).

Further, many of the motivations created by financial incentives occur in their absence anyway, as non-pecuniary initiatives (such as shaming through disclosure) and indirect financial measures (such as when consumers choose between providers based on their reported performance) act as their own incentives. As noted above, many government-funded services are also delivered by professionals whose primary motive may not be financial rewards from their work — these individuals are unlikely to be driven by performance-related pay.

The following section draws on evidence in the government administration, health and education sectors to examine how financial incentives linked to performance indicators have worked in practice.

Incentive regulations, capitation payments, activity-based funding and pay-for-performance

For regulated or government-owned natural monopolies, regulators often use 'incentive regulation' in which cost recovery from consumers cannot exceed some efficient benchmark level (such benchmarks are performance indicators by another name). In principle, providers have incentives to improve their efficiency because they retain any (or at least a share of) profits achieved from costs being below the benchmark level, and make losses if they exceed the benchmark. Penalties for not achieving a certain quality of service

¹⁰ For an example of how uncontrolled costs could occur, see SP 7 for discussion of performance-contingent funding for universities.

outcomes are also common in utility regulation (for example, for prolonged electricity network outages). The overall impacts of such incentive regulation on the efficiency of providers has been mixed, and has hinged on the exact regulatory design, and the capacity (and willingness) of governments to bail out poorly performing businesses. Governments can also issue directives that compromise efficiency (such as procurement rules, social obligations or quality standards). The same compromises often do not exist for private entities in markets without natural monopolies.

Capitation systems for remunerating health care providers share many characteristics with utility regulation, although the parallel is often not drawn. Payments under capitation are (intended to be) based on the efficient costs of providing services to a population with given risk characteristics. Australian Health Care Homes include this feature, and they are widespread in the United States health care system, particularly through health maintenance organisations. As discussed in chapter 2 of the main report, the design of capitation arrangements and the performance metrics that underpin them are critical to outcomes.

Activity-based funding (ABF) of hospitals is similar to capitation, but relates to the efficient costs of particular hospital services. In Australia, the Independent Hospital Pricing Authority makes an annual National Efficient Price determination for public hospitals for the coming year, which is the basis for the payments to hospitals. As with any financial incentive arrangements based on performance measures, a critical issue is that the measures be objective, precise, strongly correlated with good outcomes and resistant to cost shifting (such as pushing difficult clients onto other providers) or gaming (also known as 'cherry picking', where adequate risk adjustment has not occurred). Research overseas has found mixed results from ABF, such as reduced lengths of stay, shifts from high-cost inpatient care to outpatient care (which may be desirable), and a possible increase in readmissions (CIHI 2013, p. 5; Palmer et al. 2014). The most thorough (indeed best practice) meta study found that strong claims in favour or against ABF were not supported by the evidence, but that ABF had positive effects in some settings and not in others (Palmer et al. 2014). Context therefore clearly matters.

No system for managing health care (or any other non-market services) will provide perfect incentives for efficiency, which is hard to do even in market services where there is a clearer indicator of outcomes in terms of profits. The key question is whether the overall effect is positive or can be made to be so through finessing the model. Given the widespread adoption of ABF in Australia, monitoring and finessing is likely to be appropriate. This will involve decisions about payment levels, governance arrangements and the scope of performance indicators.

Pay-for-performance in health care

The potential value of disincentives for poor clinical outcomes has long been presumed. More recently, health purchasers have turned to financial incentives to encourage better clinical outcomes for patients. In particular, pay-for-performance (P4P) incentives have been used to (ostensibly) encourage higher quality care in general practice — exemplified in Australia by the Australian Government's Practice Incentives Program (PIP). This program has generally involved 'performance' measures of desirable processes¹¹ that the Government infers will enhance quality care, rather than measures of outcomes. The PIP has a range of deficiencies, being too complex, with high administrative costs and having inadequate data collection for the task. These problems have been recognised and it is currently subject to re-design (ANAO 2010; DoH 2016b). Nevertheless, there is some indication that it has influenced diabetes care (Oliver-Baxter et al. 2014). The international literature appears to suggest that P4P in health care 'works' or at least does not produce negative outcomes, but with the size of the effects dependent on context and the magnitude of the payment (Gee 2016; Ogundeji, Bland and Sheldon 2016; Partel 2014; Scott and Connelly 2011).

There also seems to be some promise for P4P in hospital settings, in which funders provide no payment for events that should never occur (sentinel events) and reduce payments for events that involve complications. Non-reimbursement for sentinel events in the United States appear to have been effective for some event types and no worse for others (Waters et al. 2015). The Council of Australian Governments (COAG) intends to introduce pricing incentives to reduce 16 Hospital Acquired Complications (HACs) in 2017, although stopping short of full non-reimbursement given that complications are often not fully avoidable (Gee 2016; Herkes 2016; IHPA 2016).

In a much more radical move, Medibank (Australia's largest private insurer) has introduced non-reimbursement for 165 hospital-acquired complications. This initiative has proved controversial because of the large number of non-compensable complications, the cost of implementation, the way in which HACs have been determined, and the risk that, where complication risks are high, private hospitals may attempt to divert patients to public hospitals. In this case, the claim is that the performance indicators have been selected more to reduce pressures on premiums than to reduce adverse events — a claim the Commission has not tested — but which, in principle, illustrates another element of the complexities of linking performance measures and financial incentives.

Performance pay in teaching and the public service

While performance-related incentives are widely used in health care and utilities, internationally, their genuine adoption in the public service and in teaching is patchy. Prima facie, the contention that they should be used appears sound, and reputable parties have urged their adoption (Jensen and Reichl 2011). The use of performance pay in the Australian and State and Territory Government public services has waxed and waned (for example, being axed in Queensland in 2015). The Australian Government has recently

¹¹ Examples are payments to GPs for screening women between 20-69 years who have not had a cervical screen within the past four years.

announced plans to eventually provide funding to schools contingent on performance-based pay for teachers (Australian Government 2016).

Globally, the issue of performance pay for teachers and public servants is controversial, and accompanied by mixed and contested evidence about their benefits, sometimes infected with ideology. Most of the best (of a lot of bad) evidence relates to teachers. The results of performance pay depend on context, place and time. For example, in the United Kingdom, over a succession of studies, a researcher found that teacher performance pay in the United Kingdom appeared to produce positive results initially, which then subsided (Marsden 2009, 2015; Marsden and Belfield 2006). Teachers themselves have mixed views — with recent UK survey evidence suggesting that a (slight) majority supported some link between performance and pay (Ware et al. 2014).

The Organisation for Economic Cooperation and Development (OECD) found no average relationship between student performance on Programme for International Student Assessment (PISA) tests and the presence of performance pay. However, it did find a positive effect if teachers' base salaries were low and a negative effect if base salaries were high (OECD 2012). Australia falls into the latter category. Nevertheless, the result was based on very simple analytics for a single year of data, and ignored the possibility that countries that were concerned about their relative PISA standing might try to improve outcomes through performance pay. A recent comprehensive meta-study found a sufficient number of studies favourable to performance-based pay in teaching to warrant further trials and evaluations (Leigh 2013).

A lack of consensus

One of the key problems in appraising the impacts of pay for performance in teaching is that there is no consensus on:

- the form and size of financial incentive such as a payment for high performance, variable bonuses for variable performance, progression in pay scales based on annual assessment, access to additional teaching resources, or providing non-personal financial rewards (such as additional school funding).
- the appropriate measure of performance for example, test results, truant rates, student and parent appraisal results, achievement of some agreed standard of teaching, engagement in processes linked to performance such as professional development, or some mixture of the above.
 - It cannot be said that there is no mechanism for assessing the 'art of teaching'. After all, students training to be teachers are assessed on a proficiency rather than a competency-based standard (see chapter 3 of the main report for a discussion of the differences). There have been advances in the development of recognised teaching standards that more accurately reflect the nature of teachers' work and which could be a basis for new performance pay initiatives.

- the appropriate parties who should make the assessments (external to the school, peers, the principal)
- the extent to which there needs to be agreement between the main actors in schools —
 governments, school administrators, principals, teachers, school boards, parents and
 children about the legitimacy and accuracy of the measures of quality. At least one
 authoritative study has attributed failure of performance pay on the absence of buy-in
 by teachers and school administrators (Ingvarson, Kleinhenz and Wilkinson 2007)
- the relative importance of performance-based pay compared with other initiatives that might improve student performance, bearing in mind that all school-based initiatives entail implementation and financial costs. Performance pay might produce a benefit, but it might be more or less than some other interventions.

Given the wide variety of outcomes from experiments in teacher pay performance around the world, any definitive declarations that they *do* or *do not* work are to be treated cautiously, as outcomes are highly contextual (that is, they depend on what incentives were used, for whom, and under what conditions).

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 4

WHY A BETTER HEALTH SYSTEM MATTERS 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

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Why a better health system matters

1 Introduction

Many of the issues confronting the Australian health care system have origins in the heightening prevalence of chronic conditions among the population, how the system is structured, where resources are allocated and how its prime actors behave. There is a particular concern about how Australia's health system engages in preventative care and, where people have acquired a chronic illness, how it integrates care to manage their condition.

This paper provides supporting evidence for key aspects of chapter 2 in the main report.

- It assesses how Australia's health system is performing in achieving the health aspirations of Australians ('the good' section 2 and 'the bad' section 3). This is not a systematic assessment of the functioning of the *system* a task that is explored in Supporting Paper 5 (SP 5) and chapter 2 in the main report. Rather, it selectively examines some of the indicators of the health or ill-health of the nation, including the prevalence of key chronic diseases (which are the target of the reforms recommended in the chapter 2 in the main report and in SP 5). These indicators are ultimately measures of the outputs of the health care system.¹
- It explains why, and to what degree, health matters for almost all aspects of a society, including its economic and social impacts (section 4). Its broad impacts and its large costs means that even small improvements in managing or preventing chronic conditions can produce substantial benefits for people's wellbeing, labour markets, productivity and avoided health care costs.
- Appendix A focuses on obesity and its consequences since this is now commonly identified as a priority for action by governments and individuals.

2 Where the Australian health system is performing well

In many respects, Australians enjoy comparatively good health, and by many measures, outcomes are improving (table 1). The vast bulk of Australians had 'confidence that they

¹ Supporting papers are available on the Productivity Commission's website at www.pc.gov.au and are referenced throughout this paper using the abbreviation 'SP' and the relevant number.

would receive quality and safe medical care, effective medication and the best medical technology if they were seriously ill' (MCHP and Nous 2012).

Life expectancy at birth increased by nearly 12.5 years for males and 10.3 years for females between 1960 and 2014, much of it due to lower mortality rates in people's older years (AIHW 2017b). In 2015, among OECD countries, Australia had the third highest period life expectancy at birth for males (80.9 years), and the sixth highest for females (84.8 years) (WHO 2016).² Given trends, future life expectancy will probably increase substantially, with Australia still likely to maintain its high longevity status compared with other OECD countries (Kontis et al. 2017). Moreover, age-specific disability rates have fallen considerably, and especially profound disability rates for older people (figure 1). The overall burden of disease — measured as disability-adjusted life years — has also fallen (figure 2) — and as a result health-adjusted life expectancy has risen over time (AIHW 2016b, p. 12). Australia's life and health expectancy are at the high end of OECD countries (figure 3).

Description	Measure	Comment			
Life expectancy ^a	82.8 years people; 80.9 males, 84.8 females	3rd highest among 35 OECD countries in 2015 for all people and males, and 6th for females			
Healthy life expectancy	71.9	14th highest among 35 OECD countries in 2015			
Number of adults in good to excellent health ${}^{\boldsymbol{b}}$	15.8 million Australians	85.2% of the population aged 15+ population in 2014-15			
Average of 13 WHO International Health Regulations core capacity scores	100 out of 100	Equal first among 35 OECD countries			
Prevalence of smoking among females	13.1% age standardised rate for people aged 15+ years	6 th lowest among 34 OECD countries (where data are available)			
Prevalence of smoking among males	16.7% age standardised rate for people aged 15+ years	Lowest among 34 OECD countries (where data are available)			
Mortality rate attributed to ambient air pollution	0.4 per 100 000 population	Equal lowest among 35 OECD countries in 2012			

Table 1Where Australia is doing well compared with other OECD
countries

^a World Health Organisation, Global Health Observatory. ^b ABS 2016, *National Health Survey: First Results, 2014-15 — Australia*, table 1, Cat. no. 4364.0

² Period life expectancy is likely to understate the actual life expectancy of a person born in any given year because it assumes that future mortality rates for any given age remain the same as the base year of the calculation. Typically, cohort life expectancies can be expected to be about 10 years more than period life expectancies. There are no widely available estimates of cohort life expectancies among OECD countries. Australia's ranking in cohort life expectancies might vary from that implied by the period life expectancies. For example, Australia has very high obesity rates compared with many other countries and the full effects of that on mortality rates for older people is yet to be observed, and therefore not captured by period measures.



Disability rates are falling Percentage points change in disability prevalence rates, by age, 1998 to 2015

^a Other disability rates are equal to the rates for all disabilities less rates for severe and profound disability. They mainly relate to moderate and mild core activity limitations and those with a schooling or employment restriction.

Sources: ABS, Survey of Disability, Ageing and Carers, Cat. no. 4430 (1998 and 2015 editions).

It is difficult to estimate value for money, but Australia spends less per capita on health that many countries for comparable or better outcomes in life expectancy. One imperfect but useful measure of the 'bang for a buck' for health spending for any country is the degree to which it achieves better or worse life expectancy outcomes than that predicted from the estimated relationship between life expectancy and health expenditure per capita (figure 4).³ Australia was ranked 14th out of 35 OECD countries in terms of this measure of the bang for a buck. However, among the 17 OECD countries whose GDP per capita exceeded the OECD average (the 'rich' countries), Australia had the third highest bang for a buck (figure 5).⁴

Figure 1

³ Excluding the United States, which is an outlier. GDP is measured in PPP terms.

⁴ While other factors than health expenditure affect life expectancy, the empirical literature is consistent with a link (Gallet and Doucouliagos 2016; Medeiros and Schwierz 2015; Zare, Gaskin and Anderson 2015). The elasticity of life expectancy with respect to health expenditure for OECD countries in 2014 derived by the Commission (excluding the United States as an outlier) is consistent with the



^a YLL is years of life lost, while YLD is years lived with disability. *Source*: AIHW (2016a, p. 76).

And Australia is faring comparatively well by international benchmarks in certain areas of preventative health — most notably in reducing rates of smoking (AIHW 2016b, p. 16). Deaths due to transport accidents have fallen.⁵ So too has alcohol consumption, potentially reducing the health consequences that flow from excessive use.

Australia has also been a leader in particular arenas of technology development and adoption, such as the Cochlear implant, the development of 'spray on skin', the human papillomavirus vaccine (which reduces the risks of cervical and many other cancers), and the effective treatment of H. pylori bacteria (a major cause of stomach cancer).

meta-analysis of Gallet and Doucouliagos even after controlling for other factors influencing life expectancy.

⁵ ABS 2016, *Causes of Death, Australia, 2015*, Cat. no. 3303.0 and BITRE (2017). There has been a small increase in road user death rates in recent years, but the trend is still negative.


^a OECD countries plus Singapore. HALE is health-adjusted life years.

Source: Online data from the Global Burden of Disease Study 2015 and the Institute for Health Metrics and Evaluation (IHME).





^a All OECD countries except the United States.

Source: OECD Health Statistics (online) for 2014.

Figure 5Australia's health bonusDifference between actual life expectancy and life expectancy given health



^a The richest countries are those with GDP per capita adjusted for purchasing power parity (PPP) above the OECD average. Expected expenditure was based on a regression of log life expectancy against the log value of health spending (in PPP terms) per capita.

Source: OECD Health Statistics (online) for 2014.

3 The burden of chronic conditions

Medical advances have lowered the rate of premature death, for example from infectious disease and trauma. The burden of disease has therefore shifted from premature death to managing chronic and complex conditions such as diabetes, lung cancer, cardiovascular disease and mental illness (table 2). As the risk factors vary by socioeconomic status and location, there are major health inequalities in Australia (table 3 and figure 6). Nearly 45 per cent of Australians have three or more long-term illnesses — a share that has grown significantly over time. Nearly three million people say they are only 'fair to poor' health (table 4).

A consequence of this shift is that while life and health-adjusted life expectancies have increased, Australia has a high number of years spent in ill-health in absolute terms and as a share of life expectancy. On both of these measures, these rates are second highest among a wide range of OECD and other developed countries. Were Australia to have the same ratio of healthy life expectancy to life expectancy as Singapore, Australians could expect about 2.6 years more of healthy life (figure 7).

Table 2A snapshot of Australian's major health problems and
lifestyle risks

Description	Measure	Comment
Selected long-term cor	ditions	
Diabetes ^a	1.2 million people	5% of the population in 2014-15. Rates were 12.8% of obese people and 2.5% of normal weight people
Mental and behavioural problems ^a	4.0 million people	17.5% of the population in 2014-15. More than double this proportion experience a mental disorder over their lifetimes ^b
Chronic obstructive pulmonary disease ^a	0.6 million people	2.6% of the population in 2014-15
Heart, stroke and vascular disease ^a	1.2 million people	5.2% of the population in 2014-15
Suicides ^c	3 027 in 2015, up 43% from 2006. 12.6 per 100 000 people in 2015 ^{c}	21st highest in 2012 in OECD, but about double the rate of the best-performing countries ^d
Lifestyle risk factors ^a		
High/very high psychological distress	2.1 million people	11.8% of 18+ population in 2014-15
Obesity	4.9 million people	27.5% of 18+ population in 2014-15
High blood pressure	4.1 million people	23% of the 18+ population in 2014-15
Daily smoker	2.6 million people	14.7% of the 18+ population in 2014-15
Risky/high risk alcohol consumption	1.8 million people	10% of the 18+ population in 2014-15
No/low exercise level	11.7 million people	65.9% of the 18+ population
Inadequate fruit or vegetable consumption	16.8 million people	94.9% of the 18+ population

^a ABS 2015, Australian National Health Survey: First Results, 2014-15, Cat. no. 4364.0.
 ^b The lifetime mental illness rate is based on ABS 2008, National Survey of Mental Health and Wellbeing: Summary of Results, 2007, Cat. no. 4326, released 23 October).
 ^c ABS 2016, Causes of Death, Australia, 2015, Cat. no. 3303.0.
 ^d WHO, Health Statistics 2016, Annex B.

nctor Measure	Context
sability rates ^a Prevalence rates by household income quir	ntiles for
1 st quintile (lowest income) 37.3% people aged 15+ year	rs, 2015
2 nd quintile 34.7%	
3 rd guintile 17.9%	
4 th quintile 12.0%	
5 th quintile (highest income) 9.6%	
Ratio of age-standardised death rates by socioed	conomic
Highest status (5) 1.00 group, 2009–2011 relative to the highest gro	up. If all
4 quintiles had the 5 th quintile rates, there wou	uld have
3 1.16 been about 54 000 fewer deaths in this	s period.
2 1.23	
Lowest status (1) 1.29	
Prevalence rates of people with 3 or more	chronic
1 st quintile (lowest income) 15.2% illnesse	es, 2015
3^{rd} quintile 9.8%	
4 th guintile 5.9%	
5 th quintile (highest income) 6.1%	
Prevalence rates of people with 3 or more	chronic
Major cities 8.3% illnesse	es, 2015
Inner regional 12.4%	
Outer regional 10.8%	
6.7 year life expectancy gap between low	vest and
highest educational attainment fo	r males.
Low education 52.6 and a 3.7 year gap for	females
Medium education 55.9	
High education 59.3	
males (vears)	
Low education 58.2	
Medium education 60.4	
High education 61.9	
munisation rates for 1 year olds ^e Rates in about 1500 postcodes throughout Au	stralia in
Rate in best area 98.2%	2014-15
Rate in worst area 73.3%	

Table 3 There is significant health inequality in Australia

^a ABS 2017, *Disability, Ageing and Carers, Australia: Summary of Findings, 2015*, Cat. no. 4430.0. ^b AIHW 2014, *Mortality Inequalities in Australia, 2009–2011*, Bulletin 124, August. ^c ABS 2016, *National Health Survey: First Results, 2014-15 — Australia*, table 1, Cat. no. 4364.0 ^d OECD (2017) ^e NHPA (2016).



Source: ABS 2016, Deaths, Australia, 2015, Cat. no. 3302.

Table 4 Aggregate measures of ill-health and disability

Factor	Measure	Context
Years spent in ill health ^a	10.9 years	Highest among OECD countries and higher than would be expected given life expectancy
Number of adults in poor to fair health ^b	2.8 million people	14.8% of the population aged 15+ population in 2014-15 compared with 15.1% in 2007-08
Number of people with 3 or more long-term conditions ^b	10.1 million people	44.1% of the population in 2014-15 compared with 38.8% in 2007-08 9
Number of people with a disability ^C	4.3 million people	18.3% of the population in 2015
Number of people with a profound or severe disability ^C	1.4 million people	5.8% of the population in 2015. Of people aged 70+ years, 23.0% have profound or severe disability

Sources: ^a World health Organisation, Global Health Observatory. ^b ABS 2016, *National Health Survey: First Results, 2014-15 — Australia*, table 1, Cat. no. 4364.0 ^c ABS 2017, *Disability, Ageing and Carers, Australia: Summary of Findings, 2015*, Cat. no. 4430.0.

Figure 7 Australians live longer, but a greater share of that life is spent in ill health compared with most countries 2015



Source: Institute for Health Metrics and Evaluation (IHME), 2016, Global Burden of Disease Study 2015.

The burden of disease is measured by its cumulative effect on years lost from premature death and years spent with disability.⁶ The Australian Institute of Health and Welfare (2016a, p. 13) estimated that 31 per cent of the Australian burden of disease in 2011 was preventable. The estimate is not exceptional by international benchmarks. In a global context, the World Health Organisation estimated that 80 per cent of all heart disease, strokes and diabetes are preventable and 40 per cent of cancers (WHO 2005, p. 18). In the United States, the Centres for Disease Control and Prevention (2014)

⁶ The sum of these years is referred to as 'disability adjusted life years' or DALYs.

estimated that 20 to 40 per cent of deaths from heart disease, cancer, chronic respiratory diseases, stroke, and unintentional injuries could be prevented (and as a result, 12.5 to 25 per cent of all deaths).

For some health conditions, the very existence of the disease reflect modifiable risk factors. For instance, an estimated 96 per cent of the burden posed by diabetes in Australia reflects modifiable risk factors such as excessive body fat and physical inactivity (AIHW 2016a, p. 122).

But prevention is only feasible if the community and the health system is geared to early intervention and proper management of existing conditions. The problems are known — the solutions have only partly been implemented. While the Australian health *system* is a high-performing one by global standards, there are nevertheless a range of systemic flaws that weaken its capacity to address chronic illness effectively. (Table 5 provides just a few indicators across various domains of performance — some indicating excellence, others not.) Some concerns relate to coordination and communication within the system (including use of IT), some to the diversion of resources to unjustified clinical practices and away from critical needs, and others to the way that health professionals work with one another to produce outcomes. In chapter 2 of the main report, we have set out a health care system that is likely to reduce the incidence of chronic diseases or moderate their effects, and this issue is not examined further in this paper.

4 Why should we care about preventative health?

The enduring nature of chronic conditions affects health care costs and people's capacity to participate in society, including in the workforce.

Wellbeing matters

Fair or poor self-reported health status, mental illness and psychological stress, and poor dental health, and have major adverse impacts on people's sense of wellbeing (VicDHHS 2015, p. x, 82).⁷ To put this in perspective, 24 per cent of older people with type 2 diabetes are on anti-depressants (AIHW 2016d). Sixty per cent of people with type 2 diabetes will develop eye disease within 20 years of first diagnosis (Dirani 2013). In 2012-13, there were 3570 lower limb amputations relating to diabetes or approximately 1.7 per cent of all diabetics in that year (AIHW 2017a).

⁷ A major challenge for preventative health is that while people do not like being unwell, they do not have the same attitude to unhealthy habits. Some of the key precipitating factors behind ill-health, such as obesity, a sedentary lifestyle, the composition of diet, smoking and alcohol consumption have relatively weak links to *perceived* wellbeing.

Table 5	System indicators
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Description	Measure	Comment
Use of cardiac catheterisation ^b	7.4 fold variation in use between areas	Age-standardised use of technique in areas of NSW. Example of substantial unwarranted clinical variations
Knee arthroscopies ^b	71 087 admissions	Unneeded treatment given no evidence of clinical benefits in the majority of cases
Unplanned readmissions ^C	About 7% in NSW hospitals in 2014-15	Measure of problems in initial hospitalisation and in follow-up care
Vancomycin resistance in Enterococcus faecium ^d	About 45 per cent resistant	Indication of mismanagement of antibiotics. Highest rate compared with 29 European countries
Practice nurses used managing/caring for people with chronic conditions ^a	81% of GPs	Australia ranked 5 th among 10 developed countries, with the three best: UK (96%), Netherlands (92%) and New Zealand (90%)
Capacity to email a GP about a medical question or concern ^a	30% of GPs	Australia ranked 9 th out of 10 developed countries, with the 3 best: Switzerland (80%), the Netherlands (57%) and the United States (57%)
GPs use of electronic medical records ^a	92% of GPs	Australia ranked 6 th among 10 developed countries, with the 3 best: New Zealand (100%), Norway (99%) and Sweden (99%)
Share of primary care providers who report they always receive a notification when a patient is seen in an Emergency Department ^a	18% of GPs	Australia ranked 9 th among 10 developed economies with the 3 best: Netherlands (68%), New Zealand (56%) and UK (49%)
GPs saying health system works well ^a	48% of GPs	Australia ranked 5 th among 10 developed countries, with the 3 best: Norway (67%), New Zealand (57%) and Switzerland (54%)
Quality of Death ^e	Index value of 91.6 out of 100	Based on measures of the availability, affordability and quality of end-of-life care. Data relates to period 2011–2014. Australia was ranked 2 nd globally, just behind the UK, and well ahead of many other OECD countries
^a Osborn et al.(2015). ^b ACSQF Intelligence Unit (2015).	HC and AIHW (2014)	. ^c BHI (2015). ^d ACSQHC (2016). ^e Economis

Impacts on labour supply

Poor health status represents one of the largest brakes on an economy's labour supply, and thereby successful preventative health measures can potentially have significant positive economic effects. Ill health and disability also restricts the productivity of those in the workforce.

Participating in the labour force

Labour force participation is much lower for people with work limitations, disability and ill-health (figure 8).⁸

- For example, in June 2014, only an approximate 40 per cent of people aged 25-49 years • with a profound or severe disability participated in the labour market. For those aged 50-69 years, this had fallen to one in five. In comparison, the participation rates for people with no disability or health condition were about 90 and 80 per cent respectively for these two age groups.⁹ (Much the same contrast occurs for people with poor compared with excellent self-assessed health status and, to a lesser extent, for people with and without long-term health conditions.) For men under 55 years, ill health and major reason disability is the for premature exit from the labour market (Lattimore 2007). The effects of ill-health on participation vary over age and by disease, but common preventable conditions like diabetes and emphysema lead to major reductions in participation (figure 9).
- A working age male with excellent health has a probability of participating in the labour market that is 63 percentage points higher than someone in poor health (Cai and Kalb 2006, p. 12). The incremental labour market benefits of increasing health status decreases as people become healthier. For example, the gain in the participation rate from moving from poor to fair health is 34 percentage points, while the gain from moving from good health to very good health is 5 percentage points. This suggests that preventative health measures can be effective even if they only have modest effects on those who are most unwell.
- The successful prevention of a mental health or nervous condition is predicted to raise the probability of labour force participation, of both men and women who would have experienced that condition, by between 17 and 26 percentage points (Laplagne, Glover and Shomos 2007, p. 48). The effect would be larger if the person said they were in poor health and had a mental condition.
- Only 36 per cent of mothers with 'work-affected' health conditions were employed compared with 63 per cent for other mothers (Renda 2007). Work-affected mothers were much more likely to work less than 15 hours a week (p. 15). Of those not in work, such mothers were much more likely to say that they would find it 'very difficult' to obtain a suitable job compared to other mothers (p. 18). Their job search intensity was also less (p. 11).

Family members' participation rates are also lower. People's ill-health and disability not only affects their own labour market involvement, but also those who provide informal care. From age 35 years on, caring for people with a disability becomes a significant driver of non-participation by people without disabilities (ABS 2015a, table 6).

⁸ There are comprehensive tables of supporting data and graphs in Excel spreadsheets available from the Commission.

⁹ Based on ABS, *General Social Survey, June 2014*, Tablebuilder data extraction.

Unemployment and underemployment is higher. Where people with disabilities or ill-health *are* in the labour force, they are more likely to be unemployed or underemployed (ABS 2015a, table 4, 2015b, microdata). For example, unemployment rates for a person aged 25-49 years old with poor self-assessed health is about six times higher than for people in the same age group in excellent health (ABS 2015b, microdata).

Hours of work are shorter. Employed people with lower health status or with disabilities are more likely to work part-time and, therefore, for fewer hours than those in good or better health (ABS 2015b, microdata). This divergence grows with age. People with mental health conditions in particular tend to work fewer hours (ABS 2015b, microdata).

Absenteeism rates are higher. If people have disabilities or long-term health conditions, they are (unsurprisingly) more likely to take sick leave. For example, someone with generally poor health had approximately 50 per cent more sick leave days in 2014 than the average.¹⁰ People with the highest ratings for health-risks (based on a composite measure of obesity, poor nutrition, low physical activity, high stress and other risk factors) had nine times the annual absenteeism rate than those whose health risks were low to moderate (Medibank Private 2005, p. 5). This underlies an important element of absenteeism, which is that the distribution of days off is highly skewed, with most people only taking off a few days a year, but a few experiencing major illness or injury taking many weeks (Sturman 1996). Since preventative health is mainly focused on the latter group, successful preventative health measures are likely to have larger effects on average absenteeism than might seem to be implied by the prevalence of disease and major injury. Another feature of employer absenteeism data is that, over several years, medically certified absences appear to 'distil risk factors for mortality' that may not be immediately apparent to the person or to the certifying physicians (Kivimäki et al. 2003). In other words, the data itself may be a resource for early interventions and preventative health. A higher prevalence of chronic illnesses is also associated with higher likelihood of presenteeism (being unwell at work), which reduces labour productivity of those at work.¹¹

From an economy-wide level, the above adverse labour supply effects of poor health can be seen as a 'big picture' productivity measure in that it reduces overall economic output per capita.

¹⁰ Based on analysis of the HILDA survey, which shows average sick leave days of about 4.5 per person (Wilkins 2016, pp. 52–53). This is well below those recorded by employers, which are approximately 8.5 days per person per year (Direct Health Solutions 2015). If the percentage variations in HILDA data between people with different health status are roughly correct, then people in generally poor health have about four more days of sick leave per year.

¹¹ The evidence is partial and draws principally on data from the United States (Econtech 2007; Goetzel et al. 2004; Medibank Private 2011; Schultz and Edington 2007).

Wage rates and productivity

However, ill-health and disability have important second round effects on productivity. Presenteeism only captures one aspect of the impacts of disease or disability on productivity since people with chronic illnesses or disability may choose jobs that have lower productivity rates than the jobs that they could have performed had they had higher health status. Wage effects may better capture both presenteeism and job selection effects. For example:

- for a man who retains employment, poor mental health reduces hourly wages by about 5 per cent (Forbes, Barker and Turner 2010, p. 27). Major injury had a somewhat higher impact. Wage effects for women are lower than men
- people in very good health can earn an hourly wage 18 per cent higher than those in poor or fair health (Cai 2007, p. 17)
- men with a nervous or emotional condition earn 35 per cent less than average earnings, while men with chronic pain earn 15 per cent less (Brazenor 2002).

The lower incomes that arise from lower wages and labour supply reduce Australian Government revenue through lower income and consumption tax receipts.

The fiscal dimension

An attractive feature of preventative health and better management of chronic conditions is that, if effective, not only do they produce benefits for people (their key goal), but they can partly alleviate budget pressures, reducing the extent that governments must increase tax rates or cut needed services and transfers. Similarly, reducing low quality care can provide significant efficiency gains, with one estimate suggesting that approximately 10 to 15 per cent of health spending is used inefficiently due to poor-quality care (Herkes 2016).

Societies invest huge resources in increasing health status, in providing care, and in lengthening life spans. In Australia, aggregate health care expenditure from private and public sources accounted for about \$162 billion in 2014-15 (the most recently available data), exceeding 10 per cent of GDP for the first time in Australia's history (AIHW 2016c). A rough estimate suggests that expenditure could be about \$5 billion higher in 2015-16.¹² Of the \$162 billion, over \$62 billion was spent on hospital care nationwide in 2014-15 (SCRGSP 2017, table EA.2).

¹² There is a relatively strong relationship between the ABS National Accounts (Cat. no. 5204.0) estimates of spending by general government and data compiled by the Productivity Commission on health spending for the SCRGSP. Given ABS data were available for 2014-15, this relationship was used to estimate a measure of health spending for 2014-15 consistent with previous SCRGSP estimates.



Sources: From right to left and top to bottom, the sources are for charts 1, 2, 5 and 6: ABS 2015, General Social Survey, Australia, 2014, Cat. no. 4159.0, microdata; chart 3 from ABS 2016, Retirement and Retirement Intentions, Australia, July 2014 to June 2015, table 5.1, Cat. no. 6238.0; and chart 4 from ABS 2015, Disability and Labour Force Participation, 2012, table 6, Cat. no. 4433.0.55.006.



^a The deficit is the difference between the participation of people without a health condition in the given age group and the rate for a given disease.

Source: ABS 2015, General Social Survey, Australia, 2014, Cat. no. 4159.0, microdata.

About 70 per cent of health funding is from the Australian and state and territory governments. These figures exclude expenditure on other services that address the disability associated with health status — the aged care and disability sectors (\$15.8 billion and \$8 billion in 2014-15 respectively), with the latter due to expand significantly after the full roll out of the National Disability Insurance Scheme.¹³

Accordingly, in 2014-15, close to \$210 billion, some 13 per cent of GDP, was spent on meeting the various health-related needs of Australians. The government-funded share of this represents more than one third of total taxation revenue collected by all levels of government, and approximately \$10 000 per taxpayer.¹⁴

Taxpayer-funded income support for people in ill-health or with acquired disabilities add another layer of costs, some of which could be avoided through prevention or early intervention. The Disability Support Pension and various carer and sickness payments provide support equivalent to about \$24 billion in 2014-15 (SCRGSP 2016, p. 14.8). Further, while many people are often on welfare payments for short periods, the likelihood of leaving welfare payments for people in poor health or who have work restrictions are much lower. For instance, there is approximately an 80 per cent lower likelihood that someone with a severe work restriction will cease welfare payments at any given time

¹³ Based on data from tables 13A.5 and 14.A.6 respectively from SCRGSP (2016).

¹⁴ ABS 2016, Government Finance Statistics, Australia, 2014-15, table 1, Cat. no. 5512.0 (released 26 April).

compared with the typical experiences of people (Wilkins 2016, pp. 40–42). Consequently, the average duration on welfare is much higher for those with health and disability issues. Low earnings and premature retirement also affects Australian Government age pension obligations. For instance, individuals aged 45 to 64 years who have retired early due to depression have 73 per cent lower income then their full time employed counterparts (Schofield et al. 2011), suggesting much higher qualification rates for the age pension.

In addition, one of the key economic and social roles of governments is to redistribute resources through taxes, transfers and the direct provision of goods and services (such as health and educational services). Cost effective preventative health measures may reduce inequality without the tax and other distortions imposed by the tax/transfer system.

The gains from effective preventative care and improved management of the health care system also extend to some often neglected beneficial second-round effects. Any reductions in health care costs borne by taxpayers lowers taxes, and with that, the adverse impacts that taxes have on investment and labour supply across the economy generally. Income taxes are typically the first recourse for revenue shortfalls for the Australian Government under current policy settings. The most recent estimates suggests that they impose an approximate \$200–\$390 million 'deadweight' economic burden for every one billion dollars of unneeded taxpayer-funded expenditures (Cao et al. 2015; Murphy 2016).

Appendix A Obesity

Some public health analysts see obesity as 'the' major public health challenge of the 21st century. For example, the World Health Organisation observed with alarm:

At the other end of the malnutrition scale, obesity is one of today's most blatantly visible – yet most neglected – public health problems. Paradoxically coexisting with undernutrition, an escalating global epidemic of overweight and obesity – "globesity" – is taking over many parts of the world. If immediate action is not taken, millions will suffer from an array of serious health disorders. (WHO 2017, p. 1)

A.1 Prevalence

When *The Economist* quipped that the 'world is round', its allusion was to body shape not to an astronomical observation (Howard 2012). Over the long run, obesity rates have climbed for nearly all countries, with some estimates suggesting that about 300 million people are affected globally (NCD-RisC 2016; Peirson et al. 2014).

Australian obesity prevalence is similar to New Zealand, Canada and the United Kingdom, but remains considerably below the rate in the United States, where the prevalence rate is about one third. There is some evidence that adult obesity levels may have stabilised in developed countries, with a number of OECD countries showing modest declines in prevalence in the 2010s (OECD 2016).¹⁵ Nevertheless, for all developed economies, with the notable exception of South Korea and Japan, obesity levels are sufficiently high to pose significant population-wide health risks. In Australia, obesity is rated as one of the key single most important risk factor for poor health (AIHW 2016a). The year-by-year changes have been 'small' — for example only 0.4 percentage points per year in Australia from 1995 to 2014-15 (figure A.1). However, the progressive increase has meant that in 2014-15, nearly five million Australian adults were obese, amounting to one quarter of adults. (A further 6.3 million Australian adults were overweight.) To illustrate the meaning of the measure, an Australian man of average height (175.6 cm) would be obese if his weight exceeded 92.5 kg and morbidly obese if his weight exceeded 123.3 kg. A woman of average height (161.8 cm) would be obese if her weight exceeded 78.5 kg and morbidly obese if her weight went beyond 104.7 kg.¹⁶

¹⁵ Only a few years ago, several public health analysts projected that every American adult would be obese by 2048 — an unlikely outcome (Wang et al. 2008).

 ¹⁶ Average heights are based on ABS 2012, Australian Health Survey: First Results, 2011-12, Cat. no. 4364.0.55.001 (released 29 October).

There are several other potentially disturbing aspects of Australia's experiences.

First, the share of people who are *very* obese has been growing over time, and this presents a particularly high risk of premature morbidity and mortality. For example, in 2014-15, 3.2 per cent of Australian adults (570 000 people) were 'morbidly' obese (with a body mass index (BMI) greater than 40), more than two times the rate in 2011-12 and greater than three times the prevalence rate in 1995 (ABS 2015c, 2013, p. 4).

Second, people's perceptions of their healthy weight are often inaccurate (ABS 2006, p. 55). A substantial share of people who perceive themselves to be of an 'acceptable' weight are actually overweight or obese when measured using (self-reported) height and weight. In 2004-05, for example, of males who thought they were of acceptable weight, approximately 47 per cent were overweight or obese, a figure that had climbed since 1995.¹⁷ Moreover, people lie. When self-reporting their weight and height (the basis for the BMI), people say they are taller and lighter than they are. Accordingly, people's self-reported height and weight tend to underestimate actual BMIs, further accentuating that people's views about the degree to which they are overweight are often poorly informed.¹⁸ On the other hand, there are many people, particularly females, who believe they are overweight when they are in the underweight/normal BMI category. Misperceptions are important because:

- people who do not believe they are overweight, even if they are, are less likely to change their behaviours following public health interventions
- there is a risk of undernourishment if normal or underweight people respond to obesity prevention measures by significantly reducing their caloric intake (Lobstein et al. 2015).

Third, the rate of obesity levels in children have been rising significantly over the longer run — rising from 1.8 per cent of 7 to 15 year olds in 1985 to 7.9 per cent by 2012 (Garnett et al. 2016). High obesity levels in parents partly explain higher obesity levels in children, creating a potentially problematic health cycle (Bammann et al. 2014; Oken 2009). To this extent, the growing obesity prevalence rates in children may put pressure on future adult prevalence rates (noting that the estimates of obesity in figure A.1 are period rather than cohort prevalence rates).

¹⁷ This misperception was much lower for females (at 20.7 per cent).

¹⁸ In one Australian study, people overstated their height by 2 cm and understated their weight by 2 kg, with the result that when accurate measures of height and weight were used, the measured prevalence of obesity increased by 40 per cent (WHO 2001, p. 60).



Figure A.1 Adult obesity has emerged as a major health risk

^a In Australian and international statistics, obesity is typically measured by the body mass index (BMI), which is derived by dividing a person's weight in kilograms by their height (in meters) squared. A BMI of 30 or more is labelled as obese. While the BMI does not control for muscle mass and the location of fat on the body, it is still a useful and simple method for gauging excess body fat and is correlated with poor health outcomes. Trends in BMI are also closely related to increases in high-risk waist circumference — another measure commonly employed. Class III (or morbid) obesity refers to a BMI of 40 or more.

Sources: ABS 2015, National Health Survey: First Results, 2014-15 — Australia, Cat. no. 4364.0, table 8, released 8 December for 2014-15 data. The time series data are from OECD 2016, Health Statistics 2016 database, 30 June.

Finally, there are strong associations between disadvantage and obesity, which also plays out at the regional level. For instance, in Queensland in 2015-16, the adult obesity rate in the Northwest health service area was 38.5 per cent, while it was 16.4 per cent in the Gold

Coast area.¹⁹ The corresponding numbers in 2009-10 were 31 and 16.4 per cent, indicating that obesity rates had risen by nearly 25 per cent in the more remote area over a very short period.

A.2 The health effects of high body mass

The burden of disease

The picture suggested by obesity trends paints a grim picture of Australians' health. While it has not yet materialised into declining health or life expectancy, it is contributing to chronic illnesses that are debilitating and costly.

The burden of disease attributable to high body mass has increased over time in Australia (figure A.2), as it has in other countries, such as the United States (Jia and Lubetkin 2010).

Figure A.2 The burden of disease posed by high body mass has been increasing



2003 to 2011

Source: AIHW (2016a, p. 76).

¹⁹ Queensland Government 2016, *Overweight and obesity in Queensland – regional detailed data*.

Life expectancy and disability

Among children, obesity heightens the risk of ill-health even in a person's early years. Being overweight at age 4-5 years increases the health costs of children in their first five years of school (Au 2012). Obesity is strongly implicated with chronic illnesses in young adults, such as early onset type 2 diabetes (Kelly et al. 2013; Reilly and Kelly 2011). It suggests the likelihood of higher obesity levels at older ages, producing health and other costs that can endure for 50 years or more.

Overall, the effects of higher body mass on mortality and disability are strong, notwithstanding the multiple complexities in controlling for many other factors driving health.

Obesity and wellbeing

The evidence suggests that obese people tend to report lower levels of subjective happiness. Most of this appears to be attributable to the adverse impacts of obesity on health, such that obesity has little effect on happiness of people who are not yet suffering from ill-health (Ul-Haq et al. 2014)

The effects of obesity may be changing

One of the challenges for preventative health measures is that the largest benefits are often realised many years after their introduction. This reflects that the greatest burden of disease occurs in middle and old age. Yet, given medical advances, the burden of disease of an obese person aged 60 years in 2046 (a 30 year old in 2016) may be very different from a person aged 60 years today. There is evidence that obesity-related years of life lost has declined over time for class 1 obese people, though this does not seem to apply to more severe types of obesity (Mehta et al. 2014).

On the one hand, this implies that the life expectancy dividend of preventative health measures aimed at obesity may fall over time because future medical interventions counteract the mortality risks of excess body fat. On the other hand, preventative measures may save the health care resources used to achieve that greater longevity and those that are then needed to treat the conditions and disabilities that still manifest themselves in obese people who live longer lives. Evidence in the United States suggests that functional impairment rates have actually risen over time for obese people (Alley and Chang 2007).

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Australian Government

Productivity Commission

SHIFTING THE DIAL

INTEGRATED CARE

3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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1 What should be the direction of Australia's health care system?

1.1 Introduction

An ideal health system must bring together a range of critical resources and processes geared to keeping people well and addressing their needs and preferences when not. Those needs have changed. Like all other developed countries, chronic illness is now the main focus of Australia's health care system (OECD 2015a).

In part, this is a story of success. Chronic illness is what is left over if a system has solved many of other sources of morbidity and death, such as infection, infant mortality, and premature death after the onset of a disease. While prevalence rates of some chronic illnesses appear to be stable (cancer for example), the reported prevalence rates of affective disorders, like anxiety, are rising. Population ageing and rising public health problems, such as obesity, will also increase the share of Australians with complex and chronic conditions, a trend that is evident across the Organisation for Economic Co-operation and Development (OECD 2015a).

By definition, chronic illnesses are enduring and, therefore, where they have serious effects on a person's life, they require ongoing and often costly management from different parts of the health system. Given their persistent nature, they are also inviting prospects for prevention — or at least, for attempts to delay the onset of more severe and costly harms to their sufferers.

Against that background, health policymakers have embraced the concept of integrating the actions of, and information from, the different parts of the health and community sector to provide care suited to the personal circumstances of the patient — 'integrated patient-centred care'. The objective is fourfold – to improve health outcomes while at the same time delivering a higher quality service to patients, lowering costs and ensuring the wellbeing of the health workforce (Berwick, Nolan and Whittington 2008; Bodenheimer and Sinsky 2014). These provide a balanced measure of the success of a health reform and motivate an integrated patient-centred approach to care.

The boundaries of the terms 'integrated' and 'patient-centred' are imprecisely defined. This partly reflects that there are no single definitions of these terms¹ and that their positive connotation means that they are used to describe policies that may only entail a few aspects of integration and patient-centredeness.

The Australian Government's Diabetes Care Program (appendix A) had some key elements of integrated care through its funding model, electronic medical records, care plans and multidisciplinary focus. However, the boundaries of integration were largely limited to the areas funded by the Australian Government. Accordingly, hospitals — the responsibility of State and Territory Governments — were not included in managing patients.

Consequently, when someone describes some aspect of a health reform as integrated or patient-centred, it is important to examine what this means in practice. A failure to do so makes it harder to draw the lessons from the multiple applications of these practices in Australia and globally (appendixes A and B). For example, the failure of the Diabetes Care Program to achieve cost-effective gains was not a failure of integrated care, but a reflection of the problems that occur when implementation of the model is incomplete. Health Care Homes — an Australian Government trial due to shortly begin — also involves incomplete recognition of some key parts of health care. (The Commission proposes changes to the trial that would integrate it better into the whole health care system.)

The Commission's concept is that integrated patient-centred care involves the entire health care system, such that all services — community, primary, secondary, tertiary (and quaternary) — are integrated to achieve good health outcomes and to efficiently deliver a high quality of service to people over their lives. Figures 1.1 and 1.2 describe the key elements of integrated care as we define it, and the roles of the parties in such a care model. Any given person in the current system may try to integrate services — developing care plans, communicating with fellow clinicians and involving allied health professionals, following up on hospital admissions and linking to family members to deliver quality outcomes. But they are swimming against the tide of a *system* that frustrates that model — funding models that discourage this mode of practice, incompatible information systems, poor linkages between the various health professionals, and gaps in the availability of services, among other obstacles. As two Australian health experts commented:

Currently, most interventions remain focused on episodic pharmaceutical treatment and medical procedures. Care coordination is usually limited to referral and information exchange. There is little active team management across specialist medical practitioners, nursing, pharmacy and allied health services. (Swerissen and Duckett 2016, p. 18)

¹ For instance, one researcher found about 175 overlapping definitions of integrated care (Armitage et al. 2009, p. 4).



Figure 1.1 The essential elements of integrated care

Figure 1.2 How integrated care affects different parties



1.2 Seamless and patient-centred care

An integrated system must deliver customised services to people, but its processes must be highly organised to provide consistency and to reduce costs. This is probably best seen in parts of the system, particularly hospital care. One important aspect of integrated care involves the adoption of production and operations planning akin to those in modern commercial enterprises — sometimes referred to as 'clinical redesign' — to manage the patient journey through the system. Under such management processes, all aspects of operations are coordinated to provide quality outcomes at minimum cost to a mix of customers with different preferences and needs.

Sometimes the methods for achieving this are simple, as in Patient Journey Boards — a prominently displayed board in hospital wards that provide members of interdisciplinary teams information to coordinate care and monitor progress of multiple patients through the hospital (NSWMoH 2013).²

Within the hospital part of the system, so-called 'lean care models' adapted from Toyota have also been used. In one instance, application of this approach was able to massively increase the capacity utilisation of operating theatres (PC 2013, p. 250). Another illustration is the High Volume Short Stay model of care for suitable planned surgical cases being implemented in New South Wales (NSW). Infrastructure NSW (2014) indicated preliminary forecasts of productivity gains in the order of \$100 million over 10 years based on reduced length of stay. Organ donation in Australia has also taken a similar coordinated approach to better manage the critical stages that maximise the rate of successful donations (appendix A).

It should be emphasised that seamless care does not have to be impersonal. To the contrary, if executed within the framework we propose, it treats the person as the central party around whom resources and processes that improve their wellbeing are methodically assembled.

There is a danger in seeing integrated care just in terms of 'who does what to who'. This would risk losing sight of some overarching ideas central to a patient-centred model: the person, the process in which they participate, the needs for links outside the system, and the requirement that what is done to people has a proven basis and adapts through innovation.

1.3 There is a consensus that a patient-centred integrated care approach is the right way to go

An integrated system of patient-centred health care has been a policy objective in all Australian jurisdictions at least since a Council of Australian Governments (COAG) agreement in 1995.

The consensus is not isolated to governments. Consumer groups have embraced the concept (GIGH and CHF 2016). The Royal Australasian College of

² In 2017, the original NSW Whole of Hospital Program was transitioned to a Whole of Health Program, though its focus still remains on processes in public hospitals.

Physicians (RACP 2015) advocates patient-centred integrated health care as the right direction for policy. The Queensland Nurses Union advocate funding reform to better ensure providers work together and to contain rising health care costs (sub. 10, p. 19). In its submission to this inquiry, the Australian Chamber of Commerce and Industry (sub. 37, p. 15) state:

Current funding arrangements and financial incentives are structured around providers rather than health outcomes as funding is provided on the basis of activity, rather than on improvements in people's health.

Likewise, the Business Council of Australia identifies patient-centred integrated care as a key microeconomic reform, and like past reforms in other parts of the economy, argues it must be supported by new governance arrangements, consumer power and metrics on performance to ensure progress (BCA 2011). And health experts, in Australia and overseas, have long argued for its adoption. It is rare to have a consensus from such disparate groups.

There have been many experiments in what might loosely be called integrated care (appendix A). However, Australia's progress towards an Australia-wide integrated system of care across primary, hospital and other sectors has been poor, hampered by weak information flows and coordination, inadequate attention to the experiences of patients, and flawed incentives and fragmented governance arrangements (in large part created by the Commonwealth-State divide in funding arrangements).

A simple illustration of the problem is the proportion of a hospital's patients whose GPs are provided with a discharge summary within twenty-four hours of discharge. Currently, Australia's performance is weak. An international survey found that less than 20 per cent of Australian GPs were always told when a patient was seen in an emergency department compared with 68 per cent in the Netherlands, 56 per cent in New Zealand and 49 per cent in the United Kingdom (Osborn et al. 2015).

In addition, while not always conceived this way, an integrated patient-centred system should also give prominence to the quality of service and efficiency.

Quality of services includes not providing low-value care, which by definition is care that either has no effect, causes harm or is not worth its cost. In consumer law, this would be a product that someone would return as unfit for purpose. Similarly, no patient likes to be subject to sentinel events or hospital acquired complications, and their presence is an indicator of poor processes.

Efficiency also matters. NASA is a brilliant integrator of all the processes required to launch a spacecraft, but that is a fabulously extravagant exercise that no health system should seek to emulate. There are finite resources available for health care, and a choice to spend here is a decision not to spend there. A failure to consider efficiency and value for money across the health care system (and public health) is to forgo better value services in exchange for poorer value services. That is not in the interest of people.

To that end, an integrated approach to care should concentrate most on those whose health conditions are critical and for whom the returns will be greatest in terms of better health outcomes and lower health costs. Nonetheless, aspects of an integrated system can be cost-effective for the population more generally, such as a widespread patient record system like My Health Record.

Such as system should also embrace new technologies that lower costs, and increase convenience and quality, though this often seems to have been slow in Australia.³

Finally, an integrated health system extends to preventative activities (appendix D) and to social policies that can have potentially large ancillary health benefits, such as addressing social isolation.

Accordingly, it is clear then the term 'an integrated and patient-centred health care system' embraces many dimensions, which in turn requires complex inter-linked policy initiatives to make it function well.

We do not need to wait another 20 years since the first halting steps were taken.

This paper sets out a roadmap ...

This paper explores the importance of the key elements of an integrated patient-centred health care system, the problems Australia faces in realising the 'ideal', and what can be done to improve the system, covering:

- the role of patient-centred care, the degree to which Australia's health care system has embraced the concept, and the policies to shift the current system away from its producer-centric model (chapters 2 and 3)
- the need for a regional focus in health care (chapter 4)
- the debilitating effects of poorly designed incentives (chapter 5)
- new approaches to pooling funding and collaborating at the local level, including the role that might be played by Health Care Homes (chapter 6)
- changes to funding arrangements to address the persistence of low-value care and adverse events (chapter 7)
- the role of patient incentives in an integrated system, but with an emphasis on carrots not sticks (chapter 8)
- data and information as the lubricant for evidence-based policy and coordinated care of patients across a complex system (chapter 9)

³ For example, telehealth is still embryonic, and its diffusion is discouraged by restrictions in payment models. More generally, the adoption of E health has had a protracted and troubled history in Australia that are only now being resolved (Jolly 2011).

• a brief consideration of how to make the transition from the current system to a better one (chapter 10).

This paper also includes several appendixes that describe the various Australian attempts at integrated care (appendix A), some of the leading overseas examples of successful integrated models (appendix B), the capacity to shift the current retailing model of pharmacy into one that plays a role in an integrated care system (appendix C) and the important role of preventative care, including, as a case study, the issue of taxes on sugar sweetened beverages (appendix D).
2 Patient-centred care is unfinished business

2.1 Defining the scope of a patient-centred model

'Patient-centred' care gives prominence to the preferences, needs and values of consumers. The prominent American cardiologist and geneticist, Eric Topol summed up the change of direction with the title of his book on the matter: *The Patient Will See You Now* (2016).

Patient-centred care has many dimensions.

In some instances, it is about how patients experience their treatment in the health care system (respected, listened to, treated compassionately). In palliative care, the medical outcome is death, regardless of the treatment options. What people want is pain management, proximity to family members and often being at home, rather than being in a hospital.⁴ Effective care largely revolves around meeting these needs. While the health system is still poorly engineered to meet those needs, it is no longer controversial for clinicians to advocate for end-of-life care centred on the preferences of patients and their families rather than a hospital-oriented model (for example, as discussed by the RACP 2016).

In another context, it enables a more individually-based assessment of clinical outcomes. After all, in most cases, ill-health matters to people because it creates distress, inconvenience and functional deficits — whose extent is often best gauged by the person or carer.

In yet another, it is a question of power, which revolves around patient choice and collaboration between the patient and clinicians. Patient choice is a major aspect of a parallel Commission inquiry into human services (PC 2017b).

It is all very well to observe that patient views are important, but acting on them requires behavioural and system changes, and measurement of people's experiences.

⁴ The Productivity Commission has examined end-of-life care as one of the key areas where choice and patient empowerment — typically achieved through access to high quality palliative care — can play a major role in improving outcomes for people (PC 2017b; Swerissen and Duckett 2014). Many people would prefer to die at home or some other non-acute care setting. Yet access to high quality end-of-life care is inadequate.

In its most simple terms, a key goal of a health system is 'mechanical' — to avoid, repair or mitigate the damage that genes, bad luck, lifestyles and ageing have on all people. However, to limit the health system to that goal neglects the importance of how the system deals with people as people. If a health system were only aimed at maximisation of the functioning of the human body, the concept of a 'good death' would be nonsensical if it came at the expense of a longer life.

As in social and disability policy, there is an increasing expectation that the publicly funded health care system should involve people in all the important processes that directly affect them. A patient-centred health services system therefore revolves around the patient, giving them agency through choice, shared decision making with medical professionals, and the capacity for self-management where feasible. Just as is the case in disability care, the potential for such agency requires capabilities and changes in mindsets. People need:

- access to relevant information. This involves good communication from medical professionals, the availability of information technology (IT) platforms that let people record and retrieve their own data, and information on the price and quality of services
- a capacity to make sense of information about their health and the factors that impinge on it (health literacy)
- to shift from passive to active engagement with health care professionals, and to acquire a capacity to exercise greater responsibilities for management of their health care needs.

There is also a dynamic aspect to patient-centred care. People's health care preferences, risks, conditions, and system usage change over time. A system can recognise this in several ways. One is to collect and recognise in advance people's future preferences for care, such as in Advance Care Directives and organ donor registration. Another is to better meet people's needs through the more systematic collection and use of information about their long-term engagement with the health system and associated services, like housing, disability services, and community services. This is increasingly based on large linked longitudinal data sets and new custom made collections like the Sax Institute's 45 and Up database (NSW BHI 2015a; Weber et al. 2017). As the analysis becomes more sophisticated, vulnerable subgroups can be identified for individualised care at critical points in their lifetime before hazardous, debilitating and costly episodes of illness and care.

2.2 Patient-centred care is not the dominant model in Australia

In most of the service sector, the concept that a good consumer experience is a somewhat desirable but peripheral objective would be seen as (undelightfully) antiquated. Yet, there is no consensus by the medical and associated workforce about whether the design, performance measurement, funding and ethos of the health system should give much

prominence to encouraging patients to participate in their own care ('agency') or to give much weight to patients' experiences in the system (GIGH and CHF 2016).

This is not an Antipodean peculiarity. One US physician observed the tensions in the profession:

The larger question is: is health care a service industry? Many physicians do not believe that patient satisfaction is a legitimate pursuit. In this viewpoint, enhancing patient experience offers no value to medical care. ... [Yet] The ideal patient experience merges excellent medical care, high-quality outcomes, compassion, and empathy that address the emotional needs of patients. (Rosen 2017, p. 1)

Some have characterised medical care, especially outside primary care, as too frequently impersonal, treating the patient as a body requiring expert care, but with little interest in the person' agency, experiences or perspectives (Haque and Waytz 2012). It is notable that when doctors become patients, they often recognise the importance of patient experiences and preferences (Murray 2012; Tomlinson 2014).

There is some evidence that Australian clinicians might be less oriented to the concept of patient-centric care than some other countries.

Evidence on patient experiences provides startling incidents of inadequate communication between clinicians and patients. In 2015-16, among those who saw three or more health professionals for the same condition, one in eight reported that there were issues caused by a lack of communication between the health professionals, and this was worst (more than one in six) for those who were least healthy (ABS 2016b).

In Queensland emergency departments, only 46 per cent of people were fully advised about the side effects of new medications, and 80 per cent were not advised about how long they might wait to be examined (QGSO 2016). The same survey found profound differences across regions in all dimensions of the experience of care. For instance, full advice about side effects varied from 61 to 32 per cent across the best and worst performing Queensland hospitals, while the share of people who said that health practitioners talked in front of them as if they were not there varied from 4 per cent to 23 per cent. Greater trust and respect, and better communication between patients and doctors would improve medication adherence — to the benefit of the person and the health care system.

While most Australians can get access to clinicians, about 16 per cent of patients considered that they waited longer times than acceptable to get an appointment with a GP, and this was nearly 25 per cent for specialists.

Even apparently mundane aspects of the health system can have large impacts on people's experiences of the system, can waste resources and have adverse effects of behaviour, for example, through non-attendance (van Baar et al. 2006). In a study of a particular approach to the care of diabetics, one Australian study found:

When patients were referred to different health professionals, the logistics of scheduling and attending various appointments, finding time, transport and support to get there, re-telling the medical history and remembering treatment were burdensome. Information received was found to be conflicting in some cases and often the quantity of information received was deemed too much and overwhelming by some patients. Integrated care appears to be a middle class concept with little applicability to those from disadvantaged backgrounds or those with several chronic conditions. (Maneze et al. 2014, p. 23)

Waiting times in waiting rooms imposes a cost on patients. Most people say that being seen by a GP at the appointed time is very important (Haas and de Abreu Lourenco 2016). While it may seem that the costs of waiting in a waiting room are trivial for any given person, the cumulative effects of waiting times in doctors' offices is likely to impose costs on Australians approaching one *billion dollars* annually — testimony to the millions of physicians visits (box 2.1). By effectively raising the price of access, unnecessary waiting could be expected to sometimes reduce clinically-desirable demand. The use of telehealth for just 10 per cent of consultations would save about \$300 million annually in travel and waiting times. Even when waiting is unavoidable — as it is any customer service industry — waiting rooms could be used as a place for community health initiatives about risks. For example, this might include the simple COPD Assessment Test and the Royal Australian College of General Practitioners' Family history screening questionnaire (RACGP 2016)). The use of rooms for such purposes seems to be rare.

Australian doctors are, by international standards, less receptive to patients' capacity to access their own medical records. One indicator of this is an international survey by Accenture about patient access to their medical records — a prerequisite for patient participation in care, and in any case, an obvious element in any model that gives patients agency. 16 per cent of Australian doctors said that patients should have no access to their own medical record, 65 per cent favoured limited access, and 18 per cent supported full access (table 2.1). They were also less likely to accept that patients be able to amend their record to take account of medical events, such as allergic reactions or medication side effects. Australian doctors were significantly less open to access than were those in the United States.

Table 2.1Doctors' attitudes to patient right to access and update
electronic medical recordsa
2013

Patients should	AUS	ENG	US	SING	CAN	SPAIN	FRA	GER
have no access to EMR	16	6	4	7	14	13	11	34
have limited access	65	60	65	63	57	65	68	54
be able to update family medical history	49	47	67	54	54	43	65	37
not be able to update allergic episodes	26	23	15	20	21	17	10	19
not be able to update medication side effects	28	21	18	18	22	20	16	22

^a AUS is Australia, ENG is England, US is United States, SING is Singapore, CAN is Canada, FRA is France and GER is Germany.

Source: Accenture (2013).

Box 2.1 Waiting, waiting, waiting ...

The concept of a 'waiting room' is an oddly doctor-centric expression. It accepts as its basic premise that waiting after the allotted appointment time is expected and normal, when in other services, it is not. A more patient-centred system would use modern technology, such as SMS, to alert people of delays before they came to the practice or use available appointment management systems. The Commission estimates that the annual costs for patients of excessive waiting times for attending GP and specialist clinics might amount to about 0.1 per cent reduction in Australia's annual labour supply and a cost of the order of \$900 million costs for patients — waste that is preventable (Knight et al. 2005; Knight and Lembkie 2013).5 This reflects the fact that small costs for each of the roughly 170 million annual physician attendances accumulate to large costs.6 There is strong evidence that waiting times affect people's satisfaction with general practice (Potiriadis et al. 2008).

Similarly, online and phone based consultations could avoid both waiting room and travel costs. Even if only 10 per cent of consultations could be undertaken this way, annual savings to consumers would be about \$300 million.7

These experimental estimates relate to something that policymakers might regard as trivial, but that is because the health system concentrates on practitioners, and ignores the invisible burdens falling on patients (and employers). Moreover, such invisible costs are like copayments, and discourage people from physician visits despite illness. For patients, this is an adverse outcome. But for government funders, increases in service provision would have (initial) budgetary impacts (Ray et al. 2015), which may be one reason for the lack of policy prominence given to this issue.

Even if the scope for reducing waiting time was less than suggested above, more value could be obtained from waiting (Cass, Ball and Leveritt 2016; Sherwin et al. 2013). Waiting rooms could be used as a place for community health initiatives about lifestyle risks (for example, using surveys of the kind available on the UK's NHS Choices website) or to seek or give information relevant to the given patient prior to the formal consultation (for instance, the Patient Health Questionnaire and the COPD Assessment Test). It would also be a place for initiating Advance Care Planning, in which patients with advanced illness or serious injuries can set down their preferences for care if, in the future, they are unable to make their own decisions (using the tools and guidance outlined in https://www.advancecareplanning.org.au/state-information).

There are legitimate reasons for doctors to be concerned about access to some records, such as pathology tests unguided by clinical guidance, but that has to be balanced by patients' right to information often paid by them and about them. Accenture noted:

⁵ In the United States, where it appears lost time is greater, it has been estimated that the lost economic value from physician visits were US\$52 billion, though these estimates related to the total opportunity costs of time and not just the avoidable ones, as in the Commission's estimates (Ray et al. 2015).

⁶ This includes total non-referred attendances of 141 million (including GPs, enhanced primary care, practice nurses) and specialist attendances of 29 million (DoH 2017a).

⁷ A barrier to such consultations is that they are generally not covered by the Medical Benefits Schedule. There are grounds for relaxing this, but with oversight to reduce the risk of over-servicing and excessive cost blowouts.

You see countries at one end of the continuum like the US where it seems that clinicians' attitudes are that not only should patients have access to much of the record, but they should be able to play an active role as a co-contributor. Australia is towards the other end of the continuum with countries like Germany, where doctors are more reluctant. ... the comparison across countries that points to a more deep-seated cultural issue around perceptions of the patient and the role that the patients play and should play in the management of their own care. I think some of it is a lack of familiarity with models of care where the patient is actively involved and plays a useful role. (McDonald 2013, p. 1)

Not all is bad. Most patients have a reasonably high regard for their doctor's interactions with them. Patient survey evidence indicates that about 75 per cent of patients thought that GPs always listened carefully, while only about one in twelve considered that their GP did this 'sometimes, rarely or never' (ABS 2016b; SCRGSP 2017, table 10A.65). Perceptions of respect were also generally positive (with 80 per cent saying their GP always showed respect). Outcomes were similar for specialists. However, people who had the highest level of socioeconomic disadvantage and the worst health status fared least well on most of these measures, which is a concern because they are the most vulnerable. It is also notable that the share of dentists who only 'sometimes to never' respected, listened or gave enough time to their patients were 40 to 60 per cent lower than GPs and specialists (SCRGSP 2017 table 10A.65).

The Commission's analysis also suggests that some practitioners have already taken a far more patient-centric approach (often with benefits to them as well), for example by improving appointment management processes (Montague Farm Medical Centre 2012) and using waiting rooms for health education and assessment purposes with the aid of electronic media and information technology (AMA 2014). Diffusion of best practice is then the challenge (section 9.3).

3 How can Australia move closer to a patient-centred system

There are many elements in the successful transition to a more patient-centred model of care:

- an ethos by all actors in the system in favour of it
- raising people's health literacy, and associated with that, giving people information that allows them to be participants in their care, including a capacity to self-manage. The rights to patient data would be one element of any such strategy (with the Productivity Commission seeing such rights to data as a broad requirement across many public and private services)
- providing choice to people where it can realistically be exercised, underpinned by readily interpretable measures of health providers' performance, accessibility, waiting times and prices. Extensive parts of the Australian health system already do allow some measure of choice, such as for GPs, pathology services, dentists, and many allied health professional services. There are however, still big gaps for acute and outpatient care. We do not cover the issue of choice to any great extent in this paper or the main report because it is a central concern in a parallel Commission inquiry into human services (PC 2017b)
- measuring the degree to which health providers meet people's needs particularly through patient-reported outcome and experience measures (PROMs and PREMs), not just clinical judgments or administrative statistics about deaths and hospitalisation rates
- incentives for providers to take into account patient experiences
- identifying those people where the system should devote the greatest attention
- expectations that people would take some responsibility for their own health. Patient passivity reduces the scope for self-management of conditions and reinforces a provider-based system. Nonetheless, the potential for exercising responsibility requires the system to be responsive to it and for adequate health literacy, issues that are considered below.

3.1 Accepting the legitimacy of the concept

There needs to be acceptance by all the actors in the health care sector of a premise that patients are the centre of the system in the same way that disability care has shifted. Many Australian governments have accepted this premise, but patient-centredness requires

structural reforms and attitudinal changes by clinicians *and* patients. Many of these changes are not complete. In considering the receptiveness to measures of patient experience, one health researcher remarked:

Evidence suggests that the extent to which patients' experiences are utilized may be associated with health professionals' attitudes, including their willingness to consider and act upon the patient perspective. (Harrison et al. 2015, p. 17)

Governments and others could take several practical steps.

Health professional education and training needs to reflect the changing model of care. Governments play a role in shaping such education, and can put more emphasis on diffusing a patient-centred approach into the emerging health workforce. While not mature, there is already acceptance of the need for this (Collins 2014). Similarly, the various medical colleges will need to play a role in encouraging acceptance of a patient-centred system among current clinicians — and its implications for their practices. As one participant told us, 'patient-centric' is not 'just about being nice'.

Giving greater weight to patient convenience would represent a major shift in the orientation of the health care system. The change would be underpinned by not just attitude changes, but through the development, dissemination and (if necessary) funding of the technologies that assist this.

Another important change is to give people a greater capacity for making choices between alternative suppliers, buttressed by transparent measures of prices and performance. This is a key message from the Productivity Commission's inquiry into human services (PC 2017b). However, doing this, needs capable consumers, clinicians as willing partners and relevant information (section 3.2).

It should be emphasised that patient-centred care does not equate with giving people what they want if the services are not clinically justified or fail cost-effectiveness criteria for the group to which a patient belongs. While sometimes a patient might say they have had a bad experience because the system did not deliver what they wanted (say antibiotics for a viral infection or a CAT scan after infrequent headaches), few would regard it as desirable or ethical to provide services that harmed people or that used scarce resources better applied elsewhere. As observed in section 7.2, clinicians sometimes feel pressured to provide low-value services by demanding patients. Of course, that there are instances where physicians should not act to improve patient experiences does not invalidate the presumption that in most cases they should.

3.2 Health literacy

There are strong arguments for greater health literacy — 'how people understand information about health and health care, and how they apply that information to their lives, use it to make decisions and act on it' (ACSQHC 2014, p. 2). Several health experts

consulted as part of this inquiry considered it to be a critical feature of patient-centred care and effective choice. The Australian Chamber of Commerce and Industry likewise identify the lack of health literacy as a key impediment to improving health (sub. 37, p. 14). Health literacy is an enabler of prevention, better self-management of chronic conditions, patient collaboration with clinicians, a greater capacity for informed choice and effective advocacy. While the results vary, programs aimed at improving health literacy have been demonstrated as effective in changing health outcomes and in reducing usage of high-cost parts of the health care system (AHRQ 2011).

Yet health literacy is often poor. About 60 per cent of Australians have inadequate health literacy.⁸ This rate is higher, at nearly 75 per cent, for Australians aged 55 years or more, and they are those with the highest likelihood of chronic disease. People with lower education qualifications and income, whose parents have low education, live in regional areas, or have four or more chronic conditions were much more likely to have poor health literacy levels (ABS 2008; Williams et al. 2016b). Remarkably, about 40 per cent of people whose qualification related to health had inadequate health literacy.

While many Australians search for health information online, there is evidence that 99.6 per cent of online health information is beyond the average comprehension level of Australians (Cheng and Dunn 2015). In the United States, the situation is so bad, that the term 'the health literacy epidemic' has gained currency (Sørensen et al. 2012).

Health care costs and poor health outcomes are higher for people with low health literacy, for example because they fail to follow medication directions (ACSQHC 2014; Chesser et al. 2016; Levy and Janke 2016; MacLeod et al. 2017). One study suggests that after controlling for health behaviours and status (among other factors), limited health literacy has an impact that is nearly the same as chronic disease (Volandes and Paasche-Orlow 2007), though meta analyses suggests that this is likely to be an inflated assessment.

There are several strategies for improving health literacy, with roles for all levels of Australian governments.

Populations vary regionally in their health literacy, and in the health issues that might best be the target of efforts to lift literacy. At the regional level, the key local health entities — PHNs, LHNs, community health centres and clinicians — are best able to identify the needs of communities for targeted efforts to measure and improve health literacy. They are also valuable sources of experimentation. As an example, the Northern NSW Local Health District (a LHN) and the North Coast Primary Health Network are currently developing a health literacy initiative in their region, with a particular focus on raising the capabilities of local clinicians (NNSWLHD and NCPHN 2016). It is intended that Health Care Homes which are to be embedded in the local community — include assessment of people's health

⁸ Defined as having competencies of level one or two on a five level scale (ABS 2008, *Health Literacy Australia, 2006*, Cat. no. 4233.0).

literacy (PHCAG 2016, p. 22). Hospitals and waiting rooms are potentially also attractive places for raising health literacy because people are already in a health setting and usually have time. All such programs are readily amenable to high quality evaluation — of the kind being used in a recent NSW trial for raising health literacy in socially disadvantaged adults (McCaffery et al. 2016).

Schools are the dominant place for raising health literacy as they are mandated to teach health education nationally, and prima facie are an ideal platform for raising people's capabilities. Their role in doing so is affirmed by key medical bodies, such as the Australian Medical Association (AMA 2015b).

However, their effectiveness in increasing health literacy is not clear. For instance, in one study it was found that 50 per cent of teachers delivering health education in public lower secondary schools were not qualified or trained in the area, with evidence that this is also a national problem (Barwood et al. 2016; Lynch 2013). Also approximately one third of teachers have inadequate health literacy (ABS 2008). One recent initiative in Ipswich demonstrated the complexities of achieving outcomes (McCuaig et al. 2012). Notably, inadequate health literacy is highest among 15-19 year olds and falls in post-school years, suggesting that health education may not be achieving good results (figure 3.1).





A particular challenge for schools is that inadequate health literacy is strongly associated with poor academic achievement, raising the importance of foundational skills as a complement to any efforts (chapter 3 in the main report). The Commission is not aware of many high-quality evaluations of school-based programs to raise health literacy (Perry et al. 2014 being a rare example in the area of mental health literacy). Evaluation is needed to substantiate the post-school effects of health literacy programs in schools, especially for those students whose general academic achievement and schooling duration is lowest.

Not-for-profit agencies like *headspace* can also play a role both with employers and schools in promoting health literacy — and engagement with such groups are best orchestrated at the local level.

What role could My Health Record play?

At the national level, My Health Record would be a new way of raising health literacy as it will become a ubiquitous way of engaging with nearly all Australians (following adoption of an opt-out system). First, it should link to information on health issues in a similar way to the UK's NHS Choices website (figure 3.2). It could include access to information about low-value interventions, along the lines of the technically accessible Choosing Wisely Australia guidelines.⁹ The information would have to be contemporary and evidence-based (a role that could be performed by the Australian Commission on Safety and Quality in Health Care), while its form would have to be tested for its comprehensibility. The various medical colleges would have to play a major role as collaborators in the development of content and in educating clinicians about the benefits of informed patients.

Second, My Health Record would be an accessible platform for simple tests of health literacy, such as the Health Literacy Questionnaire or the Newest Vital Sign test, to identify whether a person has a good capacity for assimilating health information — for their benefit and for clinicians (Beauchamp et al. 2015; Weiss et al. 2005). In turn, this would inform clinicians' approaches to advising their patients. The capacity to link data on outcomes would also enable continued refinement of any information provided to consumers. It would be possible to test whether any given approach to improving health literacy had any effects on hospitalisation rates, and indeed using random controlled trials (RCTs) to test what types of information are effective and for whom. The strategy taken for raising the health literacy of the elderly (who are intensive users of the health system), people in remote communities, men, or Indigenous Australians may be quite different from those for others. eHealth has the advantage of providing very low cost RCTs and for using behavioural insights to test the best ways of making information delivery more effective.¹⁰

⁹ See http://www.choosingwisely.org.au/home#consumers.

¹⁰ While My Health Record could usefully be an access point for reliable information, it should also be emphasised that people will always seek information from diverse sources even if high quality government-endorsed information is available. A major goal of raising health literacy is therefore to enable people to access information from *diverse* sources and to discriminate between high and low quality advice. Sorting the wheat from the chaff is a key skill.

Figure 3.2 NHS Choices webpage^a



^a Snapshot at 7 June 2017. Source: http://www.nhs.uk/pages/home.aspx.

Third, My Health Record could provide custom-based advice depending on the health status of the person. For example, a person might be reminded of the potential need to have a vaccination or a screening test, such as a check for osteoporosis for post-menopausal women. The Australian College of Nursing supported a role of My Health Record as a source of information for self-care (ACN 2017). The clinician would ultimately be the decision maker (and their decision could be undertaken remotely in many cases). In the United Kingdom, a new artificial intelligence smart phone app has been developed that provides triage services for determining whether a person needs to be directed to a clinician (Burgess 2017). In the United Kingdom, the NHS is trialling this technology alongside its current non-emergency 111 telephone helpline. As it stands, this technology is independent of any personal medical record. A future development could allow a person to link such an app to their health record to improve the precision of any advice.

The high frequency of medication non-adherence and its adverse impact on health care outcomes and costs makes it a clear area for improving health literacy at the individual patient level. Medical non-adherence includes failing to fill a script, stopping medication earlier than advised, changing dosage, or taking other products (such alcohol or over-the-counter drugs that affect the efficacy of prescribed medicines). The evidence suggests that about 50 per cent of patients do not take their medications as recommended by their clinician (DoHA 2010b). At the end of two years, non-adherence to taking statins (the key drug class for lowering blood pressure and avoiding heart attacks) is as high as 75 per cent (Brown and Bussell 2011). In the United States alone, it has been estimated that improved medication adherence could save about US\$100 billion annually, and this is a dated estimate (Osterberg and Blaschke 2005). The problem will rise significantly with population ageing and the greater prevalence of chronic conditions.

Forgetfulness plays a role, in which case reminder notices issued through My Health Record by SMS would be a partial remedy. Non-compliance can also reflect lack of awareness of the consequences. For instance, underestimation of the risk of fractures is a major reason for non-compliance in taking medications for osteoporosis (Inderjeeth, Inderjeeth and Raymond 2016). More frequent patient interaction with physicians has proven effective in dealing with this, but is costly. Education and reminders through My Health Record may be a complement to this approach, and its effectiveness could readily be tested. A recent review of eHealth in this area observed:

Greater use of eHealth to improve health literacy at an individual and population level is an obvious priority area for research. There are few, if any, technological barriers and risks are likely to be minimal. (Car et al. 2017, p. 7)

Personalised advice (and interventions) could also be mediated through apps connected to electronic medical records. There are already several apps that link to My Health Record, such as Healthi, HealthEngine and Tyde, although these do not currently provide additional information beyond that already contained in My Health Record. There should also be a capacity to transfer information from wearable health technologies to My Health Record (and subject to a patient's consent, to his or her clinician), and, based on this information, to provide tailored advice to the person. Wearable activity trackers have already shown promise for post-surgery recovery in cardiac patients, pulmonary rehabilitation, and activity counselling in diabetic patients (Chiauzzi, Rodarte and DasMahapatra 2015).

One of the advantages of integrating care along the lines proposed in this paper is that a variety of parties — primary health networks, public hospital networks, clinicians, and insurers — will have aligned interests in maintaining care, developing apps, even subsidising wearable technologies targeted at given groups, and in promoting greater capabilities in health professionals to recognise and address the health literacy of their patients.

There are several barriers to using My Health Record as a tool for consumers:

• there are difficulties in engaging older people (and to a lesser extent, males). This was demonstrated by a registration rate of people aged 65 or more years that was less than half that of people aged 20 years or less when My Health Record was an opt-in system (ADHA 2017). Concerns about privacy and people's technical capacity to use the system may have played a role in this outcome (for example, ACN 2017). While an opt-out system will ensure more complete clinical records, it will not guarantee that

older people will use the system for their own purposes. This is problematic because older people use more services and are much more likely to have complex interacting chronic conditions where information given *to* them, not just recorded *about* them, is important.

• There is also evidence of a lack of awareness by people of the potential uses of the Record. For example, only 1071 people (0.002 per cent of registered users) had used My Health Record to lodge an Advance Care Planning Document by mid-June 2017, despite the relevance of such a document to all Australians.

While social marketing might partly address these barriers, advice from health professionals (regardless of where they operate in the system) about its value to people may be the most successful approach to encourage its use.

The presumption in much of the material is that low health literacy is a deficit in the patient, but this ignores that a role of health professionals is to tailor their communication to patients' health literacy level. Nurses, for example, tend to overestimate patients' literacy levels, and professionals fail to recognise that people with poor literacy are reluctant to reveal their lack of understanding of advice (Johnson 2014, p. 43). This is why My Health Record may be a good vehicle for testing literacy in a non-stigmatising way and communicating the results to clinicians. It also suggests that medical education should provide training on the importance of health literacy in obtaining good clinical outcomes and better patient experiences. This has been identified as a 'major gap' (Hill 2016).

To have its full impacts, health literacy needs to be accompanied by information on system performance

Health literacy can contribute to giving consumers more power and choice. But actually achieving these goals needs divulgence of information about the performance of providers. In some cases, that requires new measures of performance (the next section), and in others, transparency of prices and indicators of the quality of services provided by hospitals and clinicians (chapter 7).

CONCLUSION 3.1

Health literacy is one of the key determinants of health outcomes and a capacity for people to participate in their own care and make informed choices between alternative health providers.

Increasing health literacy should be a major objective of an integrated health care system. Achieving this will involve multiple initiatives:

- The funding reforms proposed in Conclusion 6.1 and the cultivation of experimentation and collaboration at the local level is a key way of developing effective health literacy in communities.
- It would be desirable to give more weight in health professionals' training syllabuses to the implications of people's health literacy for effective communication with patients.
- While having good prima facie validity as a mean of raising health literacy, health education in schools appears to suffer from the problems affecting other aspects of teaching, such as teacher capabilities. Few high-quality evaluations of the long-run effects of raising health literacy in schools have been undertaken, which should be remedied.
- My Health Record shows promise in improving health literacy by:
 - being a vehicle for assessing health literacy with accompanying advice to people on where to acquire more skills if that is required or desired, and, if a person consents, permission for health professionals to access the results
 - lowering the costs of randomised control experiments to assess the most effective ways of communicating with people, based on their characteristics
 - providing tailored information that would allow greater scope for patient self-management and joint participation in health care decision making, potentially supported by the use of apps and wearable technologies.

Many of the benefits of health literacy — and in particular the capacity to exercise choice — require greater divulgence of the performance of clinicians and organisations, including hospitals and practices, and where they apply, prices.

3.3 Asking people about their experiences and outcomes

Some aspects of health care can only be assessed by asking people about their outcomes and experiences. Yet, to the degree that outputs and outcomes are measured in the health care system, they typically relate to clinical assessments, administrative records and notifiable events (death, adverse events, hospital discharges, readmissions and so on).

There are now well-established ways of assessing patients' experiences through Patient Reported Experience and Outcome Measures (PREMs and PROMs). PREMs provide insight into processes that affect patients' experience, for example they ask patients about the time spent waiting and the quality of communication. PROMs focus on patients' health and their health-related quality of life. These ask patients for their views about post-operative outcomes (say their capacity for doing everyday tasks after a knee replacement), distress, and pain levels among other things. They are less subjective than standard satisfaction measures, though they may also have a role and sometimes overlap.

There is evidence that PREMs and PROMs lead to better decision making and patient experiences (Breckenridge et al. 2015; Chen 2016; Duckett, Cuddihy and Newnham 2016). They are now widely used in the United States, the United Kingdom, Sweden and the Netherlands and for given diseases in a range of other countries (OECD 2017a; Williams et al. 2016a).

Patient experience measures can relate to specific types of events — for instance adverse events in hospitals — where their insights can add new dimensions to routinely-collected data. As noted in a recent large-scale study:

Specifically, patients can provide valuable information regarding problems with continuity of care, medication errors and communication between staff and with patients. The information from patients is critical to identifying incidents and ultimately to reducing patient harm, but they are not routinely asked to provide these data. (Harrison et al. 2015, p. 16)

Some Australian State Governments are piloting PREMs and PROMs (NSW for both measures, and Victoria for PROMs).¹¹ In NSW, the Bureau of Health Information collects various PREMs for hospital admissions across the state with a routine Adult Admitted Patient Survey (figure 3.3). The BHI has also undertaken targeted data collection for Aboriginal people (NSW BHI 2016). Other jurisdictions also undertake patient surveys in hospitals, though their methods and survey frequency vary (ACSQHC 2012). There are also various disease-related registries across Australia that collect PROMs, such as the Victorian Cardiac Outcomes Registry (ACSQHC 2016b).¹²

However, there is no coherent Australia-wide collection of patients' assessments of outcomes and experiences across various medical procedures (knee replacements, dialysis, breast cancer treatments and so on), and for different parts of the system (GPs, allied health care, specialists, acute and palliative care). Little is known about patient experiences in the primary health care sector beyond limited ABS survey data, and the instruments for measures in this part of the health system are still under development (ABS 2016b;

¹¹ For instance, the Northern Sydney Local Health District Osteoarthritis Chronic Care Program includes PREMs and PROMs as part of an explicit patient-centred approach (NSW ACI 2016b).

¹² The VCOR is a Victorian Government-funded collaboration between Monash University, the Victorian Cardiac Clinical Network and various Victorian hospitals. It collects data about patients undergoing cardiac treatments, procedures and interventions. It follows up medical outcomes and complications up to 30 days after hospital discharge. This information is used to report the outcomes of interventions and treatments back to hospitals and others to help determine the factors that contribute to and promote better patient outcomes. It also helps to identify the issues that may be impede better outcomes. (https://vcor.org.au/).

Gardner et al. 2016). PREMs and PROMs should be common across jurisdictions so that results can be more readily benchmarked and lessons learnt.

Figure 3.3 A sample of the patient reported experiences for admitted patients in hospital emergency departments in NSW^a



^a The circles relate to hospitals in various NSW Local Health Districts. Data are typically April 2014 to March 2015.

Source: NSW Bureau of Health Information, Healthcare Observer from http://www.bhi.nsw.gov.au/.

A starting point for change would be the general requirement for hard-headed ongoing assessment of patients' assessments of outcomes and experiences — which would hold governments and health care providers accountable. The International Consortium for Health Outcomes Measurement (ICHOM) — a global collaboration on the development of outcome measures — has already developed standard outcome measures for just under 50 per cent of the global disease burden. It would provide a good starting point for the collection of data for many diseases.

The immediate universal rollout of new data collections that measure patient experiences and outcomes would be risky. Clinicians need to accept the legitimacy and value of the measures, and the compliance costs of data collection would be high unless the instruments, the associated IT and training were geared to reduce these. As users of the health system, Australians will need to know in plain English what PROMs and PREMs mean for them ('Why am I filling out this questionnaire?' 'Why will it help me get better outcomes?). Such system changes require time and resourcing, and suggests pilots, as in Victoria and New South Wales, building on the experiences of other countries that have already implemented PREMs and PROMs.

The adoption of PREMS and PROMs should be accompanied by the development of guidelines indicating how clinicians, administrators and funders should reflect the outcomes of these measures in health care management. The guidelines should be co-designed by all of the above parties in a collaborative effort, with the ACSQHC being a natural vehicle for progressing this.

CONCLUSION 3.2

The realisation of patient-centred care requires measures of how patients experience the system and their reports of the outcomes.

This requires the development of well-defined measures of people's experience of care and the outcomes they observe (so-called Patient Reported Experience and Outcome Measures — PREMs and PROMs), and integration of these into disease registries.

The Australian Commission on Safety and Quality in Health Care (ACSQHC) would be the orchestrator of these developments, in consultation with State and Territory Governments, consumer groups representing patients, the various medical colleges, and specific clinicians with expertise in the relevant fields.

PREMs and PROMS should not vary across jurisdictions.

State and Territory Governments should commit to the development of PREMs and PROMS for primary and acute care, underpinned by an implementation timetable. The measures should initially be confined to pilots in given specialities and locations.

Jurisdictions should agree on sharing information about pilots and on the evaluation strategies for them. Compliance costs and implementation risks should be an explicit consideration in forming the timetable.

The ACSQHC should develop guidelines indicating how clinicians, administrators and funders should reflect the outcomes of PREMs and PROMs in health care management.

Regardless, PREMs and PROMs should be published at the hospital level in all jurisdictions and potentially at the clinician level. If nothing else, clinicians should be informed about how patient experiences of their care compares with their peers.

Publicly available PROMS and PREMs should be explained in plain English with the goal of being accessible to patients with a reasonable degree of health literacy.

3.4 Targeting patient-centred care

A common feature of health care is that some groups make very intensive use of the health care system. Identifying such people and tailoring services to their needs can have large

social and economic benefits. As indicators of the concentration of problems among some groups:

- In the Diabetes Care Program, 5 per cent of participants accounted for 62 per cent of potentially avoidable hospitalisations (appendix A). That program failed to adequately target such people for additional care and support, but had it succeeded in doing so through more elaborate risk modelling and targeting of the capitation payments, it would have improved the wellbeing of the people concerned and saved costs.
- In 2013-14, one per cent of the NSW population were admitted to hospital three or more times accounting for 46 per cent of the 7 million bed days (figure 3.4 and NSW BHI 2015a).
- The Ambulance Service of NSW found that between July 2013 to July 2015, 2693 people (0.31 per cent of ambulance users) accounted for 64 434 ambulance uses (calls that resulted in dispatch) or 4.7 per cent of total ambulance uses over that period (CEC 2016). Ten patients accounted for 1360 ambulance uses. Chronic pain, complex psycho-social factors and inadequate engagement with the primary care health system were significant drivers of use by this small group of people (McLaughlin 2014; Wildon 2014).



Figure 3.4 A few people account for a large share of hospital admissions NSW 2013-14

Targeting such groups through patient-centred care models can be very effective. For instance, 88 high-end frequent ambulance user patients in NSW have been case managed by the Frequent Use Management program from its commencement in September 2013,

with the program taking a patient-centred approach. During the period January 2014 to December 2014 there was a 77 per cent reduction in calls from patients being managed by the program (NSW Ambulance 2015).

CONCLUSION 3.3

Relatively small groups of people account for a high usage of services.

While a patient-centred approach should apply to all people in the health system, it is particularly important to discover those who are the most vulnerable and intensive users of the health system and build services around them to manage their chronic conditions better.

Better utilisation of data will be a key to discovering these high-risk groups.

4 A regional approach is needed in collaboration and funding

Integration of care is generally best managed regionally, reflecting local knowledge and relationships, variations in the characteristics of regional populations, an efficient scale for managing health service delivery, and integration with other parties that address local population health (Baker et al. 2008; Ham 2010; Ham and Timmins 2015; Nicholson, Jackson and Marley 2013; Suter et al. 2009).

All jurisdictions have made progress towards a regional approach to care, providing a good foundation for further reform. Local Hospital Networks (LHN) are public sector bodies that manage hospitals and state government health services in a given area.¹³ Primary Health Networks (PHN) are private entities that have been contracted by the Australian Government to improve the efficiency and effectiveness of services and to coordinate patient care in their locality, including by working collaboratively with Local Hospital Networks. For that purpose, the geographical boundaries of Australia's thirty one Primary Health Networks are generally aligned with those of the LHNs in each State and Territory jurisdiction. This regional structure lays the foundation for integrating health care.

Some PHNs and LHNs have been building on this foundation, working together to deliver integrated health — and where they do, for example in Western Sydney, Brisbane North, and the Hunter, they are proving effective for improving the coordination of care (appendix A).

While there has been a greater policy orientation to subsidiarity in health care, the journey is far from complete, nor the arguments for it, completely accepted. Partnerships between PHNs and LHNs are currently rare in Australia, a consequence of relatively weak financial incentives, and underdeveloped governance arrangements for their universal adoption and (based on feedback from stakeholders) the likelihood that there is insufficient funding of PHNs for them to achieve their goals — an issue we examine further in chapter 6.

Moving to a more regional model makes sense from multiple perspectives.

¹³ The role, governance and names of LHNs vary across state and territory jurisdictions. Generally, they are responsible for delivering or procuring hospital services, public dental services, and community and public health primary services. Except in the ACT, they are a separate government agency from the department of health. LHNs are known as Local Health Districts in New South Wales, hospitals or Health Services in Victoria, Hospital and Health Services in Queensland, Health Services in Western Australia, Local Health Networks in South Australia, the Tasmanian Health Service, Health Services in the Northern Territory and the Local Hospital Network in the ACT.

4.1 Relationships matter

Relationships and collaboration at the local level are critical to successfully progressing towards an integrated system of patient care. The evidence shows that effective integration of primary and secondary care services requires joint planning by regional primary and secondary institutions, including formal agreements, multilevel partnerships and joint boards (Nicholson, Jackson and Marley 2013). Likewise, the sharing of clinical priorities, a shared electronic health record and agreement to share relevant data are prerequisites for productive partnerships. Examples of such collaboration between LHNs and PHNs in Australia are rare, but where they exist, they have improved population health, delivered higher quality services, been more cost-effective and increased workforce satisfaction (box 4.1 and appendix A).

There is little in the current health system — outside hospitals — that resembles the teamwork and clarity of relationships that take place in normal 'production' processes. A key feature of integrated care is *willing* collaboration between different parts of the medical workforce, administrators, researchers and funders. Collaborators' satisfaction with multidisciplinary integrated care depend on many factors.

These included communication; workload; clear roles and responsibilities; clear leadership/decision making; facilities/infrastructure; knowledge, training and skills; provider engagement; trust and respect between providers; usefulness of collaboration; impact and benefits; management; access; and flexibility of the integrated model (Stephenson et al. 2015, p. 4).

Participants in the inquiry often emphasised the need for 'buy-in' from clinicians in implementing integrated care given many clinicians were time poor and distrustful of new initiatives that involve changes to their practices, funding arrangements and clinical relationships. The Commission was also told how often personal relationship and networks made it possible to develop trust and obtain agreements between disparate parties and to innovate. Finding the right partners in any given health intervention depends on knowledge of their capabilities. The following two (hypothetical) conversations are plausible at the local level:

XX is a very competent and enthusiastic director of the Community Health Care Centre and she'd love a chance for partnering on that idea.

YY just pursues old ways of doing things — choose someone else as a partner for that initiative or you'll be blocked at every move.

These are not judgments that could be made remotely by a distant bureaucracy.

In discussing integrated care with various participants in this inquiry, the Commission was also told of negative undercurrents that affected the relationships between general practitioners, allied health professionals, nurses (including nurse practitioners), specialists and health administrators. These arose from multiple quarters — such as different perceived levels of prestige and power, the academic difficulty of the disciplines, relative

earnings, concerns about the scope of practice, lack of respect, and loss of autonomy.¹⁴ While any such tensions are not uniform, they must affect the capacity for a multidisciplinary and collegiate approach to patient care, as well as the capacity for innovation and diffusion of best practice.

One qualitative study of attitudes of doctors found:

Indeed, almost all of our participants had something to say about the disrespect that they or their colleagues had experienced from hospital managers or university bureaucrats. Here their concern was not so much about the rights of doctors by virtue of their status, but rather a lack of regard for doctors' perspectives, expertise, and efforts. (Lipworth et al. 2013, p. 9)

The implication is that integrated patient-centred care needs the able fostering of relationships and trust between parties where that has often been weak. Structural reforms will not be enough.

A regional model still requires oversight by the Australian and State and Territory Governments. They have a key role in encouraging local collaboration by setting the same broad priorities for each party and by holding boards accountable for objective measures of performance.

Across all jurisdictions, key performance indicators are already available for some aspects of care, mainly at the hospital level. For example, state government reporting frameworks include, among other factors, patient satisfaction, pain reduction, hospital hygiene, survival rates for cardiac arrest, operational efficiency, and post-discharge follow-up rates (NSWMoH 2016; VicDHHS 2015).

In contrast, measures of the performance of general practice is sparse. This is largely the result of governance and funding arrangements for primary care. As noted by two policy analysts:

The states manage public hospitals, while the Commonwealth has accepted 'lead responsibility' for primary care. However, the way they perform these roles is quite different: the states have clear responsibility for delivering hospital services, but the Commonwealth confines its responsibility for primary care primarily to funding ... There is no comprehensive framework in Australia for measuring or rewarding quality and performance in primary care. (Duckett and Swerissen 2017, pp. 7, 15)

In part, the scarcity of performance measures also reflects that most general practices are small and with that, have a weaker capacity to manage information compared with hospitals. Nor is the primary care payments system geared to provide clinically-relevant information (as the most common MBS items are consultations with unknown interventions). Electronic health records are changing this. For instance, a patient record

¹⁴ There is a voluminous — largely qualitative literature — on such attitudes across most Western health systems (Clarin 2007; Lipworth et al. 2013; Rogers, Creed and Searle 2012; Schadewaldt et al. 2013; Street and Cossman 2010; Tierney et al. 2016).

can identify how many patients with type 2 diabetes lose their vision, suffer limb amputations, experience renal failure and cardio-vascular disease, become obese, have unplanned admissions to hospital, and have elevated glycated haemoglobin levels. While much of this information would be entered by hospitals (thus reducing any compliance burdens of record-keeping by GPs), the measures would be indicators of the effectiveness of primary care in managing diabetes. While no single instance of any of the above outcomes suggests poor care, when aggregated across time and patients, they will highlight general practices where care is highly effective and others that could improve their management of diabetes. They will also indicate whether collaborative efforts by PHNs and LHNs are delivering the desired outcomes, and if not, where the failings and lessons lie. Accordingly, for accountability and learning, more work has to be undertaken to develop KPIs for primary care, while avoiding excessive data collection, and choosing the best point at which to collect the information (chapter 9).

4.2 People and regions vary

Health needs vary across regions, with a need for custom-made variations in the allocation of resources. In an area where there are concentrations of older people, dealing with falls and loneliness — both associated with avoidable hospitalisation and low wellbeing — would be a higher priority for preventative and management strategies undertaken by PHNs, LHNs and community health care centres. In other regions, different issues would predominate. Hospitalisations for regular dialysis is twice as common for people in remote and very remote areas (AIHW 2013). Diabetes rates and associated limb amputations, obesity levels, smoking rates, suicides, and heart failure admissions to hospital demonstrate large variability across regions (figure 4.1; ABS 2016a; AIHW 2016d, 2016e). For instance, in the latter vein, the Australian Commission on Safety and Quality in Health Care has emphasised that effective management of heart failure requires a multidisciplinary integrated approach across the acute, primary and community care sectors, and health promotion strategies like physical exercise and fluid intake, with the latter being obvious target for tailored local initiatives (ACSQHC 2015, p. 321).

Suicide prevention is another illustration of the potential value of regional responses. Cliffs, bridges, tall buildings and other manmade structures in certain locations are often suicide hotspots, where changes in the local environment to reduce access or provide help (for example gates and fences, signs with helpline numbers, and CCTV monitoring) have been shown to reduce overall local suicide rates (CHPPE 2012). Preventative measures on such a localised level need the involvement of local agencies, including local government. Regional decision makers have detailed local knowledge and the capacity to determine the amount of funding they should devote to this area of public health compared with others. That would not eliminate the role of State, Territory or the Australian Government in this area. They could still provide national prevalence statistics by area, and develop general national protocols for addressing local suicide risk that regional decision makers could draw on in making their local decisions. Ideally, funding hypothecated to specific public

health concerns by governments would be better pooled and given to regional decision makers so they can allocate it to the highest value areas of concern among their local competing health priorities. If governments still provide funding centrally, as is proposed for a recent Australian Government initiative to address suicide hotspots around Australia (DoH 2017b, p. 17), local decision makers would best be left to decide how it is to be spent on suicide mitigation.



^a Age standardised by Australian Bureau of Statistics' Statistical Area Level 3.

Source: Australian Commission on Safety and Quality in Health Care and National Health Performance (ACSQHC), 2015, Australian Atlas of Healthcare Variation, chapter 6 data.

4.3 Experimentation thrives among diverse thinkers and diverse environments

Regional flexibility gives permission for experimentation. The international evidence shows there is no single best model of integrated care, and that therefore central governments should step away from prescriptive rules about how it is delivered. Devolution to the regional level can also partly address the perpetual contest between Australian, State and Territory Governments about their competing roles in orchestrating the system using tops-down approaches. In the view of the Australian Chamber of Commerce and Industry (sub. 37, p. 15), for example:

The fragmented and complex web of government roles in different parts of the health system also makes enduring or meaningful structural change difficult to achieve.

Devolution to the regional level can help to circumvent barriers to improvement associated with negotiating agreement at multiple levels of government.

Some PHNs are already demonstrating local innovation, encompassing activities as diverse as: implementation of health pathways; use of allied health professionals for preventative health; models of care for general practice to adopt for patient weight management; capability building of physicians through professional development; and the development of telehealth initiatives.

Even within the current restrictive funding framework, some PHNs have formed alliances with other health care entities in their region to deliver integrated care for particular chronic conditions (box 4.1). In Queensland, the government established an Integrated Care Innovation Fund that requires Local Hospital Networks to partner with Primary Health Networks in order to receive funding. It may also be desirable for governments to strengthen local innovation by making LHN and PHN board appointments independent of the respective health Minister, as recommended for Victoria's LHNs by Ham and Timmins (2015).

That does not preclude initiatives at a higher level of government that are then implemented at the regional level. Bonuses can be effective for achieving behavioural change and facilitating the diffusion of best practice. Under activity-based funding, this can be achieved with payment loadings on given activities, such as establishing a stroke unit where that is a cost-effective option (Queensland Department of Health 2016a). This loading assisted hospitals to make changes to their stroke management, with known benefits for mortality.

In New South Wales, the Agency for Clinical Innovation (ACI) undertook a major initiative to improve stroke management in hospitals, after compelling evidence from the NSW Bureau of Health Information of inexplicably large variations in mortality outcomes across hospitals. The ACI recognised that some of the variations would reflect factors outside the control of hospitals and that local features mattered:

By providing reliable service data and reaching out face-to-face across NSW, the SCAP [Stroke Clinical Audit Process] has increased the profile of unwarranted clinical variation in general and demonstrated that unwarranted clinical variation is a local issue with local solutions.(NSW ACI 2017, p. 3)

Box 4.1 Hunter Diabetes Alliance: better diabetes management

The alliance involved collaboration between the four prominent health care providers in the region — Hunter New England Local Health District, Calvary Mater, Hunter New England and Central Coast Primary Health Network, and Hunter Primary Care.

The Hunter area has a higher than average prevalence of type 2 diabetes mellitus (T2DM) and the complications associated with it, and there was significant variation in care — which made T2DM a priority for intervention.

The alliance created integrated clinics in GP rooms involving a multidisciplinary team (the patient's GP, a practice nurse, an endocrinologist and a diabetes educator), the patient and their carer. The aim of the model was to improve diabetes control, patient experience and self-management; to support clinically-justified prescribing and monitoring; increase GP team diabetes knowledge and skills; address barriers to implementation of best practice diabetes management; and reduce the time taken by clinicians to initiate or intensify treatment. The model of care drew heavily on collecting patient data to monitor progress and respond (including benchmarking against other practices).

Over 14 months, 456 patients with T2DM were seen. At the start of the intervention, 29% of T2DM patients with a BMI>35 had not seen a dietician (noting a BMI>30 is regarded as obese), 12.5% had not had their glycated haemoglobin levels (HbA1c) checked in the last year (despite this being a key measure of future adverse outcomes like coronary heart disease), and 33% had no record of testing for urine microalbuminuria (an indicator of kidney damage).

After the case conference, 92% of patients had medication changes recommended. Thirty-six per cent were referred to a dietician. After a 6 month follow up for a sample of patients, there was a significant improvement in HbA1c levels, 51% of patients had lost weight; and the share of people exercising for 30 or more minutes per day increased from 30% to 75%. A significant share of patients reported improved knowledge, confidence and skills in self-management. Overall clinician costs of care fell by about 20%. The 'did not attend rate' fell from 25% to 2%. And it cost less. The evaluation found a range of qualitative improvements (as shown below).

(continued)

Box 4.1 (continued)

Orthodox Model	Alliance model				
Consultations at hospital	Consultations close to people at GP clinics				
Recommendation made to GPs, which may not be implemented by GPs	During the case-conference, the GP takes ownership of recommendations and implements them				
Little skill development of primary care team (letters sent only)	High levels of upskilling for primary care practitioners, including live demonstrations in case conferences				
Specialists obtained limited information and consultations were slowed down to gather data	Comprehensive information available with GP database (also saving time)				
Multiple routine follow-ups with specialists	No routine follow-up from specialists. All follow-ups were at the GP practice from the primary care team. Liaison with specialist if needed.				
Limited development of partnerships	Based on a partnership model				
By definition, no new learnings to be diffused	Potential to improve entire practice cohort				
^a There were some differences in the data reported by the two sources below (likely to reflect updated information used by Lynch et al. 2016). The biggest discrepancy related to the share of patients reporting improved knowledge and confidence in diabetes management, but both measures were still material					

Sources: Lynch et al. (2016) and Hawker et al. (2016).

The ACI's approach helped redress unusually high mortality from stroke in certain hospitals (section 9.3 of chapter 9). But it also indicated the value of data (the basis for discovering the problem), local engagement, behavioural change and measurement of impacts — all requiring trusted networks and local buy-in.

At the Australian Government level, the prospective Health Care Home program has many positive elements. However, capitation payment rates are fixed across the various locations, and it does not include provisions for LHNs and PHNs to change the funding model or develop innovative contracting and incentive approaches with the Health Care Homes. That suggests that there are benefits in retaining Health Care Homes as a Commonwealth-initiated initiative, but with permission for, and indeed encouragement of, local adaptation.

Moreover, as discussed earlier, the success of financial and non-financial rewards to motivate lifestyle behavioural changes or to increase compliance with care plans, medication and attendance at health care facilities depend on the context. Local area bodies are likely to be best able to experiment, learn and transfer their experiences to others. As PHNs and LHNs are close to their community, real time assessment and qualitative judgments can more quickly establish whether an experiment should be modified or abandoned. Central organisations would remain relevant as supporting (rather than directing) institutions, assisting in contributing ideas, providing advice on evaluation, consolidating and analysing data, and diffusing knowledge about what works (and what doesn't). Moreover, under the blended funding arrangements envisaged by the Commission, LHNs and PHNs have strong incentives to discover the interventions that save them money (such as through lower hospitalisation rates).

Of course, experimentation should not be arbitrary. There are common features to effective models of integrated care (illustrated in figure 2.1 in chapter 2 of the main report). In particular these require a patient-directed approach, breaking down of the boundaries between the medical disciplines, highly-developed supplier links underpinned by aligned incentives for cooperation (relating primarily to community health, general practice and hospitals), and data sharing. In short, there should be a coherent system for addressing all of a patient's needs.

4.4 There should be links to regional community services and public health initiatives

Public health is sometimes seen as the poor cousin of the integrated care family because of the weight given to joining up conventional health care services. The public health role of integrated care is often largely isolated to vaccination, maternal and infant health monitoring, and advice from clinicians and allied health professionals about lifestyle risks, such as smoking, physical activity and obesity (though currently physicians rarely provide such advice). These are all very important, but there is more to public health.

There is a strong prima facie rationale for a greater emphasis on public health and prevention in an integrated system, and in particular, an extension to community engagement and purchasing services that may have public health benefits and advocacy. For example, this can encompass:

engagement of the community, paid community workers and the not-for-profit sector to assist vulnerable people. Social housing, drug rehabilitation and harm minimisation services, outreach to homeless people and sex workers, and engagement with families at risk are examples of areas where public health and community services intersect with primary health (for example, as described in VicHealth 2009). Provision of meals on wheels is another illustration, with evidence (albeit incomplete) of social and health benefits (Campbell et al. 2015). There are, more broadly, grounds for interventions to relieve people's loneliness because of its effects on people's wellbeing (Ong, Uchino and Wethington 2016; UKLGA 2016; Willett 2015). There is (as yet incomplete) evidence that loneliness and low social participation rates are associated with higher re-hospitalisation rates, longer hospital stays, greater visits to physicians, higher participation in behaviours with health risks, and greater mortality.¹⁵ For instance, poor

¹⁵ For instance, Gerst-Emerson and Jayawardhana (2015); Newall et al. (2015); Ong et al. (2016); and Taube et al. (2015).

social relationships are associated with a 29 per cent increase in risk of incident coronary heart disease and a 32 per cent increase in risk of stroke (Valtorta et al. 2016)

- partnerships with commercial parties that may voluntarily change their practices. (The Commission was told of a local hospital network that successfully engaged with local supermarkets about promoting healthy eating)
- social marketing about lifestyle risks (where that works)
- engagement with, and learning from, private health insurers and bodies that regulate workforce, health and safety
- engagement with state bodies responsible for interregional infrastructure decisions, which can have implications for health, for example through their impact on road safety (Australasian College of Road Safety sub. 34, pp. 4-6) and/or air quality (Clearways sub. 44, pp. 26-27)
- cooperation with local governments about the services they provide, and the built environment, such as access to recreational facilities. Sometimes information provided by a local government agency to a health service can trigger other needed services (box 4.2).

There are limits to the *direct* role of the health system in some areas that affect health risks. Some public health measures require coercive action through taxes and regulation — tools that have proven effective in reducing the risks from tobacco use and vehicle accidents (appendix D). Other measures relating to the management of people with drug and mental problems involve the criminal law and the justice system. The use of these measures involve considerations outside health care, such as regulatory burden, community norms and the acceptable boundaries on the powers of the state, which mean that the decisions should be directly politically accountable. Nevertheless, there are grounds for more systematic involvement of the parties responsible for health policy and purchasing with those making regulatory and tax policy decisions, including through data sharing that would allow more effective assessment of the health impacts of such policies.

Box 4.2 **Two brothers — a journey to better health**

The Latrobe City Council and the Latrobe Community Health Service have been working together for several years to improve service coordination. In one case, two brothers were referred to the city council for meals on wheels. Assessment indicated the need for provision of other services by the Council and the Health Service that went well beyond meals on wheels, but included multiple coordinated interventions.

- 'Fred' and his brother were poor at meal preparation, and purchased many takeaways (creating financial pressures). A dietician assisted them in shifting away from this pattern of eating.
- Fred found it difficult to swallow and was referred to a speech pathologist.
- Fred found it hard to undertake personal care as a result of dizziness and fatigue and was assisted by an occupational therapist.
- Fred was often in severe pain, was depressed and talked of suicide. A mental health caseworker provided assistance.
- The brothers had difficulty controlling spending on poker machines, increasing their financial burdens. A financial counsellor provided support and planning.

The practitioners involved in Fred's care used a common electronic support plan and given access to an e-care planning system so they could follow progress and know about others' interventions. Outcomes for Fred and his brother improved significantly from this joint approach.

Source: Victorian Government, Department of Health and Human Services (2016e).

4.5 Horses for courses — not everything should be devolved

While devolution and links between primary care and hospitals are probably the most important directions for the Australian health system, some functions require coordination and cooperation across regional boundaries, or exhibit significant economies of scale — which means they are best left at the national level. There are myriad Australian State and Territory Government agencies and committees whose existence is justified on these grounds. Almost all research activities fall into this category, although that should not limit the capacity and desirability of strong links between researchers and regional decision makers.

CONCLUSION 4.1

There are compelling grounds for greater devolution of decision making about primary health initiatives to local health institutions, involving alliances between primary health networks, community health centres, local hospital networks, and local governments.

The goals of such alliances should be:

- effective preventative health
- better management of chronic conditions
- reduced need for the (high-cost) hospital system.

Subject to achieving the above goals, collaborative arrangements should extend to non-government parties — such as not-for-profit enterprises and private health insurers.

Changes to funding (conclusion 6.1) and attitudes by parties not accustomed to collaborative arrangements are needed to support any alliances.

Formal mechanisms, such as memoranda of understanding, joint board memberships, compatible electronic health records, data-sharing agreements, localised health pathways and broader involvement of diverse parties on decision-making boards, will be required.

Governments should hold the boards of PHNs and LHNs accountable for their impacts on patient experiences, efficiency and outcomes across primary care, and not just the hospital system. This requires refinement of KPIs that measure the effects of primary care.

At the Australian Government level, the leading examples of functions best undertaken centrally include the estimation of hospital costs that underpin activity-based funding (undertaken by the Independent Hospital Pricing Authority), the centralised purchasing of pharmaceuticals (the Pharmaceutical Benefits Scheme and the associated Pharmaceutical Benefits Advisory Committee), the assessment of the safety of new technologies and drugs (the Therapeutic Goods Administration), the systematic evaluation of quality across the entire Australian health system (the Australian Commission on Safety and Quality in Health Care) and a centralised repository for health statistics (the Australian Institute of Health and Welfare). Similarly, committees like the Medical Services Advisory Committee provides advice to the Australian Government on new medical services proposed for public funding.

State and Territory Governments sometimes also have expert bodies whose work could not cost-effectively be replicated at the regional level.¹⁶

¹⁶ Examples include the various behavioural insight units, the NSW Bureau of Health Information, the NSW Agency for Clinical Innovation, and specialist functions in all of the jurisdictions' departments that have responsibility for health care.

In addition, while there are strong grounds for experimentation at the PHN/LHN level, there are compelling grounds for interoperability in information technology for managing medical records (which require cooperation), and for links to My Health Record. Moreover, as discussed in chapter 9, there is an imperative for data sharing and an established vehicle for diffusing successful initiatives across regions and jurisdictions. Not all Australian States and Territories quickly adopted NSW's Ambulance Frequent Use Management Program.

There *may* be some scope for pruning the many bodies by substituting some at the state and territory level and replacing them with cross-jurisdictional entities funded jointly by the Australian, State and Territory Governments, For instance, the Australian Commission on Safety and Quality in Health Care is jointly funded by all governments to lead and coordinate national improvements in safety and quality in health care. Yet, NSW still has a Clinical Excellence Commission, which is the lead agency for quality and safety improvement in NSW. Other jurisdictions include clinical excellence functions in their health departments (which has the virtue of sharing some common costs and allowing a greater degree of flexibility in shifting resources between the multiple tasks such departments must undertake).

The Productivity Commission has not examined whether the apparent duplication is a genuine problem because it is easy to advocate neatness and not always prudent to follow through. There are differences in regulatory requirements in health between jurisdictions that would need to be addressed before any re-structuring. Change itself creates costs — and those costs are upfront and might not cover the long-run benefits. There might also be alternative hybrid arrangements whereby state and territory bodies agree to share some common aspects in their functions, while leaving other functions alone.¹⁷ That said, it is easy for bodies and functions to proliferate over time, and unlike the various Commissions of Audit at the jurisdictional level, there is no periodic re-consideration of whether there is scope for economies across all jurisdictions. It is time to look.

Many public health initiatives — regulations, school-based education and information campaigns — are often best progressed by Australian, State and Territory Governments. Given section 90 of the Constitution, taxes, such as those levied on alcohol and tobacco, are the province of the Australian Government. Chapter 2 of the main report discusses alcohol and sugar taxes.

¹⁷ For example, the New South Wales Agency for Clinical Innovation and WA Health have been working as part of a broader partnership between the two states to improve the treatment of musculoskeletal conditions like arthritis and osteoporosis (Briggs 2017).

CONCLUSION 4.2

The functional value of the tasks performed by the multiple State, Territory and Australian Government entities that provide statistics, monitor quality and safety and provide advice on clinical best practice is not questioned, but there may be economies from amalgamating some of them or creating more structured networks that reduce duplicated fixed costs or incompatible data items.

The Australian and State and Territory Governments must be active participants in devolution

Devolution cannot come autonomously, but requires buy-in from the Australian and State and Territory Governments, changes to their hospital and MBS funding arrangements, the development of performance metrics to hold PHNs and LHNs accountable, and clarity about what happens if regional organisations do not meet performance requirements. The treatment of coordinated care in the 2016 Heads of Agreement between the Commonwealth and the States and Territories on Public Hospital Funding is imprecise about the roles of, and interaction between LHNs, PHNs and HCHs, leaving the form and degree of cooperation as discretionary. There is accordingly a need to re-configure Commonwealth-State agreements in this area, clearly specifying the roles, funding and accountability of the regional bodies — as specified throughout this supporting paper (a view also put by the Grattan Institute in its proposals for similar reforms of primary health care, Duckett and Swerissen 2017, p. 25).

5 Insufficient incentives for a system-wide approach

A drawback of Australia's current health system is that there are a series of budget silos. Key providers (particularly hospitals and GPs) make decisions that determine the level of expenditure under other budgets (such as the PBS and diagnostics), but without any financial implications for their own budget. Therefore, the key decision makers in our system have no direct financial incentive to be efficient in their use of other parts of the system. Indeed, there is some evidence that providers waste resources by trying to push costs onto other parts of the system (Ernst & Young 2017). This budget silo approach is blocking progress towards an integrated health system.

In a well-integrated system, suppliers should have incentives to direct people to the most suitable and cost effective services, and where possible, prevent the onset of chronic conditions.

Achieving that outcome is not straightforward, but there are some reasonably obvious 'do not dos' in health care payments and funding, including payments that encourage excessive use of services or that discourage shifts in services away from costlier parts to less expensive parts of the system (PC 2015, p. 30ff).

5.1 Activity-based funding of hospitals has improved 'seamless production', but only within hospitals

Australia has advanced its hospital funding arrangements a long way in a relatively short time, with most of the effort concentrated on improving efficiency. While each jurisdiction has different variations, major Australian hospitals are funded for the bulk of their services through activity based funding (ABF), under which hospitals receive revenues based on the efficient costs of delivering specified services to their mix of patients.¹⁸ Following the introduction of ABF, national growth in the average cost of providing hospital services has slowed significantly, including through the adoption of the kind of production processes discussed above.

¹⁸ Block funding continues to be used for some hospital services, such as some of those in remote and regional settings where ABF is not practicable. While teaching, training and research are currently block funded, the IHPA is looking to introduce ABF after the development of a robust methodology (IHPA 2017).
Nevertheless, ABF creates risks.

One concern is that where inadequate care requires a hospital to provide additional services, ABF will pay for these (that is, there is implicit 'pay for poor performance'). Nevertheless, the current form of ABF is not entirely bereft of a capacity to improve quality outcomes *within* hospitals. While not a feature of the funding model, ABF can support quality care because it provides data that allow hospital administrators and clinicians to identify conditions that patients acquire while receiving treatment, which is a basis for voluntary changes in clinical practices. To a lesser extent, cost minimisation is sometimes associated with quality improvement (for example, better patient management will result in shorter stays in hospital). Moreover, policy is moving in the right direction to discourage low quality care. Queensland, for example, will not pay a hospital for six 'never events' (events that should not under any circumstances arise). COAG has agreed to new funding formulas commencing in 2017 that financially penalise hospitals for a certain group of hospital-acquired conditions. Financial incentives may later be extended to unplanned readmissions — but caution in this area is justified. More sophisticated data analysis and divulgence can also assist best practice.

Another flaw is that a hospital that has lower costs relative to the benchmark will find it profitable to increase those activities even if these are not clinically optimal.¹⁹ This may partly explain the considerable variations in clinical practices across hospitals, but its contribution to such variations is uncertain.

The most fundamental concern with ABF within an integrated care framework is that its incentives only relate to hospital care (including hospital in the home programs). Hospitals generally benefit from illness not from its prevention or its management in lower cost settings. Ideally, purchasers of hospital services would have incentives to discover, fund, coordinate and encourage out-of-hospital initiatives that reduce activities within hospitals. Mechanisms that shift the system towards that end is one of the Commission's key focuses.

As an illustration of the important role that LHNs could play in producing better outcomes, the Western Sydney Local Health District (a LHN) created a team of specialists to work with GPs to improve the management of patients with chronic diabetes. Early indications are that patient outcomes are improving in terms of desirable reductions in blood sugar levels, weight and blood pressure (Western Sydney Local Health District and PHN Western Sydney 2016b). However, the LHN's expenditure on the program was not considered an 'activity' that attracts funding under its activity based hospital budget. Rather, to maintain the program, the LHN had to rely on the temporary injection of funds under the New South Wales Government's integrated care demonstration scheme. Further, the LHN anticipates that rolling out the scheme — and expanding it to include health

¹⁹ Ettelt, Thomson, Nolte and Mays (2006) find that the introduction of ABF in Australia led to a decline in unit costs, but an increase in activity. A rise in hospital admissions has also tended to follow the introduction of ABF in other countries (Street et al. 2011). Of course, it cannot be assumed that an increase in activities is always bad, as one of the goals of ABF was to improve waiting times.

literacy education in local communities, will lower the rates of hospitalisation for diabetes, resulting in a reduction in its activity based funding. While the Western Sydney LHN expressed a commitment to improving patient outcomes despite the risk of reduced activity based funding, this is not financially sustainable under the current funding system. Rather, the ABF system, as currently designed, deters such investments and undermines the financial capacity of LHNs to invest in improving integration with primary care or to undertake innovative activities in preventative health.

5.2 Fee-for-service does not encourage fully-integrated care

With a few exceptions, GPs and specialists are paid on a fee-for-service basis for items on the government-determined Medicare Benefits Schedule (MBS).

Both the structure of the MBS and the fee-for-service reimbursement model mean that, as in funding of hospitals, clinicians do not face strong *financial* incentives to:

- (i) avoid high-cost activities (such as tests, referrals to specialists and, above all, hospital admissions)
- (ii) use lower-cost delivery methods, such as employing nurse practitioners or phone-based consultations.
- (iii) direct patients to services not covered by the MBS, such as physiotherapists
- (iv) limit future consultations
- (v) prevent illness in the first place, such as through advice on lifestyle risks and other preventative strategies. The old witticism that 'a doctor is the only person who can suffer from good health' reflects the consequences of any payment system that does not reward clinicians for maintenance of health. This should not be taken to mean that GPs are uninterested in preventative health — merely that the funding model inhibits their full capacity to do so
- (vi) support team-based care.

Moreover, fee-for-service introduces considerable rigidity into the management of care. Once medical professionals are paid on a fee-for-service basis, a funder must tell them what they can be paid for, especially when the patient does not bear the full costs and is often ill-informed about the value of the service. Hence, Australia has the MBS — a long list of closely defined compensable activities accompanied by centrally-determined prices that are generally fixed across the country. Even very long lists of this kind will fail to cover all the activities that a health professional might reasonably undertake in a genuinely integrated system, and can be slow to adapt to technological developments. For example, it

was only after mid-2011 that MBS payments for telehealth were widened beyond tele-psychiatry and tele-radiology. Telehealth MBS items still remain highly restricted (chapter 2 in the main report), so that compensation through the MBS requires the consultation to be via video and be only used in regional areas, even when it is easy to foresee circumstances in which telehealth consultations in a city could be beneficial. (Some have advocated this - Bupa 2017.)²⁰ Regardless of whether such an extension might be justified, the point is that the MBS is slow to adapt to new developments, and its design must give considerable weight to risk management across the entire country and population of physicians.

While the clinician-funding model provides some similar incentives as ABF of hospitals, there are some important differences:

- The financial disincentives associated with (iii) to (v) are partly mitigated by *individual* doctors' ethical convictions²¹ and the fact that in some areas, growing demand or physician shortages means that there is an excess demand for consultations, and therefore no financial penalty from limiting future consultations through effective disease management. Some MBS items are also directly aimed at prevention and condition management, for example, the 'Healthy Kids Check' for children aged three or five years old and care planning for people with chronic illnesses. Changes to MBS items have also sometimes encouraged referrals to lower-cost professionals for example, a shift to psychologists rather than psychiatrists for treatment of anxiety and depression (Britt and Miller 2009, pp. 7–8). Practice incentive payments lie outside the fee-for-service model and also provide incentives for general practices to detect and manage chronic conditions. (That said, the uptake of Medicare incentive payments has been low (accounting for about 10% of GP's remuneration according to NSW ACI 2015, p. 12)). The Practice Incentive program is discussed further in chapter 6.
- People have choice of GP, which is consistent with a patient-centric model. (On the other hand, the capacity to exercise choice is limited by poor information about the attributes and performance of different practices).
- The Australian Government covers the cost of the MBS-scheduled fee, but there is no particular link between that fee and efficient costs, with GPs allowed to set their own prices to recover any additional costs from patients. Accordingly, efficiency is largely driven by competition between GPs, as it is for many other goods and services. It is hard to determine the degree to which competition has driven costs to efficient levels. Notably bulk-billing rates an indicator of price competition are geographically variable, and depend on proximity of nearby GP practices, suggesting that competitive forces vary (Gravelle et al. 2016).

 $^{^{20}}$ An obvious practical concern is the risk of over-servicing and fraud.

²¹ While ethical convictions also apply to individual clinicians in hospitals, they are less free to act on them autonomously under a system where the hospital as a whole is the funded entity.

A fully integrated system should deliver treatments that have demonstrated efficacy that is a reasonable consumer mantra is 'Don't do things to people that are not needed or harmful'. There is less timely and detailed assessment of the evidence base for physicians' practices than in hospitals. The payment method in hospitals means that there is good evidence concerning unwarranted clinical variations — which at least provides a basis for limiting these through provision of information to clinicians. In contrast, overwhelmingly, the most common MBS items for GPs are consultations of varying lengths (most commonly a single MBS item — number 23), rather than provision of specific services. Accordingly, much of what goes on in general practice is a black box, with the outcome that no tools exist to systematically understand the extent of variation in quality of care in general practice, or the consequences of those variations (EY 2015a, p. 16). The data that do exist on what happens in the black box relate to only a sample of GPs and the survey has now been discontinued (Britt et al. 2016). Nevertheless, there is some evidence. For example, the rates of amoxycillin dispensing were 20.5 times more in the geographic area with the highest rate compared with the area with the lowest rate, and 2.7 times when the highest and lowest rates were excluded — which will primarily reflect variations in prescribing patterns in general practice (ACSQHC 2015). There seems also to be variations in the clinical practices of physicians depending on their age and gender (Charles, Britt and Valenti 2004).

It has long been recognised that the dominant fee-for-service model in general practice does not encourage coordinated care of people or disease management, nor strong incentives to adopt processes like eHealth or the employment of allied health professionals. When looked through the lens of normal business practices, the fact that government has to co-fund general practices to introduce new technologies and change their occupational mix to provide good quality services is symptomatic of something very awry. This has motivated the various incentive payments (like the PIP) and the special MBS items described above, which represent attempts by the Australian Government to combat the perverse incentives posed by the fee-for-service model. Moreover, it has driven governments to trial completely new models of care that do not reward activities — which the Commission sees as the most promising direction for policy change in primary care (chapter 6).

5.3 Private health insurers face frustrating incentives

Private health insurance is highly regulated — with many of the most significant rules stemming from the overarching principle of community rating, which, unlike orthodox insurance products, sets premiums that are unrelated to the patterns of claims of the class to which a person belongs. Accordingly, a person aged 70 years (who has higher than average claims) will pay the same premium as a person aged 20 years (who has low average claims).

Risk equalisation underpins community rating by requiring that insurers with healthier members (most commonly younger people) bear some of the costs of insurers with greater representation of less healthy people. However, the risk-equalisation scheme (at May 2017) also reduces the drive for efficiency and preventative care because any gains made by one insurer are shared with other insurers, weakening incentives for investment by any insurer in cost minimisation. The implicit tax rate imposed by risk equalisation can readily be as high as 50 per cent (box 5.1). That does not preclude the adoption of some preventative measures, and indeed some insurers have been innovative in using their data to target preventative care to avoid subsequent large claims (for example Australian Unity and Medibank). Nevertheless, as for all investment, a lower rate of return must reduce the scale of investment.

There are other barriers to preventative care by insurers:

- while often desirable, the regulatory requirement for portability of membership across insurers means that an investment in preventative care by one insurer (upfront costs for the insurer and long-run reduction in claims) can be lost if the participating members move to another insurer before the returns from the investments have been sufficiently realised
- there are restrictions on the parties that private insurers can use for provision of preventative care services. While some of these restrictions may be justified, some prominent insurers have argued that they limit innovation in prevention (HRSCH 2016, pp. 58–60; PHA 2017).

Notwithstanding these barriers, some insurers have introduced new services aimed at reducing use of hospitals (box 5.1). Unlike ABF for public hospital services, private health insurers do retain *some* incentives to shift resources out of the high cost part of the system.

This suggests that local hospital networks (who run public hospitals) would also have incentives to provide similar services if doing so was not inimical to their financial position, and would likely do so even if they shared the gains with other parties (such as primary health networks and governments).

The complex nexus between Medicare and private health insurance may also affect the scope for full health care integration.

At times, public hospital funding arrangements have provided incentives for public hospitals to encourage people admitted as public patients (primarily through emergency departments) to subsequently convert to private patients if they have private insurance cover (King 2013, p. 14). The number of admissions in public hospitals funded by private health insurance increased by 110 per cent from 2007-08 to 2015-16 compared with growth of only about 25 per cent for publicly-funded patients over the same period. Reliance on private health insurance funding was particularly high in NSW and Tasmania (figure 5.1). Public hospitals have recruited specific staff to encourage patients to opt for

private insurance status on admission (EY 2017, pp. 27–28) and have sometimes guaranteed no gaps for such people.

Notwithstanding recent changes to Commonwealth funding formula that would remove these incentives, state-level variations in the implementation of ABF has meant that incentives for attracting private patients continue in NSW, Queensland, Western Australia, and Tasmania, while there are now either no or weaker incentives in other jurisdictions (EY 2017).

Box 5.1 Notwithstanding adverse incentives, some private health insurers are offering preventative care programs

After 2007, private insurers were permitted to offer cover for clinically justified alternatives to hospital services ('Hospital Substitute' treatments) such as wound care at home rather than in hospital, and chronic illness management ('Chronic Disease Management Programs' — CDMPs), for example management of diabetes (HRSCH 2016, p. 57). Some insurers offer phone-based health coaching, goal setting and monitoring. Insurers are not obliged to offer such cover.

As an illustration, HCF offered a CDMP — My Health Guardian²² — which included individualised support via telephonic nurse outreach and online tools for self-management, behaviour change and wellbeing. Longitudinal data over a four year period found significant reductions in hospital admissions by the covered group (-11.4%), readmissions (-36.7%) and bed days (-17.2%). Effects increased over time (Hamar et al. 2015). Under the risk equalisation arrangements of the time, HCF retained about 54 per cent of the savings, with the other savings shared among all other insurers despite the fact that they had committed no resources to HCF's program. Of course, HCF itself would have benefited from any successful programs implemented by other insurers. Regardless, risk–equalisation effectively taxed the investment returns by more than 50 per cent, with obvious effects on investment incentives.

Australian Unity offers 'Mindstep', a six-week phone-based program using cognitive-behavioural therapy that helps manage depression and anxiety for people who have been admitted to a hospital for these conditions in the past. Claim costs fell \$7800 per person per year for those enrolled in the program, and average days in hospitals fell, as did readmissions. The insurer saved \$4 million in the first year of the program (Potter 2017).

Medibank Private also offers a sophisticated integrated care package for people with chronic conditions — CareComplete — which includes three elements (CareFirst, CarePoint and CareTransition).²³ CareComplete is distinctive among other private insurer packages in that it is funded in partnership with several state governments and is also available for other private insurers, with free access by patients enrolled in the system. It is discussed further in appendix A.

²² The program involved approximately a \$100 million dollar investment and provided phone-based support to about 40 000 members (HRSCH 2016, p. 61).

²³ See http://carecomplete.com.au/.

In those jurisdictions where these incentives still exist, the capacity to cross-subsidise public hospitals through private health insurance has several consequences beyond its immediate effects on private health insurance premiums.

For example, it has been claimed that public hospitals have invested in more single room accommodation to motivate patients to switch to private insurance funding of their stay. Certainly, some public hospitals provide single rooms to privately-insured patients as a matter of course (subject to availability), with this not being the norm for publicly-insured patients. As one of the attractions of private health insurance is a capacity to gain access to a single room, increasing access to these for private patients in public hospitals is not per se bad. Nonetheless, it appears that the particular implementation of ABF in some public hospitals means that the returns from building rooms in public hospitals are greater than for private hospitals, which would distort investment decisions (King 2013). There might, for example, be better *social* returns from other capital expenditure in public hospitals.



^a PHI is a hospital admission funded by private health insurance.

Sources: AIHW 2017, Admitted patient care 2015-16: Australian hospital statistics, Health services series no. 75, Cat. no. HSE 185, Canberra; AIHW 2013, Australian hospital statistics 2011-12, Health services series no. 50, Cat. no. HSE 134. Canberra.

Some argue that single rooms produce better clinical outcomes (such as lower infection rates), which would justify the investments. However, those clinical benefits have been disputed in several evidence reviews. Even if, on balance, these benefits were accepted,

this would not justify privileged access to privately-insured patients.²⁴ The key point is that a genuinely integrated public system allocates resources to the parts that generate the best health outcomes. Some have certainly called for a more collaborative approach between the public and private sectors for health care infrastructure investment (Infrastructure NSW 2014), though achieving that would require aligned incentives.

If the growth rate of private health insurance funding of public hospitals continues at its current rate, then it will place significant pressures on premiums. The demand effects that this induces may act as a threat to the longer-run sustainability of private health insurance. By diverting demand to the public system, this would require either rationing in the public system or additional taxpayer revenue to fund it. The desirability of that outcome depends on debates about the role of private insurance as a limb to a universal system and the degree to which private health insurance efficiently relieves the public health care system of costs (noting that the Australian Government commits large amounts of funding to support private health insurance). These are subjects beyond the scope of this inquiry, and in any case, involve some value-based issues that are inherently political in nature.

As most patients who elect private insurance cover for their hospital stay do so after an unplanned admission through the emergency department (AIHW 2017a, p. 69), it is unlikely that they receive clinical treatment that is different from people without insurance status, though they may get a private room. This does not apply to elective surgery, where waiting times are less for people who are privately insured than publicly-funded patients (AIHW 2017a, p. 202). It has been claimed that in NSW, public hospitals have placed pressure on doctors to admit private patients 'promising them immediate access to the hospital in preference to public patients' (King 2013, p. 3). On face value, this appears at odds with an integrated system, which would ideally admit people into the public system using clinical and cost-effectiveness criteria as the basis for queuing.

However, the issue is less clear-cut than this. Most elective surgery for privately insured patients is undertaken in private hospitals — and that too confers an advantage in reduced waiting times. Removing the scope to 'jump the queue' in public hospitals would most likely divert private patients to an expanded private hospital system. Absent new injections of public funding into public hospitals to replace the lost private funding, public hospitals may not be able to reduce waiting times by as much as might be thought, especially if the bottleneck is the availability of specialists. The intrinsic problem is that the ideal of 'treatment according to clinical need' is in tension with the requirement by members that private health insurance offer something in excess of that supplied at no cost by the public system.

²⁴ Some have argued strongly in favour of the clinical and social advantages of single rooms (Fairhill et al. 2017; Pennington and Isles 2013; Stall 2012; Ulrich 2007). On the other hand, the UK NHS National Institute for Health Research found patients generally preferred single rooms, but that they cost more and did not appear to produce clinical benefits (NHSNIHR 2015). A review by Healthcare Improvement Scotland found it was not possible to reach firm conclusions about their clinical benefits (HCIS 2016). Others suggest negative effects (Young, Edwards and Singh 2017).

Arguably, the biggest problems associated with the existing model of private health insurance and Medicare is that it brings additional complexity to the already messy system that arises from the mixture of responsibilities and funding of state and territory governments and the Australian Government. Changes to government funding and governance arrangements to provide more incentives for integrated care will need to avoid a circumstance in which this mess gets worse. If nothing else, private insurers have demonstrated a capacity to provide novel preventative care and integrated services. Governments should collaborate with insurers or where sensible, fund them to provide services to public patients. The integrated care pilot (*CarePoint*) involving Medibank Private and the Victorian Department of Health and Human Services is an example (appendix A).

Moreover, there are opportunities to break the current nexus between ownership of hospitals and the funding source for patients. Currently, non-public hospitals primarily supply services to privately insured patients, while public hospitals largely serve publicly-insured patients (figure 5.2). That nexus is arbitrary and can forgo opportunities for maximising spare capacity across the supply system and gains from specialisation. A recent study of NSW hospitals found that greater commissioning of public in-patient rehabilitation bed days in private hospitals would significantly relieve elective surgery waiting times for public patients (Saunders and Carter 2016). Even if it cannot ignore different funding streams, integrated care can ignore ownership. That is already evident with GP services, which are largely privately-provided, though largely publicly-funded. In making this observation, we are not saying that private provision is preferred. The key message is not to put the cart before the horse, whether that cart be ownership, funding source, technology, primary or acute care, and so on. Rather, *always concentrate on the best outcomes for people*, subject to any budget constraints.



Figure 5.2 Funding source and ownership of services are closely related^a

^a 'PHI-funded' is a hospital admission funded by private health insurance.

Sources: AIHW 2017, Admitted patient care 2015-16: Australian hospital statistics, Health services series

Figure 5.2 Funding source and ownership of services are closely related^a

no. 75, Cat. no. HSE 185, Canberra; AIHW 2013, Australian hospital statistics 2011-12, Health services series no. 50, Cat. no. HSE 134. Canberra.

Absent a coherent funding system aligned with integrated care in Australia, it is hard to envision anything other than partial and fragmented attempts to improve patient care and generate efficiencies — though these have merit. While not possible to implement quickly, there are several linked initiatives that will create much better incentives for integrated care. Chapters 4 and 6 set out these linked initiatives, whose basic thrust is:

- subsidiarity regions are the best organisers of hospitals and primary care (chapter 4)
- hospital funding should shift so that local hospital networks can fund activities that prevent hospitalisation (chapter 6)
- there should be hard-headed experimentation of targeted rewards for patients to change behaviours that generate costs for the health care system and themselves (chapter 8).

CONCLUSION 5.1

While Australia's health system has many positive attributes, there are significant limitations in its funding models and service structures, including

- the lack of incentives for parties to cooperate and efficiently provide integrated services:
 - across community health care centres (funded and managed by State and Territory Governments), general practice (funded and regulated by the Australian Government) and hospitals (managed by State and Territory Governments, and jointly funded by both levels of government)
 - between private insurers and public funders
- the disincentives posed by risk equalisation for private insurers to prevent or manage costly conditions
- the limits on using private hospitals as suppliers of services to publicly-funded patients.

6 Show me the money — where from, to whom, and how allocated?

6.1 Changes to hospital funding

Given the weaknesses identified in chapter 5, hospital funding needs to create incentives to cost-effectively avoid hospitalisations through investments in public health and in community and primary care.

There are several options for reform, all involving some common issues. It is therefore useful to start with the least complex because it exposes all the main issues. However, we would like to make one point emphatically: *Do not become mired in the specifics. If there are better ways of changing activity-based funding to give LHNs the incentives to avoid hospitalisations and hospital durations, then implement those.*

A basic approach

The intention is that LHNs be able to make investments outside a hospital setting to reduce costly hospitalisations, with the overall outcome that hospital costs currently funded through ABF would fall, but with LHNs obtaining a share of the savings to motivate their initial investments.²⁵

The concept that ABF could cover interventions outside a hospital setting is already well-understood. Currently ABF provides funding to some non-admitted services, including services that:

... intended to substitute directly for an inpatient admission or Emergency Department attendance; or expected to improve the health or better manage the symptoms of persons with physical or mental health conditions who have a history of frequent hospital attendance or admission. (IHPA 2017, p. 12)

²⁵ There have been other proposals along these lines. For example, Ham and Timmins (2015) review of the Victorian health system supported experimenting with adaptations of ABF to reward LHNs for preventing hospital admissions. They raised the idea of a bundled care approach in which LHNs could be paid an annual amount (a 'year of care') to oversee the care of patients with multiple chronic conditions — effectively a capitation payment that could pool the funds from all the various health budgets for the integrated care of patients in greatest need of care.

However, there are several constraints on the funding of non-admitted services under the current ABF model:

- the 'interpretative guidelines' for funding of such non-admitted services would rule out many innovative approaches to preventative health care
- given existing funding streams and methods, such services exclude general counselling and primary health care. From the perspective of an integrated care model, it would not be desirable to forego these levers for reducing acute care demands.

As noted earlier, some state and territory jurisdictions have given LHNs temporary funding outside ABF for initiatives to better manage health in their regions with a key goal being savings in the acute care system. These have been useful for indicating the proof of concept, but their temporary nature makes it difficult for LHNs to implement long-run strategic approaches and to involve PHNs in enduring alliances. Accordingly, there needs to be a greater long-run commitment. Second, as a contributory funder to hospitals, the Commonwealth also has an incentive to reduce use of the acute care system, and so should also be a party to funding arrangements that achieve that.

The Commission does not propose a prescriptive model because all options will involve information and implementation issues that cannot be determined yet. One way of formalising a new approach would be to establish a Prevention and Chronic Condition Management Fund (PCCMF) in each local health district. The LHN in each district would decide how and where to spend funds from the PCCMF (though often they would do so collaboratively with other local partners). There should be few restrictions on the types of investments made by LHNs. For instance, if low-cost community initiatives to reduce loneliness among older people reduced hospitalisations, then this would be an attractive intervention. Equally, so too might an alliance with PHNs that led to more effective management of people with incipient obesity, and thereby, at some later time, reduced rates of type 2 diabetes, and lower hospitalisation rates.

Australian and State and Territory Governments would provide annual funding injections for each LHN's PCCMF over a span of years (say five years). This would be accompanied by a performance contract that outlined minimum expected savings from reduced acute care activities over the relevant period, but with no expectation that the gains be immediate. The returns from reduced activities would need to provide sufficient returns to recover governments' investments, thus lowering overall future ABF.

The PCCMF would then be renewed in subsequent periods, based on performance. The Commonwealth and the relevant State or Territory Governments would be the ultimate shareholders in this venture. Any gains over the minimum returns in the performance agreement would be kept by the LHN for future investments.

From the perspective of current ABF, the model is new, but not revolutionary. It would simply create a new compensable non-admitted hospital activity — preventative care and chronic condition management, accompanied by limits on allowable expenditures,

expectations about outcomes, and significant freedom by LHNs about how to manage the PCCMF.

There are other variants of such a PCCMF — some of which were suggested to the Commission in its consultations — but they all involve the creation of incentives for LHNs to cut avoidable activities.

Any method must also take into account that many PCCMF investments would yield savings in hospitalisation only after several years (hence the suggested five year contract period above).

Governance and accountability

The most likely avenue for successful initiatives would be collaborative ventures between LHNs, PHNs and other regional parties that can generate and implement good ideas for effective health management at the regional level. LHNs could also cooperate with each other — as they saw fit — to undertake initiatives that spanned several regions.

Once the concept of subsidiarity is accepted (chapter 4), then LHN's boards should be ultimately accountable for the outcomes of their investment choices, including against the KPIs specified in their service agreements. In some instances, there could be scope for LHNs to form joint ventures or alliances with various other parties for some projects. However, that should still preserve ultimate accountability of LHNs for their performance across the full portfolio of their initiatives to their relevant State and Territory Governments.

How big should the PCCMF be?

It is difficult to determine the desirable size of each PCCMF but, given regional variability, a rule of thumb would be that the annual funding amounts would reflect the overall anticipated ABF in each region in each year, taking into account the factors that drive hospital use, such as population growth and ageing.

What should be the desirable floor?

If an LHN is unable to identify a sufficient portfolio of profitable investments, then it could simply decline to enter any agreement with funders (although a failure to do so might suggest some problem in the capabilities of the LHN's leadership). On the other hand, a requirement to have a minimum PCCMF pool would provide an incentive for an LHN to search for profitable investments up to that pool size — 'necessity is the mother of invention' — albeit with risks for funders, the CEO and board if it failed.

Overall, the Commission is uncertain about the desirability of a requirement for a minimum PCCMF pool size. This question should be investigated as part of any implementation plan for changes to hospital funding, but if sufficient uncertainties remain, then governments should err on the side of simplicity — which would entail no floor.

What would be the desirable ceiling?

Were the PCCMF to comprise a significant share of the activity-based funding payments pool, and LHN-funded initiatives did not yield lower hospitalisation rates, State and Territory Governments would most likely be obliged to intervene to supplement hospital funding. Clear accountability by LHN boards could never eliminate such risks. Any such required interventions would have immediate adverse financial and political ramifications for governments, but could also imperil the implementation of long-run innovations in health care funding and management. In government, there often can be a temptation to centralise control following local mistakes, but Australia's health system is already too complex for a centralised system to be effective (Ham and Timmins 2015).

Given this, it would be prudent to commence with relatively modest PCCMFs — say equivalent to two to three per cent of projected ABF. This may sound small, but to put it in perspective, the activity-based funding payment pools are often large. For example, the payments pool for the Western Sydney Local Health District is likely to be more than \$1.1 billion for 2016-17, so that a 3 per cent allocation would be about \$35 million in that year.²⁶

Over time, the ceilings could be amended based on the performance of LHNs. An LHN whose demonstrated capacity for innovative investment is constrained by its contracted limit on its PCCMF should have that limit raised by its funders.

6.2 Primary care

Adopt blended payments

While fee-for-service has its weakness by rewarding throughput instead of value of care (chapter 5), a pure bundled payment (as currently proposed for the Australian Governments' Health Care Homes initiative — appendix A) also has limitations. A bundled payment introduces an incentive to under-service, particularly when other parts of the health care system bear the cost of reduced outcomes. Further, GPs have a financial disincentive to enrol patients with particularly complex or high-cost conditions who are

²⁶ PC projections are based on year-to-date expenditure published in January 2017 by Administrator of the National Health Funding Pool (2017).

likely to generate losses for the practice. (This is often labelled pejoratively as 'cream skimming', but its presence may simply reflect the need for practices to remain financially viable.) The Australian Medical Association opposes capitation funding methods on this basis, noting the concern that clinicians may avoid high-risk patients (AMA 2015a).

CONCLUSION 6.1

The Australian and State and Territory Governments should change the funding of hospitals as follows:

- They should create a Prevention and Chronic Condition Management Fund (PCCMF) in each local health district.
- They should provide annual funding injections for each LHN's PCCMF over a span of years, accompanied by a performance contract that outlined minimum expected savings from reduced acute care activities over the relevant period, but with no expectation that the gains be immediate.
- The gains in reduced hospital costs from PCCMF investments in better health management should be shared between each LHN and the Australian and the respective State or Territory Government.
- The annual funding contributions should be equivalent to a small share of expected ABF in each district (say two to three per cent).
- Local Hospital Networks (LHNs) would be responsible for the management of their district's PCCMF, using the funds as they deemed fit to improve population health and to reduce hospitalisations and durations, in collaboration with other regional parties.
- The effects of PCCMF investments on acute care activity would need to be reasonably validated.
- The lessons from the assessments of PCCMF investments should be disseminated among all LHNs (conclusion 9.2).
- The annual limit on the scale of the PCCMF for each LHN should be adjusted over time to reflect the LHN's success in reducing hospital activity levels.
- The Administrator of the National Health Funding Pool and the National Health Funding Body would manage any formal arrangements for funding pools.

There is some empirical evidence of cream skimming. For example, medical homes in Canada paid through (non-casemix) capitation payments had a lower likelihood of enrolling people with mental illnesses (Steele et al. 2013). However, a meta-study of GP behaviour under different payment systems found that capitation did not inexorably lead to cream skimming (Peckham and Gousia 2014), while a Cochrane Review found no reliable results, in part attributing this to the low quality of the studies it examined (Scott et al. 2011). The financial disincentives to enrol high-risk patients may be countered by other factors, such as professional ethics. Of course, all these results depend on particular fee levels. It would be surprising if clinicians were immune to the effects of financial carrots and sticks were these large enough.

So where does this leave policymakers who must make some choice about payment methods? One US economist reached the acerbic judgment that *all* the simple payment methods are bad:

There are many mechanisms for paying physicians; some are good and some are bad. The three worst are fee-for-service, capitation, and salary. Fee-for-service rewards the provision of inappropriate services, the fraudulent upcoding of visits and procedures, and the churning of "ping-pong" referrals among specialists. Capitation rewards the denial of appropriate services, the dumping of the chronically ill, and a narrow scope of practice that refers out every time-consuming patient. Salary undermines productivity, condones on-the-job leisure, and fosters a bureaucratic mentality in which every procedure is someone else's problem. (Robinson 2001, p. 149)

While the evidence suggests that Robinson's assessment is too bleak, his proposal to implement mixed payment systems has merit. One such model would maintain fee-for-service as a major portion of GP revenue, combined with capitation payments. This would strengthen the incentive GPs have to provide necessary services via multidisciplinary teams, including a greater role in preventative health and management of chronic conditions. Finding an effective mix may require some experimentation, which is the advantage of running trials, and suggests leaving open the scope for regional health entities to develop funding variants.

Listen and engage with general practitioners

In its consultations, the Commission has been advised that the efforts of Primary Health Networks and Local Hospital Networks to achieve a more integrated system depend on the sometimes challenging task of engaging effectively with GPs. This can best be addressed in several ways.

Cultivating relationships with GPs is critical — especially ones who are receptive to new models, who can then act as trusted agents for change within their professional community. The task of engagement is probably best undertaken by PHNs, whose prime responsibility is to seek best practice in primary care.

GPs are often overstretched, reflecting large patient caseloads, paperwork, training of new medical staff, and professional development. It is hard to know whether these obligations are excessive, but regardless, long hours and stress are commonplace among GPs (Evans 2015). Consequently, any proponents of new models of care must credibly demonstrate clinical gains, while not adding to GP workloads. The Hunter Diabetes Alliance found that all physicians found the experience positive (box 4.1). Expanded initiatives would need to sustain that outcome.

Give Local Hospital Networks an opportunity to engage with and fund primary care

LHNs should be given the legal capacity to fund GP practices to undertake specific tasks (which they are currently not able to do), including for GPs to work with hospitals to better manage the care of patients with complex and chronic conditions. Section 19 of the *Health Insurance Act 1973* (Cth) currently prevents payment of Medicare benefits where the service is 'by, or on behalf of, or under an arrangement with' a state, including a state agency such as an LHN. This effectively precludes LHNs from funding or commissioning GPs given that practically all GP work is at least partially funded under Medicare (or of allied professionals to the extent their work is funded under Medicare).

Funding might also be directed at allied professionals, who have a smaller scope of practice than GPs, can have lower caseloads and can therefore be trained more quickly. PHNs and LHNs should generally take a collaborative approach, underpinned by MOUs and joint governance arrangements to any commissioning by LHNs of primary care services. Otherwise, there would be a risk that there would be multiple coordinators of care, working against each other. The introduction of KPIs by their respective funding sources will be required to ensure that PHNs and LHNs work in partnership, with, as noted earlier, particular need for the development of indicators for primary health care (such as avoidable hospital admission rates).

Under a regionally-based integrated care model, MBS funding would continue, but its role would diminish as PHNs and LHNs sought other ways to remunerate GPs for clinical outcomes, or for processes that have a strong link to good outcomes. There are two broad caches of Australian Government funding that would need to fit into any genuinely integrated system: MBS payments aimed at preventative health and chronic disease management (including the Practice Incentives Program) and funding of the impending Health Care Homes program.

Fitting MBS incentives for chronic disease prevention and management into a new system

The MBS includes many specific payments for chronic disease prevention and management — with Wentworth Healthcare (2017) identifying over 40 separate MBS items devoted to this role (in areas as diverse as screening for cervical cancer, asthma and diabetes management, care planning, case conferences, medication reviews, and preventative health assessments).²⁷

²⁷ Short and long consultations (the dominant MBS items used by general practice) are also being used for prevention and management of disease, but the invisible nature of these consultations means that nothing is known about their relative significance.

Of these, some play a large role. There were 8.7 million claims for MBS items 721-721 & 10 997 in 2015-16 — which entail GP Management Plans for Chronic Disease Management, often involving multidisciplinary teams). Others where greater use might have been expected in an integrated system are little used.²⁸ There were less than 70 000 services involving case conferences, though these have been demonstrated as effective (box 4.1; table A.4 in appendix A).

Some of the 40 plus MBS items are part of the Practice Incentives Program (PIP), which, among other objectives, was intended to encourage general practices to adopt eHealth, review medications, manage two chronic conditions (asthma, diabetes) and avoid the onset of cervical cancer (box 6.1).

Box 6.1 The Practice Incentives Payment

The PIP provides blended payments for a variety of functions performed at the practice level. Apart from diabetes, asthma and cervical cancer screening, the payment covers a range of other activities, such as take up of eHealth, provision of after-hours service, teaching medical students, and quality prescribing, among others.

For any given function, the PIP includes a payment for the entire practice, subject to it providing certain care services. The payment amount is based on the Standardised Whole Patient Equivalent (SWPE) value of a practice, which is the sum of the fractions of care provided to practice patients, weighted for the age and of each patient. The average practice has 1000 SPWE each year.

Within a PIP registered practice, the relevant physicians who provides services will also receive payments (so-called Service Incentive Payments or SIPs). SIPs are paid in addition to the normal Medicare benefit for the particular items and require specific trigger Medical Benefit Schedule item numbers to be billed.

Accordingly, PIPs included a capitation based payment and a fee-for-service. To provide an illustration, under the PIP diabetes incentive a registered practice receives a sign on payment of \$1 per SWPE, with the practice obliged to use a patient register and recall and reminder system for their patients with diabetes mellitus. The practice also receives a \$20 per diabetic SWPE per year subject to there being at least 2% of practice patients diagnosed with diabetes mellitus and completion of a diabetes cycle of care for at least 50% of these patients. The SIP is \$40 per competed cycle of diabetes care per year.

A practice can participate in any or all of the functions covered by the PIP. For the two chronic conditions, the PIP provides capitation payments to practices that commit to an annual cycle of care for a sufficient number of their patients, topped up by a fee-for-service for the actual services provided to patients. The capitation payment allows the practice to invest in capacity for addressing the condition. The PIP is accompanied by various other incentive programs, such as the Practice Nurse Incentive Program (PNIP), which co-funds employment of practice nurses and a wide range of allied health professionals (such as

²⁸ The data are from the online Medicare Statistics database managed by the Department of Human Services.

dieticians, diabetes educators and podiatrists). The PNIP moves practices towards more efficient use of scarce professional skills, while under a standard fee-for-service model, GPs risk facing financial losses if they substitute from a more highly remunerated service to a lower cost substitute service.

When first introduced, the Practice Incentives Program was associated with a spike in standards of care, but GP uptake fell, in large part because of its administrative complexity (Kecmanovic and Hall 2015; Swerissen and Duckett 2016). A major concern too was that the number of people with the relevant chronic conditions who were engaged in the PIP was a fraction of those needing help.

The PIP is changing in a positive way (as discussed below), but the fact that it ever took the form that it did is revealing of the capricious character of incentives for health care in Australia, as is the miscellany of MBS payments and other incentives devoted to prevention and chronic condition management. Why for example, did the PIP focus on asthma, diabetes and cervical cancer? Accidental falls, melanoma, affective disorders, dementia, malnutrition amongst the elderly, and many other preventable or manageable disorders could have been justifiably included.

Following a consultation paper in late 2016 (DoH 2016c), the Australian Government is making changes to the program that will reduce complexity and be more oriented to quality outcomes (underpinned by mandatory data collection that substantiate that these have occurred). Following its commencement in May 2018, the Government intends that the new program — the PIP Quality Improvement (QI) Incentive (PIPQII) — will combine current incentives relating to Asthma, Quality Prescribing, Cervical Screening, Diabetes, and General Practitioner Aged Care Access into a single QI incentive that leaves GPs with more flexibility to choose aspects of care that are important to them and to target the high-risk sub-groups specific to their local area.²⁹

The details have not yet been fully specified, but the PIPQII is heading towards the funding model favoured by the Commission. However, it will be still surrounded by a sea of fee-for-service MBS payments directed at many of the same chronic conditions that are the focus of that program and the capitation model underpinning Health Care Homes.

Given this, there are several directions for creating a more coherent system for funding and governing integrated care.

(A) Pooled funding

Under a pooled funding model, the Australian Government would allocate the expected funding of the PNIP, the PIPQII and all MBS items directly related to prevention and

²⁹ The new program will retain payments that fund eHealth, provision of after-hours services, a rural loading, a teaching payment, Indigenous health, and the Procedural General Practitioner Payment.

management of chronic conditions to PHNs (or at least choose some from this suite of payments). The allocation would be based on the usage of these items at the regional level in the year of commencement.

In its consultation paper concerning reform of the PIP, the Australian Government floated the option that the funds could be allocated to PHNs — which was supported by the Consumers Health Forum (CHF 2016). The Forum noted that this:

... fits with the desirability of promoting both quality general practice generally, but also practice readiness for any wider, national rollout of health care home models of care where it will be critical for practices to have good profiles of their practice populations, greater data literacy and analytics capability in order to take a more sophisticated approach to practice development, redesign, improvement etc as well as monitor patient outcomes. (p. 3)

There is also a recent precedent for pooling program funds and shifting them from centralised allocation to delivery at the regional level. In mid-2016, the Australian Government commenced the three-year transition from centralised delivery and funding of mental health to a devolved model in which PHNs could draw from the 'Primary Mental Health Care flexible funding pool' to commission services at the local level (DoH 2016f, 2017b, p. 63). This is not a small change. It will provide PHNs with approximately \$1 billion over three years commencing in 2016-17.

The Australian Government's reasoning for mental health pooling is that:

To successfully deliver a stepped care model it must be recognised there are individual needs and challenges that are specific to communities that do not always fit the one-size-fits-all model of service delivery run from Canberra. What works in Brisbane may not work in Broken Hill. Service providers operating in Adelaide may not consider it viable to operate in Albury. ... Service delivery [will shift] from Canberra to local communities through the 31 Primary Health Networks across the country. PHNs will be put in charge of commissioning the mental health services they consider necessary and appropriate to the needs of their local communities ... For example, decisions about the youth mental health services required in a local community will now be made by that local community, not Canberra. ... The funding will be made up of: ATAPS; Early Psychosis Prevention & Intervention Centres (EPPIC); Headspace service delivery (national office to remain); Mental Health Nurse Incentive Programme; Mental Health Services in Rural and Remote Areas; and various fragmented Suicide Prevention programmes. (Ley 2015)

This reasoning applies with equal force to primary health services generally.

In further support of that reasoning, because PHNs are on the ground, they are well placed to promote government policy in their locality. For example, the Australian Atlas of Healthcare Variation may indicate a comparatively high rate of treatments in the PHN's region, but the PHN is positioned to explore the extent to which that rate is warranted, including through its contacts with individual clinicians.

In combination with the PCCMFs discussed earlier, shifting to a pooled funding approach for prevention and management of chronic conditions would allow PHNs and LHNs to commission services through flexible localised funding models, avoiding the rigidities of the current system. They could specify different prices, incentives and bundles of services compared with those determined centrally by the Australian Government under the MBS/PIPQII/PNIP and Health Care Homes programs. They could also broker (and potentially co-fund) cooperative health initiatives with third parties that also want better health outcomes, including local government, various allied health professionals, schools, employers, private health insurers and social entrepreneurs. In the latter instance, PHNs and LHNs could be equity partners in social bonds. Subject to changes in ABF (as discussed earlier), LHNs would have incentives to identify and fund initiatives that would reduce hospitalisation rates (and stay durations).

The PHN funding model could extend beyond that envisaged above to more closely parallel the funding model for LHNs, though this would require more policy analysis before implementation. The skeletal features of this model would be:

- The Australian Government would develop and publish key performance indicators of PHN's impacts on hospitalisation rates, and the degree to which they have disseminated best practice in general practice, the use of diagnostics and prescription of pharmaceuticals. This might extend to indicators of key regional health outcomes, after adjusting for changes in socioeconomic and other demographic factors. A complexity here is separating these effects from those initiated by LHNs, though this might be more tractable in alliance models in which both entities are contributing ideas and funding. Regardless of any linkage to funding, it makes sense to still develop the indicators because these will assist PHNs in targeting their efforts and provide the Australian Government with evidence of their effectiveness.
- Just as in the funding approach described above for LHNs, a PHN that achieved its key performance indicators could be provided with access to additional funds. This would allow it to reinvest a portion of the dividends that its investments have helped generate.
- (B) Build new health packages through clever combinations by cooperating parties of existing discrete payments

A second option would leave the MBS, PIPQII and PNIP as they are, but (somewhat³⁰) augment the funding of PHNs so that they can more effectively partner with LHNs and primary care.

Under this approach, by carefully assembling the discrete elements of all of the payment streams, it would still be possible to craft innovative primary care initiatives without pooling funding through PHNs:

³⁰ It could only be 'somewhat' because, unlike the pooled funding model, there would be few (immediate) savings on MBS expenditure, so that funding would need to be mindful of the Australian Government's fiscal position.

- (a) the MBS sets compensation rates for a wide range of MBS items relating to the prevention and management of chronic conditions by GPs. The revenue from any relevant MBS-compensable activities would pay for (or at least co-fund) the role of GPs in any initiative
- (b) the PNIP and the new PIPQII would support eligible activities and capabilities in general practices. The general practice (not the individual GP) would be the source of these funds
- (c) LHNs would fund activities or capabilities that reduced hospitalisation rates and length of stay (potentially including augmentation of MBS payments where these were insufficient to motivate physicians to undertake effective actions)
- (d) As in the pooled funding approach above, LHNs and PHNs could still broker (albeit with less scope to co-fund) cooperative health initiatives with third parties.

There is some evidence that health providers are willing to develop projects along this line. For instance, the Hunter Diabetes Alliance took advantage of MBS item 743 ('organise and coordinate a case conference of at least 40 minutes') in developing its multidisciplinary approach. The prospective changes to the PIP and additional funding from LHNs would make more ambitious possibilities feasible. Nevertheless, as is any approach with hypothecated payments and centrally regulated prices, option B is still less flexible than the pooled funding approach in option A. For that reason, the Commission favours the pooled funding model.

Carving out a role for Health Care Homes in a new funding system

The prospective Health Care Homes Program would also need adaptation following implementation of either option A or B. The payments for the HCHs are substitutes for those from MBS and other Medicare sources, so these should not be added as additional funding sources for HCHs.

The 2016 COAG agreement on public hospital funding left open — albeit ambiguously — a role for State and Territory Governments in participating in Health Care Homes. State and Territory Governments are partners in Health Care Homes in that they have agreed to form bilateral agreements with the Australian Government about how Health Care Homes will work in the relevant regions in their jurisdictions. However, the content of such agreements lack specificity or clear commitments. They *may* include *elements* involving coordinated planning, blending funding and collaboration between LHNs and PHNs *where feasible*, with the possibility that after the trials have been completed that there *may* be 'collaborative, joint or pooled funding arrangements' (COAG 2016b, p. 9).

In our view it is critical for the effectiveness of HCHs that they collaborate with PHNs *and* LHNs to improve population health and reduce hospitalisations. The present model relies predominantly on PHNs, but given the current funding model, they have a weak capacity

to improve the health outcomes for people with complex and chronic conditions or to reduce hospitalisation rates. This is notwithstanding that one of the four national headline indicators in the Performance Framework for PHNs relates to reductions in potentially preventable hospitalisations (DoH 2016g). The performance framework needs to be coupled with the flexibility and capacity for PHNs to invest in improving outcomes. The augmented funding of PHNs, as described above, will overcome the funding obstacles. LHNs, which have the highest stake in reducing hospitalisations, should also play a role in HCHs. They should do this through alliances with PHNs, including by making additional financial or in-kind contributions to HCHs. LHNs should also share the patient data needed to stratify patients according to their need and to otherwise support patient management by health care homes. If necessary, the performance indicators of LHNs should require that such data sharing takes place.

Moreover, given that most HCHs will not be in place for some time, it might be possible to move away from the prescriptive nature of the current pricing regime for HCHs to the pooled funding model above (or to allow a certain share of the proposed HCHs to move in that direction). The 2016 COAG agreement on public hospital funding left open — albeit vaguely — a role for State and Territory Governments in participating in HCHs.

Relationships of LHNs with HCHs should extend beyond funding. The goal would be that all the main entities involving regional health care — PHNs, community health centres, LHNs and local governments could collaborate in any activity that had promising outcomes for people.

The focus on people with existing chronic and complex conditions in Health Care Homes is too narrow

Capitation payments in HCHs relate only to patients already with chronic and complex conditions. The rationale for this is that these are the highest-cost patients in the health care system, and that better management can improve their lives and potentially reduce costs. However, many people at serious risk have not yet developed chronic illnesses, and they would be good targets for preventative action. People who smoke or are obese are at high risk of developing chronic conditions, and yet the current model of general practice often does not result in even conversations about these issues with patients (chapter 3). Addressing these issues may not require capitation payments, but it suggests funding and collaborative models that diverge from fee-for-service.

One approach would be to allow PHNs and LHNs to co-design the form of the integrated health model for their communities, and leave it to them to decide the scope of patient types enrolled into the health care homes (and the funding arrangements that underpin this). Of course, any such collaboration must involve clinicians — and given their key role as gatekeepers — general practitioners in particular.

6.3 In essence, reform needs to be underpinned by 'win-win' alliances

Globally, health care systems that have successfully integrated care around patients have resolved the budget silos discussed in chapter 5. Canterbury in New Zealand relies on an alliance budgeting approach where all providers win or all lose. In the Kinzigtal integrated health system of Germany, stakeholders all share in budget savings across the entire system — or all miss out. Under the system preferred by the Commission, there is the opportunity to deal with the silo budget effect by creating incentives for Local Hospital Networks to invest in health care outside of the hospital, and at the same time giving Primary Health Networks the resources to invest in measures that reduce hospitalisation rates and low-value care. Any savings from the region's entire health budget costs would be shared between the two key funders (the Australian Government and the respective State or Territory Government) and LHNs, with the possibility that, as outlined above, of extending this to PHNs if this proves feasible.

CONCLUSION 6.2

The Australian Government should:

- allow Local Hospital Networks to commission the services of GPs by amending section 19 of the *Health Insurance Act* 1973 (Cth), with the proviso that the Local Hospital Networks are operating in formal agreement with their region's Primary Health Network
- remove any administrative constraints on Primary Health Networks allying with Local Hospital Networks to commission GP or other services related to prevention or management of chronic conditions
- allocate expected funding from the Practice Incentives Program and other MBS items to Primary Health Networks in each region where they are *directly* related to prevention and management of chronic conditions.

6.4 Cooperation might be the best option for private health insurers

As noted earlier, like all the other actors in the system, private health insurers face mixed incentives to encourage preventative care.

There are several options for addressing the current deficit in risk equalisation, including a prospective system (as used in the Netherlands) in which transfers between the funds reflect the differences in *expected* claim costs, rather than ex post claims. Another option might be the rigorous independent assessment of the net benefits of private insurers' Chronic Disease Management Programs (box 5.1) with these benefits being largely

quarantined from risk equalisation. A further option, which would require a less significant or no overhaul of risk equalisation, is a cooperative approach by insurers to manage chronic illness. This would reduce free riding. But there are other technical approaches that would also reduce unwarranted free riding (Reid et al. 2017). Risk equalisation arrangements are under review by the Private Health Ministerial Advisory Committee.

CONCLUSION 6.3

The pending Health Care Home trial is a significant development in integrated care in Australia, but its design warrants adaptation.

- Funding arrangements should include a mix of capitation and fee-for-service, with scope for local hospital networks and primary health networks, in alliance with each other, to provide additional funding or supports to the homes.
- A key goal should be to avoid hospitalisations, which will require leadership from Local Hospital Networks, and otherwise strong links between hospitals and Health Care Homes.
- Health care homes should also target people with high risks of developing chronic illnesses, such as those who are obese or smoke.

Giving effect to these features and those in Conclusion 6.2 will require different governance arrangements. There should be collaborative arrangements at the regional level between service providers funded by State and Territory Governments (local hospital networks and community health care centres), the Australian Government (primary health networks) and local government.

Different regional collaborations could adopt variants of health care homes that suit their regions.

Any local collaboration would have to engage with general practitioners and other clinicians, as their 'buy-in' will be critical to success.

CONCLUSION 6.4

If risk equalisation arrangements are not changed to provide greater rewards for preventative health by private health insurers, then the Australian Government should consider:

- quarantining the net benefits of private insurers' Chronic Disease Management Programs from the risk equalisation pool (subject to the capacity to rigorously assess those net benefits)
- encouraging a cooperative arrangement between insures for preventative health from which all would benefit.

6.5 Why not implement managed competition?

There are alternative funding models that might also encourage integrated care. An oft-cited option — 'managed competition' — involves pooling of the current disparate sources of funds (hospital, primary care, medical and pharmaceutical benefits, and so on) and their allocation to competing budget-holding intermediaries (regardless of their location). These then purchase health services for their clients (PC 2002). This would mean that the funding arrangements spelt out above for primary and hospital care would not be relevant — the funds would comprise a part of a bigger funding pool.

Under this approach, government manages competition through a variety of rules and rights to ensure access and stem strategic behaviour by budget-holders and others. As different intermediaries have customers with different health risk profiles, funding is shifted between insurers to equalise risks ('risk equalisation').³¹ This approach — similar to that currently used in the Netherlands — has been championed in Australia by several health economists, committees and other groups (CEDA 2013; NHHRC 2009; Scotton 1995; Stoelwinder 2014; Stoelwinder and Paolucci 2009). Achieving it would create better incentives for coordinated care, chronic illness management and disease prevention.

Nevertheless, it would be a radical step, requiring the complete dismantling of current Federal arrangements for health care funding and management, and the development of a new set of regulatory oversights. The Dutch health system — while widely regarded as good — costs more as a share of gross domestic product than Australia's, does not appear to produce superior health outcomes (Duckett 2014), and has encountered a range of other problems (Hall 2010).³² If nothing else, the transition to a Dutch model would be complex and risky, and those costs might not be worth the gains.

In that vein, a less radical approach based on reconfiguring the relationships and roles of regional care providers — as recommended in this report — has the potential to deliver many of the gains, without these costs and risks. (It also draws on some of the insights of the managed competition model.) Given the risks to quality of care, access to services and governments' budgets, incrementalism is generally a judicious approach to policy change in health care, especially as the Australian system produces reasonably good health outcomes by global standards. However, the system changes we recommend could be a step along a pathway to managed competition if evidence mounted in favour of this more radical overhaul.

³¹ Such equalisation is also used in Australia to underpin community rating of *private* health insurance.

³² Though there is some evidence that waiting times for elective surgery is less, which while involving expenditure, might still be beneficial (Stoelwinder 2014).

7 Funding of quality care in an integrated system

The above policy changes would help to finance initiatives that reduce hospitalisations. However, safety and quality in health care are sometimes tenuously linked to funding. Financial incentives are probably not the principal avenue for improving quality or safety, but they should not be overlooked as useful complements for other policies.

7.1 Preventable events are now on the policy agenda

Preventable events that lead to the need to provide additional services in hospitals can still be remunerated. Sentinel events (so-called 'never' events like leaving instruments in a patient after surgery, discharging an infant to the wrong family or operating on the wrong patient) are at the extreme end of the spectrum. Funding arrangements are changing from July 2017 so that hospitals will not be funded for episodes of care that involve such events (Hunt 2017a, 2017b). This funding change is justified for most sentinel events. However, it will do little to improve the overall quality of care because sentinel events are very rare (roughly 100 a year). Moreover, it is likely that public divulgence and the desire for clinicians and hospitals to be seen as competent and to avoid litigation are themselves powerful motivators of the avoidance of such events, and would encourage them to adhere to advice on how to avoid them.

A bigger issue is the large group of hospital-acquired complications (HACs) and avoidable hospital readmissions where establishing responsibility is more difficult than 'never' events.

Unplanned readmissions have shown little downward trend in recent years, despite increasing awareness of the issue (figure 7.1). In New South Wales, where published aggregate rates across outcomes from all admissions are available, unplanned readmission rates have been rising, and were 7 per cent in 2014-15 (Bolevich and Smith 2015).³³ There are even greater variations in unplanned readmission rates between hospitals, and these are largely not explained by complexity or other factors that can confuse the interpretation of these rates. For example, in New South Wales, even after adjusting for factors outside the control of hospitals, there was a more than nine-fold difference in the unplanned

³³ This excludes readmissions for some purposes, such as mental health assistance and chemotherapy.

readmission rates for treatment of pneumonia between the lowest and the highest performing hospitals (NSW BHI 2015b, p. 25).³⁴ That suggests inadequate diffusion of best practice for addressing unplanned readmissions.

HACs and avoidable hospital readmissions are less amenable to litigation or shaming, though disclosure of outcomes at the surgeon level would still be a powerful factor in revealing clinicians that are linked to HACs persistently outside the normal range. While not identifying the surgeons, the Royal Australasian College of Surgeons and Medibank Private have recently collated data at the surgeon level on HACs, admissions to intensive care units and readmission rates for a range of common orthopaedic procedures (RACS 2016b). They comment that 'such information would enable surgeons to gain a better understanding of variations, and consider how their practice could be improved for the benefit of patients'.

From July 2018, the IHPA will only provide partial (public) funding for episodes of care that lead to an agreed set of HACs, and has developed a framework for doing so (IHPA 2017).



^a An unplanned readmission occurs where a patient is admitted for an unplanned care or service in a hospital within 28 days of an earlier discharge. Not all unplanned readmissions are necessarily avoidable, but they are recognised as a valid indicator of safety and quality in State and Territory Government Service Performance Agreements with LHNs. The data are limited to public hospitals. Only the first readmission following surgery was included. A readmission was not included if there was an intervening unrelated separation.

Source: SCRGSP (2017 table 12A.50).

³⁴ The difference was more than eight fold if a simple unadjusted measure was used — so the adjustments here did not alter the results much here in any case.

7.2 Progress to limit low or no-value services is less rapid

Many medical interventions are fully remunerated by taxpayers even if the context in which they are used is not justified.

It is important to distinguish between two types of questionable treatments. One are treatments that lack clinical evidence in favour of their use *altogether* — or for which more cost effective treatments of better or equal efficacy have been discovered. This concern is not isolated to hospital care, but also to primary care, medical appliances and pharmaceuticals. Where ambiguity is not present, clinical standards and payment systems can be readily adapted to eliminate them.

A second, more problematic type of treatments are those that are clinically justified in some instances, but not in others. Sometimes, it is possible to determine authoritatively the circumstances in which a treatment is not clinically indicated. For example, there is no evidence in favour of chlamydia serology as a *screening* test, though it may be useful in other specific cases (Choosing Wisely Australia 2017). Similarly, computed tomography (CT) scans for head injuries are only warranted for high-risk presentations. Antibiotics are rarely justified for upper respiratory infections (which are overwhelmingly viral in nature). In Australia, about 75 per cent of acute bronchitis is treated with antibiotics. The evidence suggests that the rate should be close to zero (Hansen et al. 2015).

Arthroscopic knee surgery for degenerative knee disease provides a good case study of the complex issues at play. It is a very common orthopaedic procedure, performed millions of times per year internationally, despite evidence against it in many instances (Bohensky et al. 2012; Siemieniuk et al. 2017; Thorlund et al. 2015). The Australian Commission on Safety and Quality in Health Care (ACSQHC) has recently issued some guidelines that make clear that certain procedures have no evidence behind them, including arthroscopy for knee osteoarthritis (ACSQHC 2017a, 2017b). The ACSQHC is unequivocal about the right standard for this invasive procedure:

One effect of the new standard is to *discourage* [our emphasis] the use of arthroscopy for patients with knee osteoarthritis. Knee arthroscopy – a procedure that involves doctors inserting a camera and surgical instruments inside a patient's knee joint to clear out debris – is costly, may cause harm, and has repeatedly been shown to bring minimal benefit to patients with osteoarthritis, and yet it remains a common form of treatment. (ACSQHC 2017a, p. 1)

The standard is advisory — a surgeon could still elect to undertake the procedure for knee osteoarthritis.

Given the high prevalence of this procedure in Australia, the estimated annual costs of unjustified knee arthroscopies could readily be of the order of \$200 million.³⁵

It is also notable that in the United States, the Centers for Medicare and Medicaid (CMS 2004) and the UK's National Institute for Health and Care Excellence (NICE) has been recommending against this procedure for many years (NICE 2008, 2014b). These decisions are only made after thorough clinical advice. The clinical awareness of its inefficacy should have been apparent to all specialists more than a decade ago.

A group of clinicians at Liverpool, St George and Sutherland hospitals in Sydney have stopped performing arthroscopies on patients aged over 50 years because they do not feel they can clinically justify doing them (Aubusson 2014).

While most knee arthroscopies in Australia (and globally) are undertaken for degenerative knees, where they have no more effect than a placebo, there *are* some circumstances where knee arthroscopies are justified (Australian Knee Society 2016). This means that at the *surgeon level*, it is hard without sufficiently granular data describing the exact context in which a procedure is undertaken to know whether that surgeon has undertaken a low-value operation. However, there are often large regional variations in the use of particular clinical procedures that cannot be explained by differences in the characteristics of the underlying served populations (figure 7.2 shows this for knee arthroscopies and table 7.1 for some common operations on women). The best explanation for these variations are differences in clinicians' norms.

Variations across hospitals are greater than those across areas. For instance, one study found that an average of 3.3 per cent of patients with osteoarthritis of the knee received arthroscopic lavage and debridement of the knee (a do-not-do treatment), but four hospitals had rates of over 20 per cent (Duckett, Breadon and Romanes 2015).

The apparent widespread continued use of procedures without strong clinical evidence of benefits suggests problems in patient awareness and the dissemination of evidence-based medicine across clinicians.

³⁵ In Australia, there were about 33 000 knee arthroscopies for people aged 55 years and over in 2012-13 in all surgical settings, a group for whom degenerative knee disease is most common (ACSQHC 2015, p. 110). In 2010-11, there were 71 000 knee arthroscopies for all ages, many of which would still not be clinically justified (ACSQHC & AIHW 2014, p. 27). From 2010-11 to 2015-16, MBS data, which ignores public patients in public hospitals, show a decline in arthroscopies of 18 per cent (based on DSS online Medicare data). That suggests that a rough estimate of total arthroscopies in 2015-16 might be 58 000. If 30 per cent of these were clinically justified, and the cost per arthroscopy was about \$5000 (based on HCF data), then the waste from unneeded arthroscopies would be of the order of \$200 million annually.





Knee arthroscopy hospital admissions for persons >=55 years

^a The local area refers to the ABS Statistical Area Level 3 classification of geographic regions. *Source*: ACSQHC 2015, *Australian Atlas of Healthcare Variation*, chapter 3.1 (p. 107).

Table 7.1Variations in procedures relating to women's health and
maternity

Across 309 areas (Statistical Area Level 3), 2014-15

Procedure	Range across areas a	Times difference	Trimmed divergence ^b	Number over year
Hysterectomy ^C	115-763	6.6	2.1	27 586
Endometrial ablation ^C	19-390	20.5	4.2	28 606
Cervical loop excision cervical laser ablation	23-408	17.7	2.1	43 920
Caesarean section ^d	147-438	3.0	1.5	75 018
Third- and fourth-degree perineal tears ^e	6-71	11.8	2.9	18 463

^a Number of procedures per 100 000. ^b Difference between the 90th and 10th percentile rates. ^c Women aged 15 years and over. ^d For women aged 20-34 years. ^e For all vaginal births.

Source: ACSQHC 2017, The Second Australian Atlas of Healthcare Variation, June.

In some respects, the apparent proliferation of low and no value care is perplexing. As observed by one Australian clinician:

To deliver a do-not-do procedure a medical practitioner must first be credentialed, have a defined scope of practice and operate within their clinical team alongside support services and the governance structures of an organisation. Start counting how many people are involved. Therefore, the question we should be asking is: how is it possible for inappropriate care to occur? And what systems-level agreements perpetuate this situation? (Ibrahim 2015, p. 162)

Several factors are likely to be at work.

One is that many practices in any profession becomes customary, even as evidence slowly undermines their legitimacy. A leading Australian orthopaedic surgeon is sceptical of a range of commonly performed orthopaedic procedures, including knee arthroscopies. He observed:

I am not suggesting that surgeons are recommending operations *knowing* that the potential risks outweigh the potential benefits. Largely, surgeons believe that they are doing the right thing, but often they are not aware of the strength (or weakness) of the supporting evidence or, what is more often the case, there is simply no substantial or convincing scientific evidence available. Without good scientific evidence, surgeons perceive the procedures they recommend to be effective – otherwise their colleagues wouldn't be doing them, right? Put simply, a lack of evidence allows surgeons to do procedures that have always been done, those that their mentors taught them to do, to do what they think works, and to simply do what everyone else is doing. (Harris 2016b, pp. 1–2)

Cognitive biases appear to reinforce the status quo (Scott et al. 2017).

Another is patient expectations. Survey data from the United States suggest that more than 50 per cent of physicians acquiesce to patient requests for unnecessary medical practices (Kaul et al. 2015). It would be surprising if this were a US peculiarity. A surgeon commented about his own past practices:

I have operated on people that didn't have anything wrong with them in the first place. This happens because if a patient complains enough to a surgeon, one of the easiest ways of satisfying them is to operate. (Harris 2016b)

Overall, there appears little national progress to limit the use of low (or no or negative) value interventions. The Australian Commission on Safety and Quality in Health Care pointed out:

In some high-cost, high-burden clinical areas, where notable variation exists, there is little or no nationally agreed guidance. In these areas, there is a need for information on what constitutes best practice and effective care to produce care pathways, indicators for monitoring and resources for clinicians and consumers. (ACSQHC 2017c)

The ACSQHC, the Department of Health and the National Health and Medical Research Council are developing a framework to promote the efficient production of trustworthy clinical practice guidelines, but that will take some time.

Government-subsidised private health insurance also fund dubious treatments

As with the public system, private health insurers also fund some doubtful hospital procedures. Indeed, about 80 per cent of arthroscopies are undertaken in the private system (ACSQHC 2015, p. 106). Given spiralling costs, insurers have incentives to inform consumers about low-value care and to exclude cover. However, consumers are not well informed and may continue to demand cover for low-value procedures. Indeed, if the Australian Government ceases to fund activities that have little clinical value there may be a risk that patients will seek these procedures through the private system, funded by health insurance. The Australian Government bears some of the costs of funding low-value care through private health insurance because it provides substantial transfers to this part of the health system. ³⁶ The justification for such transfers is weak for services that would (or should) not be supplied by the public system. It may be that this issue will vanish if clinicians adhere more stringently to medical guidelines issued by their professional bodies and the ACSQHC. If not, it suggests that certain surgical services funded by insurers should be ineligible for the tax rebate.

Subsidies to ancillaries involve similar concerns. Taxpayers effectively underwrite private health insurance for ancillaries through the tax rebate, yet some of these services have no evidential support, such as homeopathy. An Australian Government review into various natural remedies found weak or no evidence about the efficacy of many treatments (Baggoley 2015).

7.3 Avoidance and management of chronic disease

As noted by the Australian Medical Association, 'general practice is the cornerstone of successful primary health care, which underpins population health outcomes' (AMA 2017). The Australasian College of General Practice has emphasised SNAP — smoking, nutrition, alcohol and physical activity — as key targets for preventative care (RACGP 2016).

Yet most people in the SNAP categories have not had discussions with their GPs about preventative health, including those who are in a high-risk category, such as obesity (table 7.2).

³⁶ This is more than is reported in the portfolio budget papers, which amounted to \$5.95 billion of direct subsidies in 2015-16 (DoH 2016b, p. 88). The exemption from the Medicare Levy Surcharge for those who hold insurance also represents an implicit transfer — estimated to be approximately \$2.5 billion (Doggett and McAuley 2015). (There is also notionally revenue forgone of \$1.69 billion because the rebate is not counted as income for the beneficiary. However, non-taxation of a subsidy does not represent a genuine loss to taxpayers because were there to be no subsidy, there would be no income to tax.)

Table 7.2GPs often do not discuss health issues with people with high
health risks
2014^a

Risk groups having discussion with GP about risk	
	%
Smoker — reducing or quitting smoking	39.6
Overweight person — a healthy weight	13
Obese person — a healthy weight	34.6
Obese person — eating healthy food or improving diet	20.1
Obese person — increasing physical activity	18.2
Person exceeding alcohol consumption guidelines — moderating use	
People with no/low exercise — increasing physical activity	12.5
People with inadequate fruit or vegetable consumption — eating healthy food or improving diet	13.3

 a The shares relate to those who had a at least one consultation with a GP in the 12 months preceding the survey.

Source: ABS 2017, National Health Survey: Health Service Usage and Health Related Actions, Australia, 2014-15, Cat. no. 4364.0, table 5.1.

Similar results were found in a South Australian survey of patients. Only about one third of patients with hypertension were advised to reduce their salt intake (Booth and Nowson 2010).

Moreover, there are many people with incipient chronic disease. Notably, for every 100 adults already with type 2 diabetes, there are an additional 20 who have just developed the condition, and another 100 who are at high risk (ABS 2015).

7.4 What are the solutions?

The development of standards is already underway, and is the first step in reducing low-value care. Such standards will need to be adaptable as new clinical evidence arises. These can further disrupt older standards, as better or more cost-effective interventions are apparent. 'Do-not-do' lists can play a key role, an initiative used in other countries and previously proposed by the Productivity Commission (PC 2013, 2015). The UK's NICE has already developed a comprehensive evidence-based 'do-not-do' list, while the Netherlands has also developed guidelines that identify low-value services (Wammes et al. 2016). The major deficit in the Australian approach seems to be its slowness. It is understandable that local clinician 'buy-in' is important, but there is greater scope for faster adoption of evidence-based assessments made in other countries by reputable agencies, like NICE and the Centers for Medicare and Medicaid Services. Chapter 6 in the main report discusses the importance of faster learning by Australian agencies across many policy arenas.

Education of patients is a second step. There is evidence that consumers are often unaware of the true effectiveness of interventions. For example, in a US study of patients with incurable cancer, nearly 70 per cent of those with lung cancer and about 80 per cent of those with colorectal cancer did not understand that chemotherapy was not at all likely to cure their cancer (OECD 2017b, p. 63). Another study found close to 90 per cent of patients who had committed to have surgery for coronary artery stents (for heart disease) believed that it would reduce their risk of heart attack, while 63 per cent of cardiologists considered that the benefits were limited to symptom relief (*ibid*). Making the advice of the ACSQHC and Choose Wisely Australia accessible in plain English through My Health Record may assist people to make more informed choices, as would raising health literacy generally (chapter 3).

Better dissemination of best practice among clinicians and funders is also a justified response, ideally led by the various medical Colleges and the ACSQHC. Clinicians receive periodic professional development. Focusing on the most commonly used low-value interventions would offer the best immediate returns. There is evidence of this happening autonomously. For example, the Royal Australasian College of Physicians and its associated Specialty Societies in Australia formed EVOLVE, which is a physician-led initiative to ensure the highest quality patient care through the identification and reduction of low-value practices and interventions.

In its consultations for this inquiry, the Productivity Commission was told that just by making information available to clinicians about the use of low-value treatments (and, where meaningful, HACs) by their peers was a useful mechanism for change as most clinicians wanted to be regarded as highly proficient in their discipline. Such information should also be made available to the public. How messages are transmitted to clinicians can make a difference too. Prompts for clinicians to enter free-text reasons for prescribing antibiotics into patients' electronic health records reduced unwarranted prescribing (Scott et al. 2017).

Finally, where it is possible to distinguish the circumstance in which an intervention is a low-value one from one where it is clinically justifiable, governments should remove funding. Notably, arthroscopy for knee osteoarthritis has not been covered by public insurance in the United States since 2004, in recognition of its lack of clinical and economic justification. The Pharmaceutical Benefits Advisory Committee has long taken this approach in respect of listing of pharmaceuticals for public funding through the PBS — basing its decision to list or de-list a drug on the basis of clinical effectiveness, safety and cost-effectiveness ('value for money') compared with other treatments. An added advantage of a capacity to de-list pharmaceuticals on cost-effectiveness grounds is that it provides pressure on pharmaceutical business to lower prices to maintain listing on the PBS (a prerequisite to successful sales in Australia).

Following the 2009-10 budget, the Australian Government developed a new framework for managing the MBS — the MBS Quality Framework — which has similar goals as those relating to reviews of the PBS (with a focus on using contemporary evidence to assess

clinical efficacy and cost-effectiveness of new and existing services). This developed subsequently into the Comprehensive Management Framework for the MBS.

The Medical Services Advisory Committee (MSAC) is the principal agent for assessing existing and proposed MBS services, with its role being to:

... advise the Australian Minister for Health on evidence relating to the safety, effectiveness and cost-effectiveness of new medical technologies and procedures. This advice informs Australian Government decisions about public funding for new, and in *some cases* [our emphasis] existing, medical procedures. (DoH 2016a)

However, most of MSAC's efforts have related to new services, with limited reappraisal of existing items. This led to a backlog of items that needed to be reappraised, prompting review processes overseen by the Australian Government Department of Health rather than MSAC. Until recently, very few services covered by the MBS have undergone any formal evidence-based review. In the latter respect, the Australian Government's Medicare Benefits Schedule Review Taskforce (the Robinson Review) is currently assessing the alignment of MBS items with contemporary clinical evidence (Robinson 2016). The result is that some items will be removed and therefore be no longer compensable by taxpayers.

In the future, some new services that are more cost-effective than existing ones will emerge, and new evidence will reveal that some MBS items have low value — suggesting de-listing. Reversion to the appraisal practices that existed prior to the Robinson review is likely to result in a new backlog of items that will need to be reappraised – and in the costs associated with the taxpayer funding of low value or sub-optimal treatments. The process for MBS reviews that existed prior to the Robinson taskforce appears on face value to be thorough, but convoluted (with four committees successively making decisions as part of the review process, prior to ultimate consideration by the Australian Government). After the Robinson Review, it would be desirable to reconsider review arrangements so that they are more nimble, and can keep up with the evidence on what works best.

There is already a recognition that any review process should examine MBS items that are growing rapidly in significance or already account for a large share of total MBS expenditure, which takes account of the finite resources available for review processes. In addition, there should be more rapid assessments of efficacy when NICE or some other comparable entity issues a guideline against the routine use of a treatment. The presumption in that case should be 'show us why we should not de-list?' Because reviews are, in their own right, investments, there should also be a deliberate process of learning about the rate of return of reviews and how the processes and targets of reviews should be configured to maximise those returns.

The above changes should not preclude clinicians from offering interventions on a user-pays basis so long as they are not harmful and so long as the consumer is not being subject to misleading claims about the efficiency of the intervention.
If many medical interventions have their impacts because of placebo effects, then it suggests analysis of the origin of such placebo effects, rather than the continuation of costly therapies (Bystad, Bystad and Wynn 2015; Kaptchuk and Miller 2015).

What about private health insurance?

The issues confronted by private health insurance discussed earlier suggest similar policy responses. In the case of surgical procedures, it is possible that better information provision to consumers and mounting clinical agreement about 'do not do' lists will preclude any significant problem. If that is not so, the Australian Government may need to recoup the subsidies it contributes to privately insured low-value surgery.

The logic underpinning reform of the MBS and encouragement of evidence-based interventions should also apply to ancillaries. It is questionable whether items that have no proven efficacy should receive any effective support by taxpayers. Removing the taxpayer subsidy for ancillaries would resolve the problem — and is justified for other reasons anyway (Ancillaries are not insurance products in any genuine sense because there is very little risk pooling across population groups. They more resemble savings plans.) The Australian Government has reviewed private health insurance arrangements, but the outcomes of that review were unknown at the time of this report's completion.

Increasing the capacity for preventative care

Evidence suggests that general practitioners are often overburdened — they must deal with the acute care needs of the patient that motivated the consultation in the first place, and do not always have the time, funding or sometimes the skills to succeed in altering hard-to-change lifestyle behaviours (Mazza et al. 2011; Volker et al. 2017).

The Health Care Home model is better suited to prevention than the standard model *if* it is adapted to link better with hospitals and community health, and is adequately funded, and coordinated at the local level. The changes to the MBS, and the roles of PHNs and LHNs, is the prime vehicle for achieving better preventative care in the primary care setting. As emphasised earlier, preventative care should also occur outside primary care. Moreover, in some instances, public health initiatives that address the environmental factors that lead to disease are a key aspect (appendix D).

CONCLUSION 7.1

There is compelling evidence that, despite their intrusiveness and cost, many medical interventions lack convincing evidence for them compared with placebos. Australian governments should:

- more quickly respond to authoritative international assessments identifying low-value interventions
- produce more comprehensive guidelines for clinically-justified interventions, including the creation of advisory 'do not do' lists for low-value treatments as identified by the Australian Commission on Safety and Quality in Health Care
- disseminate best practice to health professionals, typically through the Australian Commission on Safety and Quality in Health Care, state bodies like the NSW Bureau of Health Information, and the various medical colleges
- collect and divulge data at the hospital and clinician level for episodes of care that lead to hospital acquired complications and for interventions that have ambiguous clinical impacts (such as knee arthroscopies)
- provide patients with plain English explanations of treatments that often lack efficacy and improve health literacy using the approaches described in Conclusion 3.1
- ensure that the ongoing processes for reviewing existing MBS items is more rapid and comprehensive than occurred under the arrangements prior to the Robinson Review
- de-fund interventions that fail cost-effectiveness tests, with priority for doing so based on medical interventions with the greatest budgetary effects and where it is easiest to identify the context where they should not be used. This should extend beyond sentinel events and procedures associated with hospital-acquired complications.

8 The role of *patient* incentives in an integrated system

8.1 Patient charges

In principle, patient charges (typically in the form of copayments) could encourage patients to select the lowest-cost part of an integrated system (for example, primary care rather than hospitalisation) and to avoid low-value interventions. In theory, they could also increase competition between suppliers if patients have to bear some of the costs of the price differences between competing suppliers/products. Such incentives could reinforce the effects of supply-side funding changes in an integrated system that intend to achieve the same outcomes.

Nevertheless, it is well-recognised that patient charges have some potentially undesirable effects — depending on their design, level and incidence across the health care sector (OECD 2017b, p. 99; SCARC 2014).

A major concern is that charges may impose hardship on lower income households or reduce their access to health care. For example, the ABS' Patient Experiences survey found that 8 per cent of Australians do not fill a medical script when needed due to cost, and that proportion is highest for those in the most disadvantaged socioeconomic quintile (10 per cent) and lowest for those in the most advantaged socioeconomic quintile (5 per cent) (ABS 2016b). A similar socioeconomic disparity is apparent for services provided by medical specialists, dental professionals and GPs.³⁷ Means-testing of subsidies to alleviate these problems can lower incentives to work or encourage people to restructure their financial affairs. For instance, many people attempt to structure their financial affairs to obtain a part age pension because this provides an entitlement to a Pension Concession Card, which entitles the holder to lower copayments.

Also, charges may perversely lead to people being shifted to higher cost services (such as hospitalisation following failure to comply with full medication use or script-filling). There is evidence that those in fair or poor health or those with long-term medical conditions are more likely to delay or not fill a script, see a doctor, or obtain recommended care because of cost than those in good health, which increases the likelihood of higher cost health

³⁷ Other data form the Commonwealth Fund's 2016 International Health Policy Survey found that 14 per cent of Australians said that they had not filled a prescription, did not see a doctor or did not otherwise get recommended care because of cost (Mossialos et al. 2017).

interventions (ABS 2016b). For example, 14 per cent of people in fair or poor health did not get prescribed medication when needed due to cost, compared with 6 per cent of those in good to excellent health.

There is relatively little Australian evidence on the effects of patient charges on consumer choices across different health services and disease categories, especially in light of the difficulties for consumers in discerning quality of care and efficacy (as evidenced by the burgeoning sales of unsubsidised products that have few clinical benefits). Copayments currently vary in type and level across different parts of the health care system. Some health care services are free and some involve much higher costs. Such variations in charging rates are likely to elicit different demand responses in these segments, and sometimes substitution. For example, a non-concessional patient with chronic health conditions could readily pay more than \$1500 annually for PBS drugs.³⁸ Similarly, people face a copayment attending a non-bulk billing GP, but not when visiting a hospital emergency department, which may increase pressures on hospitals.

While a patient-centred system will encourage health literacy, it would be naïve to assume that this would provide sufficient clinical knowledge that patients would be able to always make the right tradeoffs between the prices of services and their impacts on their wellbeing. An open question is the degree to which information disclosure of the kind proposed in this and the Commission's Human Service inquiry (PC 2017b) could address some of the difficulties consumers face in making informed decisions. There are similarly important issues concerning the form of pricing. For instance, private insurance products often have benefit limits, excesses, and copayments, which have varying effects on the costs of services facing patients. The complexity of the products and the associated uncertainty about the ultimate cost of a service could be expected to affect patterns of consumer demand, but the evidence about this is scant.

This does not mean that copayments should be absent from an integrated care system, merely that their design and scope require very careful assessment. For example, given their ancillary role in an essentially universal health care system, front-end deductibles in private health insurance may help contain overuse of what are often discretionary services and help to relieve pressures on premiums.

Given there must be some limits on the scope of this inquiry, this paper has not examined consumer charges in any detail, but the issue is still an important one that should not be neglected.

³⁸ The annual expenditure threshold in early 2017 for a Safety Net Concession Card was \$1494.90 for 'general patients', with subsequent scripts costing \$6.30 (DoH 2017d). There were just over 91 000 cards issued in 2015 (Table 17(b) of DoH 2016e).

CONCLUSION 8.1

The present Australian health system employs consumer charges in an incoherent fashion, and little is known about their impacts. Further research is needed to understand the impact of current copayment arrangements on health costs and outcomes, and the implications of this for policy.

8.2 Rewards for people are an overlooked part of the picture

Social, monetary or in-kind rewards might also sometimes be used to create incentives for people to use the lowest-cost part of the system, to adopt preventative health measures, and to improve the health system in other ways.

The need for such rewards sounds counterintuitive when people already have incentives to avoid chronic ill-health. However, the onset of chronic conditions is insidious, their timing and effects are uncertain, and inertia favours any ingrained unhealthy lifestyles. A (if not *the*) major challenge for preventative health is challenging habits that people have acquired as unwanted parts of their lifestyles. (For instance, most people do not want to be obese and do want to control their food intakes, but their efforts to do so usually fail.)

Rewards have been used, quite often effectively, in preventative health (like smoking cessation).³⁹ Recently, there has been innovative use of 'gamification' — the use of game-design elements in non-game settings, usually using the internet — to provide non-pecuniary rewards for positive behaviours (Lewis, Swartz and Lyons 2016). Even the existence of a publication called the *Games for Health Journal* is revealing. There is also increasing use of pre-commitment approaches to preventative health (as noted below).

The size and form of rewards appear to matter. In school settings and for low-income people, the rewards can be lower and still be effective. For example, a school-based intervention aimed at reducing obesity in socially-disadvantaged youth used small rewards, amongst other strategies, to motivate reduced body mass (for example, a recognition bulletin board was used as a social reward and T-shirts and wrist bands for in-kind rewards). Effects on body mass were significant, though the role of rewards compared with

³⁹ Rewards have been applied in areas as diverse as rehabilitation for cocaine dependency; motivation of weight loss and physical exercise; smoking reduction; treatment of tuberculosis; postpartum appointment keeping for low-income pregnant teenagers; preventative dentistry; eating fruit and vegetables; adherence to long-term antipsychotic injectable drugs; and substance abuse problems in veterans. For a small sample of a diverse literature, see Cahill, Hartmann-Boyce and Perera (2015); Gardiner and Bryan (2017); Giuffrida and Torgerson (1997); Higgins et al. (2017); Mattke et al. (2013); Petry et al. (2014); and Priebe et al. (2016).

other factors was not isolated.⁴⁰ In contrast, financial rewards, among other measures, were used to encourage better diet and more exercise for a small group of Australian truck drivers, but the rewards were too small on their own to be an effective strategy (Gilson et al. 2017). A recent 'meta'-study of the impact of incentives to improve physical activity found short-run positive impacts that vanished over the longer-run (Molema et al. 2016). However, this analysis was based on only three interventions, all involving low-value in-kind benefits, which could be expected to have minimal effects.⁴¹ A large-scale study of smoking cessation involving a good experimental design and large financial incentives found material and statistically significant impacts associated with incentives (Volpp et al. 2009). There is a prospective study of the effect of much larger financial incentives for diabetes prevention in a US Medicaid population (Desai et al. 2017).

That incentives seem to work better for low-income vulnerable populations may reflect that any given payment represents a higher share of their income. The greater effectiveness for such households is also promising because they score consistently worse on nearly all measures of health outcomes and are overly represented in groups where preventative health appears to offer the greatest payback. For instance, 20 per cent of people in the lowest socioeconomic groups smoke daily compared with 6.7 per cent of those in the highest socioeconomic group. Rates among Indigenous populations are about 40 per cent. Smoking is the leading risk factor contributing to death and disease in Australia (AIHW 2016b, p. 171,176,184).

One of the fertile areas for further development is the use of 'nudges', which can use rewards to motivate behavioural change or apply so-called pre-commitment strategies. Also sometimes referred to as Ulysses contracts, the latter recognise that people would like to cease some activity and, anticipating that they will be unable to control their future impulses, want to bind themselves to their initial commitment. The Productivity Commission has examined pre-commitment for harm minimisation in electronic gaming machines (PC 2010). The approach has been used in a variety of other contexts. For instance, smokers who paid a weekly amount into a bank account, which they risked losing after a set period, were more likely to cease smoking than a control group (Cahill, Hartmann-Boyce and Perera 2015).

Various governments in Australia have established behavioural insight groups to develop nudges to promote healthier lifestyles. As illustrations:

• the NSW Government's Behavioural Insights Unit experimented with the best form of content for SMSs reminding people of an outpatient appointment (many thousands of which are missed every year). The most effective message was "You have an

⁴⁰ Of all adolescents at the healthy weight at baseline, 2 per cent of the intervention group became overweight after five years, while 13 per cent of the comparison group increased to overweight or obese (p=0.02) after four years (Lazorick et al. 2014). Follow-up research showed persisting benefits (Lazorick, Fang and Crawford 2016).

⁴¹ A broader review cited more positive results and also proposed some guides for the future use of incentives, drawing on behavioural economics (Shuval et al. 2017).

appointment with Dr [XXXX] in [clinic XXXX] on [date] at [time]. By attending, the hospital will not lose the \$125 that we lose when a patient does not turn up. This money will be used to treat other patients." During the first trial there was a 19 per cent reduction in the number of the people missing their appointments, saving St Vincent's Hospital more than \$68 000 (NSW BIU 2017)

• the Victorian Government's behavioural insights unit examined the effect of 'nudges' to encourage reduced sales of high-sugar beverages at the Alfred Hospital. The trial significantly reduced the sales of less healthy drinks, without reducing overall sales of drinks for participating businesses, thus making it a commercially-viable strategy (Alfred Health Victoria 2017; VicHealth 2016).

These measures often involve partnerships with businesses or regional parties.

Rewards and 'nudges' have some advantages over pricing, especially in their capacity for tailoring to specific regional populations. Pricing cannot usually target low-income users because of its obvious effects on income distribution, while rewards and nudges have no adverse financial consequences on such groups, nor any adverse effects on employment incentives.

Innovation and flexibility is also easier. It would be hard to implement geographically-varying PBS copayments or mandated GP copayments (even if it was thought they had some merit). In contrast, PHNs, LHNs, community health centres and others can run reward-based experiments at the local level that take account of the capabilities of their communities and the specific health issues (and their drivers) that predominate in their area (section 4.3).

While there have been many interventions using rewards for preventative health, there appear to be fewer instances where they have been applied to encourage those already with a chronic health condition to use the lowest-cost part of the health system. However, there are grounds for LHNs and PHNs to also consider these as tools for lowering their costs. For example, rewards might assist compliance with care plans for patients most susceptible to non-compliance. Small incentives have been shown to be effective for compliance with treatments for hypertension (Giuffrida and Torgerson 1997).

CONCLUSION 8.2

Internationally, financial and non-pecuniary incentives have proven successful in preventative health and in encouraging efficient use of the health system, but are not used extensively in Australia. They are particularly useful when used for lower-income groups.

Regional alliances, with advice from businesses and central agencies (such as the various government 'nudge' units) would be a natural starting point for experiments.

Information collection and management — a focus on what works and what people need to know

The role of data collection in health makes a difference to practice and policy. As early as 1911, the Commonwealth Statistician justified the population census for, among many other things, the insights it provided into causality and good health policy:

...excessive mortality or morbidity rates furnish evidence of the need and necessary direction of prophylaxis [preventative measures]. And it may be here remarked that statistical results of such a nature have disclosed the fact that popular impressions are often wholly erroneous. (Knibbs 1917, p. 8)

Information is increasingly playing a pivotal role in Australia's health care system. It has always been important, but when it was in paper form, it often lacked value. As one party described it:

.. the vast majority of this data was trapped in file folders and banker's boxes. This static data resource often obscured by illegible handwriting, missing papers, and mistakenly misplaced records . (Bresnick 2016, p. 2)

Digitalisation of data, information systems, new ways of transmitting information to clinicians and patients (the rise of the smart phone for example) and more efficient approaches that convert data into knowledge and practice have all developed since the era of paper records.

However, just as diffusion of technologies for treating patients has often been gradual, the same applies to the processes for collecting and using data. Part of this is the familiar story of the barriers posed by customary practices, the poor capabilities in administrators, clinicians and patients to use this new resource, and legitimate concerns about the investment costs associated with new technologies. But part also reflect regulatory barriers (such as ethical clearance, privacy requirements for data use, and rules about sharing) and administrative practices (like incompatible data definitions). These only mattered peripherally when movement of information was predominantly frustrated by its physical form. Nowadays, information systems and digitalised data have permitted the speedy and low-cost transport of data, and the costs of failing to exploit that means that many opportunities for better health care have been forgone. Strong regulation remains important, but its form must be suitable and take into account the consequences of too regimented arrangements.

This chapter explores some of the dimensions of this problem and their solutions in the health care sector. It does not consider all of the solutions in depth as the Commission has recently concluded an inquiry into *Data Availability and Use* (PC 2017a), which provides a generic framework for government policy for data in all sectors. Further, the Commission is also considering how to improve the collection and dissemination of information on hospitals and specialists to better support self-improvement by service providers and patient choice in an inquiry into human services (PC 2017b).

9.1 Poor information flows and coordination for users of the health system

Recognition of the importance of data in health care is not new. The clinical medical record dates back to antiquity, but the systematic use by clinicians of patient health histories (in paper form) commenced only in the early 20th century — and provided many benefits to patients (Gillum 2013). New technologies, the sophistication of modern medicine, greater levels of specialisation, and improved tools for using information have markedly increased the value and necessity of using information well.

The provision of information about patients, quality, clinical guidelines, and costs that moves 'seamlessly' between the parts of the system has been a longstanding worthy aspiration of the Australian health system. Any integrated model needs to keep track of where the patient goes and what happens to them. However, seamless information sharing has so far failed to fully materialise. The OECD has characterised Australia as relatively poor in its capacity to collect and link health data (OECD 2015b).

Poor information flows raise the risks of conflicting treatments, duplication of effort, suboptimal outcomes, inconvenience for patients, and excessive costs. Associated with this, there is no clear system for coordinating the care of a person as they enter the health system's various fragmented bits.

For instance, there is widespread dissatisfaction by GPs about divulgence of key aspects of a patient's experience in hospitals. More than 40 per cent of GPs were unsatisfied with information about the patient's functional status on discharge (Mahfouz et al. 2017). Many do not know that a patient has been to hospital at all. Similarly, hospital emergency departments do not always receive the right information.

One hospital clinician remarked:

... harm may similarly be imposed on ambulance-transported patients who have a critical illness and face delayed admission to ED, or even diversion from their usual hospital to one that is unfamiliar or ill-equipped to deal with complex, high acuity and specialised care. Without electronic records, these patients' medical notes are frequently hard to access. Ambulance load sharing doesn't make sense if it leads to the patient being brought to the wrong hospital or some ending up far from their "home hospitals". For example, a patient who was

dying and in palliative care was diverted by ambulance to my hospital after being discharged the same day from his distant home hospital, where he had previously spent several weeks and was close to his family. (Ting 2017, p. 2)

Data cannot be readily transferred between different sectors in Australia's health system or even between providers in the same sector because of a lack of interoperability in existing data systems. For instance, the South Australian Government's system for providing an integrated health record for every patient admitted to a South Australian public hospital or health service (the Enterprise Patient Administration System — EPAS) claims as it goal: '1 Patient. 1 Record. Better Care'. However, the system will not be available to the private sector (that is, most GPs and all private hospitals), and the intention is that only some information will be linked to the national My Health Record (SA DoHA 2017). On the implementation front, EPAS has also been criticised by the South Australian Auditor-General as overly ambitious in time frames, costs and efforts needed to implement — another Achilles heel in large IT system developments (SA AG 2016).

Electronic coordination of dispensing of controlled drugs provides a good illustration of incomplete adoption of an already available system. Electronic recording and reporting of controlled drugs dispensed by pharmacies is used to address problematic access, such as drug overdoses, but its implementation is not yet complete across all jurisdictions (PC 2017a, p. 513). More generally, the absence of a system for reconciling prescriptions issued by clinicians with the purchase of drugs from dispensers means that it is difficult to target people who are not filling their scripts, with the dangers that this poses for their health. It also means that the system for issuing PBS Safety Net cards for people whose annual expenditure has exceeded a threshold (which entitles them to lower priced drugs) is unwieldy and incomplete.

Nor do current information systems provide consistent quality assurance at the site and clinical level. In a wide-ranging (largely positive) review of the Victorian health care system, it was noted:

When the work for this study was being undertaken, Victoria had not had – at least to anyone's knowledge – what might be dubbed a major hospital scandal: the equivalent of the paediatric cardiac deaths in Bristol or a Mid Staffordshire in England's NHS, or the equivalent of the Bundaberg, or Campbell and Camden events in Queensland and New South Wales. But, as one senior official in the department put it, 'How would we know?' (Ham and Timmins 2015, p. 44)

Victoria is not alone. Not only are there large clinical variations across Australia, and a significant number of adverse events, but in many cases, the evidential basis for clinical practice is deficient or dated. There are changes afoot — such as the Australian Atlas of Clinical Variations (chapter 7) and initiatives like the ACI's Stroke Clinical Audit Process (SCAP) (discussed in chapter 4 and further below in section 9.3). The latter is an exemplar of what data collection, analysis and learning at the site level can do. The SCAP was able to identify exactly what happened to patients when they were admitted to different hospitals with strokes, thereby isolating practices that should change (such as having a

swallow test or providing an antithrombotic on discharge — table 9.1). Ideally, patient-level data like this would be routinely collected at the hospital level for high-risk admissions, and would provide continuous feedback to hospitals so they can improve practices (decision-support systems).

Various disease registries are being used to inform best practice. For example, the Australia and New Zealand Hip Fracture Registry was established in 2011 to develop guidelines and quality standards, collect a dataset and monitor hip fracture treatment outcomes over time, and create a website to disseminate good practice (Taylor 2015). As for stroke, the process included a facility level audit of the processes and outcomes following the presentation of a patient for a hip fracture. One clinician estimated that the use of the audit (and action based on it) had saved 1000 lives (Harris 2016a).

Even where data systems are available, that does not necessarily guarantee their use. Clinicians may have access to systems that guide their clinical judgments or help them interpret a patient's record, but they do not always use them or have the incentives to do so (Fountaine and Bennett 2016).

General practice has engaged far more with information technology than others in the health care system. In June 2017, about 6100 general practices were registered for My Health Record, representing 85 per cent of practices.⁴² While 96 per cent of general practitioners used computers for clinical purposes, prevalence rates for specialists (37 per cent) and surgeons (22 per cent) suggest that they cannot efficiently transfer information — a critical feature of integrated health (PC 2017a, p. 517). As one clinician remarked:

I use a fax machine almost daily, as well as other arcane technologies, such as the pager that has to be carried around at all times. These rather quaint examples make for fun anecdotes to regale non-medical friends with, but they speak to something more profound: the generally abject quality of the communication tools employed by health care practitioners. This is especially clear in our handling of medical records. It's ironic, given that our profession takes so much pride in the ability to tell the story in a succinct and a systematic way, that we are so tolerant of platforms that obscure rather than illuminate the important points in a patient's history. Even within a single hospital network, the archive can be dense, chaotic and generally migraine-inducing. It's not uncommon to find a crucial operation report hidden among a dozen computer-generated data logs or lost at the end of a digital cul-de-sac. (Dando 2017, p. 1)

⁴² Based on practice numbers reported in Scott (2017) and GP registrations recorded by the ADHA (2017).

Clinical measure	Unit	H1	H2	НЗ	H4	H5	H6
30 day mortality rate	%	20.7	8.2	9.2	19.1	30.6	9.6
Stroke Unit Bed or High Dependency Unit	%	100	100	63	0	0	100
24 hour neurological observations	%	100	95	63	55	9	100
Used stroke clinical pathway	%	0	45	85	80	0	75
Swallow test <4 hours	%	25	70	20	10	0	40
Discharged on antithrombotic	%	78	84	93	71	80	100
Aspirin within 24 hours	%	44	58	60	47	20	72
Palliative care	%	0	3	2	0	3	0
Discharged on Statin	%	28	63	60	43	20	67

Table 9.1 Data identify the potential for practice improvements What 6 hospitals did for an admitted stroke patient

^a The higher the share for any measure, the more a hospital is adhering to best practice.

Source: NSW Agency for Clinical Innovation (2017, p. 12).

What can be done?

In one of the world's leading health systems in Canterbury, New Zealand, an electronic system of scripts, referrals and medical records is well utilised by GPs under the Health Pathways system, and is part of the data exchanged with hospitals for the purpose of providing the best care to patients.

Under the funding recommendations of this report, PHNs would have the capacity and the incentive to coordinate local shifts to an electronic system such as that of Canterbury in New Zealand, and to otherwise coordinate data sharing with Local Hospital Networks. Sufficiently granular data should be remitted to GPs, hospitals and other health providers in a form that assists them to assess their own performance. More aggregated data could also be remitted to the AIHW for broader dissemination.

There are other steps that can assist:⁴³

- a coordinated approach to standardise definitions and terminology including within the primary health sector. This is a role that the Accrediting Release Authority recommended in the Commission's data inquiry could play or could at least commission (PC 2017a)
- data at the right level of granularity needs to be collected, subject to the costs of digging deeper. Information is already collected on referrals, diagnostics, numbers of consultations and their durations, scripts issued and filled, and hospitalisations. At a minimum, linking these together is feasible and useful (but is currently prevented by

⁴³ Many of these are described in the PC's inquiry into *Data Availability and Use* and the burgeoning analysis of the obstacles and solutions to the use of data in the health system (Kruse et al. 2016).

the inefficient implementation of Commonwealth privacy legislation). However, several stakeholders told the Commission that little is known about what happens during the short and long GP consultations that constitute the dominant MBS items. The practicality and value of discovering the content of that black box will depend on technology, software design, compliance costs and its usefulness in learning. As an illustration, suppose that a patient presented with anxiety about work and has difficulty sleeping. The GP provides advice that this is quite common and often resolves itself, and that simple approaches such as exercise, establishing a routine for sleeping, avoiding excessive alcohol, and relaxation techniques would assist. She also counsels the person to discuss workloads with the employer, and to seek more support from friends. While some record is needed in case a condition persists, it is an open question about the degree of detail required when a GP must deal with a full waiting room. For example, is it necessary to record the GP's assessment of the level of anxiety? And were it recorded, would data inconsistencies across GPs and the difficulty of establishing outcomes (did the anxiety dissipate, by how much and through what mechanism) make it useful? Peering inside the black box for all consultations may not be cost-effective when these involve so many nuanced interventions. Nevertheless, surveys may help to understand more about what happens, while specific trials of interventions for given presentations seems a more promising avenue to clinical improvements

- changes to the procurement processes in the health sector by all jurisdictions to ensure that future interoperability is not blocked by contract terms or software design
- co-design of data systems by those who use them
- training of the medical workforce (and administrators)
- demonstration of the benefits to clinicians and patients in effect, data have to be translated into information that can change behaviour or give people control, with the lowest compliance burdens. While based on data from the United States, an observational study of four specialties found nearly half of the clinicians' time was spent on compliance with clerical and electronic health records (Sinsky et al. 2016). One of the key challenges in implementing information management systems will be to highlight its clinical value to physicians telehealth, elimination of duplicated data collection, automatic billing, and better clinical advice and better patient outcomes.
- quality control to ensure data are as accurate as possible
- software and hardware design that minimises the cost of accessing and inputting information
- not constraining the sharing of data for analytical purposes unless there are concerns about cybersecurity and privacy. For example, while the data were collected at the patient level for ACI's stroke audit, the focus was on improving clinical practices. Similarly, if clinicians receive information on their clinical performance compared with peers, the patient-level data are required, but the creation of benchmarks is the goal. Where the interest is ensuring that patient-specific information is used to provide

coordinated patient-centred care, some other issues can emerge, such as correction of records by patients and a capacity for patients to withhold information in some instances. Patients might not want all the clinicians and allied professionals with whom they may have some future involvement to know about stigmatised conditions — like eating disorders, affective disorders, sexual addiction or anger management. A requirement for disclosure can prevent people from seeking help in the first place.

The dividends from better coordination of data for people's care appear to be large

Overall, the dividends from good data management for patients appear to be high. Electronic medical records can reduce the risk to patient health of incomplete or inaccurate patient information — which results in up to 18 per cent of medical errors in Australia (Jolly 2011). Accurate information also reduces the risk of duplicating tests or of conflicting medical treatments. In the United States, nine per cent of pathology tests are duplicates and therefore add to costs without adding value (CBO 2008). Similarly in Australia, survey data indicate that medical tests are duplicated for over ten per cent of adults with chronic conditions (Schoen et al. 2009).

Well-designed information systems are not enough

The most exquisitely designed information sharing and management system will not deliver its full benefits if clinicians and others do not enter reliable data or use it for managing the treatment of patients. That cannot be assumed.

The evidence indicates that the provision of reliable health data leads to improved health outcomes, including by assisting individual providers to self-evaluate their performance against other providers (ACSQHC 2016a; Henderson and Henderson 2015; Shaw, Taylor and Dix 2015). However, it is critical that the data are of high quality, the setting in which the data have been collected is divulged, the risks of unintended negative outcomes from misinterpretation or mismeasurement is assessed and remedied, and the measurement of performance is regularly refined.

The Australian Government's Diabetes Care Project showed that provision of a sophisticated information management system for GPs (including the capacity to provide linked electronic patient records, information on GPs' performance relative to peers, automatic generation of care plans, and fund management, among other functions) was little utilised by GPs and had no benefit for patients unless accompanied by other aspects of integrated care, such as financial incentives (DoH 2015b). There are grounds for linking access to government funding for some services to the uptake of electronic medical records. We envisage that in many of their collaborative ventures for better integrating care, PHN/LHN alliances would require health professionals to participate in a shared information system in order to be eligible for additional funding.

Even rudimentary approaches to help people with chronic conditions navigate the health system can be incomplete or out-of-date. For example, the National Diabetes Services Scheme (*ndss*) provides a national online services directory that provides patients with lists of the local professionals that can assist them in managing diabetes (for example, podiatrists, psychologists, dieticians, and endocrinologists). There are large gaps in coverage, as exemplified by negligible coverage of podiatrists in the database (figure 9.1), a coverage rate that is similarly poor in other specialties. For example, the database lists only seven medical practitioners in all of New South Wales with a role in diabetes management.



^a The National Diabetes Services Scheme (*ndss*) online data indicate the number of podiatrists by locality. The AIHW undertakes regular surveys to estimate the national medical workforce. The ratio of the former to the latter is the coverage rate. A comprehensive online database would have a 100% coverage rate. Podiatrists are key professionals for addressing the common limb problems experienced by diabetics. The ndss is an initiative of the Australian Government that commenced in 1987 and is administered with the assistance of Diabetes Australia.

Sources: Data extraction from the ndss online database (http://osd.ndss.com.au/search/default.aspx) on 15 May 2017, and AIHW National Health Workforce Data Set (NHWDS) 2014.

The deficiencies of databases of this kind reflect that maintenance is costly, other tasks have higher immediate priority and health professionals have little interest in providing details because of time poverty. Further, providers and consumers have little incentive to look at a database that has limited functionality. There are also other competing databases — creating a source of confusion. Arguably, something as simple as providing patients with some guidance on using Internet search engines for accessing services might have a higher payoff if there is a risk that any newly advocated online resource is insufficiently maintained or incomplete. Regardless, the lesson from this small case study is that aspects

of an integrated care system ('access to information') may seem to be present, but vanish when probed more deeply.

9.2 Using data for evidence-based policy and practice

It is now well understood that alcohol and drug abuse are major contributors to illness and mortality in Australia (AIHW 2016a; Manning, Smith and Mazerolle 2013; NHMRC 2009). It is less well recalled that this understanding stemmed from the seminal work of researchers in Western Australia who linked 6.5 million records of births, deaths, hospital separation and other health data to quantify the impact of drug and alcohol abuse on mortality (Holman et al. 1990). This approach set the benchmark for researchers around the world (for example, Sjögren et al. 2001) and helped to precipitate Australia's campaign to reduce drug and alcohol abuse.

Integrated care provides an opportunity for integrated data for evidence-based policymaking and clinical practices. With the right information technology infrastructure and capabilities, it is possible to collect information on the inputs, outputs and outcomes associated with each of the myriad interactions people have with the different parts of the health system. This goes beyond single episodes of care to lifetime datasets that provide a better understanding of the long-run effects of any intervention.

Data collection is one dimension of building an evidence base, but equally important, the data has to be useful, linked and made available to providers and researchers. As part of its *Data Access and Release Policy*, the Australian Government has committed to releasing medical information 'in an appropriately de-identified and confidentialised form' unless there is a good reason not to (DoH 2015a). Consistent with that policy, the Department agreed to allow the AIHW to store a five year dataset of MBS and PBS claims, which will facilitate more efficient access to linked data for medical research (AIHW 2015). The Department also released a sample of MBS and PBS de-identified data to the public in August 2016. However, this was subsequently removed when some of the data were re-identified.

It is possible to resolve these issues by:

- concentrating on access for trusted users who are most likely to add value to the data
- using proven mechanisms. For research purposes, an effective mechanism is the Secure Unified Research Environment, which was established with Australian Government funding as part of the Population Health Research Network (PHRN).⁴⁴ When adequately resourced and well managed, clinical quality registries such as Victoria's trauma registry (VSTR) and the Australian and New Zealand dialysis and transplant

⁴⁴ SURE was established to facilitate large-scale research projects to address major health and social issues confronting Australia.

registry (ANZDATA) have proven effective for encouraging clinicians to engage in self-improvement (ACSQHC 2016a)

focusing on the release of data that are most likely to benefit the public. For example, there is evidence that public reporting of health outcomes for service providers leads to improved outcomes because providers use the data to self-improve (and not so much because consumers use the data to choose providers) (Henderson and Henderson 2015; Shaw, Taylor and Dix 2015). Therefore, health outcome data need to be readily understood by service providers in order for its release to be valuable for improving health outcomes. Examples of how targets, measurement and reporting have led to significant improvements include reductions in patient waiting times in England, lower risk-adjusted mortality rates for cardiac surgery in New York, Great Britain and Ireland, improvements in prostate cancer outcomes in Germany and improvements in hip replacement performance in Sweden (Shaw, Taylor and Dix 2015).

The issues about managing and distributing data in an integrated health system are largely addressed in the Commission's inquiry report into *Data Availability and Use* and are being further explored in the Commission's inquiry into the reform of human services (PC 2017a, 2017b). Under the recommendations of this current report, there is also a role for PHNs and LHNs to engage with individual clinicians and other providers using performance data that assist the individual providers to assess their contribution to the health of the region's population.

It's difficult to find data

A solicitor of even reasonably aggregated health information about population risks (for instance obesity rates or healthy diets) finds life far from easy when seeking to navigate the maze of websites and agencies reporting health information across the various jurisdictions. All jurisdictions conduct regular surveys on population health risks and report regional results in their jurisdictions. State Government bodies also undertake patient experience surveys, typically using different instruments and covering different periods.

There is no single place where the data are consolidated, systematically compared or available for trusted researchers using a common protocol. The AIHW's list of data sources for monitoring health conditions only relates to national surveys (AIHW 2016c). The Australian Government's open data portal (data.gov.au) includes a hotch-potch of 'data' sets relating to health, many of which are lists of facilities by location (to name a few: ice skating centres in Victoria; playgrounds in the City of Greater Geelong, and the location of European wasps in the ACT). Many key health data collections known to exist were absent and the ones present were jumbled up with ones with very different purposes.

The difficulty of accessing information forgoes opportunities for richer analysis, including of causal analysis of the factors that affect population health, benchmarks for performance at the regional level, and a greater capacity for testing the efficacy of some health promotion initiatives. For instance, if one jurisdiction runs a campaign on smoking cessation, it might be possible to use smoking rates in the regions of other jurisdictions as a control.

The Productivity Commission's inquiry into *Data Availability and Use* made several recommendations that would improve matters, including for all Australian governments to create 'comprehensive, easy to access registers of data, including metadata and linked data they fund or hold' with data available or signposted on data.gov.au. We also recommended the accreditation of data release authorities (such as the AIHW) that, subject to risk management protocols, could release Australian Government unit record data, with opt-in arrangements for State and Territory governments (recs. 6.4, 6.6 and 6.7 PC 2017a). These should be progressed.

CONCLUSION 9.1

There is a maze of websites and agencies reporting health information across the various jurisdictions, making it difficult to obtain a reliable Australia-wide perspective on patient experiences of health care, and the incidence and prevalence of chronic conditions. Neither the Australian Institute for Health and Welfare nor data.gov.au are currently serving as comprehensive data holders.

The implementation of the Commission's recommendations in its inquiry into Data Availability and Use (specifically, recommendations 6.4, 6.6 and 6.7) and in its inquiry into human services (specifically, draft recommendations 10.1 and 10.2) would resolve these problems.

9.3 Disseminating best-practice

Inertia is a characteristic of many parts of life — in business, government, in ordinary people's lives (including their lifestyle choices), health care providers and clinicians. One of the biggest brakes on productivity in an economy — or any part of it — is that learning is slow. In the early 1980s, beta blockers were shown to reduce mortality rates by up to 25 per cent after a heart attack, yet by the early 2000s in the United States, median state-level use was still below 70 per cent (Skinner and Staiger 2015). More recently, a study of nearly three million victims of heart attacks over the period from 1986 to 2004 found that there was a three percentage point difference in the one year survival rates between hospitals that had rapidly taken up three best practice techniques for clinical responses to heart attacks and those whose take up was poorest. This was one third of the total improvement in survival rates for heart attacks over the 18-year period concerned (*ibid*).

In Australia, there are major differences in mortality rates following strokes. A minority of NSW hospitals organise stroke care. Yet where stroke units have been implemented, there was a 30 per cent reduction in mortality (Worthington 2016).

Skinner and Staiger observed the power of patients in getting better outcomes if they are informed about best practice:

If patients both knew about the benefits of aspirin, beta blockers, and reperfusion, and were sensitive to published and reliable information about hospital quality, physicians would be forced to respond rapidly to new innovations or face the loss of patients. But when quality measures are limited, patients are not well informed, and markets are distorted, remarkably large inefficiencies can persist across hospitals and over time (*ibid*, p. 18)

The fact that new technologies are not always rapidly adopted is not, per se, undesirable. Many new technologies are costly, and the evidence base for their long-term effectiveness is often unknown. The issue only relates to 'new' technologies where efficacy has been reasonably established, and where their usage passes a cost-effectiveness standard. In the case above, the innovations apparently passed this test.

Diffusion does not just relate to new technologies, but to the elimination of interventions that do not have strong evidence in favour of them. The large variations in procedures between areas revealed in the Australian Atlas of Healthcare Variations is as likely to reflect the same slow rejection of unjustified practices as much as the slow adoption of new ones. The story of arthroscopy for knee degeneration (chapter 7) is a good illustration.

Addressing inertia in health care is demonstrably difficult, else the persistence of low-value clinical practices could not be explained. There are many pre-conditions for diffusion of innovations, many well-articulated in the literature (Cain and Mittman 2002). In Australia, one such barrier is the 'Koala' syndrome, which characterises Australia as sufficiently special that innovative devices approved overseas must often be re-investigated. CSIRO has voiced frustration about this for a bowel testing kit developed in Australia and licensed in the United States, but not approved for Australian use in the same timeframe (Woodley 2017).

From the perspective of an Australian medical manufacturing firm:

Synchronisation with offshore health regulators and administrators would increase the speed to market for Australian manufacturers, allowing patients access to innovative therapies far more rapidly than is currently the case. (Anatomics, sub. 3, p. 3)

This paper has already considered some of the measures that could assist diffusion, such as greater patient health literacy, transparency in the performance of health care providers and clinicians, and the use of My Health Record as an 'intelligent' advisor for patients.

General practice could also receive online reminders. Currently, 56 per cent of Australian GPs say they routinely receive computerised reminders for guideline-based intervention or screening tests — though how often they act on these is not known (Osborn et al. 2015).

There are already institutions well-equipped to provide advice to clinicians — such as the ACSQHC and Choosing Wisely, and research agencies that develop tools for better health care, such as the Centre for Health Informatics. De-funding of interventions lacking

efficacy or cost effectiveness would certainly end these practices in the public system because they would no longer be remunerated.

However, there is no formal established vehicle for diffusion of innovations in commissioning health care. One of the values of a regional focus is a greater scope for experimentation in achieving better outcomes. For instance, what multidisciplinary teams work best together? Do team members need to be co-located? What types of blended payment models work best? What types of patient rewards are effective? Where does telehealth pay off? There are already some informal mechanisms for disseminating best practice in these areas through meetings between various regional PHNs and LHNs, but there are grounds to consider a more systematic approach. Yet another new agency in health care is not justified. If anything, there are too many already. Given that, many of the above questions relate ultimately to improved quality and safety of care, the best available agency would probably be the ACSQHC. That body need not undertake evaluations, but would be a clearinghouse for their dissemination. Moreover, just as it assesses deviations in clinical practices by area throughout Australia, it could examine how quickly established good ideas for organising health care spread among health districts or jurisdictions (an exemplar being management of high-usage ambulance users — chapter 3). The ACSQHC should work collaboratively with other agencies with a similar role — most notably the NSW Agency for Clinical Innovation (ACI). The value of the ACI approach is apparent in their successful implementation of improved stroke management across NSW hospitals (as described earlier). It involved identification of clinical variations, engagement with the chief executives of LHNs and hospital clinicians, the development of an audit tool, its application in sites, feedback and finally re-auditing and evaluation (NSW ACI 2017; Worthington 2014). A hub and spoke model involving collaboration across jurisdictions may work as well as, or better than, a single agency.

There is a developing suite of policy approaches to effective dissemination and implementation of health innovations, which will help provide guidance on the best mechanisms (Inkelas et al. 2015; Rapport et al. 2017). One of the elements of this are 'champions' — people who have led innovative ideas and who can transfer them well to others because they have hands on experience and know the practical obstacles and how these can be overcome. The concept is well known in business, and increasingly so in health care (McNeil 2014; Shaw et al. 2012), but needs to extend beyond clinical champions.

That is a role less likely to suit the ACSQHC, which is a more technically-oriented body. One possibility is that PHNs and LHNs (and possibly State and Territory Governments) agree to create a national 'champion' program, where champions of an innovative idea assist other PHNs and LHNs to more speedily adopt new ideas. Regardless of whether that is the best vehicle, there is a need to recognise that changed practices often require persuasive and trusted advocates.

CONCLUSION 9.2

A key goal of a regional approach to health care is that it is an ideal vehicle for experimentation. The Australian Commission on Safety and Quality in Health Care, potentially in collaboration with other government agencies, should be a clearinghouse for the results of evaluations of these experiments, and report on the diffusion of any well-established best practices across Australian health districts and jurisdictions.

This initiative needs to be accompanied by the capacity for people with hands-on experience with innovations to assist others to copy them. One approach may be a cooperative 'Champions Program' co-funded by Primary Health Networks and Local Hospital Networks. Complementary models, such as the use of the approaches applied by the NSW Agency for Clinical Innovation, are also likely to be desirable.

10 Transitioning to a new system

While the shift to integrated care has been slow and disjointed, Australia's health system is now much more coordinated than in the past. As discussed above, all Australian governments have implemented — if sometimes only on a trial basis — various forms of integrated care. Moreover, there is increasing support from clinicians about the desirability of adopting integrated care as *the* Australian approach. A recent discussion paper issued by the Royal College of Australasian Physicians laid out a blueprint for integrated care that captures all of the essential steps needed (RACP 2015).

Moreover, while not fully joined up yet, some of the key ingredients essential to an Australia-wide integrated care system are in place or in train, including:

- community health care centres throughout Australia (appendix A)
- bodies that play a role in coordinating or managing services at the regional level (PHNs and LHNs)
- greater use of telehealth, particularly in Western Australia, Queensland and the Northern Territory for servicing remote locations (ATS 2017)
- more sophisticated national approaches to funding all public hospitals through activity-based funding
- the emerging (if still very incomplete) development of PREMs and PROMs
- national institutions that aim to ensure safety and quality in health care services (avoiding unjustified variations)
- an awareness of the power of data, and the growing development of systems that allow its exploitation
- a nationwide approach to organ donations
- the rollout of My Health Record (with all Australians on the record by 2018 unless they have opted out).

In this, Australia is not alone. The United States, the United Kingdom, New Zealand, Germany and Sweden all have examples of patient-centred care within their borders, but they have not yet been successful in rolling out patient-centred care across the entire nation despite demonstrated health dividends. In response to this global dilemma, scholars have investigated how to make a successful transition to an integrated and patient-centred system of health care (Baker et al. 2008; Ham 2010; Nicholson, Jackson and Marley 2013; Suter et al. 2009). Two of the most recent systematic reviews of the literature consider the implications for Australia (Janamian et al. 2014; Nicholson, Jackson and Marley 2013).

Janamian et al. (2014) considers how to overcome the obstacles to patient-centred care specifically within Australia's primary care setting. Nicholson et al. (2013) investigates the elements of a successful transition to an integrated health system. These are the basis for the suite of desirable changes to Australia's health system summed up in table 10.1 below and in chapter 2 of the main report.

Overcoming barriers to change in the primary care sector

A patient-centred system of primary care that is part of a broader effective health system is critical for achieving much better health outcomes (for example, Gawande 2017; Macinko, Starfield and Shi 2003; Swerissen and Duckett 2016). Slow progress towards an integrated, patient-centred approach in primary care therefore undermines the entire health system (and is not unique to Australia). The international evidence identifies various challenges and possible solution (Janamian et al. 2014; Nicholson, Jackson and Marley 2013), with implications for Australia.

- 1. It is difficult for primary care practices to change their approach to patient care. Bringing about the necessary behavioural change relies not only on the qualities of each GP practice, but also requires external coaching on top of external payment reform that facilitates a patient-centred approach to care. PHNs are best placed to coordinate the coaching and incentive payments needed in a locality, but will need to be adequately resourced for that purpose.
- 2. It is challenging for primary care practices to put in place a patient-centred, user-friendly, integrated shared electronic medical record system. In the United States, the required investment in IT infrastructure and training for primary care practices often exceeded expectations. Further, there are economies of scale in taking a broader approach. In Australia, the investment in IT infrastructure is best resourced through the LHN. This takes advantage of economies of scale, it will better ensure the necessary interoperability between hospitals and GP practices, and it reflects the general situation that hospitals unlike most GPs are mostly still using archaic data record systems and are in greater need of an upgrade.
- 3. Funding models based on reimbursement do not support a patient-centred approach to care (as noted in section 9.2) and must be one of the early focuses of reform. The Productivity Commission has set out simple changes that could be incrementally implemented, with capacity to expand their scope after learning.
- 4. Economies of scale matter in the transformation phase. Smaller primary care practices face a greater administrative burden to transition to patient-centred care than larger institutions. It may also be that smaller practices face a larger administrative burden in keeping up with best practice and in providing multiple specialisations within the practice. While the consolidation of practices both horizontally and vertically will be market driven, government initiatives should

facilitate that integration and not hinder it. Consolidation need not involve larger practices but can also occur through a federation of smaller practices that agree to share administrative and other resources and that cooperatively serve patients according to the comparative advantage of GPs. Such a federation model is on the increase in the United Kingdom. In regional and remote locations, where consolidation is not feasible or may undermine competition, additional support may be justified, for example in the form of temporary in-kind administrative support. In urban locations, the GP sector is highly competitive, and so increasing consolidation will not undermine competition, particularly if there is increasing oversight by PHNs and LHNs, together with the publication of GP performance indicators.

5. A transition to an integrated, patient-centred system of care is constrained by standards, measures, targets for performance, and accreditation that do not reflect a patient-centred approach. There is therefore a need for a review of accreditation frameworks so they align with the key aspects of patient-centred care. Such a review was canvassed in 2014 by the Royal Australian College of General Practitioners and the Australian Commission on Quality and Safety in Health Care. Further, there is a need for governments to refrain from prescribing how to transition to an integrated, patient-centred system beyond what is supported by the evidence (as summarised in this section — table 10.1). Micro-management constrains the innovation and flexibility that is needed to successfully find the best path to an integrated, patient-centred system of care. As pithily encapsulated by a recent study of effective health care:

Micromanagement carries well-known risks. It all too easily disempowers local leaders, creating a culture of compliance and risk aversion that can lead to gaming and misreporting of performance data, with the net result that it stifles innovation. (Ham and Timmins 2015, p. 42)

CONCLUSION 10.1: A SUMMARY OF THE CRITICAL INITIATIVES					
The things that work	What it means for Australia				
Informed and engaged consumers	 Improve health literacy Involve consumers as partners in care Adopt arrangements that allow informed consumer choice Use My Health Record as a mediator for information provision to consumers, including on medical interventions that have no proven efficacy Change passive attitudes of consumers Publish plain-English indicators of quality, safety and outcomes Target high-risk groups for particular care and innovation in health care 				
A regional approach to health care	 delivery suited to the person Regional approach to the management and provision of health care through collaboration between LHNs, PHNs, CHCs, local governments, health insurers and other regional partners Ereedom to vary funding and collaboration models region by region (but 				
	 MOUs between LHNs and PHNs to facilitate joint planning, and identify shared clinical priority areas based on local need and on national priorities Keep some bodies at the national level, if there are economies of scale and learning 				
Effective change management: manage change locally, strategies specified, executive and clinical leadership, commitment at all levels	 Skills needed in leadership of LHNs and PHNs. Select leaders for LHNs and PHNs who have proven change management skills and who clinicians trust Early engagement with key clinicians is critical, as is reducing the compliance costs of shifting to new models of care Information technology must work Use champions for change 				
Incentives aligned to promote: integration, innovation and reducing costs of hospitalisation	 Create Prevention and Chronic Condition Management Funds that LHNs can use to collaborate with local entities to improve population health and to reduce hospitalisation Remove legislative restriction on LHNs, PHNs and jurisdictions providing additional funds for MBS-funded activities of GPs Ultimately reallocate funding of regional and general practice initiatives to PHNs LHNs and PHNs would be the key decision makers at the local level, but would have to have governance structures that made them accountable Adapt Health Care Homes Program so it allows new payment models and permits greater regional flexibility De-fund health interventions that fail efficacy or cost-effectiveness criteria, moving from volume to value 				
	(continued heat page)				

CONCLUSION 10.1 (continued)				
The things that work	What it means for Australia			
Seamless care	• Public funding of health care should be based on quality, safety and value — and not differentiate decisions about sourcing care between private and publicly owned entities			
Integrated ICT: shared electronic health record,	 Invest in information technology and software for information flows throughout the system 			
linked clinical and financial measures	 Use My Health Record as the key patient record 			
Collect and use data for coordinated care,	 Measure outcomes as people see them. Develop and adopt PREMs and PROMs, drawing on existing instruments and evidence from abroad 			
transparent measures of performance and for	 Follow recommendations of the Productivity Commission's inquiry into Data Availability and Use 			
research into what works best	Systematic diffusion of best clinical and organisational practice			
Professional development to support	 Increase emphasis on health professional training and professional development concerning patient-centred and integrated care 			
patient-centred integrated approach	 Included in these requirements should be cross-sectoral and interdisciplinary training. 			

A Integrated care in Australia

A.1 The evolution of integrated care policy

While technological change has been spectacular in health care in all developed countries, the organisational models that deploy such technologies have not kept pace, even when new models of funding and structuring health services appear to offer better outcomes. Australian health policy has slowly evolved in response to the evidence in favour of an integrated, patient-centred approach to care (box A.1), and arguably Australia lags many other countries.

Policy measures to integrate Australia's health care system were initially concentrated in the primary care sector. The coordinated care of chronically ill patients by primary practice was trialled in the late 1990s and early 2000s. Despite the lessons learnt from the trials, the coordinator role of primary care ceased to be a policy priority for almost a decade – until the current proposal to again trial the coordination of primary care, this time through the health care homes initiative. The Australian Government otherwise sought to integrate GP services with that of other providers by co-locating GPs with specialists and other providers in the GP Super Clinics program of 2007–2011.

More broadly, the Australian and state governments have agreed to take a regional approach to the management of health services through Local Hospital Networks and Primary Health Networks (formerly known as Medicare Locals).⁴⁵ This regional approach has extended to the pooling of hospital funding (through Activity Based Funding), but not yet to the pooling of general practice funding. Some progress has also been made towards an electronic patient medical record system, which would facilitate patient transition between providers and between sectors.

A number of options for realising integrated care in Australia have been proposed. In 2009, the National Health and Hospitals Reform Commission recommended the introduction of health care plans that would purchase all the health needs of an individual, with the Australian Government funding these through risk adjusted capitation payments. It recommended that such plans be provided by Commonwealth and State governments and by other providers, including for-profit providers, with each individual free to switch between plans.

⁴⁵ There are thirty-one Primary Health Networks with boundaries that are generally aligned with the one hundred and thirty-five regionally defined Local Hospital Networks.

Box A.1 Key developments in Australia's integrated care policy

1970s – Community health centres — an Australian Government initiative subsequently adopted by states and territories. They revolve around place-based access to allied health professionals

1992 – The Australian Government's national health strategy included integrating GP services and the broader health system including through funding reform and information technology

April 1995 - COAG identified the need to coordinate health care

June 1996 — COAG agreed to explore options for better coordinating care

1997–99 — First round of National Coordinated Care Trials

2002–05 — Second round of National Coordinated Care Trials

February 2006 — COAG endorsed a national action plan that included incentive funds to improve the integration of services, case conferencing to improve the care of cancer patients, and development of a national electronic patient medical record system

July 2006 — COAG agreed to the National Action Plan on Mental Health, which emphasised coordination and collaboration between all providers in order to deliver a seamless system of care. COAG also agreed to health workforce reforms, including allowing practice nurses to provide ongoing support for patients with chronic disease on behalf of general practitioners

2007–11 — The Australian Government rolled out GP Super Clinics to provide multidisciplinary and integrated care by co locating GPs, specialists and other providers

July 2008 — COAG endorsed a national approach to integrating Australia's organ and tissue donation system

2009 — The National Health and Hospitals Reform Commission recommended integrating health care services particularly for those with complex and chronic health conditions

2010 — In the National Primary Health Care Strategy, all jurisdictions committed to integrating health care, including through regional based integration, e health, chronic disease management and prevention. COAG otherwise endorsed the first annual National Healthcare Agreement that affirms the centrality of patients and their families in the health system and aims for an integrated approach to health care, including prevention.

August 2011 — Under the National Health Reform Agreement, COAG agreed to funding reforms that can facilitate the provision of integrated care, including localising control of health systems (through Local Hospital Networks and Medicare Locals) and the pooling of Australian and state government funding of hospitals at the local level (through Activity Based Funding)

2011–2014 — The Australian Government and various partners trialled the Diabetes Care Project. This was the precursor to the subsequent development of Health Care Homes, but limited to diabetes management.

2014 — The National Commission of Audit advocated a coordinated approach to health care

2015 — The Primary Health Care Advisory Group recommended a 'health care home' model of integrated care for people with chronic and complex health conditions, block funding of Primary Health Networks and the pooling of Australian and state government funds in primary care

April 2016 — COAG's public hospital funding agreement emphasised the coordination of patient care, including through a bilateral approach that facilitates flexibility, the development of funding options to incentivise higher quality hospital care, integrating services at a regional level through PHNs, the piloting of health care homes and progressing My Health Record.

Sources: (COAG 1995, 1996, 2005, 2006a, 2006b, 2006c, 2007, 2008a, 2008b, 2011, 2016a; Consan Consulting 2012; DoH 2016d; DoHA 2001, 2007, 2010a; National Health Strategy (Australia) 1992; NCOA 2014; NHHRC 2008; PHCAG 2016).

In 2014, the National Commission of Audit advocated greater reliance on private health insurers to coordinate health care. The distinguishing features of its proposals included giving private health insurers the capacity to cover primary care spending and ultimately to move to a lifetime model of insurance funded largely through mandatory premiums (effectively a new hypothecated tax).

Most recently, the Primary Health Care Advisory Group made a number of recommendations building on Australia's current health system, including health care homes and the block funding of Primary Health Networks. To improve integration and to remove the costs and complexity associated with funding silos, the Advisory Group also recommended exploring options for pooling the health care funding of Australian and State and Territory Governments, including of primary care. Other recommendations of the advisory group with implications for coordinated care covered:

- the investment in digital health devices, targeted online health literacy information for patients, an electronic patient record system and software compatibility between providers to facilitate data sharing
- reform of the current approach to risk equalisation of private health insurance. Risk equalisation is currently only based on age. The advisory group recommended also taking into account the presence of complex and chronic health conditions. The group otherwise recommended expanding the types of health services that can be risk equalised beyond hospital services, for example, to include community nursing and community pharmacy.

The variety of options proposed for realising integrated care is testimony to uncertainty about its best form, but also to the range of normative views about how a health system should be structured. While inevitably, views about the nature of an ideal system will change, it will be critical to achieve some agreement about the key elements of integrated care. A well-functioning system requires investments by various groups, changes in cultures, and agreements between funders and providers — all of which hinges on the commitment by successive governments to the basic nature of the new system. To this end, the Commission advocates an approach to reform that builds on what has gone before, while also recognising and addressing key dichotomies in policy directions.

A.2 Australian evidence on integrated and patient-centred care

Because of the limitations highlighted in previous chapter, there is incomplete evidence in Australia about how to integrate health care around the needs of the patient, and about the benefits of such an approach. The Australian examples of integrated care tend to be either confined to the GP-dominated primary sector (national initiatives) or fail to fully engage with GPs (state-led initiatives). Private health insurers have also been investing in integrated care for members with complex and chronic conditions. There are some recent initiatives that seek to integrate care across all sectors, but these are at an early stage. Few initiatives have progressed beyond a trial stage and trials have often had an inadequate timeframe to support an effective evaluation.

The nature and impacts of the multiplicity of trials are summarised in table A.6 at the end of this appendix.

The single most important message is that where there is a higher degree of integration across the primary care and hospital sectors there are larger impacts on the utilisation of health services and on the health of clients; and these larger impacts are achieved at less cost.

A.3 The evidence from national initiatives

Community health programs across the nation are a form of integrated care

Integrated health care can arise without being referred to explicitly as part of an 'integrated health care program'. Integration can emerge organically, reflect past programs or result from payment systems that encourage their developments (such as some of the incentive payments under the MBS).

Community health centres (CHCs) have long been a feature of the Australian health care system. They were a legacy of a 1970s Australian Government program that State and Territory Governments then preserved and funded (Baum et al. 2017; Montalto and Dunt 1992).⁴⁶ The implication of this is that programs at one jurisdictional level can be adopted by others even when the initial program dies.

As their names suggests, CHCs are regionally focused and aim to provide a host of connected services drawing on multidisciplinary teams. These could include nurses, dieticians, counsellors, physiotherapists, speech therapists and health educators. CHCs often focus on people with the poorest health (those with chronic health conditions particularly) or those who face significant social and economic disadvantage.

Community health centres are now widespread throughout Australia. As an illustration, the Victorian Department of Health provides Community Health Program funding to approximately 100 CHCs in Victoria operating from approximately 350 sites. Each year, Victorian CHCs provide about one million hours of allied health, counselling and nursing

⁴⁶ Notwithstanding their origin nearly 50 years ago, Australia was a relatively latecomer to the concept. CHCs have been in Canada since the 1920s (Wong et al. 2015).

services (VicDHHS 2017). In Victoria, government funding in 2013-14 was about \$140 million (approximately 60 per cent of the revenue of CHCs).⁴⁷

While CHCs are widely available, there is no national strategy for community health services and there is considerable variation in the services across the various levels of government (SCRGSP 2017, p. 10.3). A common model involves cooperation with private GPs.⁴⁸ There also large differences in the goals and processes used by CHCs within states, as demonstrated by a series of case studies published by the Victorian Government (further discussed below).⁴⁹ CHCs are also vehicles for delivering various health initiatives in varying regions — such as measures that improve child and maternal health, reduce obesity levels, and support youth. CHCs can be part of broader systems that aim to coordinate care between the primary and hospital systems — as exemplified in Hospital Admission Risk Program (HARP) in Victoria (section A.4). This adds to the variations in CHCs within, and across different, jurisdictions.

There is not, as far as we are aware, any studies that indicate the overall impacts and cost-effectiveness of CHCs in Australia, and the several that related to Victoria were limited in scope and dated (McDonald et al. 2006, pp. 23–24). This is not surprising given the challenges. Their universality means that it is not possible to compare their outcomes to control groups. Moreover, it would be difficult to measure objectively the sometimes subtle and changing variations between the approaches of different CHCs and of the programs delivered through them. The AIHW notes that there is no national data about community health activity (AIHW 2016b, p. 265). The myriad of factors outside the control of the centres, such as the socio-demographic characteristics of their clients, adds further difficulties. Any evaluation would need not only to have the above data, but also good information on the outcomes for clients. EHealth records might ultimately capture those data, but their coverage is currently incomplete. Evaluation is best suited to circumstances where a reasonably clear-cut intervention has been trialled in multiple places or with large populations, and can be compared with the outcomes from other places. A possible approach is to examine differences in outcomes that relate to observable traits of different CHCs (such as degree of remoteness, whether they employ in-house GPs, the types of allied health professionals they employ, availability of e-records, use of telehealth, and funding levels) and assess whether, after controlling for population characteristics, there seem to be any marked differences in outcomes. This is, at best, a

⁴⁷ In NSW, funding was about \$900 million for 'Primary and Community Based Services', but this includes a broader range of services (NSW Budget 2016-17, Health Cluster). One of the complications of assessing coordinated care arrangements across Australia that fit broadly under the rubric of community health is that their scope varies.

⁴⁸ While the evidence is dated, about 40 per cent of Victorian CHSs offered GP services — (VicDHHS 2009). Use of GPs in CHCs in other jurisdictions can be much lower, and sometimes CHCs aim to address primary health care needs in areas where GPs are in short supply.

⁴⁹ https://www2.health.vic.gov.au/primary-and-community-health/community-health/community-health/ program/chronic-care-guide (accessed on 17 May 2017).

project for the future, and might be superseded by new types of coordinated care arrangements.

The evidence that is available is therefore largely qualitative, supplemented by some partial quantitative assessments:

- The Dianella Community Health (Victoria) aimed to improve communication and integration of diabetes care by using common tools, an agreed preferred standard of general practice referral documentation and agreements about minimum services for diabetics, depending on the severity of the condition. There was no evidence of any clinical improvements (though these may have occurred), but service waiting times were reduced (VicDHHS 2016c).
- Other case studies in various Victorian community health services showed that innovations in various aspects of their operation resulted in improved processes and where measured, better outcomes — for instance, reduced travel times to access cardiac rehabilitation services for remote populations by using telehealth (VicDHHS 2016f); better outcomes in care for chronic conditions (VicDHHS 2016b); re-direction of referrals to lower cost alternatives, improved blood sugar levels, lower levels of diabetes distress, and higher satisfaction with services (VicDHHS 2016a); and higher take up of care plans for people with chronic and complex conditions (VicDHHS 2016d).
- An evaluation of Aboriginal health workers (AHWs) on delivery of diabetes care in remote Northern Territory community health centres resulted in improvements in regular testing and monitoring, but had no effects on glycated haemoglobin levels or blood pressure among treated patients. However, where a CHC had a visiting GP, clinical outcomes did improve (Si et al. 2006).

There is international evidence about the impacts of CHCs, though its relevance to Australia is only partial because CHCs take different forms in different countries and the health system in which they are embedded can be quite different. In the United States, CHCs serve as the dominant model for provision of federally-funded primary health care. They include general practitioners, some are affiliated with hospitals, a few would more aptly be referred to as patient-centred medical care homes, and the populations they assist are often not insured (Doty et al. 2010). At least, the international evidence is generally positive. CHCs in the United States appear to have achieved the same or better health outcomes at lower costs than occurring in private physicians' offices and outpatient clinics. For instance, in California, adult patients in federally qualified community health (FQCH) centres had 18 per cent lower emergency department visits, about 5 per cent lower 30 day readmission rates and 64 per cent lower rates of multi-day hospital admissions compared with non-FQHC adult patients. The total cost of care was 19 per cent lower after

controlling for patient characteristics (CPCA 2013). There are a range of similarly positive outcomes from other studies.⁵⁰

It is hard to conceive that CHCs would not act as a major node in any form of fully-developed integrated care in Australia, even if their scope and relationships to other parts of the health system changes. This reflects their multidisciplinary nature, their connection to the local community, and their links to non-health services — like meals on wheels (box 4.2). If nothing else, experience with CHCs throughout Australia indicates that they are the 'vessels' for trialling new initiatives in preventative health and in accessing hard-to-reach and disadvantaged populations.

CONCLUSION A.1

While there have been limited evaluations of community health care centres, they are widely accessible throughout Australia, and their multidisciplinary approach and links to the local community make them a natural partner in any integrated care health care system.

National coordinated care trials

In the late 1990s and the early 2000s, the Australian Government, with the support of State and Territory Governments, undertook two consecutive series of coordinated care trials. These trials tested alternative approaches to coordinating the primary care provided by GPs and the care provided by community health services. Secondary and other government-provided services were not heavily engaged in the trials, other than by making nurses available to assist GPs to manage the care of patients.

Much of the value of these trials lies in identifying pitfalls and process issues. Almost all encountered process difficulties that otherwise undermined their capacity to contribute to the evidence base for better coordination of primary care.

In the first round of trials, the duration of the actual intervention period was between twelve and eighteen months, taking into account the set-up and wind-down times. This was subsequently assessed to be too short to feasibly support measureable impacts (DoHA 2001). The first series of trials was not well targeted to people who would benefit most from coordinated care, diluting the value of the short-term intervention. Recruitment of GPs also proved difficult, including because of inadequate funding options.

Lessons learnt in the first round of trials informed the design of the second round of trials (DoHA 2007). The second round of trials sought to provide for:

⁵⁰ Such as Evans et al. (2015); Mukamel et al. (2016); Sharma et al. (2014); and Laiteerapong etal. (2014).

- greater consumer empowerment
- better targeting of those with complex and chronic conditions
- a more generic approach to pooling funds through the development and use of a risk-based capitation model (developed by PricewaterhouseCoopers)
- the introduction of new MBS items payable to GPs for conducting health assessments, care planning and care conferencing
- further opportunity to experiment with different approaches to integration and funding.

The second round of trials comprised five diverse approaches to primary care coordination, three of which specifically targeted indigenous populations.

The key objective of the Indigenous trials was to increase the rate of access to primary health services from a low base. The Sunrise Health Services Aboriginal Corporation trial, centred on developing community-owned indigenous health services, was particularly successful in this regard. Of the participants with complex chronic conditions reached by this trial, 57 per cent had not accessed health care services in the six months prior to entering the program. While the trial data could not indicate the implications for hospital usage, the evidence supports the expectation that ensuring better primary care of chronically-ill patients would reduce the future need for acute hospital care.

The two mainstream population trials — Brisbane North and North Melbourne — were run as randomised control trials. Both indicated higher utilisation of primary care services by intervention groups relative to control groups.

The North Melbourne trial was otherwise undermined by workforce management issues, poor recruitment of GPs and a lack of understanding among participants about the role of nurses as care coordinators. It therefore contributed little to the evidence base about the impact of a coordinated approach to primary care. Nevertheless, the contrast with the Brisbane North trial illustrates the importance of good relationships for the provision of a successful health service.

Participants in the Brisbane North trial experienced improvements in general health, mental health and health-related quality of life indicators relative to the control group (table A.1).
Table A.1Indicators of the change in health outcomes flowing from the
Brisbane North coordinated care trial

Mean scores over twelve months

General nealth	Depression	Quality of life (health related)
general health Imber indicates better health)	Kessler 10 (higher number indicates higher risk of depression)	EuroQol 5D ^a (ranging from 1.0 for perfect health to 0.0 for death)
to 3.20 (a 0.03 improvement)	17.22 to 16.31 (a 0.91 improvement)	0.74 to 0.74 (no change)
to 3.35 (a 0.04 deterioration)	17.69 to 17.57 (a 0.12 improvement)	0.73 to 0.69 (a 0.04 deterioration)
0.07 better off	0.79 better off	0.04 better off
	better health) to 3.20 (a 0.03 improvement) to 3.35 (a 0.04 deterioration) 0.07 better off	better health)depression)to 3.20 (a 0.03 improvement)17.22 to 16.31 (a 0.91 improvement)to 3.35 (a 0.04 deterioration)17.69 to 17.57 (a 0.12 improvement)0.07 better off0.79 better off

^a EuroQol 5D measures health in terms of mobility, self-care, usual activities, pain/discomfort and anxiety/depression.

Source: Australian Government Department of Health and Ageing (DoHA 2007).

The evaluation also reported financial impacts. Including the cost of care coordination (about \$151 each quarter for each participant), the difference in cost for the intervention group relative to the control group was higher throughout the trial, but the difference declined over the first nine months (table A.2). The length of the trial (and the number of participants) was insufficient to indicate whether the cost differential would have favoured the intervention group in the longer term. The size of the trial was too small to provide statistically significant evidence of an impact on costs.

Table A.2 Total health costs (including cost of care coordination) \$ for the average participant

	· U							
	Pre-comme					Tria	l periods	
	3-6 months	0-3 months	0-3 months	3-6 months	6-9 months	9-12 months	12-15 months	15-18 months
Mean control	1 265	1 313	1 491	1 455	1 563	1 764	1 748	1 688
intervention	1 517	1 385	1 987	1 837	1 853	1 843	1 886	1 787
Net cost	252 a	72 a	496	381	290 a	80 a	118 a	99 a

^a Not statistically significant at the 90 per cent level.

Source: The Australian Government Department of Health and Ageing (DoHA 2007, p. 471).

Building on the experience of the coordinated care trials, Brisbane North Primary Health Network and Metro North Hospital and Health Services (and their predecessors) have continued to seek opportunities to partner in the delivery of patient-centred care (see Redcliffe trial below).

GP Super Clinics

The Australian Government funded the establishment of over 30 GP super clinics between 2007 and 2011. These clinics were intended to bring together a variety of health services including GPs, nursing, allied health, health education, specialists and other services in a single location. The objective was to deliver a more integrated health service for the convenience of patients.

An evaluation of seven operational super clinics over the period 2007 and 2008 reported that 41 per cent of clinicians were GPs, 21 per cent were nurses and the remaining 37 per cent were from a range of disciplines including psychologists, dieticians, physiotherapists and some specialists (Consan Consulting 2012). Of the patients who were surveyed, 83 per cent indicated that they attended the super clinics because of the ready access to a variety of health professionals. Two thirds of patients indicated that all aspects of their care were coordinated by the super clinics. Similarly, two thirds of patients also reported that their clinician discussed their lifestyle, including by providing advice about how to better manage their health. This compares favourably with findings in another Australian survey related to the GP sector more broadly, in which only 13 per cent of patients reported receiving lifestyle advice from their GP in the previous twelve months (Booth and Nowson 2010). However, it may be that the more favourable result for those GPs participating in the GP super clinics program reflects that they knew that they would be accountable under the program, including for providing lifestyle advice. The evaluation of the clinics did not discriminate between the experiences of patients with and without complex chronic conditions, which meant it was unable to assess the impacts of clinics on people who most need coordinated care.

The Diabetes Care Project (DCP) 2011-2014

The DCP was a pilot of a new coordinated care approach to the management of people who already had diabetes. It was, at the time, the largest randomised controlled trial conducted in Australia (DoH 2015b, p. 1). The DCP originated from recommendations for improved care of people with chronic health conditions by the National Health and Hospital Reform Commission (NHHRC) in 2009. It reflected the relatively poor management of diabetes under the conventional approaches used by GPs. For example, the relevant clinical guidelines were not followed in nearly 40 per cent of diabetes-related encounters with clinicians (DoH 2015b, p. 8).

The DCP included several new features for management of diabetes:

(i) use of an IT platform (cdmNet) for information sharing between GPs, allied professionals and patients, and for provision of regular updates to general practices on their performance compared with their peers. This was accompanied by regular meetings between the primary care organisations and the participating general practices about ways to improve performance (ii) changes to funding arrangements. This involved three different streams of money. First, there was a move away from fee-for-service to a capitation payment available to participating general practices, taking into account variations in the expected costs of care across patients with different health care needs. Second, general practices were given incentive payments for better outcomes for patients, including patient experience, patient adherence to the care plan, care plan completeness, accurate and timely data entry, and glycosylated haemoglobin levels (which measures average blood sugar levels over a period of weeks or months). Third, practices were given funding for the costs of dedicated Care Facilitators (DoH 2015b).

The randomised trial involved three general practice groups: one where only (i) was implemented (group 1), one where interventions (i) and (ii) occurred (group 2), and a control where all of the interventions were absent (group 3). The design of the program, the commissioning process for its participants and its independent evaluation followed best practice.

However, the outcomes were relatively poor despite the strong conceptual basis for the program.

Beyond greater take up of care planning (a process measure), there was no improvement in patient outcomes for group 1 compared with the control. Accordingly, sharing data and feedback without funding reform, did not have beneficial outcomes (in this instance at least).

There were some beneficial effects for group 2 compared with the control (and group 1) across a range of measures, including lower glycated haemoglobin levels — especially for those with particularly high initial levels. This indicates that changes to funding was needed, together with better information systems, in order to facilitate effective coordination of patient care. There were several other clinically-positive outcomes, such as reduced waist circumference and depression rates. For example, the share of people with moderate to severe depression rates fell by 2 percentage points compared with the control (DoH 2015b, p. 40). On the other hand, while statistically significant, the average waist circumference reduction was trivial, underlining the importance of concentrating on effect sizes rather than statistical significance. One other outcome was a reduction of hospitalisations and hospital stay durations, which indicates that some positive acute care outcomes can occur even in the absence of direct engagement with hospitals. Nevertheless, the reduction was modest, and the savings from reduced use of hospitalis was offset by increased costs in prescribing, care facilitation, and GP use.

Notwithstanding that one of the key goals of the trial was to encourage GPs to allocate more funding to people with more complex needs and high health risks (the basis for the capitation method used in the pilot), there was little or no relationship between resource allocation and patient health risks. This is surprising because hospital costs are particularly skewed, with just 5 per cent of participants accounting for 62 per cent of potentially avoidable hospitalisations.

The evaluation concluded that:

Overall, there is no evidence to suggest that the Group 2 model of care would be cost-effective if adopted for longer, with large uncertainties regarding both the net cost and benefits of the intervention. ... the best estimate of cost per QALY would be around \$250,000. This is not considered cost-effective. (DoH 2015b, p. 53)

Another commentary on the Diabetes Care Program emphasises a key theme:

In future programs, improved information sharing between primary and secondary care may help identify those most at risk of repeated hospitalisations and allow better targeting of resources to keep people well and reduce avoidable hospitalisations. (Fountaine and Bennett 2016, p. 391)

CONCLUSION A.2

The major Australian Government trials of integrated care have demonstrated some benefits, but none resulted in tangible cost savings or produced large benefits for patients. However, they provided valuable lessons, including the need for links to the state-run health care system and for targeting patients at high risk of hospitalisation or other costly interventions.

Health Care Homes — an experiment that needs some tinkering

Ten years after the publication of the evaluation of the coordinated care trials, the Australian Government is to trial Health Care Homes (HCHs) in ten Primary Health Network regions. Trials involving 20 general practices and Aboriginal Community Controlled Health Services are due to commence in October 2017, followed by another 180 practices from 1 December 2017 (Ref to DoH 2017 9 May).⁵¹

The HCH model for coordinating the care of people with chronic and complex health conditions was proposed for Australia by the National Health and Hospitals Reform Commission and more recently by the Primary Health Care Advisory Group. The 'home' in HCHs is not intended to suggest a residential care setting, but rather is typically a general practice chosen by a person that provides or coordinates a suite of medical services, including ones that are outside the practice — a health care home for each person. The concept originates from so-called 'patient-centred medical homes' that are now widely prevalent in the United States, and whose genesis can be dated back to the late 1960s in a paediatric context — again an indicator of the slow diffusion of good ideas (Asarnow et al. 2017).

⁵¹ The rollout of Health care homes trial was delayed from its original start date following advice from the clinician-led implementation advisory group.

As currently proposed, the HCH trials focus on the coordination of primary care rather than integrating primary care with hospital services. Its scope in terms of integrating across the different health care sectors is therefore comparable to that of the national coordinated care trials of the late 1990s and early 2000s.

HCHs rely on Primary Health Networks, whose resources will be augmented by two full-time equivalent staff members for each network. In return, Primary Health Networks have additional reporting requirements and will need to redirect their existing budget to meet any funding requirements of the HCH initiative. The success of HCHs will therefore depend crucially on the resourcing of PHNs and their capacity to engage with GPs, hospitals and other state government services. Despite its limited resourcing, the HCH project has an ambitious target. It aims to service up to 65 000 patients across ten PHN regions of Australia (implying an average of 650 patients in a PHN region). To put that in perspective, an average of 650 patients is five to ten times more than the existing integrated care programs in Western Sydney and Redcliffe (discussed below), but without any significant additional resourcing.

An innovative aspect to the HCH initiative is the trial of a bundled approach to funding. Remuneration of GPs is to involve a standard consultation fee for the initial assessment of a patient's eligibility for enrolment with a HCH and a subsequent upfront payment to develop a patient care plan. The Australian Government will then make quarterly bundled payments to each HCH to manage the patient's care plan, including to deliver the GP services required by the patient and to coordinate the patient's access to allied health professionals and other services. The provision of quarterly bundled funding would replace traditional fees for service, so that remuneration would no longer be linked to the number or type of GP consultations. This increases the incentive for GPs to minimise the cost of a patient's care. At the same time, the GP bears the risk of any cost overrun caused by external factors, including the patient's own noncompliance.

Health Care Homes is only a trial, and any investment by GPs (or others) in a new system runs the risk of the program not being extended. Helping to address that risk, the Australian Government is providing a \$10 000 grant to each practice that participates in the trial. A strong commitment to rolling out an integrated, patient-centred approach to care would also indicate to GPs that investment in change is worthwhile.

There are several weaknesses in the current Health Care Homes initiative, with scope to address these before the major rollout in late 2017. These, and their solutions, are discussed in chapter 6 (and summarised in conclusion 6.3).

Coordinating a value-chain — organ donations in Australia

Integration has largely been conceptualised as what happens at a local level in the relationships between clinicians and patients. However, there are other aspects of integration that involve coordination between geographically-dispersed parts of the system.

A good exemplar is the supply chain for organ donations, which involves recruitment of donors, consent by a family for a donation to occur, organ removal and transport, organ matching to a recipient beyond geographic boundaries, protocols for requesting donations, and available specialists for transplanting. While not 'patient-centred' in a narrow sense, the experience of successful donor programs depend on engaging with individuals.⁵² Problems in any part of the supply chain can reduce the effective donation rate. The ageing of Australia's population is also expected to place increasing pressure on the existing system.

In 2009, all jurisdictions agreed to a cooperative approach to organ donation, coordinated by a newly established body, the Australian Organ and Tissue Authority (AOTA). Prior to its establishment, deceased organ donation rates (donations where organs were retrieved and transplanted) were falling. After commencement of the national reform program, Australia significantly improved its deceased donation rate to 20.8 per million persons in 2016, about 80 per cent higher than the donation rate at the start of the national reform program in 2009 (OTA 2017). Compared with a counterfactual of no improvement in rates, rough estimates suggest that the policy initiatives may have saved about 2500 people's lives from 2009-2016.

Despite some concerns about AOTA's governance arrangements and the accountability of states and hospitals (EY 2015b), this national coordination model appears to have been very successful. One jurisdiction has been particularly successful in pursuing the strategy. South Australia significantly improved effective donation rates to 23.4 per million persons in 2016, 13 per cent higher than the average Australian rate. (Some of the smaller jurisdictions have sometimes recorded higher rates, but this reflects the impact of just a few additional deceased donors and could not be expected to be sustained.) If all jurisdictions were at the South Australian rate in 2016, this would save about 220 lives yearly.

Notwithstanding AOTA's successes, the effective coordination of an efficient supply chain for organ donation is unfinished business. There is likely scope for even higher rates through further policy changes, as many other countries have higher deceased donorship rates (with Spain being highest at 39.7 per million in 2015).

There remain various generally agreed hospital-centred approaches to increase rates, such as a greater focus on donation after brain death; better education and training of clinical staff; new methods for organ donation after circulatory death, more effective conversations with family members' about organ donation; and better organ matching. Easier processes for registering consent and greater efforts to persuade people to be donors are other measures outside the hospital setting. All of these would be best progressed on a national

⁵² This involves motivating people to consider donation, encouraging would be donors to discuss their preferences with family members, and engagement in hospitals with the families of willing potential donors.

basis. AOTA (2016) is pursuing some of these measures and its governance arrangements have been changed to improve its strategic focus.

There are some controversial suggestions to improve rates, such as presumed (or opt-out) consent; removal of a capacity for family members to veto a donor's prior wishes; financial incentives to donate, and preference for organ transplants for recipients who had previously registered as willing donors (Isdale and Savulescu 2015). While having some face validity, the evidence in favour of presumed consent is equivocal, while the other proposals involve several ethical concerns. Most of these proposals are not currently on the policy agenda, and would require strong favourable evidence to get there.

If, through nationally coordinated action, Australia achieved transplant rates equivalent to Spain, then a rough estimate is that this would equate to more than 1000 additional lives saved annually in Australia.⁵³ There would also be gains through lower disability rates (for instance through the preservation of people's sight by corneal transplants, which is a highly successful procedure).

There is some evidence that improved transplantation rates might reduce health care costs because while the initial clinical investment is costly, it avoids years of costly hospital treatment (most notably, ongoing dialysis for people experiencing kidney failure). However, as in so many other evaluations of health care policies, the variation in the estimated costs and benefits of higher transplantation rates is high.⁵⁴ The broader lesson for policymakers is to avoid optimism bias. Fortunately, all transplantation cost-benefit analyses support the same policy direction, which is not true of many evaluations of health care initiatives (as is apparent for some of the integrated care initiatives discussed above).

While it might be difficult to quickly progress a best-practice integrated approach across all jurisdictions, the international evidence suggests that higher donation rates are a feasible target in Australia. This sounds like a narrow area for health care reform, but the potential to save thousands of lives annually is a rare opportunity.

⁵³ This assumes that the incidence of accident and emergency outcomes that lead to brain death are sufficient to support this rate, that transplant success rates remain fixed, and that there remains an excess demand for transplants.

⁵⁴ A European Union paper suggests that the annual savings from renal transplants in Spain were of the order of €1 000, though this seems well outside the range of any other estimates (Van der Spiegel 2013). In the United Kingdom, it was estimated that annual dialysis costs for a person with renal failure were just over £23 000, compared with a kidney transplant cost of £42 000 followed by annual maintenance costs of £6500 (ODT 2008, p. 51). A more contemporary cost assessment by the UK National Institute for Health and Clinical Excellence also substantiated net accumulated savings from kidney transplants, though these were not large (NICE 2011). An Australian study found likely cumulative health care savings of between \$14-56 million in present value terms over the period from 2009-2020 from a 50 per cent increase in kidney transplants (Cass et al. 2010). It would save an estimated 3000 incremental life years. In contrast, a US study found net *costs* from kidney transplants other than for young people without comorbidities, but the dollars spent per life year saved were relatively small, and superior to many other health interventions (Wong et al. 2012).

CONCLUSION A.3

Changes to Australia's organ donation arrangements — largely a reflection of better coordination throughout all the stages needed to obtain a successful transplant — have substantially increased successful organ donations, and may have saved about 2500 people's lives from 2009–2016.

There are prospects for further improvements in organ donation processes, with large benefits in reduced disability and premature deaths and with potential cost savings from reduced rates of dialysis and other ongoing hospitalisations of people with major organ damage.

A.4 Victorian initiatives

Hospital Admission Risk Program

Victoria had the earliest effective experience in integrating health care services through its Hospital Admission Risk Program (HARP), now a component of the Health Independence Program. Victoria's HARP program was developed in the late 1990s, drawing on the US Kaiser Permanente Chronic Care Framework and the Wagner Chronic Care model. It aims to reduce demand for hospital services through care coordination, self-management support and specialist care of those with complex and chronic needs and who either frequently use hospitals or who are at risk of hospitalisation. However, the Commonwealth-State divide in health funding has limited HARP's linkages with GP-provided care, despite the essential role of GPs in early intervention and prevention of avoidable hospitalisation.

An evaluation over 2004-05 reported that the eighty HARP pilot projects resulted in 35 per cent fewer emergency department attendances, 52 per cent fewer emergency admissions and 41 per cent fewer days in hospital (Vic DHS 2006). With the support of Commonwealth funding, HARP was subsequently extended to the care of older people. An interim evaluation completed by the Victorian Department of Health and Human Services was also positive. The interim results were summarily reported in a final evaluation. Compared with the situation of participants before they entered the program, there was a 64 per cent reduction in hospital separations, a 55 per cent reduction in emergency department presentations and a 39 per cent reduction in clients presenting to emergency after being discharged (VicDHHS 2011).

The 2006 evaluation reports the HARP program cost \$150 million over the initial four years, in order to serve 20 000 patients across 87 pilot projects. This implies a cost per patient of \$1875 in 2005-06 prices (or \$2423 in 2016 prices). Neither evaluation reports the cost of averted hospitalisation, and so it is not clear that the program was cost-effective.

Victoria commenced a roll out of HARP from the mid to late 2000s. The ongoing political commitment to this roll out is unclear and its broader impact — and cost effectiveness — has not been the subject of any publicly available evaluations. There is evidence that compared with other states, Victoria was treating a higher proportion of public hospital admissions in home in 2006-07 and this would reflect the impact of HARP (table A.3). HARP's impact is otherwise not immediately evident in the state's hospital statistics. For example, after taking into account socioeconomic status and remoteness, there is no discernible difference in the incidence of preventable hospital admissions in Victoria from that of other large states (figure A.1). Given that all jurisdictions run programs to reduce unwarranted hospitalisation, this is perhaps not surprising. Therefore, to adequately evaluate the impact of HARP in Victoria, more careful analysis is required.

Table A.3Public hospital admissions treated in the home2006-07

	Admissions	Share of admissions
	Number	%
New South Wales	12 000	0.8
Victoria	40 866	3.11
Queensland	1 125	0.14
Western Australia	4 102	0.91
South Australia	6 580	1.68
Tasmania	Not reported	Not reported
ACT	9 222	1.22
Northern Territory	599	0.70
Australia ^a	66 194	1.42
• •		

a Commission estimate.

Sources: Audit Office of NSW (2008), Australian Department of Health and Ageing (DoHA 2008).

Medibank's CarePoint and CareComplete

There have been several recent trials of integrated care by private insurers, including Medibank's CarePoint program in collaboration with the Victorian government (box 4.1). CarePoint provides holistic care to patients with complex, chronic conditions who do not require specialist oversight. Among other things, CarePoint includes a GP-supervised care plan, an initial home visit to assess a patient's home environment, and follow up phone calls and home visits as required to assist the patient to manage their health. The care plan includes measures to improve the safety of the patient's home environment and to ensure the patient has adequate social support. A two-year trial of CarePoint in Victoria concludes in June 2017, but the Commission has been advised that it is unlikely to be extended given the possibility for conflict with the recent Commonwealth Health Care Homes initiative. A

trial of CarePoint is now also underway in partnership with the Western Australian Government.

More broadly, CarePoint is one of three in a series of targeted initiatives in Medibank's CareComplete program. CareFirst is an early intervention program that assists Medibank members to manage their health better. CarePoint targets those who require a GP to coordinate their care to reduce the risk of acute illness. CareTransition provides a specialist coordinated service to members who are discharged from hospital to assist them to avoid readmission — who are the same target group as Victoria's HARP. Medibank is operating CareComplete in all states other than the Northern Territory.

Figure A.1 **Potentially avoidable hospitalisations in selected states** 2013-14^a



Remoteness and socioeconomic status

^a This figure portrays the variation in potentially preventable hospitalisations between hospitals in selected states. The horizontal line in each coloured box is the median. The top and bottom of the box are the 25th and 75th percentiles. Remaining hospitals lie along the vertical lines except for outliers, which, where they exist, are depicted by black dots.

Source: MyHealthyCommunities.

A.5 New South Wales initiatives

HealthOne

From 2006-07, New South Wales has been funding the development of integrated HealthOne services for people with complex and chronic care needs. HealthOne began in

Mount Druitt as a hub-and-spoke model of care operating around a Community Health Centre and coordinating the provision of a patient's access to GP, hospital and other health services. General practice liaison nurses coordinate the health care services of the patient, and a case manager (usually a clinician and separate from the general practice liaison nurse) oversees the care of the patient.

An evaluation of the Mt Druitt program by the Menzies Centre for Health Policy compared hospital utilisation in the twelve months before the program with the twelve months after for 125 people enrolled in the complex, aged and chronic care arm of the program. The evaluation found significant improvements. It found a 26 per cent reduction in the number of emergency visits per patient (from 3.1 to 2.3), a 52 per cent reduction in the hours spent in emergency (from 12.5 to 6.6) and a 41 per cent reduction in the hours spent in hospital (from 6.3 to 3.7) (McNab and Gillespie 2015).

The evaluation reports capital development costs and the number and classification of personnel funded by the program, implying an annualised cost for Mt Druitt of about \$1.3 million. This includes the initial cost of extending and fitting out the 'hub' facilities located at the Mt Druitt Community Health Centre and a lease for the 'spoke' located at Wilmot. Given the program served 302 people enrolled in two separate arms, the program cost up to \$1515 per person in 2012-13 prices (\$1616 in 2016 prices). The evaluation does not report the cost of avoided hospitalisation and so does not directly support an evaluation of the program's cost effectiveness.

HealthOne has now been operationalised through Local Hospital Networks at twenty-five locations around New South Wales. The model of integration in the roll out of HealthOne includes the hub-and-spoke approach of Mt Druitt, and also includes a co-location of services model and a virtual integration model in which separately located providers are linked by communication technologies. The impact of HealthOne outside of Mt Druitt has not yet been evaluated.

Chronic Care for Aboriginal People

The Chronic Care for Aboriginal People aims to improve the care of Aboriginal people with chronic and complex health conditions. The model of care was developed in 2008, drawing on previous initiatives and through extensive consultation. The model is informed by best practice in chronic disease management, coupled with greater cultural awareness, including the need for trust. A key aspect of the program has been the follow up of patients discharged from hospital within 48 hours. Preliminary evaluation indicated that follow up within 48 hours resulted in a 4 per cent reduction in readmission (NSW ACI 2013). A more extensive evaluation by the University of Newcastle was to be delivered in mid-2016, but the results of this evaluation are not yet publicly available (NSW ACI 2016a).

Hospital in the home programs

The New South Wales Auditor General considered the impact of three out of hospital acute care programs being implemented in New South Wales in 2008 (AONSW 2008). The three programs were the Community Acute/Post Acute Care program (for patients at risk of needing acute care), ComPacks (mainly targeting patients at risk of needing chronic care) and the Rehabilitation for Chronic Disease program (for patients with chronic conditions). Although constrained by a lack of reliable data, the Auditor General estimated that the programs could be saving up to \$55 million a year and freeing up 2 per cent of hospital beds. While there was evidence that access to emergency services had improved, there was insufficient evidence to attribute this to the out of hospital programs.

NSW Health Chronic Disease Management program

The Chronic Disease Management Program was implemented across all Local Hospital Networks (called Local Health Districts in New South Wales) between 2009 and 2015. The aim was to coordinate the care of patients with chronic and complex health conditions in order to provide them with better support and reduce their need for hospitalisation.

An independent evaluation of the program up until May 2014 found that care coordinators did little to liaise with GPs and that the program's engagement with GPs otherwise remained low (GIGH et al. 2014). The evaluation considered health service utilisation of the participants in the program with a control group. Utilisation for both groups dropped sharply upon the commencement of the program, raising questions about the impact of other factors. Generally, utilisation rates of program participants remained higher than that of control participants throughout the period of analysis.

Integrated care demonstrators

The New South Wales Government is funding three integrated care demonstration projects in Western Sydney, Central Coast and Western New South Wales. The Government is otherwise funding seventeen smaller scale integrated care initiatives between 2014-15 and 2016-17 and is developing a statewide model for the local delivery of integrated care to people with complex, chronic health conditions.

It is too early to evaluate the impacts of these projects, as most only just reached a stage of implementation in 2016. However, the Western Sydney Integrated Care Program builds on a pre-existing initiative by the Western Sydney Local Health District and the Western Sydney Primary Health Network (WentWest) and has therefore been the subject of some preliminary evaluations.

The Western Sydney Integrated Care Program focuses on caring for patients at a higher risk of four complex, chronic conditions: congestive cardiac failure, coronary artery

disease, chronic obstructive pulmonary disease, and diabetes. The Western Sydney model of patient-centred care integrates acute care services with primary care services, including through the exchange of data under a single Linked Electronic Health Record system; agreed localised Health Pathways⁵⁵ and a specialist helpline for GPs. The diabetes program builds on earlier initiatives by the Local Health District and Primary Health Network, which included the provision of specialist case conferencing services to GPs and an inpatient diabetes management team at the Westmead Hospital.

Preliminary evaluation of the Western Sydney diabetes initiative indicates that the average length of stay of diabetes surgical patients has fallen from being 3.5 days above the national benchmark in 2012 to 0.7 days below the benchmark in 2016 (WSLHD and PHNWS 2016b). An audit of case conferencing services recorded significant improvements in patient outcomes (in blood sugar levels, weight and in systolic blood pressure) (table A.4). It also found that 97 per cent of GPs reported greater confidence in managing diabetes. An initial evaluation reports that other aspects of the program may also be effective – cardiology patients referred to the newly formed rapid access cardiology clinic experience an average length of stay that is 1.2 days shorter than those not referred to the clinic (WSLHD and PHNWS 2016a). Data provided to the Commission indicate the diabetes integrated care program initially cost about \$1100 per patient (in 2016 prices), and that the cost of avoided hospitalisation is about ten times the cost of the program, or \$11 400 per patient (in 2016 prices). Given that the reduction in hospital utilisation exceeded 10 per cent (we estimate it to be about 45 per cent), the data indicate that the program is cost effective. A comparison with other diabetes integrated care projects indicates that the high degree of integration of GPs and hospital services in the Western Sydney Diabetes initiative is a necessary contributing factor to its cost-effectiveness in improving patient health (table A.4).

⁵⁵ Health Pathways originated in Canterbury, New Zealand, but have been adapted to Western Sydney's circumstances. They are also widely used in some other Australian regions. Health Pathways are agreements between GPs and hospital physicians based on the medical evidence that guide the treatment of particular conditions including the interaction of primary, specialist and other hospital services.

Lo	w integration	\leftarrow	\rightarrow	High integration
	GP coordinating care	Hospitals and GPs exchange information	Hospital specialists support GPs eg. case conferencing and health pathways	Hospital specialists, GPs, allied health in a single team
	The Diabetes Care Project, 2011-14	Redcliffe Integrated Chronic Disease Model of Care, 2014-15	Western Sydney Diabetes Initiative, 2012–16 ^c	Inala Chronic Disease Management Service, 2007-08
Details of program subject to impact analysis	Information sharing within primary sector Replaced fee-for-service with blended payment comprised of capitation fee, performance fee plus cost of care facilitator	Information sharing between hospital and GPs	Inpatient diabetes management service (including follow up post-discharge) Case conferencing of hospital specialist team with GPs	Community-based, multidisciplinary clinic, including a hospital endocrinologist, GPs with post graduate training in complex diabetes care & allied health. Manage complex cases in partnership with patient's GP
Impacts ^a	Hospitalisation (potentially preventable) reduced by a median of one day. Blood sugar level reduced by 0.2 to 0.6 ^b per cent (HbA1c)	Hospital admissions of diabetes patients not significantly affected. The lack of impact was attributed to the unintended focus on patients with gestational diabetes rather than on patients with lifestyle diabetes.	Inpatient service impacts: Hospitalisation: average length of stay of surgical patients reduced from 3.5 days above national benchmark to 0.7 days below national benchmark Case conferencing impacts: Blood sugar level reduced by 0.9 per cent (HbA1c) Average weight reduction of 1.9kg Systolic blood pressure reduction of 6.45mmHg 97 per cent GPs reported increased confidence in managing diabetes	Hospitalisation rate for diabetes 46 per cent lower (hospitalisation rate of 0.19 for intervention group as opposed to 0.35 for control group) Hospital cost: average cost per patient of diabetes related hospitalisation was 44% lower for intervention group (\$1425 as opposed to \$2527 for control group)

Table A.4The degree of integration of GPs and hospital services in
diabetes care in Australia

^a Statistically significant impacts. ^b Reductions in blood sugar level were greater for people with a higher starting level. It was 0.2% on average, but up to 0.6% for those with initial HbA1c levels greater than or equal to 10.0%. ^c The Western Sydney Diabetes Initiative also involves prevention, screening, education and a greater role for the diabetes outpatients clinic in complex case management.

Sources: DoH (2015b); Duke (2015); Hollingworth et al. (2017); Western Sydney Local Health District and PHN Western Sydney (2016a); Zhang et al. (2015).

A.6 Queensland initiatives

Inala Chronic Disease Management Service

The Inala Chronic Disease Management Service is a trial of integrated care in Brisbane South. Patients with complex type 2 diabetes are referred by their GP to the Inala Chronic

Disease Management Service, a community-based clinic, including an endocrinologist, GPs with post graduate training in complex diabetes care, diabetes nurse educators, a dietician, podiatrist and psychologist (Askew et al. 2010). The clinic is an alternative to the hospital-based outpatient's endocrinology clinic located in the state run Community Health Centre and operating in cooperation with the Princess Alexandra Hospital. This is an unusually high degree of integration of GP and state based services in Australia's experience of integrated care (table A.4).

The multidisciplinary clinic assesses a patient, devises the patient's management plan and manages the patient's care with the aim of stabilising the patient's condition as soon as possible and returning the patient to their own GP to continue managing their care. Where relevant, the clinic encourages patients to participate in weight loss or other self-management programs, which are managed at the Community Health Centre where the clinic is located.

A study found that two years after the trial had commenced, participants in the service were half as likely to be hospitalised for a potentially preventable diabetes-related diagnosis (table A.4) (Hollingworth et al. 2017; Zhang et al. 2015). Based on that finding, Hollingworth et al. (2017) estimate that achieving a similar impact across the whole nation could deliver a dividend of up to \$132.5 million a year. However, the study does not take into account the cost of the intervention – but only compares the hospitalisation costs of those in the treatment group with those in the control group.

Redcliffe Integrated Chronic Disease Model of Care

Building on the national coordinated care trials in Brisbane North in the late 1990s and early 2000s, the hospitals (now managed by Metro North Hospital and Health Services) and primary health coordinator (now Brisbane North Primary Health Network) have continued to pursue opportunities for integrating care across sectors. The Redcliffe Integrated Chronic Disease Model of Care is a recent trial, with the aim of developing an effective system that could be rolled out across the Metro North region (Duke 2015). Over the twelve-month period to February 2015, the trial enrolled about 140 patients with complex and chronic conditions. The essence of the program has been to facilitate communication between private and public hospitals and GPs, including through joint case management and clinical handover upon hospital discharge. For example, the Redcliffe Hospital routinely provides GPs with a comprehensive record of their patient's hospitalisation within 24 hours of discharge.

A preliminary, internal evaluation of the program over the period February 2014 to February 2015 reported an overall improvement in quality of life for 83 per cent of participants and found that all participants were satisfied with the program (Duke 2015). There was also evidence of reduced hospital utilisation, although the evaluation lacked a careful delineation of a control group. With this proviso in mind, the average length of stay in hospital of COPD patients was 32 per cent lower for participants than for all other

patients on average and the average number of admissions of COPD patients was reduced by 27 per cent for participants, compared with a reduction of 2 per cent for all COPD patients. On the other hand, the average length of stay and readmission rates for patients with heart failure were above average for participants in the program – complicated by the deliberate selection of patients who were most at risk in the program. The diabetes component of the program achieved little change in hospital utilisation rates, attributed by the evaluation to its unintended focus on patients with gestational diabetes rather than on patients with lifestyle diabetes.

Gold Coast coordinated care trial

The Gold Coast Hospital and Health Service, the principal provider of government health services in the Gold Coast region, commenced a two-year trial of coordinated care in April 2016 (Connor, Cooper and McMurray 2016). Judging by Australia's earlier experience, a two-year trial is likely to be too short a period to support an effective evaluation. Like the coordinated care programs of Redcliffe and Western Sydney, the Gold Coast trial seeks to integrate patient care across all health sectors, including through the sharing of interoperable data between the hospitals and GPs.

Integrated Care Innovation Fund

Another recent initiative is Queensland Health's Integrated Care Innovation Fund, established in 2016 to invest in integration care initiatives (Queensland Department of Health 2016b). Hospital and Health Services (Queensland's Local Hospital Networks) have been asked to partner with their local Primary Health Networks and other community health providers to develop proposals for funding. Queensland's requirement of a joint approach is an innovative advance on past approaches to governance. It internalises an integrated approach between hospital networks and Primary Health Networks in the governance of the trial rather than leaving that important relationship to be negotiated externally. This is an important first step toward a better governance model that fully integrates primary care with other services.

A.7 Initiatives in other Australian jurisdictions

In 2011, South Australia established GP Plus clinics to provide a wide range of services in one location, including the capacity for GPs to operate from the clinic. GP Plus services are an extension of the Australian Government's GP Super Clinics program and are managed by the Local Hospital Networks (called Local Health Networks in South Australia), creating the opportunity for an integrated approach to health service delivery.

In 2015, South Australia proposed taking a coordinated approach to managing chronic pain (as opposed to chronic, complex conditions). This initiative is under development.

In Western Australia, elements of a coordinated care approach were recommended in 2004 in the Report of the Health Reform Committee, including a system wide patient record system, evidence-based clinical guidelines developed by collaborations of GPs and specialists with input from consumers, close coordination of GP and hospital care of patients, and funding reform. In 2011, Western Australia released a Primary Health Care Strategy with the ultimate aim of providing a seamless interface among primary care, hospital services and other health care services (WA DoH 2011). Despite little initial progress towards implementing the primary care strategy, the recently created Western Australian Primary Health Alliance, which oversees Western Australia's three Primary Health Networks, is now exploring options for implementing an evidence-based patient-centred medical home model that is integrated within a broader patient-centred health system (WA DoH 2016; WA PHA 2016).

A.8 What does the Australian evidence show?

While Australia's experience in integrated care is not extensive, it is sufficient to affirm the international evidence that integrating the provision of GP and hospital services delivers better patient outcomes and at a lower cost (table A.5). In particular, the Australian experience indicates that both hospitals and GPs need to be part of an integrated health system for it to be cost-effective.

Australia's experience indicates that hospitals need to be part of an integrated approach to care in order to achieve significant reductions in hospital utilisation. The evaluation of the Diabetes Care Project concluded that the project was not effective at identifying patients at a high risk of hospitalisation (DoH 2015b, p. 53). Subsequent commentators recommended that close cooperation with the secondary care sector, aka hospitals, is required to allow better targeting of resources at people at greatest risk of hospitalisation (Fountaine and Bennett 2016, p. 391). In support of that recommendation, hospitals were at the core of each of the other projects reported in table A.5 and the impact on hospital utilisation is consistently more than double that of the Diabetes Care Project.

Australia's experience also indicates that integration across GPs and the hospital sector is necessary to be cost-effective. Despite achieving a 41 per cent reduction in hospital utilisation, available data suggest that the cost of the HARP project is about twice the cost of other projects (table A.5). Thus, despite the significant reduction in hospital costs, the available data indicate that the HARP project may not be cost effective (the estimated dividend is negative in table A.5). Were the HARP project to have the capacity to integrate with GPs, the evidence from the other projects indicates that the project costs would be lowered and without compromising the project's impact on hospital utilisation.

2016	price	S				
	Unit	The Diabetes Care Project, 2011–2014	HARP, 2004-05	<i>Mt Druitt HealthOne,</i> 2006–2012	Western Sydney Diabetes Initiative, 2012–2016 a	Inala Chronic Disease Management Service, 2007–2008
Degree of integration and cohort of patients targeted		GP and allied health Patients with diabetes, particularly those with complex diabetes	Hospital and community care Patients at high risk of hospitalisation	All sectors Patients in need of complex, chronic and aged care	All sectors Patients admitted to hospital for diabetes related surgery	All sectors Patients with chronic and complex diabetes in need of acute care
Recurrent hospital dividend b c Key factors	\$ per client	-118	-658	160	4 007	2 496
Cost of project d	\$ per client	845	2 423	1 616	1 101	1 358
Cost of hospitalisation e	\$ per client	4 303	4 303	4 303	11 432	8 432
Impact on hospitalisation ^f	%	-17	-41	-41	-45	-46

Table A.5 The net impact of Australian integrated care projects, 2016 prices 2016 prices

^a The estimated cost of the program is based on the cost of the current integrated diabetes care program, which is an expansion of the program in place in 2012–2013. Likewise, the estimated impact on capital outlay and workforce are based on data for the current program. ^b Recurrent hospital dividend = (the cost per patient of hospitalisation * impact of project on hospitalisation) – (the cost per patient of project). ^c There are significant savings in other sectors in some programs that are not included here. For example, the Inala program replaced GP care until the patient's condition had been stabilised. However, these savings in GP costs are excluded to simplify the comparison across projects. ^d The cost of the Inala project is assumed equal to the average cost of the two most similar projects – Western Sydney Diabetes Initiative and Mt Druitt HealthOne. Project costs are implied in all other studies. ^e The costs of hospitalisation of clients in the HARP and Mt Druitt programs are assumed equal to that estimated in The Diabetes Care Project. All other studies estimate the cost of hospitalisation is reported for the HARP project.

Sources: Commission estimates based on DoH (2015b); Duke (2015); Hollingworth et al. (2017); McNab and Gillespie (2015); Victorian Department of Health and Human Services (2011); Victorian Department of Human Services (2006); Western Sydney Local Health District and PHN Western Sydney (2016a); Zhang et al. (2015).

CONCLUSION A.4

Australia's experience in integrated care indicates that where there is a higher degree of integration across the primary care and hospital sectors, there are larger impacts on the utilisation of health services and on the health of clients, and/or there is a reduction in health costs.

An overview of some current Australian integrated care projects									
Health Care Homes	HARP	CarePoint, Victoria	Western Sydney Integrated Care Demonstrator	Redcliffe Integrated Chronic Disease Model of Care	Gold Coast Integrated Care Model				
Australian Department of Health through Primary Health Networks	Victoria's Health Department (VicHealth)	Medibank and VicHealth	Western Sydney Local Health District (WSLHD) & Western Sydney PHN	Metro North Hospital and Health Services (HHS) and Brisbane North PHN	Gold Coast Hospital and Health Services (GCHHS)				
Australian Department of Health	VicHealth	Medibank (50%) and VicHealth (50%)	NSW Health, WSLHD, Western Sydney PHN	Queensland Department of Health	Qld Health, GCHHS, Gold Coast PHN				
Coordinate care of individuals with complex and chronic conditions	Reduce hospitalisation of high risk patients	Avoid hospitalisation of those with complex health conditions	Integrated approach to care, in order to maintain good health and prevent acute or chronic deterioration of the patient's condition	Reduce hospitalisation costs through better chronic disease management	Coordinate primary, secondary and acute care to reduce emergency presentations and admissions				
Under development. Implement from 1 October 2017	Developed in late 1990s. Piloted in two stages, in 2001-02 to 2004-05 and for older people in 2006-07 to 2009-10. Was then to be rolled out.	Implemented 30 June 2015 to 30 June 2017	Developed from 2012 and implemented from 2013. Under ongoing development and expansion in implementation.	Piloted in February 2014, implemented from March 2014. Evaluation period from February 2014 to February 2015.	Under development. Implement from 1 July 2017				
Aiming for 65 000 patients	Over 100 000 in first pilot stage	1500 patients, half of whom are Medibank members	836 enrolled by November 2016	144 recruited during 12 month period of evaluation	Target population who utilise enrolled GP services and consent to sharing of information				
Ten PHNs	Across Victoria	Mornington Peninsula, Frankston & Eastern Metropolitan Melbourne	Western Sydney	Proximate to Redcliffe Hospital	Gold Coast				
	An overview of Health Care Homes Australian Department of Health through Primary Health Networks Australian Department of Health Coordinate care of individuals with complex and chronic conditions Under development. Implement from 1 October 2017 Aiming for 65 000 patients	An overview of some current AusHealth Care HomesHARPAustralian Department of Health through Primary Health NetworksVictoria's Health Department (VicHealth)Australian Department of Health Coordinate care of individuals with complex and chronic conditionsVicHealth Reduce hospitalisation of high risk patientsUnder development. Implement from 1 October 2017Developed in late 1990s. Piloted in two stages, in 2001-02 to 2004-05 and for older people in 2006-07 to 2009-10. Was then to be rolled out.Aiming for 65 000 patientsOver 100 000 in first pilot stageTen PHNsAcross Victoria	An overview of some current Australian integrated Health Care HomesHARPCarePoint, VictoriaHealth Care HomesHARPCarePoint, VictoriaAustralian Department of Health NetworksVictoria's Health Department (VicHealth)Medibank and VicHealthAustralian Department of Health of Health Coordinate care of individuals with complex and chronic conditionsVictealth NetworksMedibank (50%) and VicHealthUnder development. Implement from 1 October 2017Reduce hospitalisation of high risk patientsAvoid hospitalisation of those with complex health conditionsUnder development. Implement from 1 October 2017Developed in late 1990s. Piloted in two stages, in 2001-02 to 2004-05 and for older people in 2006-07 to 2009-10. Was then to be rolled out.Implemented 30 June 2015 to 30 June 2017Aiming for 65 000 patientsOver 100 000 in first pilot stage1500 patients, half of whom are Medibank membersTen PHNsAcross Victoria Mornington Peninsula, Frankston & Eastern Metropolitan Melbourne	An overview of some current Australian integrated care projectsHealth Care HomesHARPCarePoint, VictoriaWestern Sydney Integrated Care DemonstratorAustralian Department of Health NetworksVictoria's Health Department of HealthMedibank and VicHealthWestern Sydney Local Health District (WSLHD) & Western Sydney PHNAustralian Department of Health coordinate care of individuals with complex and chronic conditionsVicHealthMedibank (50%) and VicHealthNSW Health, WSLHD, Western Sydney PHNReduce hospitalisation of high risk patientsReduce hospitalisation of high risk patientsAvoid hospitalisation of those with complex health conditionsNSW Health, WSLHD, Western Sydney PHNUnder development. Implement from 1 October 2017Developed in late 1990s. 2001-02 to 2004-05 and for older people in 2005 to 30 June 2017Implemented 30 June 2015 to 30 June 2017Developed from 2012 and implemented from 2013. Under ongoing development and for older people in 2005 to 2009-10. Was then to be rolled out.1500 patients, half of whom are Medibank membersWestern SydneyTen PHNsAcross VictoriaMornington Peninsula, Frankston & Eastern MetropolitanWestern Sydney	An overview of some current Australian integrated care projectsHealth Care HomesHARPCarePoint, VictoriaWestern Sydney Integrated Care DemonstratorRedcliffe Integrated Chronic Disease Model DemonstratorAustralian Department of Health NetworksVictoria's Health Department (VicHealth)Medibank and VicHealthWestern Sydney Local & Western Sydney Local & Western Sydney PHNMetro North Hospital and Health Services (HHS) and Brisbane North PHNAustralian Department of Health Coordinate care of individuals with conditionsVicterlaith high risk patientsMedibank (50%) and VicHealth (50%)NSW Health, WSLHD, Western Sydney PHNQueensland Department of Health Reduce hospitalisation those with complex health conditionsNSW Health, WSLHD, western Sydney PHNQueensland thealth Correnci cord hospitalisation acute or chronic deterioration of the patientsPiloted in two stages, in 2006-07 to 2009-10. Was then to be rolled out.Implemented 30 June 2015 to 30 June 2017Piloted in February 2013. Under ongoing 2013. Under ongoing 2013. Under ongoing 2014, implemented from 2006-07 to 2009-10. Was then to be rolled out.1500 patients, half of whom are Medibank membersWestern SydneyProximate to Redcliffe HealthTen PHNsAcross VictoriaMornington Peninsula, Frankston & Easterm Metropolitan Metropolitan MetropolitanWestern SydneyProximate to Redcliffe Hospital				

Table A.6	6 (continued)					
	Health Care Homes	HARP	CarePoint, Victoria	Western Sydney Integrated Care Demonstrator	Redcliffe Integrated Chronic Disease Model of Care	Gold Coast Integrated Care Model
Target population	Patients with multiple complex and chronic conditions (about 20% of population)	Patients who frequently require hospital services or who are otherwise at high risk of hospitalisation	Patients with complex conditions who do not require specialist care	Patients with greater risk of congestive cardiac failure, coronary artery disease, chronic obstructive pulmonary disease and diabetes	Patients with multiple, complex chronic disease (admitted for COPD, heart failure, diabetes or asthma)	Patients at risk of high service utilisation or of poor outcomes that may be improved through better coordination
GP participation	Aiming for 200 practices	Evaluation reported difficult to engage local GPs	Over 500 GPs at 235 clinics, with the largest having between 10 and 20 participating patients	204 GPs (and 60 practices) enrolled by Nov 2016 (about 50% of local GPs)	88 GPs from 50 local GP practices	All 164 local GPs invited. 14 agreed to participate
Approach	A bundled fee for GP services (in place of fee-for-service), together with one-off grant of \$10 000. Eligibility for allied health services triggered by Health Care Home enrolment, but access to allied health care, specialists, diagnostic and imaging services funded through the MBS.	Care coordination, self-management support and specialist care within the hospital and state government services sectors and involving GPs.	Home visit to assess condition and develop plan for integrated care in consultation with person. Monthly check-ups to ensure patient well informed and looked after holistically. Overseen by a GP. Facilities provided in the home to improve patient safety and independence. Other primary care services provided as needed.	Patient-Centred Medical Home: Integrated Care Team comprised of care facilitator (registered nurse), primary care team, specialists, community based health care providers. Hospital rapid access (RASS) clinics provide acute specialist services and bypass emergency. Initial and ongoing capacity development of medical team. GP phone line to hospital specialists. GP and specialist case conferencing.	Focuses on facilitating communication between service providers (particularly GPs and hospitals) including through improved joint case management and clinical handover. Patients are stratified by a designated hospital nurse.	A Coordination Centre is run by GCHHS offsite from hospital. It provides rapid access to team of primary and specialist clinicians, including home care. ICT system shares patient data with all clinicians. Non clinical 'Service Navigators' provide liaison services. Care plans and decisions made with patients and family. Direct admission when needed, bypassing emergency. A series of protocols guide patient management.

Sources: Australian Government Department of Health (2016d); R Bell and B Perry (Medibank Private, Melbourne, pers. comm., 29 November 2016); Connor, Cooper and McMurray (2016); Duke (2015); Victorian Department of Health and Human Services (2011); Victorian Department of Human Services (2006); Western Sydney Local Health District and PHN Western Sydney (2016a).

B What does the international evidence show?

Despite the gains from integrating care around the patient and the priority given to integrated, patient-centred care by leading reformers such as the United Kingdom and the United States, no entire country has yet negotiated the transition. Nevertheless, several sub-national organisations have successfully integrated their health system around the patient, including Kaiser Permanente, Intermountain and Veterans' Affairs in the United States; Canterbury in New Zealand; Kinzigtal in Germany; and Jonkoping County Council in Sweden.

These international models illustrate the various options for designing such systems and provide more comprehensive evidence about impacts than can be obtained from the more limited Australian experiences. Such integrated systems of care have led to strong gains in health outcomes for patients, reductions in costs and improvements in the patient's experience of care. What has emerged from these efforts is a relatively recent body of research into the key elements of a successful transition pathway to an integrated, patient-centred health system, with immediate application to Australia.

Because of the cultural and institutional similarities with Australia, the experience of Canterbury in New Zealand is of particular relevance to Australia. However, a more complete picture of integrated care is provided by also considering experiences in other nations.

B.1 Canterbury, New Zealand

Background

The Canterbury system in New Zealand is one of the world's leading examples of how to transition from fragmented care to coordinated care (Timmins and Ham 2013). From 2006, Canterbury has been on a path of continuous innovation to achieve better outcomes for patients, including less waiting time, within a hard budget constraint. A key component has been the engagement of the entire health workforce in the process of identifying how to improve. Its innovations have included:

• HealthPathways that set out for GPs the localised, best practice approach. They are developed and maintained by GPs and hospital specialists in collaboration and are the

default expectation for referrals, diagnostics and prescriptions. HealthPathways are also translated into simple terms for patients.

- an electronic request and referral system used by GPs that is based on agreed HealthPathways
- a data portal for sharing patient records between hospitals and GPs
- a specialist phone line for GPs to support them to manage more complex cases
- alliance contracting in place of fee-for-service for the commissioning of services by the District Health Board (estimated by the Board to have delivered several million dollars of savings since its introduction)
- teams of hospital specialists and staff to manage patients with specific chronic conditions, taking the pressure of the emergency department and extending care to patients outside of the hospital, both in their home and through the support of their GPs
- the local GP association built a 24-hour surgery and care facility, staffed mainly by GPs. The capacity of the clinic is supported by HealthPathways and by telephone access to hospital specialists.

Given the similarities in institutional and cultural structures, the Canterbury example is also one of the most pertinent for Australia. In New Zealand, District Health Boards manage hospital and other government services in their region, similar in function to Local Hospital Networks in Australia. District Health Boards in New Zealand are on average responsible for a population of about 500 000, also comparable with the average size of the population served by Australia's individual Local Hospital Networks. However, unlike Local Hospital Networks in Australia, District Health Boards also manage aged care and disability care.

As in Australia, private GPs in New Zealand provide the bulk of primary care, funded on a fee-for-service basis by the government, although New Zealanders make a larger co-contribution for GP services than Australians. About 30 per cent of New Zealanders are covered by private health insurance, which is less than in Australia, but private health insurance in New Zealand can be comprehensive, covering primary and all other health services.

Evidence

The Canterbury experience was not implemented as a randomised control trial or with the intent of demonstrating its success. Its effectiveness must therefore be assessed by using a range of data sources. The evidence is:

• the Canterbury District Health Board was in deficit in the early 2000s and was anticipating a serious deterioration in financial capacity. At that point, the Canterbury Board decided to change direction and launched its process of reform, focused on valuing the patient's time. Ten years later, the Canterbury Board was highly rated by

the Auditor General for its financial performance in 2011-12 — its financial systems were rated as 'good', it was one of two health boards with a 'very good' control environment and was one of the top 4 per cent of public entities with a 'very good' service performance (New Zealand Controller and Auditor General 2013).

- Because it aims to value patient time, the Canterbury Board measures saved patient days of waiting. Over the three years to 2013, the Canterbury Board estimates that HealthPathways and other measures have saved patients 1.5 million days of waiting.
- Prior to reform, Christchurch Hospital in Canterbury regularly reached maximum capacity and could not take more patients. Following the transition to coordination of primary and hospital care, the hospital rarely reaches full capacity. For example, the daily occupancy rate in Christchurch Hospital in 2012 usually ranged between 75 and 95 per cent, rarely reaching 100 per cent.
- The acute, age-standardised hospital admission rate was about 20 per cent below the New Zealand average in 2006-07, reflecting earlier progress in the quality of primary care (table 1.1). Since then, coinciding with the ongoing transition to an integrated system of care around the patient, the rate has fallen further to be 30 per cent below the New Zealand average. In contrast, that of all other major district health boards (which have not transitioned to a system of patient-centred care) have remained relatively unchanged and have continued to exceed the national average.

Canterbury District Health Board and New Zealand								
	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Canterbury	4 798	4 555	4 757	4 770	5 017	4 920	4 947	5 209
NZ	5 813	5 829	6 796	6 865	6 917	7 197	7 308	7 426
Ratio ^a	0.83	0.78	0.70	0.69	0.73	0.68	0.68	0.70

Table B.1 Age-standardised acute medical admissions per annum Canterbury District Health Board and New Zealand Second S

^a The ratio of acute medical admissions in Canterbury relative to New Zealand. *Source*: Gullery and Hamilton (2015).

- Canterbury is also a high performer relative to the 20 health boards of New Zealand in terms of acute medical length of stay and acute readmission rates. Canterbury's performance has improved for this combination of indicators compared with the rest of New Zealand, indicating its programs have been successful at valuing patient time (Timmins and Ham 2013).
- A comparison of Canterbury's District Health Board with the rest of New Zealand suggests that Canterbury's acute care resources are more efficiently utilised. The level of access to arranged surgery has risen in Canterbury compared with the rest of New Zealand, while the relative level of hospital based resources devoted to acute medical conditions has declined (Love 2013). Difference-in-difference regression analysis supports the conclusion that Canterbury is performing fewer acute medical admissions,

and for those it does perform they are of a higher level of acuity than the national average.

- By 2013, the 24-hour GP surgery and care facility was seeing almost as many patients as the hospital's emergency department, freeing up the hospital to focus on more complex procedures (Timmins and Ham 2013, pp. 6, 28).
- While no formal attempt has been made to quantify the economic impacts, some estimates help to indicate some of the savings. For example, Canterbury's reversal of its budget position from a deficit of 1 to 3 per cent to an underlying surplus of about 1 per cent could be worth up to 2 per cent of its annual turnover, or approximately \$20 million in 2011-12. From another perspective, Canterbury's health board budget allocation (a capitation based payment from the government) has grown at about 7 per cent a year while its expenditure has varied in real terms from 3 to 6 per cent a year (Timmins and Ham 2013, pp. 30–31).

B.2 Kinzigtal, Germany

Background

Gesundes Kinzigtal Integrated Care (GKIC) is a for-profit joint venture between a network of local physicians (two-thirds owner) and a German health care management company (one third owner). In 2006, GKIC initiated long-term contracts with two non-profit health funds to provide integrated health services to health fund members in the Kinzigtal region of south-west Germany.

Germany's health funds receive risk reinsurance equalisation payments from a national health fund based on the risk characteristics of those they insure, including for example morbidity, age and gender (Hildebrandt et al. 2010). Unlike Australian risk equalisation for private health insurance, these payments are ex-ante so that the health fund retains what it does not spend (or runs a deficit if it overspends). Under their arrangement with GKIC, the two Kinzigtal health funds pay fifty per cent of any unspent funds to GKIC. The health funds reserve the right to terminate the contract if the activities of GKIC lower the quality of its health care, cause membership to drop or cause the health funds to spend more than they are allocated by the central fund. Furthermore, patients retain their legal right to choose providers, whether or not they are party to the GKIC venture (Hildebrandt, Schulte and Stunder 2012, p. 211). There is, therefore, no gate-keeper element to the arrangement. Patients retain freedom of choice of provider.

GKIC have invested in the coordinated care of patients, particularly those with common chronic diseases that have a large effect on the health of patients and for which there are effective interventions available. Their program includes care plans agreed to with the patients, coordination of patient care, system-wide electronic health records, patient telemonitoring, health literacy training and targeted exercise programs (Busse and Stahl 2014). GKIC also achieved short-term budget gains by preferring generic drugs and buying pharmaceuticals in bulk to obtain discounts.

Evidence

The GKIC approach to health care has improved health outcomes, improved the efficiency of health care and people's experience of care (Alderwick, Ham and Buck 2015; Busse and Stahl 2014). Mortality rates for those participating in the program are lower than non-participants (Busse and Stahl 2014; Hildebrandt, Schulte and Stunder 2012). For example, the mortality rate of those enrolled in the program was reduced by half after two and a half years in the program compared with those not enrolled (Busse and Stahl 2014).⁵⁶ The rate of hospitalisation was 12 per cent lower for participating than non-participating physicians, and health outcomes were better. Patients with osteoporosis experienced a 1.9 per cent lower rate of fracture than comparable patients of nonparticipating physicians (Hildebrandt, Schulte and Stunder 2012). This was despite the fact that the program attracted sicker patients, indicated by a 0.25 per cent higher comorbidity Charlson score. Based on a survey of health care members in 2014, it was found that those who agreed on shared treatment goals achieved superior health outcomes to those that did not (Struckmann, Boerma and van Ginneken 2015).

There is evidence that the GKIC program also improves patient care. For example, the proportion of patients with heart failure who were given the recommended prescription drugs was 6.8 per cent higher under participating physicians than under non-participating physicians (Hildebrandt, Schulte and Stunder 2012). A broader, controlled study from 2005 to 2011, found improved clinical practices across four of five domains under the GKIC system (in the Kinzigtal region) compared with the rest of the state (Schubert et al. 2016). For example, patients with vascular dementia who were prescribed non-recommended drugs declined by 7 per cent in Kinzigtal, but only by 1.1 per cent in the control population. In one domain, clinical practice improved in both populations, but by slightly more in the control population.⁵⁷

Further, evidence indicates patient and provider satisfaction with the program. For example, almost all patients and 80 per cent of providers would enrol in GKIC again (Busse and Stahl 2014). Similarly, in 2013 and 2015 patient surveys, over 90 per cent of patients responded that they would recommend enrolment in the GKIC program to others, indicating a high level of members' overall satisfaction (Siegel and Stobel 2017). Survey analysis suggests that the largest factor behind the high willingness to recommend the GKIC program was the patient perception of the quality of health care provided in the program.

⁵⁶ After controlling for the effects of differences in the traits of the participants and non-participants.

⁵⁷ In two of the five domains, the improvements may have arisen due to chance alone, and this was also true for the single instance where the control group outperformed the GKIC system.

The approach also reduced costs. GKIC generated a saving of 16.9 per cent between 2006 and 2010 compared with a similar population in another region (Hildebrandt, Schulte and Stunder 2012). Much of this saving was achieved by lowering emergency hospital admissions. Emergency hospital admissions rose by 10.2 per cent between 2005 and 2010 for patients in Kinzigtal, but rose by 33.1 per cent in the comparable population. Similarly, a comparison of health costs in the Kinzigtal region under participating physicians with non-participating physicians, found that health costs rose by less in the group of participating physicians (by 7 per cent) than in the group not participating (by 19.3 per cent) (Hildebrandt, Schulte and Stunder 2012). Again, this was largely because of lower utilisation of hospital services.

B.3 Intermountain Healthcare, United States of America

Background

Intermountain Healthcare is a not-for-profit vertically-integrated health insurer and health provider that provides primary, secondary and tertiary health services to approximately two million people living in Utah, Idaho and surrounding states. Intermountain directly employs 1350 physicians. It has an agreement with a further 1200 other independent physicians with whom it shares any savings generated by a reduction in total costs providing patient satisfaction rises and quality measures improve.

Intermountain began as a system of fifteen hospitals in 1975, branching out into primary care delivery from 1982. Intermountain was established to serve its members by investing in new and better ways of delivering care. However, as a vertically-integrated provider, it was not keeping the returns from its investments because insurers would cut their payments (based on fee-for-service). Intermountain was bearing the cost of the investment and the insurer was keeping the returns. Intermountain therefore changed its model of service to include a health insurance arm from 1983, allowing it to invest in the health of its members and share in the returns.

From 1986, Intermountain restructured its hospital care around regions — testimony to the benefits of a regional approach (which has relevance to Australia).⁵⁸ In 1993, general practice physicians were given greater influence through the creation of a general practice organisation, the Intermountain Medical Group, which contributed to Intermountain HealthCare's management team. Again, as in other approaches to integrated care, its model suggests the importance of promoting 'buy-in' from general practice.

⁵⁸ Additional testimony to the benefits of a regional approach is that the United States Veteran Affairs has found a regional approach to be the best approach to integrated care, notwithstanding that VA is a federal body (Curry and Ham 2010).

Evidence

Intermountain has been recognised as one of the leading health care providers in the United States (Baker et al 2008). For example, Intermountain has been consistently ranked as the leading integrated health system in a survey of regional, non-speciality health care systems in the United States. Its Latter-Day Saints hospital has been recognised as one of America's best hospitals in respiratory disorders, pulmonary medicine, endocrinology and diabetes care. It was also the first hospital in Utah to be given Magnet status, which is an international designation of nursing excellence and an indicator of staff morale.

Intermountain standardised care procedures for the prescription of medicines for cardiac patients at discharge, raising the proportion of accurately treated patients from 57 per cent to over 98 per cent (James and Poulsen 2016). Flowing from this, mortality declined by over 450 deaths a year and hospitalisations declined by almost 900 cases a year.

Intermountain also standardised the process for inducing women waiting to deliver, resulting in a reduction in induction rates from 29 per cent to 5 per cent between 2001 and 2003 (Baker et al 2006). This in turn significantly lowered the rates of unplanned Caesarean sections and otherwise reduced the costs by \$400 per birth or by \$10 million per year.

Intermountain's American Fork Hospital developed a non-invasive method for supporting the lungs of premature babies that involved blowing pressurised air through the newborn's nose instead of placing a breathing tube down their throat. This not only avoided the risk of significant complications, but also reduced the hospital's operating costs for premature babies by \$544 000 a year (James and Poulsen 2016). Extending this new method across Intermountain's hospitals reduced hospital operating costs by well over \$5 million a year.

In 2003, clinicians introduced tighter glucose control of patients in intensive care units, reducing patient mortality rates in intensive care (Baker et al 2006). This and other initiatives have been systematically rolled out across Intermountain's providers with similar rates of success.

B.4 Kaiser Permanente, United States of America

Background

Like Intermountain, Kaiser Permanente is a not-for-profit vertically-integrated health insurer and health provider. It began in the 1930s, providing prepaid health care services to construction workers in California and now services 9.5 million members in eight regions of the United States (Alderwick, Ham and Buck 2015). Care is integrated inside and outside hospitals within each region, with specialists and general practitioners working together in multispecialty medical clinics (Curry and Ham 2010). A medical group in each

region is paid a capitation payment to provide care for all Kaiser Permanente members in its region and has responsibility for the management, design and delivery of care in the region. Some of Kaiser Permanente's medical groups directly provide medical services; others contract out the delivery of services (Curry and Ham 2010).

Integration of care at Kaiser Permanente is based on population risk stratification, investment in prevention, reliance on self-management, the use of care pathways to guide the management of common conditions, case management of those with complex conditions, sophisticated data technology and the pursuit of a target of zero unplanned hospital admissions.

Evidence

Kaiser Permanente has had considerable success in all areas of health. In the case of prevention, for example, Kaiser Permanente's investment helped to lower the prevalence of smoking among its members by 25 per cent compared with a reduction of 7.5 per cent across California more generally (Alderwick, Ham and Buck 2015). Contributing to this achievement, a survey of adults in 2007 indicates that Kaiser Permanente provides easier access and a significantly stronger emphasis on case management and prevention than Californian practices more broadly (McCarthy, Mueller and Wrenn 2009). This and other investments in lifestyle improvements have resulted in significant health gains. For example, the relative risk of death within 90 days of a cardiac event was reduced by 89 per cent patients enrolled in Kaiser Permanente's cardiac rehabilitation for program (McCarthy, Mueller and Wrenn 2009). This program included six months of intensive case management and the highest rates of screening in the United States in 2007.

Comparisons of Kaiser Permanente with other health care organisations is evidence of its high performance (Alderwick, Ham and Buck 2015). Kaiser Permanente has consistently been one of the highest performers in the United States' Healthcare Effectiveness Data and Information Set (HEDIS) measures. Kaiser Permanente also performs well in international comparisons. For example, the number of bed days for those aged 65 or more years in Kaiser Permanente is less than a third of the UK's NHS, a reflection of more effective management of patients' health (Curry and Ham 2010; Ham et al. 2003).

B.5 Jonkoping County Council, Sweden

Background

Jonkoping County Council is an elected health authority in the Jonkoping region of southern Sweden. For over twenty years, it has sought to develop and provide an integrated system of quality care to the region's population of about 350 000. It encourages a culture of innovation and patient-centred care among its staff and clinicians. It has achieved

significant reductions in hospital admissions, in days spent in hospital and in waiting times for specialists (Alderwick, Ham and Buck 2015; Baker et al. 2008).

Evidence

A comparison of counties across Sweden's select range of cost, outcome and patient experience indicators shows that Jonkoping substantially outperforms all other counties. Where a lower number indicates higher performance, Jonkoping's score was below 50 and all other counties scored between 90 and 200, with 100 being the national average (Baker et al. 2008). While improving health outcomes, staff morale and patient satisfaction, Jonkoping County Council reported it had lowered its net costs by two per cent. As an example of its success, Jonkoping brought together all providers to map and help improve processes for children with asthma. The number of children admitted to hospital with asthma subsequently dropped from 22 per 10 000 to 7 per 10 000. Jonkoping has also invested in preventative care. For example, over a four-year program it raised the region's rate of influenza vaccination by 30 per cent.

The Institute for Healthcare Improvements rated Jonkoping County Council as the leading global performer in terms of clinical and financial outcomes compared with a range of other health systems, including several in the United States (Baker et al. 2008).

C Technology and the changing role of professions in integrated care: a case study of pharmacists

The potential to use technology in new ways to provide government services is a cross cutting theme in this inquiry. In health care, technology has always played a major role in providing new treatments and ways of providing care, but it has not diminished the overall demand for health care professionals.⁵⁹

In part, this reflects that technologies are often used by clinicians rather than replacing them. Another factor has been that the large growth in the demand for health services has still enabled job growth even though technologies have reduced the needs for health professionals in some areas. Nevertheless, digital disruption and automation appears likely to result in job losses for some health professionals, notwithstanding growth in the health care sector. This will occur wherever the technologies produce higher quality services for patients and/or are less costly — two beneficial outcomes for people.

This driver of change is accompanied by:

- recognition of the importance of multidisciplinary teams in integrated care
- the potential to widen the scope of practice of health professions that have hitherto been restricted from playing a more prominent role, especially where technologies can reduce any risks from widening their role (such as through technology-assisted decision making)
- cost and demand pressures in the health sector that encourage substitution from high to lower-cost professions. Australia's ageing population and the growing prevalence of chronic conditions will, under the existing professional supply model, produce substantial cost pressures. It risks that some people, particularly in regional Australia, will be less able to access health care.

The biggest stumbling block for realising beneficial changes from restructuring the role of health occupations are habit and regulation, both of which governments need to address.

⁵⁹ Other than dental practitioners (whose numbers still grew), the numbers of people employed as health professionals grew well above the growth in employment overall (based on ABS 2016, *Labour Force, Australia, Detailed, Quarterly, Nov*, Cat. no. 6291.0.55.003 at the ANZSCO 4 digit level).

A starting point for reform is the pharmacy profession, which has always played an idiosyncratic role in Australia's health care system, and where the scope for transformation is now greatest. The oddity of pharmacy is that much of its services are currently provided in a retail setting (often referred to as 'community' pharmacy). As one party put it to the Commission in this inquiry, the availability of unproven (and sometimes harmful) medical products and confectionary at the front of the pharmacy is not reconcilable with an evidence based clinical function at the back.⁶⁰

The consumer advocacy group, CHOICE, commissioned a mystery shopping survey to assess the accuracy and quality of advice in 240 pharmacies across Australia (Bray 2017). Each shopper approached the prescription dispensing counter and asked for advice from a pharmacist, stating, 'I've been feeling really stressed lately, is there something you can recommend?' In many cases, the advice was wrong or unsupported by any scientific evidence (though frequently, pharmacists inaccurately claimed that there was scientific evidence of therapeutic benefits).

No other clinician in the health system operates in a retail setting. GPs' attitudes to pharmacy reflects this:

GPs indicated that sources of distrust arose from questionable motivations of pharmacists or pharmacists from "chain" pharmacies. Similarly, professional respect between providers was important, with one study indicating that GPs were not interested in collaborating with pharmacists when the GPs were not confident in the pharmacists' abilities. (Lipworth et al. 2013, p. 20)

Moreover, technology has crept up on the dispensing function of pharmacists. Few pharmacists now physically combine or process pharmacologically-active ingredients ('compounding'). In the retail setting, pharmacists typically physically select a pre-packaged drug from a store in the pharmacy and label it — a manual task requiring no professional skills.

A more recent development is machine dispensing of drugs — a proven technology, which challenges even the manual tasks performed by pharmacists (DoH 2017c, p. 167). Robotic dispensing involves fewer medication errors and is more productive, and has for a long time been in common use in hospitals around the world (for example, Beard and Smith 2013).⁶¹ It is already in use in some Australian pharmacies because of their capacity to improve the speed of dispensing and increase face-to-face contact with consumers (Philpott 2016).

⁶⁰ An Australian Government review into various natural remedies — widely available in pharmacies — suggested that most had no strong evidence in favour of them (Baggoley 2015).

⁶¹ A minor issue for automatic dispensing outside a hospital setting is that they are not suited to uncommon and high cost medicines (such as the newly listed hepatitis C drugs, which cost tens of thousands of dollars). E-scripts and e-dispensing could solve this. A script could go to an internet pharmacist who dispatches the medicine to the patient by courier.

In addition, e-prescriptions enable a clinician to provide a prescription to a pharmacy without the need for a paper script. Such e-scripts could be sent to a robotic pharmacy instead of a pharmacist, so all aspects of the existing pharmacy become redundant. Information systems are better suited to patient-centred advice on medications — especially if they link to data on a person's My Health Record.

In a world where the physical aspects of dispensing are managed by machines, scripts are transferred to them electronically, and accurate advice is provided based on customer traits and medical evidence, the *traditional* role of community pharmacy appears to be at risk. To the extent that a person needs to be involved to supervise this process and interact with the customer, trustworthiness, personability and empathy are the key skills, not years of clinical training.

Against that background, while the role of retail pharmacy in the health system has long been problematic, given recent developments, maintenance of the current model, is, or at least should be tenuous:

To date, most applications of this technology have been at the local level, such as hospital pharmacies or single-site community pharmacies. However, widespread implementation of a more centralized automated dispensing model, such as the 'hub and spoke' model currently being debated in the United Kingdom, could cause a 'technology shock,' delivering industry-wide efficiencies, improving medication accessibility and lowering costs to consumers and funding agencies. Some of pharmacists' historical roles may be made redundant, and new roles may be created, decoupling pharmacists to a certain extent from the dispensing and supply process. (Spinks et al. 2017, p. 394)

As has been observed in the United Kingdom, this suggests a revolutionary change in the role of community pharmacy:

If there is to be widespread reform by 2020, community pharmacy requires a revolution rather than evolution. Any revolution in community pharmacy is likely to be precipitated by a massive divestment in prescription dispensing in order to release money to help fund growth of NHS integrated care organisations. ... With the use of new technologies, dispensing in the community could soon replicate the dispensing systems used in hospitals. Indeed, policymakers are pushing for the replication of hospital dispensing arrangements in the community and have been quietly preparing for factory-type dispensing pharmacy outlets. (Baines 2015, p. 2)

In light of these factors, there are compelling grounds for policy change that goes well beyond those raised in the recent Australian Government review of pharmacy (DoH 2017c). There are several desirable directions for pharmacy:

- i) accept that the retail setting is not suitable for a clinical role, and provides pharmacists with negligible capacity to apply their long-acquired skills
- ii) give wider scope for pharmacists to play a role in multidisciplinary care for those people whose medication needs are complex
- iii) accept that the manual dispensing function of pharmacists is no longer sensibly performed by highly-skilled professions, and move to automation and, where

needed, supervision by people whose prime skills are social in nature. In regional areas, this would improve access to pharmaceuticals, as no highly-trained pharmacist would be required (either locally or through telehealth)

iv) recognise that, like nurse practitioners, there may be scope for pharmacists to perform roles outside their current scope of practice.

Currently there is little government awareness of the unsuitability of the retail model for provision of clinical services, and the capacity to bypass pharmacists for manual dispensing ((i) and (iv)). Indeed, the Australian Government is spending more (some \$210 million over the forward estimates) given a lower than anticipated number of scripts filled by pharmacists. This funding would not be required under a different technological solution to dispensing because the efficient cost would be considerably lower than current margins require.⁶²

Functions (ii) and (iv) *have* been recognised as legitimate principles in the Australian Government's 2017-18 Budget, which has expanded the role of pharmacists in medication management in the community, including a clinical role in Health Care Homes. The Government has committed \$600 million over three years for this initiative. The recent Australian Government pharmacy review has also recognised the desirability of a changing role:

It is known that, with the rise of chronic conditions such as obesity, asthma, hypertension and diabetes, there will be a need for a greater focus on integrated, rather than episodic, care. It is also known that, while the Australian Government has a role to play, the pharmacy sector must take a shared responsibility for its own future if the system is to remain sustainable. (DoH 2017c, p. 3)

However, it is not clear that many pharmacists will be required to serve such a clinical function, and accordingly whether expenditure of this magnitude could be justified. Currently, there are about 20 000 pharmacists performing some kind of clinical function (largely in a retail setting). In a multidisciplinary model of care, it is hard to foresee the need for even one pharmacist per general practice (and there are only approximately 6 100 general practices). This is because the number of people who have chronic and complex chronic conditions where medication advice is critical is, in own right, unlikely to be great. Pharmacists are currently often not recognised as important participants in multidisciplinary teams. Given developments in eHealth and artificial intelligence, their role in that context is likely to diminish further. Even where medication advice is required, such advice will typically only be needed sporadically.

There may be justification for pharmacists in a peripatetic role — visiting nursing homes and people in their own homes where medication management is crucial. But even here, given the support that information systems can increasingly provide, it is not clear that this

⁶² That is also true of even the current arrangements in pharmacy — as observed by the interim report of the current review into pharmacy (DoH 2017c).

function could not be provided by lower-cost allied health professionals, such as nurses (who already do this). In a model that did not give them preferment, the role of pharmacists in a clinical activities would therefore be a niche one.

It is improbable that much can be done in the short term, recognising that the Sixth Community Pharmacy Agreement will run until 30 June 2020, while the Australian Government has committed funding to new roles for pharmacists over the next three years as part of the 2017-18 budget. However, some work can begin now:

- the impacts and cost-effectiveness of the role of pharmacists in multidisciplinary teams can be assessed as part of the evaluation of Health Care Homes, as well as the likely total number of pharmacists required were the Health Care Home model (in the adapted version that we recommend) to become the de facto model for primary care
- adaptation of training content for pharmacists to ensure it is compatible with their new role and, similarly development of a VET qualification that would be needed for those people who would oversee robotic dispensing
- signalling to the relevant departments of pharmacy in Australian universities that the likely demand for pharmacists will dramatically fall. As the industry structure is a creature of government, it has a responsibility not to train a group of people whose long-term economic and professional prospects in that occupation will be poor. This problem is all the more severe because so many pharmacists are relatively young, so that the natural process of attrition through the retirement of older pharmacists will not quickly reduce supply by much. Even if governments do not envision changes to the pharmacy model over the medium term (which would represent a lost opportunity), failure to stem supply now, would still doom thousands of pharmacists to job vulnerability when aged 45-55 years ages that do not sit well with easy transitions to other occupations
- trials in regional areas with machine dispensing supervised by non-pharmacists would be a starting point given the high level of needs in those areas.

There is another trajectory for pharmacy that would leave its current retail form largely intact, with the addition of some clinical functions. If the Australian Government maintains the retail model, it is very hard to argue for the preservation of the current antiquated anticompetitive regulations that pervade the industry, such as ownership restrictions (appendix B). But there is an opportunity to move away from a pharmacy model in which competition reform is the imperative.
D Preventative Health

D.1 Introduction

Preventative health encompasses most of the concerns of an integrated care system itself. This is because it is often characterised broadly into five groups:

- primal prevention, whose focus is on the information and support given to parents for the period from foetus to the first year of life of a baby, which is now widely seen as critical to a healthy adult life. Awareness of the impacts of alcohol and tobacco use on an unborn child is an illustration. But so too is awareness of the psycho-social needs of babies. Conceptually, the difference between this and primary prevention is somewhat semantic, but its origin reflects an increasing scientific understanding of the impacts of parental behaviour on subsequent outcomes
- primary prevention the avoidance of a disease or disorder. For example, interventions that increase healthy eating and physical activity can avoid obesity, and in turn, reduce the diseases and disabilities associated with it diabetes, cardiovascular disease, immobility and depression
- secondary prevention, which reverses, prevents or delays the progress of an already existing disease or disorder, or its impact on a person's life. For instance, changes in diet for a person with diabetes can avoid the need for insulin treatment. Another example is early identification of cancer to improve the likelihood of successful treatment. Adaptation of a workplace to accommodate a person with an acquired disability so they can still work is also classified in this category
- tertiary prevention, which concerns interventions that seek to manage the impact of an ongoing illness and to increase a person's quality of life and longevity. For example, this could include stroke rehabilitation programs
- quaternary prevention, which relates to the avoidance of unnecessary medical interventions of the kind discussed in chapter 7.

Much of this supporting paper examines secondary, tertiary and quaternary prevention. This appendix mainly focuses on primary prevention.

The framework for preventative care is well-established (figure D.1), and it is not the intent of this short appendix to re-visit the issues in any great detail. However, in light of increasing concerns about chronic conditions — especially those related to environmental risk factors and people's choices — the goal of this appendix is to provide a succinct guide to the considerations that should inform policymakers' preventative health decisions,

especially as these relate to the use of economic tools. Its discussion mainly centres on the modifiable risk factors that are a key target of preventative health measures.

The key message from this appendix is simple, if often ignored:

Policy should not be based simply on those risk factors with the worst health outcomes, but must also consider the direct long-run effectiveness of alternative interventions, uncertainty about efficacy, displacement of risky behaviour, implementation costs, forgone consumer and social benefits outside the health domain, and public acceptability.



Source: Adapted from Australian Institute of Health and Welfare 2014, Australia's Health 2014, Australia's health series no. 14, Cat. no. AUS 178.

D.2 Setting out the key questions in evaluating interventions

What are the key modifiable risk factors?

There have been many successful preventative health initiatives: anti-tobacco campaigns, road safety measures curbing automobile accidents and cervical cancer vaccines. Historically, the most crucial preventative health measures related to vaccinations (such as smallpox and poliomyelitis), improved sewerage, potable water and urban design. But the kinds of chronic conditions that now affect population health often relate to lifestyle behaviours, and the policies that attempt to prevent associated disease are different in character.

The modifiable risk factors that contribute most to the Australia's total burden of disease are tobacco use, high body mass, alcohol misuse, physical inactivity and high blood pressure, noting that there are interactions between the risk factors that mean they cannot be added up (AIHW 2016a, p. 57).⁶³ For example, some of the effects of high blood pressure can be attributed to inactivity and high body mass.

Of the risk factors, tobacco, body mass and alcohol are central to preventative health in Australia because there are a plethora of potentially powerful regulatory, educational and economic interventions that could affect their severity. While the AIHW does not publish an aggregate estimate of the impact of dietary risk factors (the types of food eaten compared with the quantity), it is clear that collectively they also play an important role in causing disease (figure D.2), and yet are very readily modifiable.

⁶³ The burden of disease is the impact of a disease or injury on disability-adjusted life years. The attributable disease burden is the reduction in the total burden of disease that would have occurred had the exposure to the risk factor been at its theoretical minimum (for example, zero alcohol consumption). So eliminating a risk factor reduces the prevalence and incidence of diseases (such as the 36 per cent of respiratory disease associated with tobacco use) that lead to reduced functioning (disability) and longevity.

Figure D.2 Share of total disability-adjusted life years associated with given risk factors 2011^a



^a The effects cannot be added up because there are interdependencies. *Source*: AIHW (2016a).

The estimates of the burden of disease reflect the multiplicity of routes by which some behavioural or environmental factors can trigger subsequent adverse effects. Alcohol provides a good example (figure D.3). The harms from excessive alcohol consumption can include cancer, cardiovascular disease, liver disease, birth defects, self-harm, assault, domestic violence and road deaths from drunk driving, among many others (NHMRC 2009; RACS 2016a; Welch 2017; WHO 2014). The above estimates of the burden of disease of alcohol do not take account of new evidence about its harmful effects. For example, alcohol dependence appears to be an important cause of dementia, accounting for potentially 10 per cent of early onset dementia and 10-24 per cent of dementia cases in nursing homes (Welch 2017).



Figure D.3 **The share of disease burdens attributable to alcohol** 2011

Source: AIHW (2016a).

The relationship between the exposure to risk and adverse health outcomes

In many cases, harms are strongly related to the frequency and intensity of use. For instance, reducing rather than complete abstinence from the use of tobacco still produces some health benefits (Schane, Ling and Glantz 2010). Similarly, morbid obesity poses far higher mortality and disability risks than obesity (Aune et al. 2016). There is little evidence that light drinking of alcohol has any adverse health impacts.⁶⁴

Accordingly, preventative health measures that reduce a lifestyle risk can still be an effective measure. This is particularly relevant to modifiable risk factors where a significant reduction is hard to achieve. So far, obesity rates fit into this category.

Economic and other impacts of ill-health

The impacts of various conditions or resulting disabilities on labour market and other economic outcomes (including avoidable use of the health care system) depend on the source of the ill health and its form.

⁶⁴ On the other hand, claims about the *beneficial* health impacts of moderate alcohol consumption may reflect the confounding impact of socioeconomic status, rather than alcohol itself (Towers et al. 2016).

The effects of various health conditions on labour market outcomes varies with age (PC 2016, p. 7). Stroke, kidney disease, osteoporosis and emphysema all reduce participation rates by between 29 and 46 percentage points for those aged 25-54 years, with the effects being even greater for those aged 55-64 years. Mental health problems and substance abuse are associated with poor labour market participation outcomes at all ages. The cost of physical inactivity was estimated to be about \$640 million through direct health care costs in 2013 and \$165 million in lost productivity (Ding et al. 2016).

The Australian Institute of Criminology estimated in 2013 that the cost of alcohol consumption to the health care sector was \$1.7 billion each year, with further costs incurred in the criminal justice system, traffic accidents and lost workforce productivity (Manning, Smith and Mazerolle 2013). Substance abuse can also increase antisocial behaviour (that may not be criminal in nature), corrode community and family life, and undermine perceptions of public safety — intangible costs that are hard to measure and that nevertheless matter to people (for example, AIHW 2017b). The particularly adverse social impacts of alcohol misuse in some Indigenous communities is well-documented.

The degree to which various interventions can reduce different risk factors

The effectiveness of measures vary with the type of health risk, the relevant affected population groups, and the type of intervention.

Variations in responses by sub-groups matter

For instance, measures aimed at obesity may need to differentiate between people of different ages. Weight loss is harder for people who are already obese than for people whose weight is still below unhealthy levels, suggesting that early-in-life interventions may be more likely to avoid lifetime obesity. Moreover, the effects of body mass on health seem to be less significant for older people (Adams et al. 2006; Patel, Hildebrand and Gapstur 2014).⁶⁵ As discussed in section D.3, the effectiveness of taxes on sugary beverages are likely to depend on the consumption patterns and price responsiveness of heavy consumers of such products, rather than the average consumer.

In addition, for some groups, interventions may sometimes justifiably seek to counteract the adverse effects of some modifiable risk factors without changing the risk factor itself. For instance, there is some evidence that physical activity counters the adverse effects of high body mass (Herman et al. 2012).

⁶⁵ Some evidence suggests that overweight people may be more healthy than lower weight people, even after controlling for smoking (Carnethon et al. 2012; Dahl et al. 2013; Diehr et al. 2008; Reuser, Bonneux and Willekens 2008).

Information and education interventions have mixed effectiveness

Views about the effectiveness of education and information programs in reducing harms is contested and context-dependent (table D.1).

Table D.1 F	indings from a review of reviews reventative strategies to reduce smoking and alcohol harm among adolescents ^a
Area	Result
Tobacco use	
School-based	 Avoiding smoking — No impacts of information-only or social influence interventions. Significant effects for combined social competence and social influences curricula 'Smoke Free Class Competition', including prizes — effective in reducing current smoking rates (but another review in multiple settings, including outside school, found no overall effects from incentives) Very limited evidence of the long-term impact of school-based smoking prevention
Family/community-based interventions	 Family-based interventions effective in avoiding smoking and reducing smoking behaviour
	 Positive impacts from community-based interventions on reducing smoking rates, but evidence is 'not strong'
	 Primary care initiatives (including combined mass media campaigns, school-based programs, price increases) suggest a significant reduction in smoking initiation
	 Media campaigns vary in effectiveness across racial/ethnic groups, but can be positive. Evidence of effectiveness for young people is 'not strong'
	 Web-based interventions among college students had mixed results, while interactive internet-based interventions had positive impacts
Impacts of promotion of smoking	Increases likelihood of adolescent smoking
Alcohol	
School-based	Appear to be effective, but effects can be small
Family-based interven	 Family-based prevention interventions have small but generally consistent beneficial impacts and also persist over the medium to long term
Digital platforms	 Computer-delivered interventions are found to reduce the quantity and frequency of drinking among college students
Promotion	Lack of robust evidence
Multi-component interventions	Little evidence that they are better than single component measures

 ${\ensuremath{^a}}$ There is an extensive bias towards US studies, which may affect outcomes.

Source: Das et al (2016).

For instance, educational programmes for middle adolescents appear to be often ineffective, whereas measures to reduce substance abuse amongst late adolescents is greater (Onrust et al. 2016). It appears that educational measures are more effective when supported by other prevention measures that target the environmental factors underlying harm (Kelly-Weeder, Phillips and Rounseville 2011). One review suggests that the effects of mass media campaigns on alcohol-related injuries and crashes are unclear due to deficiencies in the studies (Yadav and Kobayashi 2015). However, another interpretation of the evidence by the European Monitoring Centre for Drugs and Drug Addiction (2017)

suggested the evidence was favourable for such campaigns, but not so for *standalone* mass media campaigns to address alcohol misuse or tobacco consumption.

A key difficulty in all evaluations of education and media campaigns is establishing their long-run effectiveness because such interventions are often of short duration (unlike taxation and regulatory policies that change prices or the environment permanently). Moreover, by their nature, all marketing and education interventions vary significantly in their content, form, and targeting. Australia's 'Slip Slop Slap' mass media and education program has been seen as very effective for limiting dangerous sun exposure.

Measures that affect prices appear to be generally effective

For all but a few exotic exceptions, an increased price associated with a tax on any good or service generates a reduction in the overall demand for that good or services, with the associated reduction in harm depending on the responsiveness to prices amongst the varying risk groups of consumers.

Smoking prevalence rates respond to prices, with Australian rates tumbling from 28 per cent in 1989 to 15 per cent in 2013, following a range of anti-smoking measures, including substantial tobacco excise increases from the early 1990s, regulations limiting where people can smoke, information campaigns, and education (Scollo and Winstanley 2016). The evidence on price elasticities suggests that price changes would have played a decisive role in reducing demand.

Measures that raise the price of alcohol also appear to be effective (Elder et al. 2010; Gilmore et al. 2016; Wagenaar, Salois and Komro 2009; Wright, Smith and Hellowell 2017). Alcohol taxes are already imposed in Australia. However, the tax regime is complex, with multiple concessions and incoherencies. Taxes do not treat alcohol consistently across different beverages. This reflects vested interests and accidents of history, overladen with revenue-raising imperatives. Harm prevention has not been a key motivating element of Australian alcohol taxes. This issue is examined further in chapter 2 in the main report. The Productivity Commission recommends that alcohol taxes be aligned with the goal of harm minimisation — which is best achieved through taxes that are set according to the volume of alcohol in a beverage ('volumetric' taxes).

It is important to examine other behavioural responses to higher prices:

• higher prices may displace demand to other harmful forms of consumption. For instance, volumetric taxes on alcohol in Australia would increase the price of low-priced concessionally-taxed wines, but would not change the price of spirits, which are already subject to volumetric taxes. While partial substitution could be anticipated, some claim that volumetric taxes on low-priced wine would lead to *sufficient* substitution to spirits that there would be few beneficial impacts on alcohol misuse. The conditions for this to hold are unlikely, as it would require people's overall alcohol consumption to increase, notwithstanding that the average price of alcohol had risen

significantly. In addition, the evidence on the cross-price elasticity of demand for different alcohol types suggests that a price increase in one relative to the other has few impacts on relative consumption levels (Sharma, Lebrun-Harris and Ngo-Metzger 2014, p. 5).

• people may find sources of untaxed products from illicit suppliers.

The costs of any intervention and forgone benefits

It is important to assess the costs as well as benefits of preventative health measures. Interventions can entail administrative costs and compliance burdens for businesses. School educational programs displace other parts of a crowded syllabus.

Above all, many of the activities and products that lead to major harm can also produce large personal and social benefits. This is obvious in the case of motor vehicles as a means of transport, and alcohol use as a source of enjoyment and as a key element of social activities. When there is a wide-ranging taxonomy of negative effects (as in alcohol), and just a few categories of benefits, it is easy to give too little weight to the positive aspects, though these can often exceed the negatives. That is important because some policy measures that address harmful product use or activities can also undermine their safe and enjoyable use. That impact should not be neglected in any assessment of harm minimisation measures. For example, in its analysis of problem gambling, the Productivity Commission gave particular weight to measures that were unlikely to affect the enjoyment of recreational gamblers (PC 2010). The main implication is that where a product or activity also produces significant benefits, harm minimisation measures should *attempt* to target the most affected people.

By their nature, some measures cannot be targeted, in which case the desirability of their adoption involves a balancing act. For instance, while taxes are often effective in reducing the overall demand for products with harmful effects, they have the incidental outcome that people consuming at safe levels are as penalised as those who are not. Whether this matters depends on the extent of harm and the degree to which harm is present for low levels of consumption. Tobacco use appears to be harmful even in small quantities, but alcohol and sugary beverages are not. A decision to tax must weigh up the gains and losses for the different sub-groups.

The costs of preventative health measures also include the community and personal acceptability of the educational, regulatory, marketing or tax measures that underpin many strategies. Practical preventative health measures cannot ignore how people view the legitimacy of government action in any given area. There is reasonable evidence that people are often opposed to measures that increase the prices of goods or services that have harmful effects because such measures are perceived to be indiscriminate, unfair for the most disadvantaged, and ineffective, even if some of these perceptions are poorly-based (Keatley et al. 2016). As observed in a recent study of tax policy for preventative measures:

... public support for new commodity taxes tends to be low, and high public or political support is likely to be required for taxes to be initiated and sustained. (Wright, Smith and Hellowell 2017, p. 11)

However, if tax measures are accompanied by earmarking of additional revenues for other preventative health or health initiatives, public support is higher. Accordingly, some proponents for tax measures have also recommended that a share of any revenue be used for preventative and treatment initiatives (such as for alcohol taxation, as suggested by ACDPA 2011). Hypothecation of revenues for specific purposes is often inefficient because it does not consider other spending options with higher public benefits, but failure to consider it may limit the capacity for worthwhile reforms. In any case, as discussed above, there are grounds for a package of reforms anyway, so the inefficiency losses may be modest or nonexistent.

Moreover, good design is critical to positive public reception. The fat tax introduced in Denmark in 2011 was abolished only 15 months later. In part, this reflected opposition by the food industry, but it also appears that the tax was poorly designed, and was mainly oriented to raising revenue, rather than reducing harm. It accordingly lost support from the public and health experts (Bødker et al. 2015).

Taking account of adverse impacts primarily felt by the person

From an orthodox economic perspective, the strongest argument for measures that reduce some lifestyle risk is that those risks translate into costs not borne by the individual. For instance, obesity increases health care costs, which must be borne by people who are not obese (Duckett and Swerissen 2016), while alcohol misuse will often affect other people through violence, health care costs and accidents.

Some analyses go further in estimates of the costs of a modifiable risk factor to include those borne by the person exposed to that factor. This is often used to strengthen the policy case for intervention.

On the one hand, the extent to which reducing *personal* discomfort and disability are real benefits is a vexed question. Many people consider the risks of their actions when making choices, balancing them against the benefits. So regulatory or tax measures that proscribe or limit the activity giving rise to those risks may reduce costs, but can also forgo the (bigger) benefits. This will most commonly occur where people are reasonably well informed about the nature and the magnitude of the risks, are forward-looking, and can exercise self-control. Ignoring people's capacity to balance risks and benefits can lead to significantly exaggerated estimates of the benefits of harm minimisation measures. Costs rationally borne by people should not be included as social costs in cost-benefit studies.

On the other hand, in some circumstances, people may find it very hard to control their behaviour (as in addictions to alcohol, drugs and gambling). People can also be poorly informed about risks that, were they to be aware of them, *might* alter their consumption.

For example, an Australian study found that less than 50 per cent of adults were aware that alcohol can cause cancer (Cotter et al. 2013).

There is also a distinction between understanding that a lifestyle behaviour *can* have an adverse impact on health and knowledge about the *degree* to which that is the case. The latter is required to make an informed choice.

The implications are twofold. Ignorance of a risk may be largely irrelevant to policy if the risk is low or people do not place much weight on it. On the other hand, even if people are aware of a risk, that does not mean regulation is unwarranted if well-informed people would change their decision if they knew the likely extent of the risks.

Moreover, children are sometimes affected by lifestyle risks — such as lack of exercise, low fruit and vegetable diets and obesity. While children consume little alcohol and mostly do not smoke, they are significant consumers of non-alcoholic sugar-sweetened beverages. The view that choice is rational and informed for children is less clear cut — as suggested by the prohibition of various products for their use at all (tobacco for example). In this instance, the relevant issue is the quality of parental decision making.

In this more complex context, it can no longer be *assumed* that the voluntary bearing of risk reveals that people value the benefits of their actions over the problems they may pose for them. Deciding where any particular lifestyle choice lies on the continuum between rational and 'irrational' decision making is integral to both the cost-benefit analysis of alternative preventative health strategies and to their form. For example, prohibition is a very costly measure if many people undertake a risky activity with their eyes (reasonably) wide open or can be informed of the risks.

Some cost-benefit studies place too much weight on personally-borne costs as if these were invisible to the person engaged in a risky behaviour. This is a critical oversight that leads to potentially spurious policy conclusions, and ultimately discredits studies of the costs and benefits of alternative preventative health strategies. The decision to include some or all of personal costs of a disease in any cost-benefit analysis of a prospective preventative health intervention should include explicit justification.

Distributional effects

Preventative health policies intend to change the behaviour of producers or/and consumers, and will inevitably have different effects for different groups of consumers. For instance, tobacco taxes are highly regressive. However, what applies in one area does not necessarily translate to others.

For example, alcohol taxes do not appear to be as regressive as might be thought. Based on scanner data of purchases by Australian consumers, it appears that current and alternative taxation policies of alcohol are not highly regressive because the average amount spent is relatively small (Vandenberg and Sharma 2016). The largest burden of alcohol taxes falls

on heavy drinkers across the income spectrum, who are those whose behaviour is the target of the policies. In a companion study to that above, the heaviest consumers of alcohol (about 3 per cent of the population) consumed 20 per cent of the total litres of alcohol sold (Sharma, Vandenberg and Hollingsworth 2014). They were more likely to drink full-strength beer and cask wine, and because of the overall favourable tax treatment of their selected products, they paid substantially less per standard drink than light drinkers. The impact of volumetric taxes would therefore be greater for this group.

It is also notable that, unlike most other modifiable risk factors like smoking, low exercise and obesity, alcohol consumption that exceeds the NHMRC guidelines is greater among higher-income households (figure D.4).

Figure D.4 **Higher-income households engage in higher-risk alcohol use** Percentage in each group, 2014-15^a



^a The first (fifth) quintile is the lowest (highest) income household. Exceeding the single occasion risk guidelines means drinking more than four standard drinks on a single occasion in the last year. Exceeding the lifetime risk is consuming more than two standard drinks per day on average.

Source: ABS 2015, National Health Survey, First Results, Australia, 2014-15, Cat. no. 4364.0.55.001, released 8 December.

While the United Kingdom has a different alcohol tax regime than Australia, it shares the feature that spirits are taxed at a much higher rate per unit of alcohol than cider and wine. Analysis of a switch to volumetric or minimum unit pricing of alcohol shows that the largest health benefits occur for those in the lowest socioeconomic groups (Holmes et al. and Purshouse 2014; Meier et al. 2016).

Should weighting of impacts vary by age or other criteria?

Some contend that a greater weight should be given to the burden of disease for younger people to reflect that they may not have been able to experience as many of the aspects of a 'full life' as people in the oldest age brackets. Younger people are also more likely to participate in the labour market, with the shared benefits for society that this brings, while in later years are still able to make the contributions that older people make in other ways. Greater weighting of the burden of disease borne by the young would mean that lifestyle and environmental risks that disproportionately affect younger people would be rated as more significant in assessments of preventative health priorities and the allocation of health resources. While the 2011 Australian study of the burden of disease did not use age-varying rates, previous studies did so.

Equally, when assessing the burden of different diseases and the 'returns' from investments that reduce those burdens, potentially, different weights could be allocated to years experiencing disability compared with premature death. The existing equal weights are arbitrary. A greater weight on health-adjusted life expectancy would also tend to reduce protracted provision of publicly-funded health care, income support and disability services.

Even if policymakers do not, when deciding which interventions to pursue, explicitly state their views about the desirable tradeoffs between lives saved, quality of life and other desirable outcomes from health interventions, they implicitly still make these judgments. Some national bodies providing guidance on health interventions, including preventative measures, make explicit the tradeoffs to ensure consistency. For example, the UK National Institute for Health and Care Excellence assesses interventions on several criteria, including the cost per quality-adjusted life year (QALY) — as one basis for determining what should be funded under the NHS. It considers that interventions costing the NHS less than £20 000 per QALY are cost effective, while those costing between £20 000 and £30 000 per QALY may also be deemed cost effective, if certain conditions are met (NICE 2014a).

D.3 Obesity and sugar taxes — a case study of preventative health

Obesity has complex origins. However, caloric intake is the fundamental driver. Accordingly, public policy advocates have recommended policy measures that reduce the easy consumption of high calorie products. Although there has been opposition by industry groups, public health experts globally and in Australia have urged the adoption of taxes on non-alcoholic Sugar-Sweetened Beverages (SSBs) to combat obesity and diabetes, usually as part of a package of measures.⁶⁶

For instance:

There is no doubt at all that these drinks are unhealthy, and price signals work: if you make these items more expensive you reduce consumption Similarly, we should look at ways of supporting fresh foods perhaps being cheaper. So I think that [a sugar tax], as a part of a whole suite of policies, might be a good idea. Dr Michael Gannon, Australian Medical Association President quoted in Rollins (2016, p. 2)

The Rethink Sugary Drink alliance recommends that the Australian Government introduce a health levy on sugar-sweetened beverages, as part of a comprehensive approach to decreasing overweight and obesity, and with revenue supporting public education campaigns and initiatives to prevent chronic disease and address childhood obesity. A health levy on sugar-sweetened beverages should not be viewed as the single solution to the obesity epidemic in Australia. Rather, it should be one component of a comprehensive approach, including restrictions on children's exposure to marketing of these products, restrictions on their sale in schools, other children's settings and public institutions, and effective public education campaigns. Rethink Sugary Drink Alliance, which comprises various major health and community organisations (2017, p. 1)

So far, no policy change has occurred in this area. The debate provides a good case study of the complexities that face decision makers when attempting to promote healthy lifestyles. Chapter 2 in the main report summarises the initial position of the Productivity Commission on this issue.

Seven OECD countries currently impose taxes — Mexico, Norway, Hungary, France, Finland, Chile and Belgium. So do various cities in the United States. The UK Government has announced a Soft Drinks Industry Levy set to begin in 2018 to encourage soft drink manufacturers to reduce their sugar contents below certain thresholds. However, Denmark repealed a longstanding sugar tax in 2014 (and a 'fat' tax in 2013), so the direction has not always been to impose a tax.

Putting aside the role of policy, there are strong grounds for Australians to reduce their sugar intake given its contribution to diabetes and obesity. Soft drinks are very high sources of sugar (nine teaspoons in a typical 375 ml can), and are particularly problematic given high consumption by non-adults. The sugars in SSBs are quickly absorbed by the body, and overload the pancreas, whose role is to regulate blood-sugar levels, heightening the risk of type 2 diabetes. All other things being equal, the high caloric content of SSBs heighten the risk of weight gain.

⁶⁶ For example, Duckett and Swerissen (2016), Reeve and Jones (2016), and Colagiuri (2017). Public health experts have generally favoured taxes on SSBs (exemplified by an editorial in the Lancet and a statement by the Australian Healthcare and Hospital Association - AHHA 2016; Editorial 2017).

On face value, an SSB tax looks appealing as a preventative measure. The causal pathway for success is straightforward:

- 1. the tax raises supplier costs
- 2. suppliers pass on a share of these costs to consumer ('pass through')
- 3. in response to higher prices, consumers reduce the consumption of sugary drinks
- 4. overall caloric intake falls
- 5. obesity rates decrease, as does the incidence of dental caries
- 6. chronic disease incidence and prevalence falls
- 7. health care and other social costs fall, and wellbeing rises
- 8. revenue raised by the tax can be used to fund government spending (such as better health care) or relieve future tax burdens associated with the Australian Government's fiscal deficit

There is reasonable evidence for some parts of this casual pathway. The evidence suggests that the demand for SSBs is relatively price elastic, which implies that any tax-induced increase in price would reduce the demand for SSBs, and by more for lower-income households. Moreover, some consider that taxes on SSBs increase consciousness of healthier eating habits more generally, which could add to the direct health benefits of any tax (Ortun, Lopez-Valcarcel and Pinilla 2016).

In most instances where governments have introduced sugar taxes, it is hard to separate the effects from other influences, such as trends in SSB consumption over time that would have occurred anyway. However, the taxes imposed in some cities in the United States provide a stronger basis for estimating price and demand effects because neighbouring cities can be used as control sites. An SSB tax imposed in the US city of Berkeley in 2015 reduced sales of SSBs by 21 per cent in low-income neighbourhoods in the first four months, while sales increased by 4 per cent in neighbouring cities (Falbe et al. 2016). Sales of bottled water consumption rose by 63 per cent. Only about 50 per cent of the SSB tax was passed through to higher retail prices, so the demand effect would be much greater in a market where complete pass-through occurred.⁶⁷ A more recent study based on supermarket scanner data found smaller, but still significant, reductions in SSBs of 9.6 per cent across the whole city compared with the counterfactual (Silver et al. 2017). Pass-through was much higher than in the Falbe study, particularly for large chains and soda drinks. Consumer spending per average grocery bill did not increase. While city studies are useful for considering demand and pass-through effects, they cannot capture all of the possible effects of sugar taxes.

⁶⁷ A study considering price pass through shortly after the tax found a pass-through of 43 per cent (Cawley and Frisvold 2015).

There is a likelihood that manufacturers will reformulate products to reduce their sugar content if an entire country (rather than a single city or state) introduced SSB taxes. In the UK's tax model, the levy is designed to create strong incentives to lower sugar content below given levels, rather than taxing any given amount of sugar at a fixed rate. Ahead of the implementation of an SSB tax in the United Kingdom, this appears to be occurring already (Danershkhu 2017). In Hungary, which has already implemented a sugar tax, 40 per cent of manufacturers reformulated their SSBs to reduce their sugar content (Editorial 2017; Wright, Smith and Hellowell 2017). So long as an SSB tax is based on the sugar content of a beverage, reformulation directly reduces sugar consumption, even if overall demand for beverages does not change. Reformulation has the additional advantage that consumer prices will not rise by as much. This reduces the income effects for people who are intensive consumers of SSBs and eases any transition costs for the beverage industry. (Of course, it also reduces any revenue from the tax, but this is not an important consideration for a measure whose rationale is improved public health.)

Overall, it seems probable that a tax will reduce the aggregate consumption of sugars obtained from SSBs, leading to substitution to lower sugar products, including artificially-sweetened drinks, water and other beverages.

But there are some risks and concerns.

On the income side, any tax levied on sweetened beverages is regressive because the evidence suggests that lower socioeconomic groups are higher users (ABS 2014). However:

- if the use of such beverages is greater amongst such groups (box D.1), they will also be the disproportionate beneficiaries of sugar taxes, as has been found in a recent Australian study (Lal et al. 2017). There is a tradeoff between income inequality and health inequality. Reductions in the latter should not be ignored
- the average amount of spending is relatively low, and so the actual income effects are likely to be small for *most* people
- the ultimate extent of any regressivity depends on how the Australian Government spends any tax revenue.

A crucial question — not adequately explored yet — is the incidence of income effects associated with the *heavy* users of SSBs. Average outcomes across income deciles may not be large, but regressivity may be a concern if heavy users are disproportionately in poorer households — an issue that warrants further analysis.

A bigger concern is that obesity reflects overall caloric intake, not intake from any given product. Sugar taxes predominantly relate to beverages, not other high-sugar content products like confectionary, cereals, honey, jams,⁶⁸ and other high caloric products, such

⁶⁸ Hungary's SSB tax is part of a tax on sugars more generally.

as fats. Complex carbohydrates are metabolised into glucose, albeit with slower effects on blood-sugar levels than SSBs. The concern is that people may shift caloric intake from one source of food to another, in which case the effects of a reduced intake of SSBs may be partly or fully compensated by other food sources. Most empirical analyses only consider the demand for SSBs, not the overall demand for calories.

Box D.1 Patterns of sugar use

Some population sub-groups account for a disproportionate share of the consumption of added sugars. Based on interpolation of ABS health survey data, the Commission estimates that depending on age, the top 20 per cent of males' daily intake of added sugars accounted for between 32 and 41 per cent of the total male consumption of sugars. For females, the comparable estimates were between 34 and 38 per cent. The bottom 20 per cent of males' daily intake of added sugars accounted for between 5.8 and 9.7 per cent of the total male consumption of sugars. For females, the comparable estimates were between 7.4 and 9 per cent.

The figures for 'free sugars' were similar, with for example, the top 20 per cent of males' daily intake of added sugars accounting for between 32 and 40 per cent of the total male consumption of sugars. (Free sugars are monosaccharides and disaccharides added to foods and drinks by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates.)

The proportion of added sugars consumed in the form of cordials and SSBs was 28.3 per cent for males aged two years and over (with a further 6 percentage points consumed in the form of fruit and vegetable juices). The shares were lower for females (20.1 and 6.4 per cent respectively). Overall, beverages are the single dominant source of added sugars in people's diets.

Overall, added sugars represented about 10 per cent of total energy for males and 9.4 per cent for females. Added sugars were a more important source of energy for 14-18 year old males (13 per cent). The peak age of use was younger for females at 12.3 per cent for those aged 9-13 years.

The numbers imply that on average the share of total energy obtained from SSBs is comparatively small. However, the highly skewed nature of consumption of sugary drinks indicates that this will not hold for some groups.

Source: ABS 2016, Australian Health Survey: Consumption of Added sugars, 2011-12 — Australia, Cat. no. 4364.0, released 27 April.

Even if substitution between beverages and solid foods is low, that is less likely for substitution between different beverages. The pending UK tax exempts fruit juices and milk products, which can still have high sugar content (Wright, Smith and Hellowell 2017).⁶⁹ That suggests that any SSB tax should define the relevant market for sugary beverages carefully (defining it is terms of those sugary products that are close substitutes to each other). Substitution can also occur with non-sugary beverages, such as a whole milk, which few would argue should be subject to a tax. A US study of the impact of taxes on soft drinks found that demand was affected by taxes, but the caloric reductions achieved were offset by increased consumption of whole milk, so that the taxes produced no weight losses for children or adolescents (Fletcher, Frisvold and Tefft 2010).

⁶⁹ The UK levy is also poorly designed in that it is a constant price per litre of SSB, not a volumetric sugar tax. Accordingly, a one litre beverage with 15.9 grams of sugar (a particular brand in the UK) will attract a 24 pence tax, the same tax as another beverage with 10.6 grams of sugar. There is therefore the potential for consumers to switch to high sugar low priced SSBs. This repeats the flaws of many alcohol taxes, such as that in Australia (chapter 2 in the main report).

The physical effects of any additional consumption of artificially-sweetened drinks provide an avenue through which caloric shifting may occur (Borges et al. 2017; Brown, De Banate and Rother 2010). As one paper notes:

However, there are long-standing concerns that ASBs [artificially sweetened beverages] may trigger compensatory mechanisms, which could offset a reduction in energy and sugar intake provided by their replacement of SSBs. The main proposed mechanisms are that ASBs stimulate sweet taste receptors, which could theoretically increase appetite, induce preference for sweet taste, and modulate gut hormone secretion, or result in overconsumption of solid foods due to awareness of the low calorie content of ASBs. (Borges et al. 2017, p. 3)

The empirical literature on the impacts of artificially-sweetened beverages is emerging, but if the above effects are present, they pose a risk that SSB taxes may have unintended outcomes for weight gain.

Another concern relates to the (controversial) 'paradox' that SSB consumption rates have fallen in Australia, notwithstanding rising obesity rates, a coexistence that some suggest reduces the relevance of SSB taxes. The ABS found that the share of people drinking sugar-sweetened beverages decreased from 43 per cent in 1995 to 34 per cent in 2011-12.⁷⁰ The change largely reflected reduced demand for cordials. Among the key demographic of concern (14-18 year old males), the consumption rate of canned and bottled pre-prepared drinks (carbonated SSBs and energy/electrolyte drinks) did not change much (55.5 per cent in 1995 to 53.2 per cent in 2011-12). There was, however, a considerable decrease in the consumption of such products by females of this age — underlining the importance of analysing trends for different sub-groups.

Changes in *prevalence* rates of consumption does not necessarily equate to reductions in overall *consumption*. While some estimates suggest that sugar intakes per person have also fallen (Brand-Miller and Barclay 2017), unfortunately we are not aware of longitudinal data concerning consumption levels by the relevant sub-groups, which may show different trends. For example, it is possible that the trend reflects the reduction in SSB consumption by moderate drinkers, rather than a reduction across heavy drinkers. Or the pattern may go the other way. So quite different patterns of consumption with different policy implications may yield equivalent results at the aggregate level.

Brand-Miller and Barclay argued that findings concerning reduced intakes:

 \dots challenge the widespread belief that energy from added sugars or sugars in solution are uniquely linked to the prevalence of obesity (ibid, p. 1)

In fact, few public health experts attribute obesity *uniquely* to consumption of SSBs, recognising that many factors are at play. It is nevertheless clear that SSBs are not the primary factor behind obesity. This does *not* mean that SSBs have no effect on obesity as levels may have been higher had SSB consumption not fallen. Consequently, the above

⁷⁰ ABS 2015, Australian Health Survey: Nutrition First Results – Foods and Nutrients, 2011–12 – Australia, Cat. no. 4364.0, released 16 October.

evidence does not invalidate the potential for SSB reduction policies to affect obesity levels to some degree. Whether the effect is material is an empirical matter.

Lessons and unanswered questions

Overall, evidence concerning the effectiveness of sugar taxes in reducing obesity, and their optimal design to do this, is still being gathered. Though some results support the health benefits of a tax, many analyses are based on modelling of likely effects, rather than empirical analysis of actual outcomes.

The prospective nature of the SSB levy in the United Kingdom provides an opportunity for a careful assessment, given that the evaluation can be designed now and initial baseline data collected.⁷¹ If properly evaluated, the outcomes of the UK provisions should provide clearer evidence about the impacts of a levy on:

- the demand for SSBs across different population sub-groups, and substitution between different beverage types and other food products
- reformulation of products by manufacturers
- pass-through of costs by different retail segments
- distributional effects
- short and longer-run weight loss or gain for different groups of people (age, gender, existing obesity status, income and ethnicity) and their linkages to changes in the caloric intake from SSBs. Longitudinal analysis would uncover the behavioural changes of individuals pre and post-tax
- implementation costs and revenues
- consumers' consciousness of the risks of obesity
- consumer resistance and public acceptance.

This would inform any policy action in Australia.

There are several other issues that should be explored in developing any SSB tax.

Design issues

Were an SSB introduced, it should be either a sugar volumetric tax (as proposed by Duckett and Swerissen 2016) or a sugar volumetric tax with an exemption for SSBs with sugar content below a given percentage. The former is likely to be simpler to implement,

⁷¹ While the design of the UK SSB levy is imperfect because it is not based on the volume of sugar, its outcomes nevertheless can yield insights into behaviour by consumers and producers that will provide a better evidence base for any policies in Australia.

while the latter creates particularly strong incentives for manufactures to reformulate their products, with no accompanying income effects for consumers.

Any tax should *not* be an ad valorem tax on SSBs, nor should it be a tax of a given value per litre of SSB (as proposed for the United Kingdom). Both of these are likely to produce perverse outcomes.

Consumer behaviour — some significant uncertainties remain

Not enough is known about the behaviour of consumers to be certain about impacts. There are several dimensions to this uncertainty, and they could mean that the effects on sugar consumption could be more or less than modelled in studies of the impacts of SSB taxes.

The SSB market is highly differentiated, so that there is a large variety of drink types, volumes per container, pack sizes of containers and sugar content per litre. Different market segments reflect the preferences of different consumer groups. In other words, there is no single market for SSBs and no 'representative' consumer. Beyond the fact that consumption decreases with higher socioeconomic status, there is limited publicly available information about the degree to which different groups consume SSBs. One of the few available studies found that in Norway, 5 per cent of households had consumption of SSBs of 206 litres per person, 35 per cent had consumption levels of less than 20 litres per year, while the average annual consumption was 61 litres per year (Bonnet and Réquillart 2016). The Australian Beverages Council noted that while the contribution of SSBs to energy intakes is relatively low across the Australia population, it is high among those who consume them on a regular basis — which suggests that the Norwegian result is not anomalous (Australian Beverages Council 2016). As noted earlier in box D.1, there is also some Australian evidence supporting the relatively high use of SSBs among a minority of Australians.

Many analyses do not consider consumer heterogeneity in their modelling of the impacts of SSBs (Duckett and Swerissen 2016). Whether that simplifying assumption matters to the outcomes of any sugar tax is not clear.

To the extent that heavy users choose the cheapest sources of SSBs (home-brand drinks), the price effects of a volumetric sugar tax will be large (box D.2). For any given degree of price responsiveness,⁷² this suggests that they will reduce consumption of lower-priced SSBs. There is likely to be some displacement of consumption to more expensive brand name SSBs, but for any given budget, that displacement may not be high. In other words, the income effects of price increases are also likely to be important determinants of the outcome. In this instance, a sugar tax may be effective at targeting heavy users of SSBs.

⁷² This is for a Marshallian demand elasticity (which includes pure price responsiveness and the income effects in one elasticity), as used by Duckett and Swerisson.

Box D.2 The Grattan Institute's tax proposal and product heterogeneity

The Grattan Institute recommended an excise tax of 40 cents per 100 grams of sugar in SSBs. Assuming full price pass-through, such a tax would raise the price of soft drinks by between 30 and 51 cents per litre, reflecting variations in the sugar content of popular SSBs. A standard can of soft drink would increase in price by about 15 cents.

As in the case of a volumetric excise on alcohol, the variations in the content of sugar and the large price variations between brands means that the percentage increase in prices is even more variable. The variability principally reflects the low prices per litre of unbranded SSBs and the regular practice of discounting. In addition, there is a strong association between the per container litre size of soft drinks and their price. Using the data collected by the Commission, a 10 per cent increase in the per unit product size decreased the retail price by 6 per cent per litre. Consequently, all things being equal, a sugar tax will increase the price of unbranded products by much more than branded ones, and have a much bigger proportionate effect on soft drinks that come in larger sizes.



Increase in soft drink prices after 40 cents per 100 gram excise, Australia, 22 July 2017^a

^a Based on online prices collected by the Productivity Commission for a range of popular soft drinks, including own-name brands from Woolworths and Coles stores.

To the extent that heavy users of SSBs are habituated to SSB consumption, then their price responsiveness may be lower than other groups, which would also increase the regressivity of a tax.

Behavioural economics suggests that people sometimes behave in ways that are not in accordance with standard economic theory. For instance, *some* groups of people may adopt a 'mental account' that sets a budget for their SSBs and an annual number of litres. Pre-tax, some in that group will prefer brand name SSBs in smaller drink volume containers, lower sugar content per litre, and small pack sizes. However, to maximise the share of their consumption devoted to their originally preferred SSBs, while maintaining their original budget and beverage volume, they will need to change the mix of their drink to include cheaper SSBs. Using real life products, we found that this can increase annual sugar

intakes. Whether, in fact, many consumers will behave that way is untested, but it cannot be assumed that some behavioural quirks of this nature will not occur for some sub-groups (recognising the substantial heterogeneity of consumers). On the other hand, it is possible to conceive of behaviours that for some groups accentuate the sugar reduction beyond that anticipated by a sugar tax and standard theory.

Beyond reformulation of their products to lower sugar levels, retailers and beverage manufacturers may also react to taxes through marketing and promotions, with unclear impacts on the nature of demand. There can be no assumption that businesses will be passive.

Acceptability

There are diverging views about the acceptability of SSB taxes among the public. How any intervention is framed affects the answers. Not surprisingly, the results vary across countries, though there are some common aspects to attitudes to SSB taxes.

- A national US survey found a majority of people were opposed to SSB taxes, agreeing with propositions that they were a revenue rather than a harm minimisation measure, an unacceptable intrusion into people's lives, and harmful to the poor. The authors concluded that it would be hard to obtain support in the United States for SSBs, without developing compelling pro-tax messages (Barry, Niederdeppe and Gollust 2013).
- In one US study, support was higher among people who attributed obesity to environmental factors, rather than personal choice, but an overall majority of people did not support a tax (Curry et al. 2017). Another US state-based survey found 50 per cent approved the implementation of an SSB, with support greatest among those who considered SSBs were implicated in childhood obesity (Donaldson et al. 2015). Interestingly, people who had been advised by a health care professional to lose weight were less in favour of the tax.
- A national French survey found that about half of the population supported an SSB (which was launched in 2012), and about 60 per cent thought it would improve population health. Support was greater if the revenue generated was used to improve the health care system (Julia et al. 2015).
- The Australian Beverages Council cites an Australian poll that found the two measures that Australians identified as being least effective and supported in addressing obesity were a tax on soft drinks and restrictions on where parents can give their children soft drinks (Australian Beverages Council 2016). The survey is not publicly available.
- Another Australian national survey found approximately 70 per cent of main grocery purchasers were strongly or somewhat in favour of 'taxing soft drinks to reduce the cost of healthy food', but oddly only about 60 per cent favoured 'taxing unhealthy foods and using the money for health programs'. Support for taxes was lowest among lower socioeconomic groups (Morley et al. 2012). Whether the same results would hold if people were asked whether 'SSBs should be taxed to reduce their consumption' is

unknown though this corresponds more closely to the policy advocated by public health experts

- A survey of people in the United States and Australia revealed little support for taxes on foods seen as contributing to reduced obesity, principally on the grounds that weight gain was a matter of personal choice (Lee et al. 2013). Obese people had lower levels of support for SSB taxes
- A citizens' jury in Brisbane found most people did not support taxes on fast foods and processed meats, but unanimously approved SSB taxes (Moretto et al. 2014). They favoured tax rates of 50 to 100 per cent on the value of drinks (a tax model that would have the unintended impact of generating small price increases for low-priced high-sugar products compared with higher-priced, lower-sugar SSBs). It is unlikely that the views elicited through this process would be replicated by the public given the other survey evidence presented above and the circumstances in which the views were elicited.

As is, in part, revealed by the survey results, the degree to which the state should regulate and tax activities that pose risks to some people also inescapably involves value judgements about the legitimate reach of governments — an issue that can only be resolved through public debate and the political process.

Information requirements

Further data would help to clarify some of the key issues relevant to the imposition of SSB taxes. In particular, there would be benefits from better information on the sales volumes of differently priced SSBs, the reaction of consumers to discounts, and links between socioeconomic status and particular consumption patterns. The major supermarket chains are likely to have the best information for understanding the complex market for SSBs. Engagement with them may be critical in assessing the merits of a tax and in its appropriate level.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 6

IMPACTS OF HEALTH RECOMMENDATIONS 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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1 Introduction

The Productivity Commission's health policy recommendations are intended to improve the quality and quantity of life of Australians through reform of the health sector.

Based on what has already been achieved within Australia and more broadly, the Productivity Commission has indicated the nature and quantum of impacts that the recommended reforms may have (chapter 2 of the inquiry report). In this paper the Commission explains how these impacts are estimated.

In this exercise, the Productivity Commission stresses that the numbers are only indicative. It is not possible to assess and measure all the factors that will have a significant impact on future developments. Further, for the sake of simplicity or due to lack of data, the Commission has excluded some factors that are likely to be significant in the future. For example, the ageing of Australia's population and any dynamic effects of integrated care on the development of new technologies are not incorporated.¹ Other dynamic factors that are excluded from the calculations are:

- any impacts from investment in prevention that could potentially substantially increase the estimated net benefit²
- the impacts from increasing the longevity of Australians, including the higher cost of providing services to older Australians and the benefits to Australians from living longer.

The numbers should therefore be understood as a guide to some of the impacts that could eventuate and as a rough indication of the relative size of those particular impacts.

2 The quadruple aim: a framework for measuring impacts

Understanding the impacts of health reform is much more than counting the costs. It is about the quantity and quality of good health that is achieved for a given health expenditure. This is aptly expressed in the integrated health care literature in terms of four aims of health policy: improving population health, enhancing the patient's experience of care, lowering health care costs and supporting the wellbeing of health care providers (whose decisions can profoundly shape the future health of patients and whose wellbeing

¹ There is evidence that technological innovations can reduce health system costs, after allowing for the time it takes to learn the new technology (for example, Bradford 2001; Ford et al. 2011). But while potentially very important, there is little Australian data to inform the quantification of such an effect.

² For example, unpublished estimates by the Western Sydney Diabetes program indicate that while a program aimed at prevention involves greater upfront investment costs, the longer term benefits are ultimately significantly greater than a program of disease management (Western Sydney Diabetes initiative, pers. comm., 15 March 2017).

can therefore be closely interlinked with the wellbeing of patients).³ The Productivity Commission's estimates include elements of each of these four aims as follows.

- Improving population health is estimated broadly in terms of a percentage improvement in the health of those who would otherwise be in poor or fair health.
- Enhancing the experience of patients is partially represented by estimating the value of the reduction in the time that patients spend waiting in waiting rooms for a medical appointment.⁴
- Lowering health care costs (without compromising health or the quality of service) is estimated in terms of the impacts on total health care expenditure, irrespective of who is paying and therefore includes savings to patients, to providers, to insurers and to governments.
- Supporting the wellbeing of people providing health care is partly considered. The Productivity Commission has limited its considerations to people providing health care without pay, whose caring responsibilities are reduced if patient health improves. This goes beyond the concerns about paid professionals, which was the focus of Bodenheimer and Sinsky (2014).

3 Possible impacts under the Productivity Commission's package of health policy initiatives

Many of the Productivity Commission's recommendations are interdependent and this affects the estimates of the possible impacts (table 1). Briefly, several reforms are needed to free up innovative Local Hospital Networks (LHNs) and Primary Health Networks (PHNs) in the health sector and allow them to invest in health care improvements. Conditional on those reforms, further measures are required to provide all other LHNs and PHNs with incentives to adopt best practice integrated care. Related to these are a number of reforms to ensure the patient is at the centre of the health care system. Building on all of these reforms are a number of steps towards providing PHNs and LHNs with the capacity to pursue greater efficiency gains across the broader health budget.

Some reforms can be implemented independently of other reforms. These include the removal of the private health insurance rebate on ancillaries, and a number of other reforms that have not been quantified in this exercise, such as reform of alcohol taxation.

³ The first three aims were popularised by the Institute for Healthcare Improvement, beginning with the work of Berwick, Nolan and Whittington (2008). Bodenheimer and Sinsky (2014) proposed the fourth aim, including because the burnout of health care professionals has been found to undermine the care given to patients.

⁴ Timeliness of service is one measure of the quality of a service in the seminal work of Parasuraman, Zeithaml and Berry (1985).

rec	ommendations and the	estimated impacts
Description	Recommendations	How the Commission quantifies the impacts
Free up innovators	Recommendation 2.1: greater autonomy at regional level including funding flexibility	Impacts on the health and personal welfare of those in poor or fair health; impacts on hospital costs and impacts on the Australian workforce that can be associated with the first five per cent of Local Hospital Networks who implement an integrated approach
Disseminate best practice, including in integrated care	Recommendation 2.1: disseminate lessons learnt by innovative regions Recommendation 2.2: reduce low-value health interventions Recommendation 2.3: publish results so all can see how the system is working Recommendations 2.4: use information better, including 'Champions Program'	Impacts on the health and personal welfare of those in poor or fair health; impacts on hospital costs and impacts on the Australian workforce that can be associated with the remaining Local Hospital Networks
Patient-centred approach to care	Recommendation 2.3: make the patient the centre of care	Impacts on the time patients spend waiting in the waiting rooms of GPs and specialist clinics
Empowering PHNs and LHNs to pursue efficiency in broader health budget	Recommendation 2.1: formal collaboration at regional level and resourcing PHNs	Impacts on health costs outside of the hospital sector from reducing low value care
Remove the tax rebate on the private insurance of health ancillaries	Part of recommendation 2.2	Budget impact of removing tax rebate
Other recommendations	Recommendation 2.5: better use of technology in pharmacy Recommendation 2.6: amend alcohol taxation arrangements	Impacts not quantified

Table 1 The relationship between the Productivity Commission's

The net present value of the future stream of economic impacts over twenty years is estimated at about \$140 billion (in 2016 prices). This presupposes that 2020 is the first year that LHNs and PHNs implement integrated care and that it takes a further twenty years for all LHNs and PHNs to adopt integrated care. Were Australian governments to achieve the uptake of integrated care by all LHNs and PHNs within ten years (instead of within twenty years) and if the effectiveness of LHNs and PHNs was to range from 30 per cent to 45 per cent (instead of from 17 per cent to 45 per cent), then the stream of net economic benefits could be over \$200 billion.

Over ninety per cent of these measured gains are conditional on first freeing up innovative and effective LHNs and PHNs to implement an integrated system of care (table 2).

Table 2Estimated stream of impacts of recommendations2016 prices

	Net present value over twenty years
	\$m
Free up innovators	17 000
Disseminate best practice	91 000
Patient-centred	2 000
Improving efficiency across broader health system	23 000
Remove tax rebate on Private Health Insurance ancillaries	10 000
Total	144 000
Source: Productivity Commission estimates, explained below.	

The nature of impacts estimated include the direct health impacts, personal welfare gains, broader workforce impacts and the health expenditure dividend (table 3).

Table 3	Estimated net annual impacts of recommendations 2016 prices							
		Units	2020	2025	2030	2040		
Improvement	in health of those in poor or fair health	%	2	11	19	30		
Personal welf	are gains from better health	\$m	14	76	141	274		
Personal welf	are gains from less waiting	\$m	28	162	300	584		
Workforce imp	pact on GDP	\$m	16	397	1 455	4 170		
Health expend	diture dividend	\$m	1 825	7 909	15 134	33 441		
Source: Produ	uctivity Commission estimates, explained below	V.						

The health of Australians in poor or fair health is ultimately estimated to improve by up to 30 per cent. In practical terms, this could be understood as a marked improvement in blood sugar levels, blood pressure and other measures of the health of people, so as to reduce the average patient's reliance on health services by up to 30 per cent.

As a result of better health, Australians in poor or fair health will be able to spend more time at work, in home-based production and in leisure. It is estimated the value of these personal gains could amount to close to \$300 million a year.

Integrating care around the patient will benefit all Australian patients. For example, by giving greater weight to the time of patients, an integrated system of care will reduce the time that patients spend waiting in the waiting rooms of GPs and specialists. It is estimated that implementing the Productivity Commission's recommendations could benefit Australian patients by about \$600 million each year by reducing the time they spend waiting for GP and specialist appointments.

More broadly, the level of Australia's GDP will also be enhanced by the greater participation of those whose health is improved and by the greater participation of their voluntary carers. The Productivity Commission estimates this GDP effect could rise to over \$4 billion a year.

The Productivity Commission estimates the health spending dividend (irrespective of source) from the package of reforms could rise to 6.5 per cent of total annual health spending once rolled out across Australia. This would amount to over \$33 billion (in 2016 prices) if real health expenditure were to grow by 4.7 per cent a year, that being the historical rate of growth in total health spending in the ten years to 2014-15 (AIHW 2016b).⁵

Behind the numbers

The estimates of the direct health improvements and the subsequent economic impacts are based on a number of assumptions, drawing on Australian data and Australian studies. How these estimates are derived is explained in this section.

For the reader's convenience, a summary of the key calculations is in box 1 and a summary of the key assumptions in box 2. The workings are provided on the Productivity Commission's website as a separate excel file, entitled 'Health impacts workbook'.

Estimating the impact on health

The national rate of improvement in the health of those (otherwise) in poor or fair health is assumed to be the same as the national average rate of effectiveness of integrated care, which in turn depends on the rate that integrated care is adopted and the effectiveness of PHNs and LHNs in implementing integrated care (table 4).

Table 4Deriving the impact of integrated care on health

	Unit	2020	2025	2030	2040
National rate of improvement in health of those in poor or fair health	%	2	11	19	30
National average rate of effectiveness of integrated care	%	2	11	19	30
National rate of adoption of integrated care (as a share of LHNs)	%	5	30	55	100
Effectiveness of LHN-PHN partnerships	%	45	38	34	30
Source: Productivity Commission estimates.					

⁵ Growth in government expenditure on health over the period to 2040 has been estimated to range between 2.8 and 3.8 per cent a year on average, depending on policy settings (Australian Government 2015; PC 2013).

Box 1 The calculations behind the numbers: A summary

National rate of improvement in the health of those in poor or fair health = National average rate of effectiveness of integrated care

National average rate of effectiveness of integrated care = Effectiveness of LHN-PHN partnerships * Assumed national rate of adoption of integrated care

Effectiveness of LHN-PHN partnerships = Weighted sum of the assumed effectiveness of the various LHNs-PHNs that have adopted integrated care

Personal benefit from additional employment (or home based production or leisure) = Additional days of good health * Proportion of additional days of good health allocated to that activity * A proportion of the average wage (as specified below)

Additional days of good health = Reduction in hospital bed days

Total workforce effect on GDP = GDP impact from those whose health has improved + GDP impact from freeing up carers

GDP impact from those whose health has improved (as a percentage change from counterfactual) = Assumed GDP health elasticity * National rate of improvement in the health of those in poor or fair health

GDP impact from freeing up carers = GDP impact from those whose health has improved * Days carers spend caring as a ratio to days spent in hospital * Assumed participation rate of carers

Hospital recurrent spending dividend = Number of people whose health improves * Hospital recurrent spending dividend per patient

Number of people whose health improves = National population assumed to be in poor or fair health * Assumed national rate of adoption of integrated care

Hospital recurrent spending dividend per patient = Averted hospital recurrent cost per patient – Assumed cost of integrated care per patient

Averted hospital recurrent cost per patient = Assumed hospital recurrent cost per patient * Effectiveness of LHN-PHN partnerships

Other health recurrent spending dividend = Other health recurrent spending for those in poor or fair health * National average rate of effectiveness of integrated care

Hospital capital spending dividend = Reduction in beds required * Assumed hospital capital cost per bed

Reduction in beds required = Reduction in hospital bed days/365.25 * Assumed occupancy rate

Reduction in hospital bed days = Reduction in hospital separations * Assumed average length of stay

Reduction in hospital separations = Assumed potentially preventable hospitalisations * National average rate of effectiveness of integrated care

Reduction in low value hospital care = 10 per cent of counterfactual public hospital spending * National average rate of effectiveness of integrated care

Reduction in low value care (other than public hospital care) = 10 per cent of counterfactual spending for private hospitals, primary health care (other than dental and non-PBS medications), patient transport, aids and appliances and capital * National average rate of effectiveness of integrated care

Box 2 Key assumptions behind the numbers: A summary

National rate of adoption of integrated care reflects the rate of adoption of health pathways by LHNs (box 3).

National population in poor or fair health remains a constant proportion of the population equal to that in 2014-15 from the ABS' 2014-15 National Health Survey.

Effectiveness of LHN-PHN partnerships reflects how quickly they adopt integrated care. The first five per cent of LHN-PHN partnerships to adopt integrated care have 45 per cent effectiveness; the next 15 per cent to adopt integrated care have 30 per cent effectiveness; the next 60 per cent have 30 per cent effectiveness and the last 20 per cent have 17 per cent effectiveness (table 5). The rates of effectiveness reflect the range of reductions in hospital utilisation reported in Australian integrated care studies (table 6).

GDP health elasticity is based on the general equilibrium results of Verikios et al. (2015) and the age cohort workforce shares in the 2014-15 National Health Survey of ABS.

Participation rate of carers is based on ABS Cat. No. 4430.0 Disability, Ageing and Carers, Australia: Summary of Findings, 2015, 18 October 2016, table 36.3.

Days voluntary carers spend caring for patients is assumed to be half the days that patients spend in hospital.

Australia's population growth and GDP growth assumptions are taken from Gabbitas and Salma (2016).

Counterfactual health spending grows by the real growth in total health spending between 2004-05 and 2014-15 in AIHW (2016b).

Cost of integrated care per patient is the simple average of program costs in two of the Australian integrated care projects, Western Sydney Diabetes and Mt Druitt HealthOne (table 6).

Hospital recurrent cost per patient is the simple average of averted hospital costs in three of the Australian integrated care projects, The Diabetes Care Project, Western Sydney Diabetes and Inala Chronic Disease Management Service (table 6).

Hospital capital cost per bed in 2016 is based on the Victorian Government Department of Health and Human Services' (2016) hospital capital planning module and grows with the assumed real growth in total health spending.

Occupancy rate of 88 per cent based on the 2014-15 national rate in AIHW (2016c).

Average length of stay for each episode of care of those in poor or fair health is four days, calculated by dividing the number of potentially preventable hospitalisation bed days in 2013-14 in National Health Performance Authority (2015) by the number of *potentially preventable hospitalisation separations* in 2014-15 in AIHW (2016a).

Potentially preventable hospitalisations in 2016 equals that of 2014-15 in AIHW (2016a) and subsequently grows with the assumed number of people in poor or fair health.

Sources: ABS (2015); AIHW (2016b, 2016c); Gabbitas and Salma (2016); NHPA (2015); Verikios et al. (2015); Victorian Government Department of Health and Human Services (2016).

The Productivity Commission assumes that the improvement in health mainly affects those in poor or fair health. This reflects that the principal beneficiaries of an integrated system of care are those who are (or would otherwise be) frequent users of the health system, particularly those with complex and chronic health conditions (section 3.4 of Supporting Paper 5 (SP 5)).⁶ In ABS' (2015) National Health Survey, those with poor or fair health comprised 15 per cent of the Australian population. For simplicity, this proportion is assumed to remain unchanged over time — but for the recommended reforms. It is however more likely that that proportion will rise over time with the ageing of the Australian population and therefore that the Commission's estimates may understate the national health impacts of integrated care.

The national average rate of effectiveness of integrated care depends on the effectiveness of LHNs and PHN partnerships that have adopted an integrated approach to care.

The Productivity Commission assumes that the national rate of adoption of integrated care will grow by five percentage points a year, implying it would take twenty years before an integrated approach to care would be rolled out across all of Australia. This slow rate of uptake reflects the rate that LHNs have adopted health pathways, specifically the HealthPathways and Map Of Medicine packages (box 3) and is also consistent with the slow diffusion of integrated care best practice observed around the world more generally (chapter 10 of SP 5).

Box 3 The rate of adoption of health pathways in Australia

Health pathways are agreements between GPs and hospital physicians about how particular conditions should be treated in their respective sectors. Ideally they are based on the latest medical evidence and reflect the local context, including resource constraints. There are two online health pathway tools in Australia – HealthPathways, developed in Canterbury, New Zealand and Map of Medicine, developed in the United Kingdom.

Compared to the budget of a Local Hospital Network, there is little upfront cost to LHNs from adopting health pathways, particularly when most Primary Health Networks have already begun rolling out health pathways among GPs. But there are considerable benefits for patients through the more effective integration of primary and hospital care achieved by a joint commitment to evidenced based health pathways. Its adoption across Australia is therefore an indicator of how proactive Local Hospital Networks are in working with Primary Health Networks to deliver better health care.

Only a quarter of Local Hospital Networks have committed to the development and adoption of health pathways since the HealthPathways innovation became available in 2011.

Sources: HealthPathways Community (2017); South Eastern Melbourne PHN (2017); Timmins and Ham (2013).

The Productivity Commission assumes that the effectiveness of implementation of integrated care by PHNs and LHNs will vary from 45 per cent for the earliest adopters

⁶ Supporting papers are available on the Productivity Commission's website at www.pc.gov.au and are referenced throughout this paper using the abbreviation 'SP' and the relevant number.

down to 17 per cent for the last adopters (table 5). Therefore, the national average effectiveness of implementation declines over time.⁷

Table 5The rate of effectiveness in implementing integrated care is
assumed to vary with the rate of adoption

	The first 5 per cent	The next 15 per	The next 60 per cent	The final 20 per cent
	to implement are	cent are almost as	are moderately	are minimally
	the most effective	effective	effective	effective
Effectiveness of implementation by LHNs and PHNs	45 per cent	40 per cent	30 per cent	17 per cent

The assumed range of effectiveness of implementation of integrated care by LHNs and PHNs is based on estimated reductions in hospitalisation in Australian studies of integrated care (table 6). These studies have been selected because they report the impact of integrated care on hospitalisation, the cost of averted hospitalisation and/or the cost of the program.

Estimating the impact on the personal wellbeing of those in ill health

Improved health means additional days that can be used in productive activities (paid employment, home based production and leisure) instead of being lost to ill health, resulting in a welfare gain for patients (table 7). The additional days of health are based on the estimated reduction in the days of hospitalisation.

The personal benefit of spending that additional time depends on how much of the time is now spent in productive activities and on the value of those activities. It is assumed that the additional hours of improved health would be allocated to these activities of choice in accordance with how the average Australian allocated their time in ABS' 2006 survey (ABS 2006), as specified here.

- 14 per cent of the recovered time is given to employment.
- 14 per cent of the recovered time is given to home based production.
- 21 per cent of the recovered time is given to leisure.

The hourly value of the additional time allocated to these activities is estimated as follows.

⁷ This decline in effectiveness over time is consistent with declining marginal returns as investors focus on the most promising investments first. Conversely, there is evidence in the literature that the gains from innovations rise in the medium term as a result of learning by doing effects (Bradford 2001).

- The opportunity cost of foregone employment is assumed to initially be \$10 an hour, less than a third of the average adult wage, and is indexed to the growth in GDP per person.
- The hourly value of home based production is assumed to be half the hourly adult earnings of the average community and personal service worker in May 2016 (\$16), indexed to the growth in GDP per person. The nature of the work of community and personal service workers is reflective of the nature of home based production and is marginally lower than the average adult wage.
- The hourly value of leisure is assumed to equal one third of the average adult wage between May 2015 and November 2016 (\$12), indexed to the growth in GDP per person.

Table 6	Key est 2016 price	imates from A	ustralian in	tegrated c	are projec	ts
Project	Unit	The Diabetes Care Project, 2011–2014 ^a	HARP, 2004-05	Mt Druitt HealthOne, 2006–2012	Western Sydney Diabetes initiative, 2012– 2016 a,b	Inala Chronic Disease Management Service, 2007–2008 ^C
Scope of project		GP and allied health Patients with diabetes, particularly those with complex diabetes	Hospital and community care Patients at high risk of hospitalisation	All sectors Patients in need of complex, chronic and aged care	All sectors Patients admitted to hospital for diabetes related surgery	All sectors Patients with chronic and complex diabetes in need of acute care
Impact of project o hospital bed days	n %	-17	-41	-41	-45	-46
Cost of project	\$ per client	845	2 433	1 616	1 101	na
Cost of (avoided) hospitalisation	\$ per client	4 303	na	na	11 432	8 432

^a The estimated impact on hospital bed days is based on the reported impacts on average length of stay.
 ^b The estimated costs are based on unpublished data provided by the Western Sydney Diabetes initiative (pers. comm., 15 March 2017).
 ^c The estimated impact on hospital bed days is based on the reported impacts on admission rate. **na** Not available.

Source: Productivity Commission estimates.

Table 7The impact of integrated care on personal welfare of patients2016 prices

	Unit	2020	2025	2030	2040
Additional paid employment	\$m	3	18	34	66
Additional home based production	\$m	5	27	50	98
Additional leisure	\$m	6	31	57	110
Source: Productivity Commission estimates.					

Estimating the impact of saving patients' time

A key aspect of quality service is putting a high priority on the time of those being served. The Productivity Commission estimates here the value of the time of Australian patients that could be saved by more efficient service in the waiting rooms of GPs and specialists and by greater reliance on telehealth (table 8).

Based on the little data that are available, the Productivity Commission assumes that patients spend an average of 30 minutes in the waiting room of GPs and specialists, 18 minutes of which is assumed to be beyond what is reasonable. This assumption is based on Haas (2016) and Tonic Health Media (2017). A survey reported by Haas (2016) indicates patients spend about 26 minutes waiting for an appointment. Tonic Health Media (Tonic Health Media 2017) reports Australian patients spend an average of 35 minutes in the waiting room.

Table 8 The impact of integrated care on patients' time 2016 prices

	Unit	2020	2025	2030	2040
Personal welfare gains from less waiting	\$m	29	162	300	584
from quicker service in GP and specialist waiting rooms	\$m	22	120	222	432
from greater use of telehealth	\$m	8	42	78	152
Source: Productivity Commission estimates.					

Given the number of consultations reported in Medicare data for 2015-16, it is estimated that Australian adults spend 50 million wasted hours in GP and specialist waiting rooms every year. The Commission estimates that the annual costs for patients of excessive waiting times for attending GP and specialist clinics might amount to about a 0.1 per cent reduction in Australia's annual labour supply and a cost of the order of \$900 million costs for patients — based on the average labour market status of Australian adults in 2015-16, and on the average adult wage between May 2015 and November 2016.

It is assumed that the proportion of unreasonable waiting time alleviated by implementing the Productivity Commission's recommendations is given by the national average rate of effectiveness of integrated care, ultimately delivering a benefit of \$400 million a year.

The low use of telehealth also imposes a cost on patient time. On average, patients are assumed to spend about 35 minutes travelling to and from medical appointments that could otherwise be provided by telehealth. This is based on evidence for the United States where Ray et al. (2015) finds the average travel time for patients to be 37 minutes. Australian populations tend to be more concentrated in large cities, potentially adding to the time Australian patients may spend travelling. For example in Sydney, average daily commuting times for personal business, including medical appointments, was found to be 40 minutes (Bureau of Transport Statistics 2014).

In the absence of better information, the Productivity Commission assumes that about 10 per cent of consultations could be provided online or by phone. This is considerably lower — and arguably more plausible — than the share of 50 per cent cited by Griffith (2016).

Based on the average labour market status and average adult wage for 2015-16, the Productivity Commission values the patient time that could be saved by using telehealth at over \$300 million a year. It is assumed that a proportion of this is achieved by a move to integrated, patient-centred care where the proportion is given by the rate of the national average rate of effectiveness of integrated care. This contributes a further benefit of over \$100 million a year from implementing the Commission's recommendations.

Estimating the impact of workforce effects on GDP

By improving the health trajectory of those who would otherwise suffer from poor or fair health, a more effective system of care improves their capacity to work, leading to higher workforce participation (both for those whose health has improved and for those who voluntarily care for them), stronger employment outcomes and higher wages (Cai and Kalb 2006; Verikios et al. 2015). Aside from the personal income gains, there will be an overall improvement in GDP.

The Productivity Commission estimates a 0.2 per cent GDP gain could ultimately flow from a 30 per cent improvement in the health of those in poor or fair health, including the implications for their voluntary carers (table 9). Assuming an average rate of 2.1 per cent growth in GDP each year, this GDP gain is equivalent to about \$4 billion (in 2016 prices) by 2040.

2016 prices	C				
	Unit	2020	2025	2030	2040
GDP impact, total	\$m	16	397	1 455	4 170
GDP impact, total	%	0.001	0.02	0.06	0.15
GDP impact, those in poor or fair health	\$m	13	310	1 136	3 254
GDP health elasticity		0.0003	0.001	0.003	0.004
GDP impact, voluntary carers	\$m	4	87	320	916
Source: Productivity Commission estimates.					

Table 9Deriving the impact of integrated care on the workforce

The Productivity Commission's estimate depends on Verikios et al. (2015), a Centre of Policy Studies' analysis of the GDP implications for Australia of improving the health of unwell workers in two different age cohorts. Verikios et al. (2015) implement two simulations, the first estimating the GDP impact of a ten per cent improvement in the health of the unhealthiest 49-69 year olds and the second simulation estimating the GDP impact of a ten per cent after 20-38 year olds. They find the GDP impact is much larger for the older cohort (0.1 per cent after 20 years) than for the 29-38 year old cohort (0.008 per cent after 20 years), which they attribute to the greater tendency of those near retirement to retire early in response to ill health. Their conclusion is consistent with the analysis of ill health and early retirement among older working individuals in the Household, Income and Labour Dynamics in Australia survey data by Zucchelli et al. (2010). Zucchelli et al. (2010) find that a deterioration in the health of those in the workforce aged over 50 years increases the risk of early retirement by between 50 and 320 per cent for men and between 68 and 74 per cent for women.

Based on this literature, the Productivity Commission assumes the GDP effect after twenty years of a one per cent improvement in health to vary by age cohort as follows.

- For those aged 15 to 44 years, the effect is assumed to be equal to the younger age cohort in Verikios et al. (2015).
- For those aged 45 to 64 years, the effect is assumed to be equal to the older age cohort in Verikios et al. (2015).
- For those aged 64 to 74 years, the effect is assumed to be equal to the younger age cohort in Verikios et al. (2015) given that many would already be in retirement, reducing the GDP impact.
- For those aged over 74 years, the effect is assumed to be zero.

The weighted average for all Australians in poor or fair health is based on the age cohort shares in ABS' (2015) National Health Survey. For the sake of simplicity, these shares are assumed constant despite the ageing of the Australian population over time. As the population ages, it is likely that the proportion nearing the age of retirement will rise (tending to increase the workforce-related GDP impact of improving health), and so will

the proportion above the age of retirement (tending to reduce the workforce related GDP impact of improving health). Thus the additional complexity of incorporating population ageing could result in a higher or lower GDP estimate, depending on the proportion of the population beyond the working age (which is itself likely to rise over time with the improved health and longevity of Australians). Nor does the Productivity Commission account for reductions in mortality rates that could be expected to be associated with improved health. Lower mortality rates could be associated with extended years of quality life for some, but with extended years of low quality life for others, which in turn may lead to higher demand for health care services.

Better health would also reduce the demands on the time of voluntary support carers, freeing them up to participate in the workforce.⁸ This is incorporated into the Productivity Commission's estimate of the GDP effect by assuming that, on average, the impact of a carer's availability on the workforce is just under 30 per cent of the impact of the average patient's availability. This assumption is derived from the proportion of primary carers who participate in the workforce from the ABS' (2016) summary of the 2015 Survey of Disability, Ageing and Carers (56 per cent) and (in lieu of there being no publicly available data) by assuming that the average patient requires one day of voluntary care in their home for every two days spent in hospital care.

Estimating the health expenditure dividend

There are two broad means by which the proposed health reform agenda can deliver a substantial health expenditure dividend.

- They can reduce the demands on the health system by directly improving the health of Australians.
- They can reduce the provision of low value care, including the avoidance of waste such as duplication of services. Low value care are treatments that are ineffective for improving health (chapter 7 in SP 5).

The impact on hospital recurrent spending

The impact on health expenditure is best understood as the dividend that would be generated by implementing an integrated system of care. This dividend may be reinvested into further improving the health of Australians, which would lead to subsequent effects on health and on the economy. However for simplicity, the Productivity Commission only estimates direct impacts.

⁸ In 2015, 2.7 million Australians provided informal care, predominantly for family members (ABS 2016). This impacts on their capacity to participate in the workforce. For those aged between 15 and 64 years, the workforce participation rates of primary carers (56.3 per cent), and of other carers (77.2 per cent), are significantly lower than that of those without caring responsibilities (80.3 per cent).

The hospital recurrent spending dividend depends on the number of people whose health improves and on a per patient estimate (table 10). Those who experience an improvement in health are those of fair or poor health who reside in the Local Hospital Network regions that have adopted a system of integrated care – and therefore depends on the assumed rate that LHNs adopt integrated care as discussed above.

The hospital recurrent spending dividend for each patient depends on the averted hospital recurrent cost and on the assumed cost of integrated care, both of which are based on Australian studies of integrated care in table 6. The recurrent cost of hospitalisation is based on the three studies for which hospitalisation costs were available – the Diabetes Care Project, Western Sydney diabetes initiative and Inala Chronic Disease Management Service.

The per patient cost to LHNs and PHNs of integrated care is the simple average of the cost of the Mount Druitt and Western Sydney diabetes programs (reported in table 6). While other programs report program costs, they do not all involve a model of care that integrates primary and hospital care. The Diabetes Care Program only involved primary care providers and the Hospital Admission Risk Program (HARP) only involved the state government health providers. GP-focused programs tend to be less costly and less effective – and hospital-focused programs more costly – than programs that integrate both GP and hospital care (appendix A of SP 5). The assumed cost of an integrated care program (which integrates across all sectors) is therefore based only on those studies of programs that integrated the care provided by GPs and hospitals.

Table 10Deriving the impact of integrated care on hospital recurrent
spending

2016 prices

	Units	2020	2025	2030	2040
Hospital recurrent spending dividend	\$m	362	1 910	3 486	6 622
People whose health improves	'000	146	936	1 827	3 725
National population aged 15+ in poor or fair health ^a	'000	2 917	3 122	3 322	3 725
Adoption rate (share of LHNs)	%	5	30	55	100
Hospital recurrent spending dividend per patient ^b	\$	2 482	2 040	1 908	1 778
Averted hospital recurrent cost per patient	\$	3 970	3 707	3 776	4 122
Hospital recurrent cost per patient	\$	8 823	9 885	11 075	13 903
Effectiveness of implementation by LHN/PHN	%	45	38	34	30
Cost of integrated care per patient	\$	1 488	1 667	1 868	2 345

^a The proportion of Australia's population in poor or fair health (15 per cent) is assumed to remain equal to that reported in the ABS National Health Survey 2014-15. ^b This is estimated for patients who rely heavily on health services because of their poor health, represented in these calculations by those reported to be in poor or fair health.

Source: Productivity Commission estimates.

Outside of the hospital sector, it is assumed that improved health from the implementation of integrated care reduces recurrent spending by the national average rate of effectiveness. The dividend is around \$3 billion after five years, rising to \$12 billion by 2040.

The impact on hospital capital spending

The estimated hospital capital spending dividend is the reduction in capital expenditure as a result of improving the health of Australians through integrated care. The rate of reduction in capital spending is linked back to the national average rate of effectiveness of integrated care (boxes 1 and 2). Detailed calculations are provided in the excel workbook as earlier noted.

A key assumption is the capital cost of constructing or expanding a hospital per patient bed. This is assumed to be approximately \$210 000 in 2016 based on the cost per hospital bed implied in Victoria's hospital capital planning module (Vic DoHHS 2016). The cost is assumed to rise over time in line with the assumed growth in total health spending.

The hospital capital spending dividend arises from avoiding the cost of additional beds. It is estimated that the size of this dividend could be about \$1.5 billion by 2040 (table 11).

Table 11 Deriving the impact of integrated care on hospital capital spending 2016 prices

	Units	2020	2025	2030	2040
Hospital capital spending dividend	\$m	36	239	531	1 483
Capital cost per bed	\$	251 870	316 135	396 797	625 116
Reduction in beds required	No.	141	754	1 338	2 373
Source: Productivity Commission estimates					

Source: Productivity Commission estimates.

The impact on low value care

In the absence of comprehensive Australian studies of the extent of low value (or ineffective) care, the Productivity Commission has relied upon a range of sources to assume that approximately ten per cent of health care services are of low value (box 4).

The Productivity Commission estimates that implementation of its recommendations could reduce low value care by a proportion that is represented by the national average rate of effectiveness of integrated care.

Based on this methodology, savings from reducing low value treatments in public hospitals could ultimately amount to over \$4 billion per year and low value care outside of the public hospital sector could ultimately be reduced by approximately \$7 billion per year, freeing up that money for investment in other areas (table 12).

Table 12	Deriving the impact of integrated care on low value care
	2016 prices

	Units	2020	2025	2030	2040
Total dividend from low value care	\$m	349	2 193	4 587	11 428
from public hospital spending ^a	\$m	139	873	1 826	4 548
from other services ^{a,b}	\$m	210	1 320	2 762	6 880

 a The dividend from reducing low value care is calculated as ten per cent of counterfactual spending multiplied by the national average rate of effectiveness of integrated care. b Other services included here are GPs, allied health, specialists, community health, pharmaceuticals, diagnostics, patient transport, aids and appliances.

Source: Productivity Commission estimates.

There is also a deadweight burden associated with raising the tax revenue to fund this low value care. Based on recent estimates, it is assumed the deadweight burden is about \$295 million for every one billion dollars of tax revenue spent on low value care (box 5).
Box 4 Evidence of the extent of low value care in Australia

While there are currently no comprehensive estimates of low value care for Australia, there is clear evidence of overuse in Australia. Elshaug et al. (2012) identify the potential overuse of over 150 treatments funded by Australia's Medicare. One such treatment, for example, is arthroscopic surgery for knee osteoarthritis.

Another is the overuse of antimicrobials, where, for example, approximately 75 per cent of acute bronchitis is treated with antibiotics despite evidence that indicates the rate should be near zero. In an international comparison, Australia's rate of dispensed antimicrobials is double that of the Netherlands, which has one of the lowest rates in the world, and is otherwise higher than Canada (by over 80 per cent), the United States (by over 40 per cent) and most European countries. Furthermore, within Australia, the rate that antimicrobials (including antibiotics) are dispensed varies by over 11 times between the area with the highest rate and the area with the lowest rate. Such a high rate of geographic variation is indirect evidence of overuse.

This and numerous other variations in specific types of health care are reported in the Australian Atlas of Healthcare Variation by the Australian Commission on Safety and Quality in Health Care. While variation can often reflect need, the sustained and high degree of variation in Australia indicates a significant proportion of the variation is unwarranted and thereby harming or not improving health and therefore diverting resources from more effective health care.

Duplication of medical tests is another example of low value care in Australia. The Commonwealth Fund's international health policy survey indicates that medical tests are duplicated for over 10 per cent of unwell adults. A higher proportion of unwell adults report that the results of their medical tests were not available in time for their GP appointment, detracting from the value of the tests.

US studies have estimated that overuse accounts for at least 6-8 per cent of total health care spending (based on direct measurement of overuse) and could be as high as 29 per cent (based on geographical variation). It is unlikely that the extent of overuse would be lower in Australia. Australia's internationally high rate of antimicrobial use has already been mentioned. It is also notable that Australia's recently released guidelines discouraging arthroscopic surgery for patients with knee osteoarthritis is well over a decade behind the United States and the United Kingdom.

Sources: ACSQHC (2015, 2017a, 2017b); Brownlee et al. (2017); CMS (2004); Elshaug (2012); Hansen et al. (2015); Mossialos et al. (2017); NICE (2008, 2014); Schoen et al. (2009).

The impact of removing the subsidy of PHI ancillaries

The Productivity Commission estimates the net economic impact of removing the subsidy of PHI ancillaries by estimating the deadweight economic burden associated with the subsidy and estimating the low value care that may be funded by the subsidy (table 13).

The value of the subsidy paid for PHI ancillaries is estimated by assuming that the subsidy accounts for almost 25 per cent of the budget item '*Private Health Insurance Act 2007* – incentive payments and rebate' reported by the Department of Health ((DoH 2017, table 2.4.1). This assumed proportion of the government rebate and incentive payment is, in the absence of better information, based on the share of ancillaries in the total benefits paid by Private Health Insurers in the twelve months to March 2017 reported by Australian Prudential Regulation Authority (2017). The value of the subsidy of ancillaries is assumed

to grow with the forward budget estimates to 2019-20, and then to grow with the real growth in total health expenditure. Under this assumption, the value of the subsidy is estimated to be \$1.7 billion in 2020, rising to over \$4 billion by 2040.

Box 5 The deadweight burden in the taxation system of low value care

Taxpayers bear any inflated costs when spending is publicly funded or subsidised. The second round effects of the taxes that must be levied to raise the required revenue frustrate investment and labour supply across the economy generally. Income taxes are generally the first resort for revenue shortfalls for the Australian Government under current policy settings, and the most recent estimates suggests that they impose about a \$200–\$390 million 'deadweight' economic burden for every one billion dollars of unjustified taxpayer funded expenditures — 'waste on waste'. State revenue is also a large source of funding for health care, and the taxes they impose are often also inefficient (such as insurance taxes and stamp duties). Therefore, even if the deadweight costs per additional dollar of tax collected were at the bottom end of the most recent estimates, it is plausible that there are hundreds of millions of dollars of hidden costs annually in addition to the direct costs of the waste itself.

Sources: Cao et al. (2015); Murphy (2016).

There is a deadweight burden associated with raising the tax revenue (via income taxation) to the estimated value of the subsidy of ancillaries. Drawing on the literature summarised in box 5 above, it is assumed that the deadweight burden amounts to \$295 million for every one billion dollars of the subsidy. Based on this assumption, it is estimated that the gain from removing the deadweight burden could be approximately \$400 million a year by 2020, rising to over one billion dollars a year by 2040.

Table 13Deriving the net economic impact of removing the subsidy of
PHI ancillaries
2016 prices

2010 pilces					
	Units	2020	2025	2030	2040
Economic impact of removing the subsidy	\$m	611	767	963	1 516
from removal of deadweight burden	\$m	444	557	699	1 102
from assumed low value care ^a	\$m	167	210	263	415

^a The dividend from reducing low value care is calculated as ten per cent of the estimated value of the government subsidy of ancillaries.

Source: Productivity Commission estimates.

A proportion of the subsidy of PHI ancillaries is likely to fund low value care. While that proportion could be significant, there is little information to indicate what that proportion may be. Therefore, the Productivity Commission assumes the proportion to be 10 per cent, consistent with the assumption made for other forms of health care spending. Low value care funded by the subsidy on ancillaries is therefore estimated to be almost \$200 million in 2020, rising to about \$400 million by 2040.

The net economic benefit of removing the subsidy on PHI ancillaries therefore rises from approximately \$600 million initially, to about \$1.5 billion by 2040 and continues to grow with the expansion of the economy.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

UNIVERSITY EDUCATION

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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Key Points

- Universities are essential to Australia's continued prosperity. Their research helps to raise productivity and living standards, while the knowledge and skills they teach to students develops human capital for better lifetime prospects, wages and productivity.
- However, there are tensions between universities' research and teaching functions. Many university staff are more interested in, and rewarded for, conducting research (due to established cultures and the importance international research rankings). Teaching therefore plays second fiddle to research, with consequences for student satisfaction, teaching quality, and graduate outcomes.
- Realigning university incentives (both financial and institutional) closer towards the interests of students and taxpayers would help restore balance.
 - As the exact scale of any issues in teaching quality or student outcomes are difficult to determine, a first step would be improving their measurement, which would itself encourage universities to focus more on their teaching function.
 - The appropriateness of Australia's existing consumer law provisions and their application to the higher education sector could also be reviewed to determine whether they provide sufficient restitution for inadequate teaching quality.
 - Financial incentives, such as through performance-contingent funding (as proposed in the 2017-18 Budget) are also a step in the right direction, although there are a range of challenges with making this approach fair and effective.
- There is limited evidence that teaching quality is improved by universities jointly undertaking research and teaching (the 'teaching-research nexus'), which undermines the rationale for the Australian Government's restriction that all universities must do both.
- The teaching-research nexus is also used to justify cross-subsidies from teaching to research. This can create labour market distortions, as it encourages universities to increase the number of students undertaking high-margin courses and minimise the number doing low-margin courses, to increase research funds.
 - Making payments to universities for Commonwealth-supported places more cost-reflective would be an option to address the problem. However, it would have undesirable flow-on effects to university research capacity unless offset by other funding initiatives. It cannot be recommended without a reassessment of research funding arrangements for universities, or indeed their overall operation.
- Structural challenges in the Higher Education Loan Program (HELP) debt system can also
 result in unproductive skills formation. Increased costs for taxpayers associated with this
 may encourage short-term savings that have unintended consequences (such as limiting
 access and efficiency) or that undermine the principles of the system.
- As a solution, the Government has proposed decreasing the initial HELP repayment threshold. More debtors would make repayments, reducing the cost of the system.
 - This is unlikely to address many long-term structural challenges and could result in reduced labour supply and workforce participation through higher effective marginal tax rates. It could also undermine the historical 'guaranteed returns' principle of HELP (although it is subject to debate whether this remains a valid rationale).
 - A less distortionary method of reducing doubtful HELP debts would be to collect outstanding amounts from deceased estates (with adequate protections for hardship).

1 Background and existing policy settings

1.1 Introduction¹

The university sector is vital to Australia's future in its role as the educator and trainer of the workforce, as well as through advancing the wealth of knowledge and technical capabilities through its research function. The Commission decided early on in the process of reviewing Australia's productivity performance to explore some of the issues in the higher education sector — so critical is its functioning for future growth and productivity.

An increasing number of Australians are now being educated in the university sector. Student numbers were over 1.3 million in 2015, including nearly 1 million domestic students, whose growth rate still exceeds overall population growth (DET 2016i). Since 1971, the share of the population aged 15 years and above with a bachelor's degree or higher has grown from 2 per cent to nearly 19 per cent in 2011 (Parr 2015). University qualification rates are even higher for younger cohorts — 38.8 per cent of 30-34 year olds had a bachelor degree or higher in 2016 (ABS 2016). The sector also has a large direct economic impact. Total university teaching revenue in 2015 was about \$19.2 billion, sourced from both students (domestic and international) and the Australian Government (DET 2016f).²

However, the sector is also facing significant challenges (a range of which are listed in chapter 3 of the main report). Many of these challenges reflect recent changes in the sector.

The most prominent change has been the move to a demand-driven model for Commonwealth-supported students, with the previous system of caps on total Commonwealth-supported places eased and then abolished between 2008 and 2012 (Kemp and Norton 2014). Total funding for domestic students has therefore risen, while removal of the cap has, as one party put it to us, 'opened the universities for business' in the domestic student market. The shift to a demand-driven system has been accompanied by

¹ This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the author and should not be attributed to either DSS or the Melbourne Institute.

² Includes revenue from CGS grants, Commonwealth scholarships, HELP loans, upfront student contributions and all categorised fees and charges. Data for Bond and Torrens Universities not available.

another market development — the substantial growth in international student numbers, rising by 51 per cent between 2005 and 2015 (DET 2013a, 2016b).

In addition, traditional university teaching models are being disrupted by new technologies, particularly by the growth of the massive open online courses (MOOCs) (Australian Government 2014a; DET 2013c; PC 2016a). An open question for the sector is the role of traditional universities in progressing new models of teaching (such as MOOCs), and the effect that these have on the sustainability of the university's existing business models.

The architecture and conduct of the university system is heavily influenced by the Australian Government's suite of regulatory and funding arrangements.³ In particular, the Government provides considerable direct funding to the sector, as well as substantial financial support to almost all domestic students through direct subsidies, caps on tuition fees and subsidised income-contingent loans. Grasping these is a prerequisite for any reforms, as is an understanding that some regulation and public funding is strongly justified (box 1.1).

1.2 Fees, contributions and government loans

Almost all students attending university are required to make some contribution towards the cost of their university education. These student contributions are necessary because:

- graduates generally obtain substantial private benefits (monetary and non-monetary) that justify contributions to encourage efficient pricing and avoid excess demand
- at some point there is a limit on the amount the Australian Government can tax Australians. This means that ever increasing spending on higher education due to higher enrolment rates must reduce spending in other important areas where there is a lower potential for, or desirability of, raising private contributions (for example, social housing or access to justice)
- of concerns about equity. Many taxpayers do not go to university, so excessive reliance on public funds can be seen as regressive (although this also depends on the structure and progressivity of the tax and transfer system) (Barr 2014).

³ As State and Territory Government university funding forms a small and decreasing share (Universities Australia 2015), it is not the focus of this paper. The Commonwealth is also the sole regulator of the sector.

Box 1.1 Why is government involved in higher education?

Higher education is not like a standard product. Most people recognise that some government funding and regulation is justified, especially given the importance of the sector for Australia's future prosperity. Commonly cited rationales for involvement include the following.

- Positive spillovers from education university education can produce benefits for the community beyond those captured by students (positive 'spillovers' or 'externalities'). Spillover benefits can be social (improved social cohesion, enhanced political and social awareness, and reduced crime rates), fiscal (reduced welfare spending and increased tax revenue) or capture broader indirect effects on innovation, technology diffusion and organisational learning. Although their abstract nature makes the magnitude of the benefits difficult to determine, there is broad consensus that they exist (Deloitte Access Economics 2015; Gibbs 2001; Hemsley-Brown 2011; IC 1997; Jongbloed 2003; Marginson 2009; Norton 2012).
- Liquidity constraints and equity considerations considerable uncertainty about the future earnings of individual students and a lack of bankable collateral means that private lenders are generally unwilling to finance higher education on commercial terms. Without Government-supported loans, this would create equity and efficiency problems, as the university sector would be less accessible to poorer students unable to pay upfront (Higgins and Chapman 2015; IC 1997; Norton and Cherastidtham 2016a).
- Public goods from research much of the knowledge that universities produce through their research is considered a 'public good' their consumption by one consumer does not prevent consumption by others (non-rivalrous); and their benefits cannot be confined to individual buyers (non-excludable). Without government funding, commercial markets would tend to underinvest in valuable public good research (Cutler 2008; Deloitte Access Economics 2015; Jongbloed 2003; Marginson 2009; PC 2007).
- Asymmetric information higher education is an 'experience good' in that students cannot determine in advance whether a degree is good quality or suits their capabilities and preferences. This means that students are not always able to make good decisions in advance, leading to poor outcomes or the misallocation of resources (Baldwin and James 2000; Dill 1997; Jongbloed 2003; Nelson 1970; Wolf 2017).

The majority of domestic students at Australian universities (approximately 811 000) are enrolled in Commonwealth-supported places (CSPs). These are mostly in bachelor degree programs, and pay a 'student contribution fee' that covers part of the cost of their tuition. Universities set the student contribution fees, up to a maximum amount per annual equivalent full-time student load (EFTSL) determined by the Government. In 2017, the maximum student contributions ranged from \$6349 to \$10 596 depending on the discipline (figure 1.1). Although universities *can* charge students an amount less than these limits, in practice all universities charge the maximum rate (Lomax-Smith, Watson and Webster 2011; Norton and Cherastidtham 2015a).

All domestic students *not* in a Commonwealth-supported place are required to pay full, uncapped tuition fees. This includes all students at private universities (such as Bond

University), as well as most domestic postgraduate coursework students⁴ and sub-bachelor (associate degree and diploma) students at public universities. The Government does not control tuition fees for these students, so they vary considerably.



Fees for the 322 000 international students that currently study at Australian universities are also not subject to Government limitation (see figure 1.2 for student numbers by course level and liability status).

These different arrangements for university tuition fees mean that different students contribute vastly different sums for the same course. For example, a Master of Accounting at the Australian National University (ANU) has an indicative annual fee of \$30 768 for domestic full-fee paying students, but some students may be eligible for a CSP, reducing their annual contributions to only \$10 596 (alongside a \$2089 Commonwealth subsidy). For international students by comparison, the indicative annual tuition fee is \$41 040 (ANU 2017a, 2017b).

⁴ However, most postgraduate *research* students (including those undertaking Doctorates and Master's by Research) are not charged tuition fees under the Government's Research Training Program (RTP) (DET 2016h).

Figure 1.2 University student numbers



 a 'Other' includes domestic and international Research Training Program students and non-award course students. b 'Non-bachelor' includes sub-bachelor (e.g. diploma) and postgraduate coursework students (e.g. graduate certificates).

Sources: DET (2016b, 2016i).

Income-contingent HELP loans

Although payment of fees upfront is an option, nearly 90 per cent of students pay their tuition fees and student contributions through the Higher Education Loan Program (HELP) (DET 2016b). First introduced in 1989, HELP loans (then known as the Higher Education Contribution Scheme, or HECS) are income-contingent loans with an interest rate linked to inflation (that is, the Australian Government does not apply any real interest to a student's borrowings). The different loan types available to students include:

- **HECS-HELP** uncapped loans available to domestic students enrolled in a CSP. These account for a majority of HELP loans.
- **FEE-HELP** available for domestic full fee-paying domestic students to pay all or part of their tuition fees, up to a lifetime limit of just over \$100 000 for 2017.
- **VET Student Loans** available for eligible students undertaking certain vocational education and training (VET) courses of study (at diploma level or above) with an approved provider (including some 'dual sector' universities), to pay all or part of their tuition fees. These loans are also subject to the FEE-HELP lifetime limit. They replaced VET FEE-HELP in late 2016.
- **Overseas Study (OS-HELP)** available to assist with living expenses for domestic students in Australian universities who wish to undertake part of their study overseas, including for airfares, accommodation and other travel or study expenses.

• Student Amenities (SA-HELP) — available to domestic students to pay their student services and amenities fee, which universities can charge for services of a non-academic nature (such as sporting facilities, employment and career advice and child care), up to a maximum of \$294 in 2017 (Australian Government 2016d)

All HELP loans provided by the Australian Government are income-contingent — that is, the loans are not repaid until the debtor has an annual income above a minimum threshold. In 2017-18, the threshold is \$55 874, above which the debtor was required to repay a proportion of their total income, starting at 4 per cent and increasing to a maximum of 8 per cent for incomes above \$103 766 (ATO 2017a). The repayment thresholds have historically been indexed to economy-wide changes in average weekly earnings (AWE).

The Department of Education and Training (DET) estimated that students with HELP debts in 2016-17 would take an average of 8.9 years to repay their debt (which has an average value of \$20 700) (DET 2017d). However, many debtors have substantially larger debts (in 2016 over 125 000 debtors had a loan balance of over \$50 000, including nearly 11 000 with debts greater than \$100 000) and take significantly longer to repay them (ATO 2017b).

Growing HELP liabilities and doubtful debts

Nearly four million Australians have taken out a HELP loan since 1989 (Norton and Cherastidtham 2016a). Over half of these beneficiaries (2.5 million) still have an outstanding loan balance (are current debtors) (ATO 2017b, table 21).

The amount of loans and overall HELP debt increased significantly following the expansion of the higher education sector after the phase-in of the demand-driven system in 2008. As a result, the number of domestic students who access HELP loans each year has grown by 77 per cent and total outstanding HELP debt was about \$47.8 billion in June 2016 — up from \$16.1 billion in 2007-08 (figure 1.3) (ATO 2017b; DET 2013b, 2015, 2016b).

The DET forecasts that outstanding HELP debt will reach approximately \$193 billion by June 2025, while the Parliamentary Budget Office (PBO) forecasts a more conservative (but still substantive) estimate of about \$170 billion (ANAO 2016; PBO 2016).

Like all other forms of debt, some default of HELP debt is inevitable. Although HELP debts are not 'provable' under bankruptcy law (they do not get discharged on bankruptcy), any remaining balances are written off on the debtor's death (ATO 2016c).

The Australian Government makes provisions each year for likely default of HELP debt. In 2016-17, the DET expected doubtful debt to comprise 23 per cent of new HELP debt (DET 2017d). However, doubtful debt provisions are only estimates, as the timing of debtors' deaths are uncertain. For example, students who first accessed the HECS scheme

in 1989 are generally about 50 years old now, and so are likely to have many more years available to make repayments.



1.3 Subsidies, grants and direct funding

Commonwealth grants

In addition to the student contributions that universities charge Commonwealth-supported students, the Government also directly subsidises CSPs through the Commonwealth Grant Scheme (CGS). As these payments are grants (not loans), neither students nor universities are required to repay the Government at any stage. The CGS grants are not available to international or full-fee paying domestic students.

The size of the annual grant varies between different streams of study. In 2017, there are eight different grant funding clusters (figure 1.1 above), ranging from \$2089 per EFTSL for the lowest cluster, to \$22 809 for the highest (DET 2016c). Combined with the three different clusters of student contributions, this creates 11 different resourcing levels per EFTSL across different disciplines. In addition to the basic grants, regional universities also receive a regional loading of between 5 and 20 per cent on their total CGS funding (depending on their remoteness), in acknowledgment of the higher cost of education delivery in most regional areas. In 2016-17, total spending on the CGS was expected to reach almost \$7 billion (DET 2017d).

The history and rationale for total CSP resources

Total resourcing amounts for each CSP are broadly associated with the cost of delivering courses in that discipline. As such, high-cost disciplines like medicine and dentistry have the highest resourcing rates, while low-cost disciplines like commerce and law have the lowest. However, these total resources are not subject to regular review, with the current relative levels having been mostly set around the same time that HECS was introduced in 1989 (Lomax-Smith, Watson and Webster 2011; Norton 2012).

Within the total resourcing amounts, variations in student contributions between disciplines reflect not just the different costs of course delivery, but also the future private benefits that students can generally expect to gain from their degree. Those disciplines with the highest expected private benefits are in the highest band of student contributions for CSPs. This includes law, commerce, medicine, dentistry, economics and accounting, which all have sizable expected private benefits compared to other disciplines. The link between student contributions and expected private benefits was explicitly acknowledged at the time contributions for CSPs were split into the existing three bands in 1997. A Senate inquiry report at the time noted that the 'three tiers of HECS charges reflect different average likely earnings for different careers, in addition to different course costs' (SEELC 1996). Similarly, Chapman (1997) noted that 'the new differential charges do not just reflect teaching costs, [but] ... in essence the new charge arrangements are a hybrid model, with both costs and the presumed benefits from studying in a particular course being given weight.'

These differing resourcing and cost-allocation formulas lead to considerable variation in the proportion of total resources provided by student contributions for each CSP. Students currently contribute approximately 84 per cent of total resources for commerce or law courses (which generally have a low cost of delivery, but high expected private benefits), compared to approximately 28 per cent for agriculture courses (which have high costs but more limited private benefits) (Lomax-Smith, Watson and Webster 2011; Norton and Cherastidtham 2015a).

Research funding

Australian universities also help to develop knowledge and new ideas that are critical to Australia's growth and its preparedness for emerging economic, social and environmental challenges (PC 2007). The universities generally perform well in research by global standards, although there are some areas for improvement, such as in research into business and management, and education (ARC 2015).

Total expenditure on university research accounted for about 30 per cent of all research and development (R&D) expenditure across the Australian economy in 2013-14 (equating to approximately \$10 billion). This was an increase of 129 per cent from the \$4.3 billion spent on university R&D in 2004-05 (ABS 2015; Watt et al. 2015).

The Australian Government provides direct funding for less than half of this expenditure (funding mechanisms outlined in box 1.2) — in 2013-14, total direct Commonwealth funding for higher education research was only about \$3.5 billion, or about a third of total research expenditure by universities (DIIS 2016).

Box 1.2 **Research funding arrangements**

Most direct public funding of higher education research is provided through a 'dual funding system', consisting of competitive grants for specific research projects and untied block grants.

Research block grants (RBGs) are not linked to specific research projects and are instead designed to cover the indirect (or fixed) costs of research and research training. For 2017, the Commonwealth has allocated nearly \$1.9 billion to RBGs. This funding is split between two programs, with over \$1 billion for the Research Training Program (supporting students undertaking higher degrees by research) and nearly \$900 million for the Research Support Program (provides block grants for the fixed, indirect costs of research).

Competitive grants fund only the direct costs of individual research projects and are peer-reviewed to ensure projects are selected on a merit basis. The Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) administer most competitive grants. Competitive grants to universities are estimated to total nearly \$1.4 billion in 2016-17, including \$740 million from ARC and \$630 million from NHMRC.

Sources: DET (2016g, 2016h, 2017b), DIIS (2016).

2 Research and teaching

2.1 The golden child and the forgotten progeny

Australian universities have two core functions: teaching their students and conducting high-quality research into a broad range of areas. These dual roles are not only historical, but are also a regulatory requirement (see section 4.1 below). Despite the institutional support for their dual teaching-research role, however, universities do not always undertake both with the same enthusiasm and energy.

The focus on research

Notwithstanding the critical role of their teaching function, universities tend to give pre-eminence and prestige to their research functions. Most academics are hired for their research capabilities and have less intrinsic interest in teaching. The poor reputation of teaching-focused roles has been noted, with an Australian Government report into teaching-only positions in universities observing wryly that:

There are a number of different titles being used to describe these new types of appointments including the charming title of 'teaching scholar' and the less charming 'not research-active'. (Probert 2013, p. 4)

As Probert then remarked a few years later:

Evidence suggests that research performance continues to be seen as the primary source of job satisfaction, status and reward in Australian universities (2015, p. 2)

Despite many Australian academic staff being employed on a balanced '40/40/20' workload basis (for the percentage of time split between research, teaching and administration), a 2011 survey found that 67 per cent wanted more research time, while only 15 per cent wanted more teaching time (Strachan et al. 2012). Similarly, Bexley, James and Arkoudis (2011) found that about 80 per cent of surveyed staff wanted to 'raise their publication profile' or 'find more time for research', while fewer than 30 per cent wanted to focus more on teaching. The authors also found that about 25 per cent of teaching-focused staff would like to incorporate more research into their role, compared to only about 5 per cent of research-focused staff who would like to do more teaching. Bentley, Goedegebuure and Meek (2014) found similar results, with 38 per cent of teaching-focused staff having a greater interest in research, compared to 8 per cent of research-focused staff for teaching.

Even where academic staff do have an interest in teaching excellence, they have few incentives to focus on it. Teaching-focused positions have a poor reputation, with many academics viewing it as a low-pay, low-progression and low-value career pathway (Bennett, Roberts and Ananthram 2017; Bentley, Goedegebuure and Meek 2014). Indeed, staff surveys indicate that while over 80 per cent of academics think that 'effectiveness as a teacher' should be highly rewarded in promotions, less than 30 per cent think it actually *is* rewarded (Bexley, James and Arkoudis 2011).

Decisions about *who* undertakes teaching also reflects the weight given to the function. Approximately 80 per cent of teaching-only staff were in casual roles in 2015, compared to less than 8 per cent for research-only positions.⁵ The majority of casual academic roles (75 per cent in 2015) are for staff with an academic classification below 'lecturer' (Level A staff, including associate lecturers and tutors; DET 2016j). These roles, particularly for teaching, are normally performed by part-time staff who are themselves students (generally studying towards a Doctorate). They often do not have teaching-focused career progression as a goal, likely do not have much experience in teaching, and may not be equipped with the teaching skills to perform the function well. It seems likely that a system where a significant share of the teaching is provided by junior staff with limited long-term teaching interest will *not* generate the best educational outcomes for students.

Although awards are given out annually for teaching excellence,⁶ these are often not valued by staff. More than 40 per cent of all staff did not rate such awards as 'important', including nearly 30 per cent of teaching-only staff (Bexley, James and Arkoudis 2011). In contrast, the comparable rate for research excellence awards was 26 per cent of all staff.

As international university rankings are based largely on research capabilities (box 2.1), this further encourages a focus on research. In particular, universities rely on their international rankings to attract footloose international students with limited first-hand knowledge of the Australian market. With these rankings focused primarily on research output, the universities have limited incentive to hire non-research academics with valuable teaching skills.

⁵ Indeed, 57 per cent of the growth in casual places between 2006 and 2015 was driven by the increasing proportion of teaching-only staff in casual roles (DET 2016j).

⁶ Particularly the Australian Awards for University Teaching, currently administered by the DET.

Box 2.1 International university rankings are a questionable indicator of teaching quality

The most prominent global university ranking systems (the QS World University Rankings, the Times Higher Education World University Rankings and the Academic Ranking of World Universities) are all heavily weighted towards measures of research performance. Staff research quality and publication and citation numbers receive between 60 to 80 per cent weightings.

Meanwhile, only between 10 to 30 per cent of the ranking weight come from teaching metrics, limiting the incentive to focus on improvements.

Sources: Dawkins (2014), QS (2016), Shanghai Ranking Consultancy (2016), THE (2016).

2.2 Student outcomes are often poor

Universities do not always produce good outcomes for students. While, *on average*, students obtain significant benefits from a university education,⁷ averages can be deceiving. Although measuring the quality of university teaching is difficult, several indicators, when considered together, point to significant room for improvements.

Graduate employment outcomes

On face value, employers tend to rate Australian graduate qualifications well. Over 92 per cent of employers rate the foundational and technical skills of recent graduates well. Nearly 93 per cent of supervisors found that the university qualification prepared recent graduates well for their current job (SRC 2017). At 3.1 per cent (in May 2016 for those with bachelor degrees), long-run graduate unemployment rates also remain low (ABS 2016).

However, these figures hide serious issues. The unemployment rate for younger cohorts is much higher (at 6.5 per cent for 24 year olds) (ABS 2016). The full-time employment rate among recent university graduates has been consistently falling for several decades (figure 2.1), and therefore cannot be ascribed to cyclical downturns such as the Global Financial Crisis. More recently, full-time employment for undergraduates has continued to fall even as the Australian economy has grown, declining from 85.2 per cent in 2008 to 70.9 per cent in 2016. Over the same period, parallel declines have been experienced by postgraduate coursework graduates (90.1 per cent to 85.1 per cent) and postgraduate research graduates (87.6 per cent to 80.1 per cent) (QILT 2016).

⁷ Aside from higher lifetime earnings (often in the order of several million dollars over a lifetime), university graduates also have, on average, lower rates of unemployment and less welfare dependency. Most university students also intrinsically enjoy studying and learning in their chosen field. There is also evidence that some graduates enjoy better health, are more satisfied with their careers and rate their social status higher than others (Norton 2012).

Many of those who do not work full-time are not in that position by choice, with an underemployment ratio⁸ for graduates of 20.5 per cent in 2016, compared to about 9 per cent across the economy (ABS 2017, table 22; QILT 2016). The underemployment ratio for graduates has increased strongly in recent years, from 8.9 per cent in 2008 to 14.1 per cent in 2010 (GCA 2011).

Based on their assessment of given graduates from given tertiary institutions, around one in six supervisors said that they were unlikely to consider or would be indifferent to hiring another gradate from the same university (SRC 2017). These results are likely, if anything, to underestimate the degree of employer dissatisfaction with tertiary training because opinions are only elicited for those graduates who have already gone through the 'fiery hoop' of successful job selection.



Further, many graduates are employed in roles unrelated to their studies, to which their degree may add little value. Nearly 28 per cent of recent graduates employed full-time in 2015 believed that their qualification was neither a 'formal requirement' of their job, nor even 'important' to it. Twenty nine per cent felt similarly about the importance of their skills and knowledge. These figures were near or above 50 per cent for graduates from certain fields, including humanities, languages, visual/performing arts, social sciences,

⁸ The share of employed persons who would like to work more hours.

psychology, aeronautical engineering, law, and life sciences (GCA 2016a). Around one in six supervisors also agreed, believing that the graduate's qualification was not important for the graduate's current employment (SRC 2017).

To the extent that someone without a costly university education could have undertaken these roles instead, this can then have cascading employment and income effects down the skills ladder. For example, if oversupplied graduates displace retail sales assistants without a university degree, then the displaced sales assistants may have poor labour market prospects, and struggle to be fully employed — a loss for them *and* the economy.

For those graduates who do get a full-time job, initial earnings have also grown modestly in recent years, with some evidence that graduate *starting* salaries have not increased as fast as wages elsewhere in the economy (figures 2.2 and 2.3). However, this could also reflect a more general widening of the relative wage gap between younger and older full-time employees, or the ongoing automation of many entry-level graduate positions (discussed in section 6.2 below).



^a Annual rate of MAWE is derived by averaging the May quarter in a given year and multiplying by 52. Source: GCA (2016b), using data from ABS, Average Weekly Earnings, various years, Cat. no. 6302.0.



^a The median salaries for bachelor graduates are for people employed full-time aged 25 years or less and in their first year of full-time employment, while the median salaries for the population are for full-time non-managerial adult employees (of all ages and experiences).

Sources: ABS, Employee Earnings and Hours, Australia, various years, Cat. no. 6306.0 and QILT (2016).

Student satisfaction

Australian student surveys suggest while most students are satisfied with overall teaching quality, a more forensic examination of student attitudes makes this overall finding somewhat inexplicable. Substantial shares are not satisfied with key aspects of their university experience, leaving significant room for improvement by the universities (figure 2.4). Issues in the 2016 survey results include:

- 38 per cent of students did not rate their acquisition of problem solving skills positively
- 45 per cent of students did not rate their acquisition of communication skills positively
- teacher concern for student learning was not rated positively by 40 per cent of students
- commenting on work in ways that helps students learn (a basic teaching outcome) was not rated positively by nearly half of university students (47 per cent)
- academic or learning advisors were not rated as 'available' by 39 per cent of surveyed students (QILT 2017).



Figure 2.4Students are often not satisfied with their coursesPercentage of students who did not give a positive rating, 2016

Further, in spite of the ongoing shift to a demand-driven (also referred to as 'student-centred') system, these numbers have largely not improved since they were first collected in the University Experience Survey in 2012 (ACER 2012).

Tellingly, 37 per cent of recent graduates in 2016 also did not classify their university's undergraduate teaching as at least 'good', with this proportion reaching over 50 per cent for those who studied engineering or medicine. There are significant differences between universities too, as overall student satisfaction with the quality of the entire educational experience varied between 71.5 and 91.1 per cent across universities in 2016 (QILT 2016).

Rates of attrition and non-completion

Non-completion of a degree is an obviously poor outcome. It results in students wasting considerable resources (in time and effort, as well as money), while taxpayer funding for such students is also squandered.

Students who do not complete their degrees also receive minimal financial benefit from the courses that they *have* completed. Research shows that higher education generally does not provide cumulative additional earnings as courses are completed, but instead provides a

'jump' in additional expected earnings after the final completion and accreditation of the degree — this is known as the 'sheepskin' effect (Herault and Zakirova 2015; Hungerford and Solon 1987; Jaeger and Page 1996).

Despite legal requirements for universities to ensure that their student intake is capable of undertaking study and to support them during the process, non-completion rates remain substantial. In 2014, more than 26 per cent of students had not completed their degree program within nine years of commencing (DET 2017c). Recently, rates of attrition and non-completion have been trending upwards, with short-term attrition rates rising from 12.5 per cent in 2009, to 15.2 per cent in 2014 (HESP 2017).

Although these rates remain within their historically normal ranges (following a period of decline from 2005 to 2009) and a few outlying providers have driven much of the increase, the upward trend may continue. In particular, the measures of long-term non-completion do not yet include any effect of the shift to a demand-driven system (which, using nine-year cohort analysis, would only become apparent in the mid-2020s). There is a risk that, given burgeoning demand, there may be a greater proportion of students who are not academically prepared for university, and who subsequently struggle (box 2.2). This not only includes students who may have performed poorly in senior secondary school (as measured by their Australian Tertiary Admission Rank, or ATAR), but also students with marginal attachment to the university or engagement with their learning (such as some mature-age or part-time students). Indeed, research suggests that these three factors — age, part-time attendance and ATAR — are among the strongest observable predictors of student attrition (HESP 2017).

Box 2.2 Low ATARs are important to outcomes, but not decisive

Attrition and completion rates are strongly correlated with the academic preparedness of commencing students (or, as an imperfect proxy measure, a student's Australian Tertiary Admission Rank — their ATAR):

- Although the annual attrition rate of students with an ATAR above 95 was less than 5 per cent in 2014, it was about 20 per cent for students with an ATAR of between 50 and 59 (HESP 2017, p. 31).
- Similarly, while less than 4 per cent of students with an ATAR above 95 had left university without a degree after nine years, nearly 40 per cent of those with an ATAR of 50 to 59 had done so (DET 2017c, p. 22).

The number of students with lower ATARs who are attending university has also been growing over recent years, particularly after the introduction of the demand-driven model. Between 2010 and 2016, average ATARs for undergraduate university offers fell from almost 80 to 76.4 per cent, while the share of applicants receiving an offer with an ATAR of less than 50 increased from 0.8 per cent to 2.9 per cent (DET 2016k; see figures below).

However, the link between poor academic preparation and attrition is not permanent. In particular, students who undertake pathway programs and enabling courses prior to commencing a degree often outperform their higher ATAR peers (Kemp and Norton 2014; Pitman et al. 2016).



Average ATAR of undergraduate offers

Share of undergraduate offers by ATAR band^a

^a Nearly 60 per cent of undergraduate applicants do not apply with an ATAR, largely because they are not Year 12 students and have previously undertaken university or VET study, although may not have completed their previous course (DET 2016k).

However, these factors still explain only a small portion of the observed attrition rates. For instance, each decile of an ATAR score only explains about 2 to 4 per cent of the variation in student attrition or completion rates (DET 2017c, p. 8; HESP 2017, p. 39).

The overwhelming majority of variation in student attrition rates reflects unexplained individual factors. These factors, while possibly observable, are not recorded in the data, and can include the motivation of a student, their financial security and personal or health-related factors. Of the explained variation, much of it also comes from university-specific factors, with attrition higher for universities when:

- the university is smaller
- the university has a larger proportion of external enrolments
- the university admits a greater proportion of students on the basis of prior VET qualifications
- the proportion of postgraduate enrolments is lower
- the proportion of senior academic staff is lower (HESP 2017).

Further, the extent to which the introduction of the demand-driven system has contributed to rising attrition rates depends on how universities respond to this burgeoning demand. Adjustments to admissions criteria, student support systems and access to pathway courses can offset the risks of student attrition. Some initial analysis in the period leading up to the formal start of the demand-driven system (2009–11) suggests that there are not yet any major problems, although more data and continued monitoring is needed (Pitman, Koshy and Phillimore 2015).

International comparisons

Although Australian employment outcomes for university graduates are good compared to some countries (such as Italy or Greece), they are more mixed when compared across the Organisation for Economic Cooperation and Development (OECD). In particular, Australia's employment rate in 2015 for 25-64 year olds with a bachelor degree or equivalent was only slightly above the OECD average (which itself was dragged down by the dismal performance of some countries; figure 2.5). On unemployment rates for the same group, Australia does comparatively well, although still ranking below Germany, the US, the UK and New Zealand (OECD 2016).

The limited information available also indicates that Australian students are less satisfied with their higher educational experience than counterparts in the United States (measured by the National Survey of Student Engagement or NSSE) and the United Kingdom (measured by the National Student Survey or NSS) (figure 2.6).

2.3 Are universities responsible for student outcomes?

Universities are only partly responsible for student outcomes. Much of this reflects students' inherent capabilities, which can limit the value of a university education. Other students make choices (both at university and once they have graduated) that can limit their

long-term benefits from university, while still others have individual preferences that, while good for the individual, may not show up as a 'successful' outcome in the data (such as a focus on the non-monetary benefits of some jobs).

Many other poor outcomes are a result of the broader context in which university education is provided. For instance, difficult labour market conditions and sheer luck play a decisive role in the value that a given individual gets from their education.



^a Employment rates measured as percentage of employed persons among all 25-64 year olds. *Source*: OECD (2016, table A5.1).





Student ratings of the quality of overall educational experience (% positive rating)

Nevertheless, universities still have considerable control over a range of factors that can influence the outcomes for their students. For instance, universities can control:

- teaching quality (through teaching proficiency and innovation, pedagogic methods, curriculum, links to employers and flexibility of access), which affects eventual human capital development and the relevance of graduate skills
- the pre-commencement information provided to prospective students, as well as the process of screening them prior to offering a place, to better match students to appropriate courses and maximise the likelihood that they will benefit from their university education
- student support mechanisms, both inside and outside the classroom (including course guidance, onsite childcare facilities, personal and health services, student counselling, financial hardship assistance, and academic support workshops) so that students have the necessary support to achieve high quality outcomes
- helping students match their qualifications with job outcomes, through high quality career advice and the involvement of employers in universities.

As such, many of the services that universities provide can be crucial to ensuring that the student's full potential is met.

Universities can play a significant role in preventing attrition

Universities can also strongly influence student attrition and completion rates by:

- ensuring that admissions criteria increase the prospects of students successfully completing their degree program
 - This might be achieved by giving more weight to ATARs, as low ATARs are strongly correlated with future non-completion (HESP 2017). However, it would be in universities' interests to identify individuals within lower ATAR bands that have good prospects, as ATAR only explains a small amount of variation (discussed in section 2.2). Accordingly, universities would likely move towards more sophisticated entry assessment, including using aptitude tests, considering extra-curricular activities, conducting interviews, and assessing motivation to study (which appears to be a major determinant of completion rates; see McMillan 2011).
- providing (and advertising) a wide range of support services for students during their degrees, to aid their capacity to fully engage in their studies (HESP 2017)
 - Even when student attrition might be viewed as either 'unpredictable or inevitable' (such as because of financial pressures or mental health issues; see Harvey, Szalkowicz and Luckman 2017), universities can still affect the outcome by providing ongoing student support and presenting more flexible pathway options.
- encouraging students to undertake pathway or enabling courses prior to university commencement
 - These courses can help to improve academic preparedness by assisting students to develop essential academic skills in smaller, more intensive classes, and generally have the option of obtaining a diploma-equivalent qualification, instead of proceeding to a full degree. Kemp and Norton (2014) found that enabling courses largely negate the effects of low ATAR on completion and success rates.
- presenting and promoting alternatives to complete withdrawal from university, such as temporary deferment, program or campus transfer, and more flexible degree pathways (including external or part-time study) that may better suit the student's circumstances (Harvey, Szalkowicz and Luckman 2017)
- re-engaging students who have dropped out and offering support and flexibility for a return to study, should their circumstances have changed (Harvey, Szalkowicz and Luckman 2017)
- providing more information to prospective students about the content of course programmes and the expectations of universities (HESP 2017)
 - Empirical evidence in both Australia and the UK suggests that the primary reason for non-completion was that the student found that the course was different from

what they had expected — a costly informational deficit (McMillan 2011; Yorke and Longden 2008).⁹ While universities could play the major role in providing such information, there are also strong grounds for cooperative approaches involving schools. The recommendations of the Government's Higher Education Standards Panel (HESP) to improve admissions transparency (discussed in section 3.2 below) should also go some way to addressing this information deficit.

Some universities are already undertaking many of these activities in an effort to reduce attrition rates and appeal to a broader and less traditional range of students, who may nonetheless have an aptitude and motivation for university-level education (see box 2.3 for one example).

Box 2.3 You are more than just your score

The University of Notre Dame's (UND's) admissions process only accepts direct applications to the university and considers features of a prospective student's performance beyond their ATAR. Indeed, applicants are not even required to have an ATAR to apply, as other academic results can also be considered (which means a number of early offers are made to students who are still in Year 12).

Applicants to UND are required to submit a personal statement on why they want to study at UND and what motivates their course choice, as well as sit for an interview with university staff. There is also a strong emphasis placed on extracurricular activities, including leadership roles.

The result is a student body that has a relatively low rate of attrition (9.5 per cent) when compared to the national average (15.2 per cent) in 2014. Further, once other characteristics of the student body are accounted for, UND's relative performance on attrition measures is even better, becoming one of the top performing university in Australia, comparable to the highly-ranked Group of Eight (HESP 2017, p. 38).

Sources: The University of Notre Dame (2017) and Singhal (2017).

⁹ Similarly, emerging results from a large-scale survey of year 12 students in SA found that 35 per cent say they find it difficult to understand university program options and information (Nardelli 2017).

3 University incentives

3.1 **Poor incentives create poor outcomes**

The university sector is not the sole architect of the issues in its teaching functions and its focus on research. The structure and behaviours of the universities have been conditioned by the 'market' design limitations, regulatory restrictions, and funding and institutional incentives imposed on them by successive Australian Governments. Universities, much like other economic agents, respond to the incentives that they face.

Part of the reason why universities focus more on research prestige and less on teaching outcomes may be because they do not face sufficient incentives to improve the latter. This includes not just financial incentives (such as those created by the Government-controlled subsidies, funding and student contribution caps), but also the institutional and regulatory incentives (particularly 'market' design issues and regulatory controls imposed by the Government, which can limit competition between providers).

More closely aligning the interests of universities with those of the people they serve — students and taxpayers — could be one mechanism to drive improvements in student outcomes. The objective would be for universities to respond by improving their teaching quality and effect on human capital development (including through improved career prospects for teaching-focused staff, increased teaching innovation, enhanced pedagogical methods, greater links to employers or strengthened student flexibility). Further, improved incentives would encourage universities to consider the effect of their admissions criteria, pre-commencement information and ongoing student support services on student outcomes.

Improvements to the value of university teaching functions would also have productivity benefits in the broader economy. This would occur though:

- greater human capital development by improving the value and relevance of the skills and knowledge that students are taught during their degree
- better matching of students to the universities and courses that suit students' long-run interests (reducing the costs associated with wasted education investments)¹⁰

¹⁰ An ancillary benefit may also be that doubtful HELP debts are reduced, incidentally reducing costs for taxpayers. This would occur through improved student outcomes that increased their capacity to repay the HELP loans, although this is not the explicit goal of such reforms.

However, creating, designing and implementing new incentive structures for institutions as complex as universities is not easy. There is considerable risk that, in realigning the incentives of universities, other, unexpected new incentives may also be created. This could lead to universities altering their behaviour in unanticipated ways, with undesirable consequences. One example of this would be the risk that performance-contingent funding (discussed in section 3.4 below) encourages universities to focus on only the relevant metrics, rather than achieving the broader objective that the metrics are supposed to create (that is, 'gaming' the system).

As a result, the policy options presented below are generally only discussed as *potential* changes, rather than recommendations, as further work would be needed on development and testing, as well as the full range of impacts, prior to implementation.

The VET sector could also benefit from many of the potential options for universities

Realigning the incentives of education providers closer towards the interests of students and taxpayers applies equally to the VET sector, which shares many similarities with the university sector, as well as many of the same weaknesses and shortcomings.

As such, most of the ideas discussed in this paper could also be transplanted to the VET sector, with only modest changes or modifications. This includes: improving information availability for student outcomes (section 3.2); enhancing the consumer rights of students (section 3.3); and making public funding for providers contingent on their ability to deliver valuable student outcomes (section 3.4). As with the university sector, however, further consideration of the policy changes and consultation with affected parties would be needed.

3.2 Better information on outcomes

A first step towards improved incentives for universities is to expand the range, depth and availability of information about university teaching quality and student outcomes. Despite the range of indicators highlighted above (section 2.2), the full extent of the problem in teaching outcomes remains opaque. Partly, this is because measures of 'good' teaching quality and 'satisfactory' student outcomes remain elusive and difficult to define. Teaching quality also has several dimensions, aside from being difficult to measure. It is not all about the theatrical or performance capacities of teachers, but consists of their skills in converting knowledge into learning. It also encompasses the breadth, depth and relevance of the syllabus.

But, even given those difficulties, the existing sources of information remain insufficient and will need to be improved if better outcomes are to be achieved (and measured).
For one, improved information on teaching and learning outcomes in Australian universities would help universities to shift their focus away from existing metrics (such as international rankings) that are biased towards research capability. This would create incentives for them to focus more on the quality of their teaching and enhancing student outcomes. Indeed, as put by an Australian Government Minister: 'nobody wants to be on the front page of the newspaper as having a lot of un- or under-employed graduates' (Birmingham 2016b).

Further, better sources of information on relative teaching quality and student outcomes of different universities would enable students to make better-informed decisions between universities and subject areas (see Supporting Paper 3 for a discussion of comparative performance indicators). This would help to overcome the information asymmetry and result in lower costs, as insufficient information in the market can lead to poorly informed choices by students, wasting resources for them and taxpayers (IC 1997). It would also better enable universities to determine what student support mechanisms or teaching methods actually contribute towards improving student outcomes.

Given the considerable time, effort and money that is poured into higher education by students and taxpayers alike, the Australian Government has already acknowledged that information about university quality needs to be improved, with a range of measures currently being implemented (box 3.1). However, further work will be needed, after the current improvements are completed, in order to plug the remaining gaps in university information provision.

In particular, over the long-term, QILT will also need to be expanded to include value-added measures that account for the innate abilities of the graduates and measure the additional benefit that students obtain from each university. Unadjusted measures of student outcomes can disguise better teaching outcomes at institutions that lack the same prestige and reputation, but which can provide a better value-add to their students (Kim and Lalancette 2013). As noted by the OECD:

Top universities that attract A+ students and turn out A+ graduate[s] surprise no one. But what about universities that accept B+ students and produce A+ graduates? Which is doing the better job? (OECD 2013)

Producing measures of the actual value that universities have provided to students would help to level the playing field between the high-prestige Group of Eight (Go8) universities and newer or regional universities. As university qualifications can be a noisy signal of the skills and capabilities of graduates, employers often give considerable weight to a university's reputation for delivering quality graduates (their 'prestige'). This can become self-reinforcing, as many of the most academically prepared students self-select into more prestigious universities (Baldwin and James 2000; Harvey 2017).

Further, there is a pressing need to develop good data and open it up to researchers in order to conduct and publicly report research on the genuine impacts of universities.

Box 3.1 Let there be light: Existing measures to improve information availability

QILT data and website

The 2014-15 Budget announced a new Quality Indicators for Learning and Teaching (QILT) website (replacing the previous MyUniversity website) to present and compare survey outcome data on university experience, graduate outcomes and employer satisfaction between universities (Australian Government 2014a, 2014b).

Further developments of the QILT website and underlying data were announced in the 2016-17 Budget, including additional data on labour graduate market outcomes, employer satisfaction with graduate skills and work readiness (including a breakdown by different subject areas) and information about courses, fees and admissions (Australian Government 2016a).

Improved admissions transparency

In October 2016, the Higher Education Standards Panel (HESP) recommended 14 different reforms to improve the transparency of higher education admissions, including publishing information on admissions processes in agreed templates to facilitate comparisons and using common and consistent language to describe ATAR thresholds and other admissions requirements (HESP 2016).

The Government announced that it accepted all of HESP's recommendations in December 2016, with additional funding to implement the changes allocated in the 2017-18 Budget. Implementation of the recommended changes began in July 2017, with the full range of reforms anticipated to be in place by 2019 (Australian Government 2016c, 2017b; Birmingham 2017b).

One low-cost way to do this is to enable trusted users to access linked existing datasets, particularly administrative datasets. For instance, combining the administrative data on student enrolment and achievement (already collected by universities) with administrative data from other government agencies (particularly from the Department of Human Services and the Australian Taxation Office) would enable the outcomes of individual students to be tracked over time. This could shed light on a range of different policy-related questions, including:

- the effect of student attrition on HELP repayments
- the links between ATAR and long-run student outcomes
- the relative value-add provided by different degrees within different universities.

Although such research would have to be treated carefully in order to protect the privacy of students, publishing de-identified results would not only be informative to students, but could also provide information to universities about what works in different contexts to create the best possible student outcomes.

The key point is that, as in so many other policy areas, good data and its availability to trusted parties are going to play a large role in establishing the genuine impacts of universities on student outcomes.

3.3 Consumer rights and restitution for inadequate educational quality

Competitive markets for normal goods (such as consumer electronics) are generally covered by an implied warranty under the Australian Consumer Law (ACL) for faulty or inadequate products. These kind of warranties reinforce the rights of consumers to expect decent quality products and create strong incentives for the provider to ensure high-quality provision. Equally, providers that make misleading or false claims about the nature and quality of their products would also be liable under the ACL, as this would constitute misleading conduct.

Although the nature of the products provided by the higher education sector (both universities and non-university providers) is different to those in other markets, the basic principle of protecting consumer (student) rights in a competitive market and enabling them to seek restitution for inadequate product quality is sound.

The main barrier to the use of the ACL for educational services has historically been whether, for a Commonwealth-supported student, universities passed the test of being engaged in 'trade or commerce' — a necessary prerequisite for action under the statute. That barrier appears to have weakened with the adoption of a demand-driven system, which more clearly recasts universities as commercial agencies engaged in trade or commerce (Corones 2012; Fletcher and Coyne 2016; Nguyen and Oliver 2013). That has not only opened up the possibility of legal action for misleading conduct (for example, a university that marketed a course as led by an internationally renowned academic when it was not), but also for provision of inadequate services.

Equally, the requirement under the ACL for suppliers to exercise 'due skill and care' could, in principle, relate to setting admission standards, curriculum design, course delivery, support for students, supervision quality and 'fitness for purpose' of a qualification (Corones 2012, pp. 11–12). The development of standards monitored by the Tertiary Education Quality and Standards Agency (TEQSA) would provide a possible benchmark for legal action by students. The addition of the unfair contracts regime into the ACL may also expand the scope for student legal action (Goldacre 2013).

There nevertheless remains uncertainty about whether a student could, under the existing legislation and associated instruments, successfully pursue a case against a university for a low quality course (Cohen 2016 versus Fletcher and Coyne 2016). Although universities appear to be covered by the existing ACL provisions, there seems to be no successfully prosecuted case in Australia, nor a flood of claims yet to be decided.

Part of the difficulty under the existing provisions may arise because a party making a complaint would need to show how the university had provided a sub-standard service. A poor labour market outcome would not (in isolation) trigger any restitution unless the university had provided a guarantee that successful completion of a qualification would lead to good job outcomes.

Although a lack of successful cases has also been present in the United Kingdom and the United States, recent developments suggest that the global landscape for litigation may similarly be changing (box 3.2).

A legal commentator has recently concluded that: 'In Australia, a successful claim by a student for compensation for careless or incompetent teaching practices may well be just a matter of time' (Cohen 2016). With virtually no jurisprudence, it is impossible to determine the likely number of future claims, let alone their possible effects on university conduct. However, it is notable that law firms are warning universities to undertake strategies to avoid liability, such as having good quality control procedures in place for staff, random supervision of lectures and solicitation of student feedback.

Box 3.2 International changes — making consumer law great again?

- In March 2017, a US federal judge approved an agreement under which President Trump will
 pay US\$25 million to settle three class-action lawsuits relating to alleged problems in the quality
 of particular educational programs at Trump University (Eder and Medina 2017). Settlements
 have no precedent value because a party may decide to settle even if they expect to win in
 court (a point emphasised by President Trump). Regardless, the mere existence of settlements
 provides an avenue for claims by students. Settlements usually occur where is at least some
 prospect of success by the plaintiffs, whatever the particular merits of a given case.
- In the United Kingdom, the Competition and Markets Authority (the UK equivalent to the Australian Competition and Consumer Commission) has clarified that the newly enacted *Consumer Rights Act 2015* applies fully to higher education providers (CMA 2015). The result is that, among other things, universities must provide services with 'reasonable skill and care', must not include unfair contract terms, and must not misrepresent the nature of their courses. A new feature of the Act is that a student would have a 'right to require repeat performance' (s. 55) a right to return if the university's performance was below that implicit in its contract. That might arise because of the poor quality, organisation or supervision all of which would breach the requirement for reasonable skill and care. The right to return may only relate to a part of the course. A student could alternatively seek damages or a refund.

Policy options in Australia

The Australian Government has a range of different approaches open to it, given domestic and international legal developments:

- do nothing further, letting parties and courts determine the extent to which the current ACL provides remedies for students who have been given poor quality educational services
- change the ACL to include some of the features of the UK *Consumer Rights Act 2015* (particularly some provision that emulates section 55)

• develop *complementary* approaches to provide restitution outside the ACL, such as through alternative dispute resolution arrangements activated by a formal complaints mechanism.

Given the relevance of the existing ACL provisions and an apparent lack of pressing need for change, the most prudent short-term option would be to allow the current law to stand and for the courts to develop legal precedents over time.

However, continued monitoring of the outcomes of the UK experience should also be undertaken. If, after several years, the new UK arrangements have had significant positive effects on universities' conduct, it would then be worth considering adoption of similar provisions in Australia. In particular, this would involve making it clear that the ACL *does* relate to higher education and giving the student the right to a refund, other compensation or the 'right to a repeat performance'¹¹ in the event of unacceptable teaching quality.

3.4 Introducing 'skin in the game'

Another way to increase universities' incentives towards improving student outcomes is for the Government to create a financial liability — so-called 'skin in the game' — in the event that students obtain a poor outcome. It is not a new concept here or overseas. A variety of proposals have been suggested, including in Sharrock (2015), Tourky and Pitchford (2014), Knott (2015), Harvey (2017) and Goedegebuure and Marshman (2017). Some of the participants in the Commission's Productivity Conference in December 2016 also raised the importance of incentives for universities to provide a quality education.

Performance-contingent funding

One model of 'skin in the game' is to impose a penalty on (or provide a bonus for) a university that achieves poor (good) outcomes for its students as a group. This could be targeted at the extent to which a university added value to the labour market outcomes of students or achieved broader, non-labour market social objectives. Sophisticated statistical analysis across universities could, in principle, identify the extent to which universities' actions affect outcomes, which could be the basis for rewards for good (or penalties on poor) performers.

¹¹ Restitution through a 'right to repeat performance' would be distinct from the wider 'right to return' or 'right of access' at the individual's own expense that is already broadly available in Australia. For example, there are no age or time limits on who can access a CSP and no monetary limit on the amount of HECS-HELP debt that CSP students can take out over their lifetimes (although there is a non-renewable lifetime cap on combined FEE-HELP and VET Student Loans; see section 1.2 above).

However, the in-principle attractiveness of such arrangements may be less alluring on closer inspection (SP 3). In particular, there are challenges to implementation that may frustrate the goals of performance-contingent funding. On the other hand, these challenges are unlikely to be any more significant than those faced by the continued rollout of incentive-based funding in healthcare systems around the world. As such, although they require careful consideration, the challenges should not be used to justify abandoning any attempt to measure the quality of higher education teaching.

Performance-contingent funding is not new to Australia. Between 2006 and 2008, the Learning and Teaching Performance Fund (LTPF) provided \$220 million of performance-contingent funding, based on a range of measures (including student retention and progression, student satisfaction scores and graduate outcomes). However, the program was heavily criticised and eventually abandoned as the majority of funding was consistently awarded to the Group of Eight universities, despite an intention to highlight the merits of less research-focused universities (Probert 2015, p. 28). Further, in the absence of simple methods of measuring teaching performance, the LTPF metrics instead relied on proxies, which the universities disputed and criticised (Chalmers 2007; Probert 2015).

As part of the 2017-18 Budget, the Australian Government announced plans to introduce a variant of performance-contingent funding. From 2019 onwards, 7.5 per cent of total CGS funding to each university will be contingent on the university's teaching performance, with any withheld funds to be reinvested into high-performing universities, measures to improve equitable access, or additional research funding (Birmingham 2017a).¹² The exact design is still to be developed and could change following consultation.

Accordingly, there is value in identifying the multiple requirements for a good model of performance-contingent funding (summarised in box 3.3).

Reliable measures of the right outcomes

Performance-contingent funding needs objective measures of success or failure that are comparable across universities. Initial indications suggest that the Australian Government's recently announced metrics are likely to cover student satisfaction, data transparency, adequate financial management, student retention and completion rates, and employment and student outcomes (Birmingham 2017a). However, post-graduation employment and labour market outcomes are likely to be hard to equitably measure and

¹² In 2018, the funding will be dependent on participation in admissions transparency reform, cost of education and research transparency initiatives, while the Government works with the sector on developing 'robust' metrics for introduction in 2019 (Australian Government 2017b, p. 27).

will be subject to contention, as universities have very limited control over student choices once they graduate (as discussed in section 2.3 above).¹³

Box 3.3 The design of performance-contingent funding

Introducing adequate performance-contingent funding measures for universities would involve:

- development of Student Reported Experience Measures (SREMs) and Student Reported Outcome Measures (SROMs) for universities, drawing on lessons from PREMs and PROMs in health care
- the use of different SREMs and SROMs between domestic and international students, by discipline and degree level
- risk adjustment of performance measures to derive the value-add of universities
- testing the reliability of year to year performance measures, and if volatile, use rolling averages as performance measures for incentive payments
- setting a minimum acceptable performance level, such that universities falling below that level would lose access to CGS funding and their 'university' status
- withholding a share of CGS funding up to a maximum share for any given university that is performing poorly, with the withdrawal share proportional to the deviation from a defined threshold (with that threshold set higher than the minimum required standard)
- rewarding improvements beyond the desired teaching standard with additional payments, which should be known by universities ex ante
- commencing with a low share of funds at risk (less than 7.5%) during the implementation of
 performance incentives, moving this up incrementally based on observed effects on the conduct
 of universities and their financial viability.

In designing the scheme, it would also be desirable to consider:

- sharing some of any withdrawn money with students affected by poor quality
- contingently holding back funding from universities falling below a given threshold performance, with requirements for an improvement plan, which if successful, restores funding
- using measures of cost-effectiveness, not just overall quality.

Measures of student satisfaction could also be made more robust by creating an equivalent to patient-reported experience measures (PREMs) and outcome measures (PROMs) for higher education. These healthcare measures capture a person's perception of their clinical health (plus any improvements since treatment) and their customer service experience in a quantifiable and comparable format (for more details see chapter 2 in the main report and SP 5).

There are also grounds for differently structured incentive payments and performance measures for international students compared with domestic students, taking into account

¹³ The introduction of independent assessment would provide a more concrete, less subjective measure of relative teaching performance between universities (as discussed in chapter 3 in the main report).

the different needs and preferences of these two distinct student populations. For example, process measures of teaching quality (such as the availability of pathway courses and support for students with less high standards in English proficiency) might be given higher weight for foreign students.

Sensible adjustment choices for confounding factors

As noted by Gardner (2017), it can be unfair (and inefficient) to compare universities with different mixes of subjects and students. A university should be rewarded for adding value, not for their prowess in selecting demographic groups with traits that are associated with good outcomes, regardless of the teaching quality of the university.

Addressing this requires risk-adjustment for the nature of the student body. In particular, the demographics of the student body at each university should be standardised, so that universities are not encouraged to discriminate against demographic groups that have typically poorer outcomes. For example, adjustment could reflect low socioeconomic status, student gender ratios, Indigenous student proportions, student discipline choices, and regional or remoteness factors. Other factors correlated with poor performance could also be added where discrimination against those students would be undesirable. However, risk adjustment should not include ATARs, as one of the goals of performance measures is to encourage universities to set entry criteria that lead to good outcomes.¹⁴

Setting the 'right' penalty (or bonus) levels

The Government has announced that 7.5 per cent of total CGS funding will be performance-contingent. As this proportion appears to be somewhat arbitrarily chosen, it is important to consider further. If the proportion of funding that is performance-contingent is too high, universities can bear disproportionate responsibility for risks that are not wholly under their control. Further, universities can also face short-term funding uncertainty if the proportion is too high, inhibiting their ability to plan and invest for the long-term (Gardner 2017).

However, if performance-contingent funding is too low, there will also be minimal incentives to change behaviour. Given uncertainty about the reliability of performance metrics and the behaviour of universities, a prudent approach would be to proceed incrementally, with the proportion of funding that is performance-contingent increasing each year.

¹⁴ The implication is that risk adjustment would take account of unchangeable traits (like ethnicity, gender, family income, and region) for any given ATAR.

Determining the 'right' period over which outcomes should be assessed

Many performance measures exhibit 'regression to the mean' so that good performance at one time is often followed by a worse outcome. The extent to which this occurs is an empirical issue that should be tested with performance data. If there is year-to-year volatility, moving averages of performance measures (such as performance over the past three years) may be preferred to a measure relating only to a single year.

The form and choice of any penalties and bonuses is important

Deciding whether the incentive relates to competency or proficiency

Under a competency-based system (depicted by the incentive structure shown in panel C in figure 3.1), a university is penalised if it is below some standard, and receives no benefit for exceeding it. This creates strong incentives to avoid falling below the desired standard, but few incentives to go beyond it. It effectively means that the incentive to improve only relates to poorer-performing universities.



Under a proficiency-based system, the more a university improves its standard, the more funding it receives. This creates uniformly strong incentives to improve teaching quality. There are several ways of designing a proficiency-based system.

- (i) Under a 'winners and losers' system, universities that fall below the desired standard are penalised, while those who rise above it are rewarded (panel A in figure 3.1)
- (ii) Under a 'winners all' model, any university that performs better than the minimum standard required for accreditation as a university (point (a) in in figure 3.1) receives some rewards, with those rewards rising as they increase their performance (panel B). No university loses any of its initial entitlement.

Both proficiency measures provide similar incentives for universities. Their biggest effect is on funding pressures for the Government. For example, if the proportion of funding that is performance-contingent is 5 per cent, then under a 'winners and losers' scheme a university at the minimum acceptable standard (a) would lose 5 per cent of its funding. However, if it reaches the desired level it receives all of its current funding and gains up to 5 per cent if it exceeds that level. Accordingly, if a sufficient number of universities performed better than the desired level, total Government funding for universities would exceed the current level.

Under a 'winners all' model, universities receive all of their current funding, and the more they exceed the minimum acceptable level (a), the greater their additional funding. This would increase budgetary outlays by an even greater extent than the 'winners and losers' system.¹⁵

Both systems involve ex ante certainty about the incentive *structure* for universities (the funds gained for any given improvement in performance), but entail uncertain ex ante budget outlays for the Australian Government. However, any higher than expected budgetary outlays that may occur under the systems may be desirable if they help stimulate (and fund) high levels of teaching performance. In any case, if the incentive payment is initially modest, the budget risks are also small. As the Government learns more about the actual performance of universities, it can re-calibrate funding and incentive payments to levels that match its appetite for budgetary risk.

Further, both incentive payment models also involve uncertain *total* funding for each university, as the levels of achievement are only known ex post. However, any performance-contingent funding system must have this effect, as performance cannot be known beforehand.

The Australian Government's May 2017 announcement is a variant of the 'winners and losers' model. It also provides for the possibility of well-performing universities obtaining a bonus if ex post they exceed some standard. However, as the proposal appears to cap the total size of the bonus to be no larger than the penalties on poorer performing universities, it does not provide any ex ante clarity about the incentive structure. For example, a high-performing university might receive \$100 for every percentage point increase in its performance or \$1 million. (Imagine tax rates on personal income that taxpayers did not know about until they had filed their tax returns.) Panel D (of figure 3.1) provides a graphical representation of the proposed structure, with the shaded area indicating the full range of possible rewards that a high-performing university might obtain (from nothing, if all universities perform above the standard, to a great deal if only one university shines).

¹⁵ Of course, the Australian Government could respond to cost pressures by simply reducing overall university funding, such that the expected total funding after the payments from the incentives scheme were taken into account would be the same as without. In that instance, models (i) and (ii) are effectively the same.

The uncertainty associated with the incentive structure is likely to reduce university incentives to raise standards.

The advantage of the Government's chosen model is that it provides budgetary certainty. However, there is arguably a trade-off between budgetary certainty and the incentives for higher-performing universities. For the sake of simplicity, if the Government wants fiscal certainty, it might be better for it to adopt a competency-based system (panel C), and simply reinvest any withheld funds into additional university research or measures to improve equitable access (also options for allocating funds flagged by Birmingham 2017a).

Encouraging poor performers with the scope for a second chance?

An incentive structure could instead concentrate on raising the performance of the most poorly performing universities by giving them a second chance (a variant of a competency-based model). This would entail identification of universities that are below some standard, require them to create a remedial plan as a pre-condition for avoiding withdrawal of a share of their funding, and then allow them to keep such funding if they achieved a desired performance target over some agreed period. This would leave all well-performing universities outside the incentive arrangement, would encourage genuine strategies for improvement by poorer-performing universities, and would provide lessons about how to make improvements (given that the outcomes of different kinds of remedial plans could be tested over time). Although it has merit, such an approach also clearly lacks the capacity to encourage improvements in teaching quality above the desired threshold for well-performing universities, in contrast with a 'winners and losers' model.

Recognition of trade-offs between quality and cost?

All of the above incentive structures only operate along one dimension — teaching performance standards. There may also be grounds to recognise that there is always some trade-off between quality and price.

While currently universities tend to adopt common student fee contributions for CSPs, this may not always be true in the future. Depending on its design, performance-contingent funding runs the risk of penalising universities that offer students lower quality courses (that were nevertheless above a critical regulated threshold) at a much lower cost. Were this penalty deemed undesirable, then contingent funding should take into account the *cost-effectiveness* of quality, not just quality per se.

Compensation for students?

Under any of the above models, withheld funding from poorer universities either goes to the Government or better-performing universities. As an alternative, funds held back from poorly performing universities could instead be partly distributed to the students badly served by those universities. This would require identification of the courses where university performance was deficient and monetary measures of the degree of inadequacy across different courses — a complex, but not insurmountable task.

4 Teaching and research roles

4.1 The teaching-research nexus

Much of the rationale for universities' joint role in research and teaching functions rests on the premise that a university's research function improves the quality of its teaching. Some claim that access to world-class researchers makes students more engaged, develops their critical thinking, aids their research skills and keeps them up to date with the latest research findings (Cherastidtham, Sonnemann and Norton 2013).

However, there is no compelling reason why these skills and attributes cannot be nurtured by non-research academics and teachers. For instance, researchers do not have an exclusive capacity to keep up to date with the latest research findings. Further, the skills and attributes that make an academic a good researcher will not necessarily also make them a good teacher. In trying to do both functions, universities (and their staff) may lose focus and do neither teaching nor research as well as they could.

In line with this, various empirical studies in Australia and elsewhere have found little evidence to support a positive relationship between teaching outcomes and research capabilities (Feldman 1987; Hattie and Marsh 1996). Other studies have even suggested that a focus on both functions can do harm, resulting in some negative teaching outcomes for students (Barrett and Milbourne 2012; Ramsden and Moses 1992; Sample 1972).

There are, however, strong grounds to suspect that students undertaking *research* degrees (such as a doctorate) or postgraduate coursework degrees benefit more from close proximity to seasoned researchers than undergraduate coursework students. This is largely due to the stronger research focus of these courses and their smaller class sizes (Jenkins 2004; Lindsay, Breen and Jenkins 2002).

Evidence that finds no reliable link between research and teaching quality does not mean that universities should forgo trying to nurture a link, however. If a university can succeed in raising teaching quality through synergies with research, then it increases its attractiveness to students (including footloose international students). With better measures of teaching performance (section 2.2 above), different universities would also be able to develop different strategies for strengthening the links between research and teaching, doing so in courses and disciplines where that nexus was easiest and most cost-effectively achievable (Prince, Felder and Brent 2007).

In addition, although there is limited evidence of any *direct* benefit to students from universities conducting research alongside teaching, there is some evidence of *indirect*

benefits from research. In particular, as the prestige of a university is closely tied to the value of their research output (given the importance of international rankings), students can benefit indirectly from attending a research-focused institution through enhanced social-standing and improved employment outcomes (Norton and Cherastidtham 2015a).

However, given the lack of any direct link between teaching ability and research output, the research-based prestige of a university is largely irrelevant to whether the student was taught well. Instead, much of the enhanced social-standing and improved employment outcomes more probably reflect the academic preparation of the students attending (the 'self-reinforcing prestige' discussed in section 3.2 above).

Despite the lack of evidence that it exists, the research-teaching nexus is used to justify several aspects of the existing university regulatory and funding regime.

Restrictions on the title of 'university'

One such regulatory restriction is on the use of the title 'university' by higher education providers.

Currently, all higher education providers using the title of 'university' in Australia must be both teaching and research institutions, as per the higher education provider category standards, in the *Higher Education Standards Framework (Threshold Standards) 2015*, enforced by the industry regulator, the Tertiary Education Quality and Standards Agency (TEQSA). These standards require that an 'Australian university' must conduct both research and teaching (at an undergraduate and postgraduate level, including Doctoral degrees by research) in at least three broad fields of study. An 'Australian university of specialisation' is required to do the same, but in only two broad fields of study. Consequently, Australia has only 41 different universities¹⁶ operating in a market of about one million domestic university students. By contrast, only about 60 000 domestic students are enrolled directly with non-university higher education providers.

The research and teaching requirement is largely an historical quirk of the Australian market. Elsewhere around the world, 'universities' are not required to conduct research — including in England and British Columbia (Canada). Similarly, in the United States there is broad recognition that a university can undertake excellent teaching without conducting research (Moodie 2014).

Indeed, just as research is not a prerequisite for good teaching, nor is teaching required for good research — numerous institutions excel at research while conducting no teaching, such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO),

¹⁶ Including 37 public universities, three private universities and one university of specialisation, but not including two overseas universities with operations in Australia (Carnegie Mellon University and University College London).

Germany's Max Planck institutes, France's Centre National de la Recherche Scientifique and many medical research institutes (Moodie 2014).

As such, there is not a persuasive case for requiring high-quality institutions to conduct research alongside teaching in order to use the title of 'university'.

As part of the 2017-18 Budget, the Government announced the Review of Higher Education Provider Category Standards. This Review will examine the current criteria for different provider categories (including the requirement for 'universities' to undertake research) and consider the possibility of removing the research requirement for universities. The Government will deliberate on the outcomes as part of the 2018-19 Budget process (Australian Government 2017b).

Removing the research requirement for universities would allow some institutions to compete on teaching quality with established research-teaching universities, without being disadvantaged in Australia's university-centric market. Further, the 41 institutions currently using the title of 'university' would also be able to abandon some or all of their research functions without the need to cease using the 'university' title. This would allow universities that struggle to compete on international research rankings to reduce their costs (particularly the indirect fixed costs of research) and focus on providing high-quality, specialised teaching to their students. Although few are likely to entirely abandon research, some may choose to focus their research on fewer areas, particularly where they have comparative advantage (Moodie 2014).

However, given the prospects of significant new entry under such a change, there would be an imperative to ensure quality in the higher education sector and avoid creating a free-for-all on the use of the 'university' title by higher education providers. Failure to do this could repeat the mistakes of the VET sector during the VET FEE-HELP debacle, when barriers to entry and quality standards were too low (see PC 2016b, p. 37 for a summary). As such, the industry regulator, TEQSA, would have to play a crucial role, providing accreditation for the use of the title on a case-by-case basis, based on the institution's size, history, governance arrangements, risk, teaching quality and commitment to scholarship.

4.2 The cross-subsidisation of research by teaching

The apparent link between teaching and-research is also used to justify cross-subsidies from tuition fees to research costs. While longstanding, this arrangement has a range of negative consequences and can result in poor outcomes for both the students and taxpayers.

Teaching surpluses and research funding

The total expenditure by universities on current research activities was about \$10 billion in 2013-14 (ABS 2015). However, direct funding from the Australian Government for their

research functions (through the dual system of block and competitive research grants) was only worth about \$3.5 billion in 2013-14 (DIIS 2016).

The sizable gap between direct funding and total expenditure was filled through other sources of funding, including State and Territory governments, philanthropy, business income and investment income. Despite the contribution of these sources, most of the additional funding came from teaching revenues paid by domestic and international students for their education (through tuition fees, student contributions or Commonwealth grants). In particular, universities use the portion of teaching revenues that is in excess of the actual cost to educate the student (the 'teaching surplus') to cross-subsidise their research functions.

Although publicly available data are limited, most teaching surpluses appear to be generated from Commonwealth-supported students or full-fee paying international students. For instance, a recent Deloitte Access Economics report (2016) found that the teaching cost to CSP funding ratio was 0.85 for bachelor programs in 2015 — meaning 15 per cent of CSP funding was not used for teaching. This equates to a teaching surplus of nearly \$1.7 billion for CSPs, if replicated across all CGS grants and HECS-HELP payments in 2015 (DET 2016f).

That figure aligns with independent analysis conducted by the Grattan Institute, which estimated that CSP teaching surpluses were worth approximately \$1.5 billion in 2013. The authors also found that a similar-sized surplus is generated by full-fee paying international students (box 4.1). In total, the Grattan Institute estimated that the cross-subsidy from all teaching surpluses to research functions was likely to be approximately \$3.2 billion in 2013 (Norton and Cherastidtham 2015a).¹⁷ This amount is almost equal to the total direct funding the Government provides for research (\$3.5 billion).

However, poor information on actual course costs makes it difficult to determine the size of the teaching surpluses used for research (and their distribution between courses and universities). This data gap occurs because universities currently only differentiate between expense *type* (such as payroll or capital expenditure), rather than expense *purpose* (particularly, research or teaching expenditure by discipline), making it hard to determine teaching costs (DET 2016f). As part of the 2017-18 Budget, the Australian Government announced measures to address this gap in the data, stating that it:

... will work with the higher education sector to establish a more transparent framework for the collection of financial data from higher education providers in order to regularly report on the cost of teaching and research by field of education (Australian Government 2017b).

¹⁷ The 2015 Watt Review of Research Policy and Funding Arrangements put the use of 'general university funds' for research purposes at over \$5.3 billion in 2012, although this also includes other sources of discretionary funds, such as general donations, bequests and investment income (Watt et al. 2015)

Box 4.1 Sources of teaching surpluses

Due to their sheer number (at nearly 60 per cent of all students), Commonwealth-supported domestic students tend to generate the greatest value of teaching surpluses. In particular, courses in the commerce, arts and law disciplines can have substantial teaching surpluses, as they are relatively low-cost disciplines to deliver, with significant economies of scale.

However, the surplus generated by any given CSP student can be relatively small, given the strict limits on CSP resources per student (both in student contributions and Commonwealth grants). Some disciplines may even be underfunded, requiring that teaching surpluses from elsewhere be used to support their costs. There are varying suggestions about the affected courses. Some suggest veterinary science and dentistry (Deloitte Access Economics 2016), while others claim the relevant disciplines are health sciences and engineering (Lomax-Smith, Watson and Webster 2011) (this uncertainty itself reveals inadequate information about costs in universities). The Government announced the extension of clinical loading to veterinary science and dentistry as part of the 2017-18 Budget, in order to fix some of the underfunding issues (Australian Government 2017b).

Overall, however, the Grattan Institute estimates that the net teaching surplus from domestic Commonwealth-supported students is likely to have been about \$1.5 billion in 2013.

By contrast, international students pay full tuition fees, unregulated and unsubsidised by any level of government. As both domestic and international students attend the same classes, the cost of teaching them is generally the same. Accordingly, international students contribute a disproportionate amount to the cross-subsidisation of a university's research capability. The Grattan Institute estimating their total contribution at over \$1.4 billion in 2013, despite numbering fewer than half as many as domestic CSP students.

Although some full-fee paying domestic students (particularly for postgraduate coursework) pay tuition fees that are likely to be higher than course costs, the Grattan Institute also found that other full-fee paying students might be paying significantly less than delivery costs (including nursing and science students), in part due to the university's social obligations. Overall, the net teaching surplus from domestic full-fee paying students was estimated at \$220 million in 2013.

Source: Norton and Cherastidtham (2015a).

Cross-subsidies create poor incentives and can lead to adverse outcomes

The cross-subsidisation of research by teaching is not new, with previous higher education sector reviews highlighting the practice as a 'long-standing', 'historical' and an 'accepted' part of the research funding system (Lomax-Smith, Watson and Webster 2011; Watt et al. 2015). Nor is cross-subsidisation hidden, with references in the media (see Chang 2015; or Featherstone 2016) and informal acknowledgment by the Commonwealth Government.¹⁸ The 2017-18 Budget suggested that teaching surpluses have been growing

¹⁸ In August 2016, the Minister for Education and Training noted that 'the way current funding structures are set... [courses such as] law can basically be a profit centre for a university', as they 'need those profit centres to in some instances cross subsidise ... research undertakings' (Birmingham 2016).

in recent years, noting that 'universities have become more efficient over time, especially as they have achieved greater economies of scale' following the move to a demand-driven system (Australian Government 2017b).

Despite this widespread acknowledgment, cross-subsidisation is not necessarily positive. For one, cross-subsidies can create incentive structures that undermine student outcomes and university teaching quality, ultimately affecting Australia's productivity and economic growth.

Further, such cross-subsidies are invisible to students and, given the standard accounting methods used by universities, are not disclosed accurately to the Australian Government either (hence the range of *estimates*, not actual figures, discussed above). To the extent that these teaching surpluses are also partly funded by taxpayers (either directly through CGS subsidies or indirectly through subsidised student HELP loans), this represents a less transparent and accountable means of publicly funding research. And without a clear benefit to students from university research (through a teaching-research nexus), the use of teaching surpluses for research is difficult to justify as a form of cost-recovery, so more closely resembles a form of rent extraction.

The Commission is not the first to acknowledge these issues. In particular, the expert panel of the 2008 Review of Australian Higher Education was 'concerned about the possible effects of excessive use of cross-subsidies on the quality of teaching and learning provided to students and on Australia's education export industry' (Bradley et al. 2008, p. 11).

Oversupplied and undersupplied students in high-margin and low-margin courses

With cross-subsidisation, universities have strong incentives to churn out domestic and international students undertaking high-margin courses to maximise the revenue available for research. This is exacerbated by the cost structure of university teaching, as many courses have high fixed costs, whose impact on average costs can be minimised by increasing student numbers.

Increasing student numbers in high-margin courses risks creating an oversupply of those graduates in the labour market, based solely on arbitrary Government funding levels and student contribution caps, rather than any signals from the labour market. In turn, this can lead to wasted education investments for students and taxpayers (misallocated human capital development) and, for the graduates concerned, poorer labour market outcomes and costly transitions to other occupations. There is some evidence that this oversupply may be occurring in some disciplines (box 4.2).

Box 4.2 A case study of law graduates

Using law as an example (given that law has been frequently identified as a high-margin degree; see Birmingham 2016b; Carrigan 2016; Featherstone 2016), data that might support the conclusion that the field is oversupplied with students include:

- the nearly 45 per cent of recent law graduates in full-time employment who are employed in clerical, sales and service occupations (compared to an average of 22 per cent for other disciplines), rather than in professional or managerial roles (GCA 2016a)
- that the total equivalent full-time study load (EFTSL) of commencing law students in 2015 (nearly 18 000, including postgraduate students) is equivalent to almost 25 per cent of all barristers and solicitors in the labour market (76 000), such that it seems likely that most of those students will not be employed as lawyers (Australian Government 2017c; DET 2016a)
- that, prior to the phase-in of the demand-driven system in 2008, over 87 per cent of law graduates consistently found full-time employment, while by 2015 the rate had declined to less than 75 per cent (GCA 2016a).

On the other hand, however, law graduates were no more likely than other graduates to say that their qualification was neither a 'formal requirement' nor 'important' to their job (27 per cent) in 2015 (although this could still be considered unreasonably high; GCA 2016a).

At the same time, universities also face strong incentives to avoid providing student places that are in low-margin or even loss-making areas, creating potential undersupplies of graduates in some fields.

Courses that have been estimated to be low-margin or loss-making are often in disciplines that are vitally important to the Australian economy and community, including dentistry, veterinary science (Deloitte Access Economics 2016), health sciences (including medicine; Norton and Cherastidtham 2015a) and engineering (Lomax-Smith, Watson and Webster 2011). Tellingly, the Australian Government lists some of these fields as suffering from national skills shortages or recruitment difficulties in 2016, including veterinarians, health professionals (such as sonographers and audiologists), and civil engineers (Department of Employment 2017).

However, adequate data that can be linked to potentially oversupplied or undersupplied fields is difficult to come by. For instance, the lack of adequate data for oversupplied fields is primarily because it is difficult to observe 'poor' outcomes that can be *causally* linked to graduate oversupplies. For instance, as graduates with degrees in oversupplied fields remain highly educated, they are unlikely to be unemployed for long periods. Instead, these graduates will more probably be employed in a role that is unrelated to their studies, to which their degree adds no direct value.¹⁹ As there is no systematic reporting of graduates working outside their field of study, it is difficult to determine the extent of any human capital misallocation.

¹⁹ As noted in section 2.2 above, this can have cascading employment and income effects down the skills ladder if someone without a costly university education could have done this role.

Complicating matters even further, individual choices and preferences also need to be accounted for when identifying any issues, as does identifying the disciplines that are high-margin or low-margin.

Regardless of these complications, and even if there is only circumstantial evidence that universities' behaviour may lead to under or oversupplies in some occupations, it is inherently undesirable to give universities an incentive to do something not in students' best interests.

Arguments that these supply problems cannot be ascribed to universities are, on closer examination, not sufficient to ignore the risks posed by the current incentives.

- Some argue that oversupplied or undersupplied disciplines reflect student demand, rather than universities' responses to funding incentives. However, given the high expected benefits of university education (section 2.2), almost all university degrees have unmet student demand. It is ultimately up to the universities how many places they supply to meet that demand. Almost all degrees have ATAR cut-offs or other minimum entrance requirements to match nearly unlimited potential students with limited available places. Higher ATAR cut-offs for many low-margin or loss-making degrees (such as veterinary science or dentistry) imply that they have significant unmet demand.
- Those supporting cross-subsidisation point out that many of those who do not *directly* work in an oversupplied field of study (such as law) can still benefit *indirectly* from their degree through the acquisition of a range of different 'soft' skills (such as research capabilities or critical thinking) that make them valuable employees in a broad range of roles. While this is likely true, it is also true for nearly all university degrees, which (by their academic nature) require the use of these basic 'soft' skills to at least some extent.

Supply distortions could be reduced if students had the information to make decisions based on the long-run prospects of their qualifications. But (as noted in section 3.2), students face significant information asymmetries when choosing their courses. Even if better information were available, it would still take several years before it was evident that an oversupply had caused poor labour market outcomes, potentially resulting in a wasteful time lag for students making education and career decisions in the meantime. In any case, estimates of even medium-term labour market imbalances are often unreliable.

Indirect taxpayer funding for research that is not transparent or accountable

Despite the fact that some teaching surpluses are paid for by taxpayers — either directly (through surplus CGS grants) or indirectly (through subsidised student HELP loans) — research funded through these surpluses is not subject to the same degree of transparency and accountability as research funded directly by the Australian Government (through competitive or block grants).

Further, direct Commonwealth funding is also generally provided based on the prospective value of research outcomes ('merit'). Notwithstanding the difficulties of measuring merit ex ante, if designed well, merit-based grants have the potential to deliver the greatest possible benefits to Australian taxpayers and maximise knowledge spillovers (Watt et al. 2015). It is less clear that universities' internal processes to allocate research funding collected through cross-subsidies support the most beneficial research (an important line for investigation).

Extraction of rents from students

As there is limited evidence of a teaching-research nexus, a system that results in students paying for research that is of little benefit to them more closely resembles rent extraction by universities. This is because the universities obtain some of the future private benefits that students expect to gain without providing much to those students in return. Although students will continue to demand degrees as long as their expected additional earnings are greater than the tuition fees (especially given the provision of income-contingent HELP loans), there are several reasons why extracting some of the students' future private benefits may be undesirable.

- There are many possible sources of funding for university research. It is not clear why the students in particularly profitable courses are the most equitable and efficient source of funding, especially given that graduates earning higher incomes already pay higher taxes under Australia's progressive tax and transfer system.
- Given that taxpayers ultimately bear much of the risk through the income-contingent HELP debt system if students' expected future earnings fail to materialise, it is also not clear why additional costs should be placed on taxpayers to provide indirect benefits to universities (Chapman 1997; IC 1997).

Even if there was good evidence for a teaching-research nexus, the size of the cross-subsidies for any *given* discipline should relate to the magnitude of the associated benefits for that discipline's nexus. There is no evidence that this is how cross-subsidies are determined. Indeed, the teaching surpluses from one discipline are regularly used to fund research in other, unrelated disciplines. For example, the Grattan Institute found that commerce disciplines contributed nearly \$900 million to teaching surpluses in 2013, but only \$400 million was spent on commerce-related research (including funding from block and competitive Commonwealth grants). This means that at least \$500 million of teaching revenue from commerce students was being used for research by other faculties (Norton and Cherastidtham 2015a).²⁰

²⁰ Barlow (2008, p. 12) also acknowledged that 'there is anecdotal evidence that institutions are being conditioned by the present funding model to channel surplus revenues from business schools in order to support research in other faculties that earn higher research income.'

4.3 Reducing the reliance on cross-subsidisation

The Australian Government has several options for addressing cross-subsidies, some of which are discussed below.

In discussing these options, the Commission is strongly aware that the university system is complex, and that altering one aspect of it could lead to unintended outcomes. In particular, any policy changes that reduce the size of cross-subsidisation would, *without offsetting policies*, affect university research funding. This would strain university budgets in the short term and could put at jeopardy Australia's long-term productivity growth through reduced knowledge creation at universities.

There are a range of options available that would ensure adequate research funding, while still reducing the adverse impacts of existing high-margin courses.²¹ However, many of the options to stabilise or increase research funding would raise questions about the best ways to allocate such funding, which the Commission has not investigated in detail. Once that avenue of inquiry was opened, it would logically extend to all university research funding, and indeed, potentially, to the Australian Government's policies for funding research in the wider economy. Consequently, the Commission has only covered potential reforms on the teaching funding side. Before implementation of any of these, the Australian Government would need to develop the alternative research funding measures and consult with the affected parties.

Nevertheless, this critical observation aside, the inherent principle of avoiding cross-subsidies from *domestic* students is a sound one. This would necessitate the Government assessing the costs of universities' teaching functions at a granular level, and then reflecting this in revised subsidies.²²

Given the vastly different market dynamics, funding arrangements and fiscal consequences of cross-subsidies from different student groups in the university sector, each group is considered separately:

- domestic students in CSPs with taxpayer subsidies, where strict pricing caps apply and where there is limited competition between universities
- domestic postgraduate coursework students, who receive concessional student loans (FEE-HELP) for their unregulated tuition fees, but do not get taxpayer subsidies, and where the market is reasonably competitive

²¹ For example, the Australian Government could set cost-reflective prices for CSP courses, saving fiscal outlays and then returning them to universities through increased block grant research funding.

²² Some initial work by the Australian Government on the cost of teaching by discipline has already been undertaken as part of the 2017-18 Budget (Deloitte Access Economics 2016).

• full-fee paying international students, who are generally not subject to any taxpayer support (including student loans) and where universities fiercely compete for their business.

Cost-reflective resourcing for Commonwealth-supported students

Currently, the Government controls the resources provided to universities for each EFTSL Commonwealth-supported student. This occurs through the setting of maximum student contribution limits (which are normally paid through HECS-HELP loans) and providing a fixed Government grant per student.

Given the lack of price competition that occurs in the CSP market for domestic students (box 4.3), any policy changes that involved deregulating these price controls would be unlikely to result in any reduction of teaching surpluses (in fact, it would probably increase them significantly). As such, an obvious solution to minimise cross-subsidies is to maintain the existing price regulation, but reform the funding arrangements such that CSP resources more closely reflect expected teaching costs (both fixed and variable).

Under a cost-reflective pricing regime, total per-student funding would likely fall for some courses (law and commerce for example), but may rise for others (such as agriculture or health sciences), given the evidence of existing deviations between course revenue and average costs. Further, as different disciplines can have very different costs, this may also necessitate further differentiation between disciplines, beyond the existing 11 total resource amounts. Although this would add some administrative complexity, the principle of different resourcing amounts for different disciplines is well-established. Distinctions between 'fields of education' (FOE) are already identified through the Australian Standard Classification of Education (ASCED), which is used by universities to classify courses between disciplines areas (box 4.4).

The Government could also empirically estimate the relative public and private benefits of each discipline to determine the shares of the contributions met by student contributions or by CGS grants. For example, disciplines with a high degree of personal benefits and limited positive spillovers (such as a degree in finance) could require students to pay most (or even all) of the cost of tuition, with only a small CGS subsidy (or possibly none at all). By contrast, other disciplines with smaller private gains and larger community benefits (such as a degree in social work) could be reliant on a greater proportion of CGS subsidies rather than student contributions. Where such empirical evidence is hard to gather, a default split between student contributions and government funding may be appropriate, such as an equal division of the total teaching costs.

Box 4.3 The lack of competition in the CSP market

Price competition is difficult to establish in the domestic CSP market due to a range of different distortions, the most prominent of which are outlined below.

- The low price sensitivity of domestic students this is a byproduct of the HELP scheme's design, which was explicitly intended to reduce the price sensitivity of students (particularly students from low socioeconomic backgrounds) in order for university access to be awarded on merit, rather than family wealth (discussed further in section 6.1 below). While this objective is necessary to improve both equity and efficiency, it means that universities face low demand elasticity from students that is, there are only minor variations in student demand if fees increase (Dawkins 2014; SEERC 2015; Sharrock 2014).
- Tuition fees frequently act as a signal of quality in the absence of adequate information on teaching outcomes (discussed in section 3.2 above), no institution wants to signal that they are inferior to, or less prestigious than, other institutions by charging students significantly less. As such, all universities have strong incentives to maximise tuition fees, rather than compete prices downward (Hemsley-Brown 2011; Lomax-Smith, Watson and Webster 2011; Sharrock 2014; Wolf 2017).
- The existence of regional oligopolies students are often not geographically mobile, implying that many universities often only compete within city-sized or regional markets, rather than across all of Australia. While there is some movement of students from their home state to attend university, in the four biggest states well over 80 per cent of commencing students originate from the same state. For example, nearly 88 per cent of commencing students in Western Australian higher education institutions also had a permanent home residence in Western Australia (DET 2016a). This is likely reflect the cost of students moving out of their parents' home (the dominant accommodation choice for higher education students).

The lack of competitive price pressures in the CSP market is perhaps best exemplified by the fact that all universities currently set student contribution rates at the maximum allowable level, even though they could be lower (especially given the existence of teaching surpluses).

Box 4.4 Classifications by fields of education

The Australian Standard Classification of Education (ASCED) classifies courses or programs of study into relevant groupings, with varying levels of detail. There are:

- 12 broad fields of education (2-digit FOE codes), such as health or information technology.
- 71 narrow fields (4-digit FOE codes), such as nursing, public health or veterinary studies within 'health'.
- 356 detailed fields (6-digit FOE codes), such as community nursing, aged care nursing or midwifery within 'nursing'.

Source: ABS (2001).

Cost-reflective pricing for CSPs would align with the principles applied in competition policy, which generally aim to reduce any substantial price-cost deviations. In any workably competitive university market, competition between providers would drive down tuition fees to close to cost. A university would only able to charge students more if it could demonstrate to them that the additional cost (for either research or more expensive teaching methods) was of benefit to the student.

By developing coherent long-term principles for all aspects of higher education funding, the Australian Government could bring clarity and consistency to a system that has largely come about through a series of arbitrary changes over the past 25 years and does not reflect the shift to a demand-driven system. The lack of discernible purpose for higher education funding rates has been previously noted in both the 2011 Higher Education Base Funding Review (Lomax-Smith, Watson and Webster 2011) and the 2008 Review of Australian Higher Education (Bradley et al. 2008).

However, eliminating all cross-subsidies for CSPs will be difficult to achieve, for a number of reasons.

- Cross-subsidisation within universities is very common not just from teaching to research, but also between disciplines, between different types of students, between campuses and more. As with any other large firm, some parts of the university's business are more profitable than others, with loss-making areas supported by profitable ones in the short run (although normal firms would also leave a persistently loss-making market, which social obligations and barriers to entry and exit in the university sector prevent). However, subject to those constraints, there are strong grounds to *minimise* such cross-subsidies.
- The costs faced by universities also continue to evolve over time, with some disciplines becoming cheaper or more expensive to teach as student needs change and technology introduces new methods. As such, funding levels for each CSP discipline would need to be reviewed periodically (such as every three to five years), as recommended in the 2008 Bradley Review of Australian Higher Education (Bradley et al. 2008).
- There are also institutional differences that mean that a system of funding tied to average costs by discipline will still generate teaching surpluses in some universities and circumstances (Deloitte Access Economics 2016). An expansion of the existing 'loading' system could be used to reflect many of these differences, with funding varying where cost differences are identifiable and reasonable (for example, different loading levels may be justifiable for: regional/metropolitan universities; online/campus-based learning; or undergraduate/postgraduate CSP courses).
- Using average costs for each discipline can result in a circular model: current teaching costs are (at least in part) driven by funding levels, which, under the proposed model, would reflect costs (Deloitte Access Economics 2016). However, using average costs also encourages universities to maintain control over expenses and avoid 'gold plating' programs where students do not get benefits.

Some may argue that there are risks to teaching quality under a cost-reflective funding model. In particular, with funding linked to average costs of teaching delivery, individual universities may cut corners in order to continue to generate teaching surpluses for use in research, with detrimental effects on teaching outcomes. However, such a response from universities is also equally possible under the present funding model, as both models maintain the autonomy of individual universities to choose how to spend (or save) their teaching revenues.

Moreover, any cost-cutting that undermined teaching quality could be averted through maintaining adequate quality regulation. Developing and publishing adequate measures of teaching performance would also help (discussed in section 3.2), as would linking funding to them (discussed in section 3.4). Over time, an efficient pricing model for individual disciplines could also be developed (similar to that developed for activity-based funding in healthcare by the Independent Hospital Pricing Authority), which would enable funding to be based on what teaching *should* cost, rather than what it *does* cost.

Under a cost-reflective pricing solution, it is also likely that the level of student contributions would fall for some disciplines that have a high future earning potential, which some might see as inequitable. However, if the share of the total contributions paid by students were to take account of private benefits, any such reduction would be reasonable. The tax and transfer system is also a less arbitrary and more transparent way of achieving desired distributional outcomes than surcharges on certain qualifications.

Tuition fees for postgraduate coursework programs

In the domestic postgraduate coursework market, courses do not have their tuition fees regulated or limited by the Australian Government. This leaves universities with the ability to set their own tuition fees, while the Government's role is generally restricted to providing FEE-HELP loans to domestic students, enabling them to afford whatever tuition fee the universities charge.

Although these tuition fees vary greatly between different disciplines and universities across the market, there is some evidence that, *on average*, universities have set postgraduate coursework fees above the cost of teaching delivery. As such, a relatively small, but not insignificant teaching surplus is generated. The Grattan Institute estimated it at \$220 million in 2013 (Norton and Cherastidtham 2015a).

Although advocates for CSP fee deregulation have pointed to the postgraduate coursework market as proof that deregulated fees can work in the Australian context,²³ the ability to charge tuition fees above the cost of delivery for some courses demonstrates that there are at least some constraints on price competition. This limited price competition in the postgraduate coursework market is likely the result of the same constraints that occur in the CSP market (discussed above).

²³ See, for example, Group of Eight (2014, pp. 31–33) and Senate Education and Employment Legislation Committee (2014, p. 24).

However, the postgraduate coursework market also has some significant differences to the market for CSPs, which suggest that competitive forces may be stronger there than elsewhere.

- The market for postgraduate coursework programs has limited demand and has not been subject to the same large-scale take-up of bachelor degree programs in recent years.
- Postgraduate *coursework* degrees can often be a substitute for postgraduate *research* degrees (such as Doctorates or Masters by Research). As the latter remain largely free of charge for domestic students (through the Research Training Program), this effectively limits the level of postgraduate coursework tuition fees.
- Some postgraduate courses are also offered as CSPs, such that full-fee paying and Commonwealth-supported students can often attend the exact same classes, creating competitive constraints on non-CSP postgraduate tuition fees (Norton and Cherastidtham 2015b).²⁴
- Unlike HECS-HELP for CSPs, the existing FEE-HELP system places lifetime limits on the amount of FEE-HELP debt that can be accrued (at just over \$100,000 for most disciplines in 2017). This can limit tuition fees by increasing opportunity costs (of foregone FEE-HELP-supported education) for students.
- Tuition fees are lower than costs of delivery for a range of different postgraduate courses, particularly where the university has strong social obligations, which reduces the adverse impacts of limited price competition (Norton and Cherastidtham 2015a).

As a result, the case for the introduction of policy options to limit teaching surpluses in the domestic postgraduate coursework market is mixed.

While there is a stronger rationale that the comparatively large teaching surpluses in some courses should be addressed — such as in commerce disciplines, as identified by Norton and Cherastidtham (2015a) — the limited scale of the total surpluses and the additional competitive pressures indicate a lower policy priority than teaching surpluses in the CSP market. Further, postgraduate coursework students are also more likely than undergraduate students to obtain positive outcomes from the teaching-research nexus (as discussed in section 4.1 above).

However, while the risks from unregulated tuition fees in the postgraduate coursework market may be limited at present, they are likely to grow over time if postgraduate degrees become increasingly necessary to compete in a labour market crowded with bachelor degrees. There is some evidence this is already occurring, with commencing Master's (Coursework) EFTSL at public universities rising from 22 000 in 2012 to nearly 28 000 in

²⁴ The 2017-18 Budget announced moving postgraduate coursework places towards a 'student-centred' model, with the university-based allocations of postgraduates CSPs becoming a scholarship-style system from 2019, in which students can use their CSP at any university (Australian Government 2017b).

2016 (a 26 per cent increase), compared with about 7 per cent growth for bachelor degrees over the same period (DET 2014, 2017a).

The Government recognised the arguments against deregulated tuition fees in the similar market for diplomas and advanced diplomas during the recent replacement of VET FEE-HELP with VET Student Loans. The new loan scheme now caps annual loan amounts per student in three bands, broadly based on course delivery costs (such as \$5000 per year for a Diploma of Business or \$15 000 for a Diploma of Agriculture). This recognises that uncapped loan amounts, combined with deregulated fees, led to significant fee increases and unscrupulous behaviour by registered training organisations (RTOs) in the VET sector under the VET FEE-HELP scheme. While VET providers can still set fees higher than these amounts, students have to cover the gap between the maximum loan and the remaining course fee out of pocket (Australian Government 2016e; Birmingham 2016a; DET 2016e).

Should action on teaching surpluses in the domestic postgraduate coursework market be deemed necessary in the future, potential policy options that the Government could consider include the following.

- The expansion of CSPs (with their associated student contribution caps) in the postgraduate coursework market.
 - Adjustments could be made to funding rates to reflect higher postgraduate coursework costs (such as through a loading mechanism). For example, Deloitte Access Economics (2016) estimates that the average cost of postgraduate courses is \$20 050 per EFTSL in 2015, compared with \$16 025 of costs for undergraduates.
- The use of loan caps on FEE-HELP loans to limit the exposure of taxpayers, with differing caps reflecting different costs for disciplines and any course fee above the loan cap to be paid upfront by the students (this would not affect loss-making courses where fees are set below costs).
 - Introducing loans caps would be similar to the caps in the new VET Student Loans scheme. However, it is not yet clear how VET providers will respond to these new loan limits and if they will become effective fee caps or act as a price-setting signal for providers (similar to a collusive device). Despite this, loan caps could be a more market-friendly mechanism by avoiding direct fee regulation and hence retaining the autonomy of universities to set their own fees, while also putting downward pressure on prices and limiting the exposure of taxpayers through FEE-HELP loans.

International students are an important source of revenue

As noted above, while Commonwealth-supported students generate the most teaching surpluses of any student group, a sizable surplus is also generated from international students, including significantly greater surpluses generated on a per-student basis.

There is no policy rationale for the Australian Government to set regulatory ceilings on tuition fees for full-fee international students, as Australia is the net beneficiary of any rents obtained from them.²⁵ Indeed, the use of foreign private money to fund research at Australian universities is advantageous to Australia. As noted by the Grattan Institute:

While [international students] could probably get better educational value for money at cheaper universities, it is not contrary to Australia's public policy goals for them to boost Australian university research output. (Norton and Cherastidtham 2015a, p. 34)

The effect of international students on teaching quality

An additional issue is any link between the large numbers of international students attracted to Australia for commercial reasons and the quality of university teaching, which can affect outcomes for domestic students. The link could go several ways.

Some higher education experts and government watchdogs have suggested that universities have responded to their commercial imperatives by admitting and passing students with limited English or academic proficiency (Altbach and Welch 2011; Birrell 2006; Marginson 2015; NSW ICAC 2015; PC 2015; Victorian Ombudsman 2011). Recent changes to migration rules and closer scrutiny of the conduct of the education sector (including intermediaries acting on its behalf) are likely to have reduced such risks, but some perverse incentives still remain. To the extent that standards for international students are relaxed, there is some potential for contagion to teaching quality for domestic students too (such as through making courses easier for all students to pass). One of the few studies relating to Australia finds that there are negative spillover effects for domestic students, but the effect was very small and the data only related to two universities (Foster 2011).

Adverse effects on teaching quality would also risk the international reputation of Australia's higher education sector. Sudden shifts in international sentiment towards Australia's higher education sector could endanger long-run exports of educational services and thus strain university research budgets, to the detriment of the broader economy.

On the other hand, it is possible that Australian universities may attempt to increase their foreign student revenue by ensuring adequate teaching quality, which could have spillover *benefits* for Australian students. Whether there is much of a payoff from this strategy depends on the importance of quality in decisions by international students to select Australia as their study destination compared with other factors, such as access to visas and the presence of the relevant foreign nationals in Australia. The limited empirical evidence

²⁵ Any tuition fee caps on international students would also be inconsistent with the floor price that the Commonwealth Government still sets for international students to avoid taxpayer subsidies to them (Norton and Cherastidtham 2015b).

on this matter is uncertain. Some find that quality acts only as a moderate attractor (Beine, Noël and Ragot 2014), while others find a bigger effect (van Bouwel and Veugelers 2011).

It is not possible to be definitive about the extent to which the above outcomes occur in practice (or in which parts of the diverse university sector). As indicators of university teaching quality are developed (section 3.2 above), micro-level data would enable a much more rigorous assessment of this issue and could take account of variations across disciplines and universities. Moreover, one of the benefits of reliable performance indicators is that they will enable universities that invest in high-quality teaching to provide foreign students with credible verification of their quality. Accordingly, reliable performance indicators jointly improve accountability and marketability of Australian universities.

Overall, given the data limitations, the Commission has not looked at these issues closely.

5 Reforming the income-contingent loan system

5.1 In need of HELP? — Improving the role of HELP in productive skills formation

Australia's HELP loan scheme has been described by Nobel laureate Joseph Stiglitz as 'the envy of the rest of the world' (2014). Since its inception in 1989 (then called HECS), the HELP scheme has been critical for ensuring that a high-quality university education is accessible to all Australians, enabling admission on the basis of merit, not family wealth. Given the growing significance of the sector for skills formation in an evolving economy, it is a vital foundation for Australia's future productivity growth and economic prosperity.

However, as discussed in section 1.2 above, outstanding HELP debts also involve significant and growing costs for taxpayers. In particular, the current design of the HELP scheme poses several problems for economically efficient decisions about skills acquisition (section 5.2).

The willingness of taxpayers (and their agent, the Australian Government) to continue funding the HELP system depends on meeting these challenges. If these problems are not addressed, it may encourage short-term policy changes that undermine access to higher education for many people, and therefore damage the economywide gains from education — ultimately throwing the baby out with the bathwater. Further, short-term adjustments can undermine some of the principles that originally motivated the HELP loan system (outlined in box 5.1). Indeed, as noted by the Group of Eight Universities:

Experience in New Zealand ... suggests that the high and increasing fiscal cost of funding university places means that Governments seek irrational savings at the margins of the system, in order to contain increases in costs. (Group of Eight 2014, p. 27)

Box 5.1 The purposes of the HELP loan system

Traditionally, the structure of the HELP system has included several different principles, although they are by no means fixed.

- Overcoming liquidity constraints the considerable earnings uncertainty for individual students and lack of bankable collateral (discussed in section 1.1) means that the HELP system is needed to overcome the reluctance of private lenders to finance higher education on commercial terms. This not only improves equity outcomes, but also improves economic efficiency, as higher education can now be accessed on a merit basis, rather than on the basis of family wealth (IC 1997; Norton and Cherastidtham 2016a).
 - In theory, this objective can be achieved with almost any form of government-supported student loan, including mortgage-style repayments (as in much of the US), where repayments are a fixed amount each period regardless of the debtor's capacity to pay. However, making the size of repayments dependent on the debtor's income helps to smooth consumption and reduce financial hardship (Higgins and Chapman 2015).
- Providing social insurance although graduates earn substantial private benefits from their qualifications on average, averages are deceiving. Many graduates do not obtain large benefits from their degrees, often through misfortune or circumstances beyond their control. As such, the HELP scheme protects debtors from further financial hardship by only requiring repayments when the debtor is earning sufficient income.
 - Under a simple social insurance model, 'financial hardship' could be defined similarly to other social security programs, such as the income thresholds for Newstart Allowance (up to about \$27 000 for singles with no children) or the national minimum wage (approximately \$35 000) (Norton and Cherastidtham 2016a).
- Guaranteeing returns to higher education historically, HELP repayments have also been linked to whether the graduate has obtained a financial benefit from their qualification through earnings that are higher than otherwise expected, making repayments reflect 'a fair contribution to additional earning power gained through the education' (Department of the Parliamentary Library 1988). However, this guarantee can be politically contentious, as it increases the short-term costs of the system and is seen by some as unnecessarily generous (Norton and Cherastidtham 2016a).
 - Although the guarantee is occasionally conflated with the social insurance rationale, they are distinct from one another. Among other things, the guarantee allows graduates who provide substantial public benefits to the community but who receive very limited private benefits in return (such as some social workers) to have their education supported by taxpayers in that community.

5.2 Long-term increases in doubtful HELP debt

The single biggest cost of the HELP debt system is the debt not expected to be repaid. Although the existence of doubtful debt is not itself a problem with the HELP system, both the amount and the proportion of doubtful debts has been growing rapidly in recent years. In 2015-16, the DET expected doubtful debt to comprise 22 per cent of *new* HELP debt created that year (DET 2016d). By comparison, during the late 1990s the proportion of *all* outstanding HELP debt that was not expected to be repaid was generally between 13 and

18 per cent. A recent National Audit Office report into HELP debt administration indicated that the DET expects this proportion to reach nearly 29 per cent (\$55.1 billion) by 2024-25 (ANAO 2016; DET 2015).

Some of the factors leading to higher enrolments and hence greater levels of doubtful HELP debts are expected to be temporary. These include: the rapid increase in enrolments after the demand-driven model was phased in (which is expected to plateau); recent unfavourable labour market conditions (worsening short-term graduate outcomes and incentivising up-skilling to increase labour market competitiveness); and issues with unscrupulous lenders taking advantage of the VET FEE-HELP expansion (which has now been replaced by VET Student Loans) (Norton and Cherastidtham 2016a).

On the other hand, there are several structural issues pushing up doubtful HELP debts, as well as emerging risk factors that may increase long-run doubtful debts, including:

- more retirement-age students with limited expected labour market participation
- the growth of part-time work
- the continued expansion of HELP loans to the VET sector
- automation of many entry-level graduate jobs
- non-completion rates among students.

Retirement-age students

One of the fastest growing demographics entering university are those at or near the age of retirement. The number of students aged 65 years or over accessing HELP loans has grown by 80 per cent between 2010 and 2014 (from 857 to 1543) compared to total growth of 21 per cent for all HELP loan access in the same period (Australian Government 2016b). Similarly, the Australian National Audit Office (ANAO) found that the value of HELP debt incurred each year by students aged over 60 years has grown from about \$10 million in 2009-10 to over \$40 million in 2013-14 (ANAO 2016).

While the total numbers of retirement age students (and hence their costs) are only a small fraction of the one million domestic students enrolled in 2015, there are concerns about whether taxpayers should be providing loans to individuals if there are diminished public benefits (through shorter expected working lives) and a reduced likelihood of repayment (ANAO 2016; Australian Government 2016b). Most retirement age students will have little prospect of repaying their entire HELP debt, as their post-retirement income will be too low. Moreover, the HELP system subsidises the high-cost acquisition of knowledge, discouraging the use of new low-cost alternatives, such as MOOCs, which may be better suited to those with an intrinsic interest in non-vocational learning. And, unlike people who require an accredited university qualification to signal their capabilities to employers, this is not a requirement for people who have exited (or are about to exit) the labour market.

In principle, these difficulties could be resolved in several ways, including basing eligibility on retirement status, tapering subsidies after a certain age or setting an age limit for access to HELP loans. However, these options would forgo some opportunities for people and the economy. Some people who obtain university qualifications later in life may engage in more active job search and postpone retirement. Notably, higher educational attainment is associated with later retirement ages (see PC 2005, although that link may not hold for a qualification acquired later in life). More generally, mature-age workers should not be discouraged from retraining and upskilling, especially given many of the structural changes that the Australian economy is undergoing (SP 8).

As such, an alternative option could be to recover residual HELP debts from the estate of a person (discussed in section 5.3 below), which does not stop access by those who desire further education, but does discourage free-riding.

The growth of part-time employment

The HELP debt repayment schedule is largely based on the assumption that graduates will work full-time. When the system was introduced in 1989, the HELP debt repayment thresholds were targeted to commence at income levels that reflect average *annual* earnings (SEELC 1996). Therefore, HELP debtors only start to repay their income-contingent loans once they are 'benefiting' from their education through higher-than-average yearly incomes.

Over the past 30 years though, part-time employment has grown substantially, including among those with university qualifications. In 1990, only 12.6 per cent of the workforce with university qualifications worked part-time, while in 2016 it was about 25 per cent (ABS 1990, 2016). This growth in part-time employment affects HELP repayment rates and thereby increases the costs of the system. In particular, in 2014 more than 70 per cent of part-time workers with bachelor's degrees were not earning enough to reach the minimum HELP debt repayment threshold, compared with about 16 per cent of graduates working full-time (Norton and Cherastidtham 2016a).²⁶

Extending HELP to VET courses

While the driving force behind the original HECS system was to recover the costs of university from students who obtain a significant financial benefit from their university education, HELP loans are increasingly being extended to sub-bachelor courses outside the university sector. Since 2009, VET FEE-HELP loans (now VET Student Loans) have been

²⁶ Some of these graduates working part-time may still be benefiting from their degrees, through higher hourly wages that allow them to reach a given income target with fewer hours of work (the 'income effect' of higher wages), allowing them to enjoy more time away from work.

available for students undertaking diplomas and advanced diplomas.²⁷ Initial trials have also been conducted in select states to extend VET FEE-HELP loans to fee-paying Certificate IV students (Australian Government 2017a). Eventual trials and rollout to fee-paying Certificate III students seems likely, although this may take some time.

However, students in many of these VET-level courses have, on average, lower expected earnings than students obtaining a bachelor degree. For example, the OECD (2016, table A6.1) estimates that Australian 25-64 year olds with post-secondary non-tertiary education (roughly equivalent to Certificate IV) earn only 2 per cent more than those with upper secondary education,²⁸ compared with the 39 per cent premium earned by those with bachelor degrees. Similar results are found by Higgins and Chapman (2015), with median male full-time bachelor graduates earning about \$100 000 by age 40 in 2015, compared to \$75 000 for those with a Certificate IV and \$68 000 for Certificate III. These lower expected earnings can result in a higher likelihood that VET students will consistently earn below the initial HELP repayment threshold, increasing doubtful debts.

Robot interns — Automation and graduate employment

Advances in computer science, artificial intelligence and data analysis have led to concerns that increasing numbers of jobs will be automated (SP 8). In particular, while routine task automation has been occurring for many decades, technological advances mean that automation is now being felt among non-routine tasks that have traditionally been more difficult to encode. This includes the automation of many non-routine cognitive tasks, such as document discovery, low-level audit work or basic market research (Durrant-Whyte et al. 2015; Frey and Osborne 2013).

However, the basic office tasks that are being automated are also those undertaken by many new university graduates early in their post-university careers. As Davenport (2016) notes, 'if you can teach a recent college grad to do a task, you can probably teach a machine to do it'. As such, the recent declines in graduate employment outcomes (with full-time employment four months after graduation falling from 91 per cent in 1989 to 71 per cent in 2016) may in part be due to the automation of entry-level graduate tasks or the capacity for a less trained person to undertake the task with the assistance of software (PC 2016a). Continued poor employment outcomes for graduates would then have flow-on effects for their ability to repay their HELP debts.

²⁷ Following revelations that many unscrupulous registered training organisations were taking advantage of the VET FEE-HELP scheme (see PC 2016b, p. 37 for details), it was replaced with the VET Student Loans scheme starting in 2017 (Birmingham 2016a).

 $^{^{28}}$ However, the OECD's definition of 'upper secondary education' also includes those with Certificate III.

Potentially rising non-completion rates

As discussed in section 2.2 above, recent rises in attrition rates — from 12.5 per cent in 2009 to 15.2 per cent in 2014 (HESP 2017) — could signal the start of an upward trend in non-completion rates, particularly following the introduction of the demand-driven system.

Although the current rates are not yet at concerning levels, further rises could lead to increasing doubtful HELP debts for a greater proportion of non-completing students. This is because research shows that university students who do not complete their qualification often do not obtain the financial benefits associated with their additional education, despite still incurring HELP debts. As such, they may never repay their debts because they do not consistently earn over the minimum repayment threshold (which is still partially linked to the principle of guaranteed returns to university education). More data and continued monitoring are needed.

5.3 Addressing the structural challenges of the HELP debt system

In recent years, commentators and stakeholders have proposed various reforms to Australia's HELP debt system in an attempt to ensure that the system remains fiscally sustainable. The most prominent ideas are discussed in the sections below, but other major ideas not further discussed have included:

- **Higher interest rates on outstanding HELP debt** would decrease the costs of the system by reducing associated interest subsidies, but also increase the time it takes many debtors to repay, thereby increasing doubtful debts, particularly for low-income graduates or people (disproportionately female) who take an extended period out of the workforce (Norton and Cherastidtham 2016b).
- Introducing uniform loan fees on all HELP loans allows the Government to cover the costs of the HELP debt system (Norton and Cherastidtham 2016b), but would also require HELP debtors who successfully pay off their loans to bear the costs of debtors who do not.
- Securitising and selling HELP debts, which involves giving private investors the rights to the associated streams of HELP repayments, would be expected to be of minimal or negative benefit to taxpayers over the long term (ACIL Allen 2013; Norton and Cherastidtham 2014).

Lower repayment thresholds

One of the most prominent policy options is to reduce the repayment thresholds for HELP debt, which currently start at a 4 per cent repayment rate for incomes above \$55 874. Lowering the repayment thresholds (and the repayment rates) would result in more people
earning incomes that require them to make compulsory repayments. This would reduce the immediate costs of the HELP system and ensure that more of those who benefit from additional time off work or who have secondary incomes in otherwise wealthy households are making repayments (Norton and Cherastidtham 2016a). It could also reflect the extension of HELP loans to VET qualifications and the reduced expected additional lifetime earnings (discussed in section 5.2 above).

Indeed, the Australian Government has announced such a measure as part of the 2017-18 Budget, decreasing the first repayment threshold to \$42 000 in 2018-19, with a starting repayment rate of 1 per cent and subsequent thresholds increasing repayment rates by 0.5 per cent each.²⁹ About 183 000 debtors are anticipated to be brought into the repayment system as a result (Australian Government 2017b).

However, decreases to the repayment thresholds would also disproportionately affect debtors on lower incomes, leading to potential equity concerns. Further, as noted by the Grattan Institute, some students working while studying may unexpectedly have to start repaying before completing their qualification, while others may have made financial commitments based on the higher threshold (Norton and Cherastidtham 2014).

More fundamentally, lower HELP repayment thresholds can undermine two of the objectives of the HELP loan system — guaranteeing returns from higher education and providing social insurance (outlined in box 5.1 above). This is because some debtors in financial hardship or who have not benefited from their additional education (including those who incurred debts but did not complete their qualification) will have to start making repayments under lower repayment thresholds. However, a lower repayment threshold (or no repayment threshold, such that debtors start repaying as soon as they have an income) is still compatible with overcoming liquidity constraints.

While the Government's proposed \$42 000 repayment threshold remains higher than other forms of social insurance in Australia (including Newstart allowance income tests and the national minimum wage), there are concerns that it is too low to guarantee returns to higher education. Analysis by the Commission, using Household, Income and Labour Dynamics in Australia (HILDA) survey data from 2015-16 and a methodology outlined in Higgins and Chapman (2015), indicate that this may be the case, with an optimal threshold *for this objective* estimated at \$54 000 in 2018-19 (box 5.2).

²⁹ Progressive repayment thresholds will also be set 6 per cent higher than the preceding threshold (that is, the 1.5 per cent threshold at \$44 520, the 2 per cent threshold at \$47 191 and so on), up to a repayment rate of 10 per cent for incomes above \$119 882. The proposed \$42 000 threshold appears to have been selected from a Grattan Institute proposal (SEELC 2017, p. 42), although it is unclear how the Grattan Institute arrived at this figure (Norton and Cherastidtham 2016a).

Box 5.2 An 'optimal' initial HELP repayment threshold?

Under the 'guaranteed return' principle of HELP, graduates are only required to repay their debts if they are benefitting financially from their higher education qualification. As such, the initial repayment threshold should be linked to the expected income for the counterfactual scenario, where the student does not obtain further education. While this is impossible to calculate for individuals, it can be done across the population by comparing the incomes of those *with* additional HELP-supported education to those *without*. The initial repayment threshold can then be set at the expected income of those *without* HELP-supported education, as debtors earning above this level can be assumed to be benefitting from their additional education.

Using this framework and 2011 Census data, Higgins and Chapman (2015) found that median full-time income for 22 year olds without post-secondary education is about \$40 000 (in 2015 dollars). Employing the same assumptions, Commission analysis of HILDA data from 2015-16 suggests a similar threshold (\$41 000). However, some of these assumptions are problematic.

- Comparing the incomes of 22 year olds implicitly assumes that 22 year old HELP debtors should be repaying. This may not be realistic, given that less than half of domestic university students have completed a bachelor degree within four years of commencing (roughly equivalent to a 22 year old, assuming the age of entering university is 18) (DET 2017c). Higher age assumptions would be more plausible, including covering the prime working age population (22 to 54 year olds) given that HELP debts can be repaid at any age and do not expire.
- If an older comparison group were considered, then the repayment threshold should also be linked to the expected annual earnings of full-time *and* part-time workers. This would better reflect the diverse nature of the modern workforce, as many debtors voluntarily work part-time (particularly in double income households), while the proportion of graduates working part-time has increased greatly since HELP was first introduced (discussed in section 5.2). This is less likely to hold for younger comparison groups though, as younger part-time workers may still be studying at university or be involuntarily part-time as they search for graduate positions.
- Using individuals without any post-secondary education as a comparison group does not reflect current policy settings for HELP. Under the current settings, access to HELP loans is available for study towards a diploma or higher qualification. As such, the earnings comparison group should consist of those *without* a diploma or higher qualification, some of whom could still have post-secondary qualifications (such as a Certificate IV or Certificate III).
 - It seems likely, however, that HELP debt will eventually be made available to Certificate IV and Certificate III students (discussed in section 5.2), meaning that the comparison group would need to be adjusted to reflect this once it occurs.

Because of these issues, the Commission has conducted analysis of HILDA survey data using alternative assumptions. The results suggest that an optimal initial repayment threshold under a 'guaranteed returns' model for HELP would be approximately \$51 000 in 2015-16 (when the survey was undertaken). This reflects the median annual income of prime working age (22 to 54 year old) full-time and part-time workers without a diploma or higher qualification.^a Adjusting for expected wage inflation (outlined in the 2017-18 Budget), this would be approximately \$54 000 in 2018-19 (the first year of the Government's proposed new threshold).

^a Excluding those employed persons with zero incomes, as HILDA imputes annual gross wages and salaries from the most recent pay, so zero-income employed individuals are likely misreported.

However, it is unclear whether providing a guarantee for returns is justifiable. It would be relevant if it made a big difference to demand for people uncertain about the returns to university, but there is no evidence for this (Norton and Cherastidtham 2016a). Equally, it would be justified were the Australian Government to implicitly or explicitly promise that a university qualification would subsequently provide high income. The Government does not do so, nor could it, as evidenced by the limited existing information on graduate outcomes, which already demonstrate that university education does not bestow a guaranteed return (section 2.2 above).

Further, using a high income threshold before repayments become compulsory has fiscal costs — borne by taxpayers. This is especially pertinent given the recent expansion of university student numbers (moving from an 'elite' to a 'mass' university system through a demand-driven model) and the ongoing extension of HELP loans to sub-bachelor courses (discussed in section 5.2), increasing the number of debtors and their costs.

Nevertheless, recent public debate indicates that much of the electorate still supports the concept of a guarantee. For examples, see Carr (2016) or Senate Education and Employment Legislation Committee (2014), although both refer to this idea as a form of 'social insurance'. As such, whether the HELP debt system should continue to operate under this principle is a matter for public debate, with the decision (and any associated costs) ultimately up to the electorate.

Repayment threshold indexation

The indexation method for HELP repayment thresholds is another vexed issue. Historically, the repayment thresholds have been indexed to changes in average weekly earnings (AWE). As part of the 2017-18 Budget, the Australian Government proposed that indexation be linked to changes in the consumer price index (CPI) from 2019-20 (Australian Government 2017b). This follows recommendations of both the National Commission of Audit (2014) and the Grattan Institute (Norton and Cherastidtham 2016a).

However, indexing the repayment thresholds to CPI rather than AWE will result in a slow erosion of the repayment thresholds over time, as AWE has traditionally risen faster than CPI (the recent period of weak wage growth notwithstanding). This will effectively result in growing numbers of low-income debtors being brought into the HELP repayment system over time — a fact the Government implicitly acknowledges (see Australian Government 2017b, p. 18) — with repayment thresholds eventually ceasing to fulfil the social insurance principle of HELP and (to the extent it is regarded as valid) the guaranteed returns principle. In much the same way that 'bracket creep' is undesirable (although fiscally useful) in the broader income tax system, it is also undesirable for HELP repayments.

As such, the indexation of the HELP repayment thresholds should remain linked to changes in an index using the same basis (earnings). Despite this, consideration could still be given to whether the most appropriate earnings indexation measure is currently being used, as other indexes may more closely align with the unique demographics of university graduates — examples could include average weekly ordinary time earnings (AWOTE) or the wage price index (WPI).

Repayment cliffs, income bunching and workforce participation

To the extent that HELP repayment rates are considered equivalent to short-term increases in effective marginal tax rates (EMTRs) by debtors, **this can result in reduced incentives for debtors to earn extra income, affecting labour supply and workforce participation decisions across the economy.**

Nowhere is this more obvious than at the 'repayment cliffs' created by the design of the HELP repayment schedule, where debtors have to repay higher portions of their total income after crossing each threshold. These repayment cliffs result in debtors facing abnormally high effective marginal tax rates in the short term. This effect is most prominent at the current initial repayment threshold, where an individual who earns exactly \$55 874 would be required to make a HELP repayment of \$2235 (4 per cent), while their compulsory repayment would have been zero had they earned a single dollar less. Smaller repayment cliffs occur at each subsequent threshold as the rates increase from 4 per cent to 8 per cent (ATO 2017a; Norton and Cherastidtham 2016a).

These repayment cliffs can affect marginal participation and income decisions by debtors. In particular, Chapman and Leigh (2009) find that there is statistically significant income bunching by HELP debtors at levels just below the initial repayment threshold. Similar evidence is found by Highfield and Warren (2015). This not only results in lost HELP repayments, but also lost income tax for the Commonwealth (although it is not economically significant), as well as lower labour supply (assuming debtors targeted income by reducing their hours). There is a paradox in identifying higher education as a route for improving skills and productivity in the economy, and then discouraging people from shifting into the (higher paying) jobs that make the most of people's qualifications.

Despite these challenges, the repayment cliffs have advantages too. In particular, debtors consistently earning just over the current initial threshold will generally repay their HELP debts in full, due to the large repayment cliffs. By comparison, in England and New Zealand, where debt repayments are only made on the portion of income *above* the minimum threshold, very low repayments from incomes near the threshold can prevent debts ever being repaid (Norton and Cherastidtham 2016a). Indeed, the lack of repayment cliffs in the student loan systems of England and New Zealand mean that claims that Australia's HELP repayment system is 'more generous' should be treated sceptically.

The changes to HELP repayment thresholds announced in the 2017-18 Budget — moving to a 1 per cent repayment rate at \$42 000 — would help to minimise the disincentive effects of existing repayment cliffs, as initial repayments will only be \$420, rather than the current \$2235. However, even the continued (reduced) repayment cliff at the new threshold may still induce income bunching, especially given that — as noted by the Grattan Institute — lower repayment thresholds are likely to disproportionately affect part-time workers,

who generally have more control over their hours worked, and so may respond with reduced workforce participation (Norton and Cherastidtham 2016a).

More broadly, subjecting over two million taxpayers to higher marginal taxes (given that nearly all debtors will be paying more under the cascading changes to subsequent income thresholds) is likely to result in reduced labour supply and workforce participation by at least some of these debtors (even if only in the short-term until HELP debts are repaid). By contrast, the collection of HELP debts from deceased estates would not distort labour supply (and so is less likely to reduce economic growth and lower living standards) while still providing a means to equitably reduce doubtful debts in the HELP system (see below).

Collection from deceased estates

Much of the cost to taxpayers from the existing HELP debt system is a result of doubtful debts that have to be written off on the debtor's death, inviting the obvious remedy of collecting any remaining debts from deceased estates. This would bring HELP debts into line with the treatment of other public and private debts, as most debts can be collected from deceased estates, including outstanding tax debts. Further, it does not undermine the roles played by HELP in overcoming liquidity constraints and providing social insurance.

As well as significantly reducing the cost of doubtful debt provisions, this would also make the system more equitable and partly address the excess demand for university education by people who can avoid the lifetime costs of attending. Graduates who have benefited from being able to work part-time in an otherwise wealthy household (through higher hourly wages as a second household income) or who graduated after retirement would no longer be able to free-ride on the existing taxpayer-funded system.

One concern that may be raised is the cost of administering such a system. In particular, collection from deceased estates is unlikely to involve many short-term fiscal gains (given the lifelong timelag), while the Australian Taxation Office (ATO) would need to develop new systems to identify, consider and process collections straight away. However, the cost of the ATO's changes are initial establishment costs — ongoing costs should be minimal, as many deceased estates have to file a final tax return on behalf of the deceased anyway (ATO 2016a).

In return for these outlays, the Grattan Institute estimates that doubtful debt could fall by up to 67 per cent (Norton and Cherastidtham 2014). Given current doubtful HELP debt levels, this could equate to a saving of nearly \$10 billion. Even if that is optimistic, it is very likely that the present value of the stream of future benefits from deceased estates collection would far exceed the costs of ongoing administration. The fact that existing budget rules hide those gains is a problem with the rules, not with the policy.

To have any sizable impacts, collecting from deceased estates would have to apply to existing HELP recipients, not just new ones. Although it could be argued that applying the

collection from deceased estates to existing debts is 'retrospective' (in the sense that it changes the terms of an implicit contractual arrangement after agreement), there have been a raft of other changes to the HELP 'contract' (particularly changes to repayment thresholds) that have not been considered retrospective (Norton and Cherastidtham 2014). Moreover, collection from all debtors is consistent with intergenerational equity, as otherwise future students would be subject to collection from deceased estates, but their parents with current debts would not.

Another potential issue is the treatment of small estates. As outstanding debts may be several tens of thousands of dollars, small estates may not be sufficiently large enough to repay the debt. In any case, one of the chief goals of collection from estates is to recover funds from people who can afford to pay — a condition that arguably does not hold for people with modest estates. One potential solution is to only collected HELP debts from estates worth above a certain amount. Although Norton and Cherastidtham (2014) suggest a \$100 000 threshold, the chosen threshold would have to consider an appropriate balance between collecting outstanding debts and maintaining the social insurance (or guaranteed returns) principle of the system.

Parallel to this concern is the treatment of debtors who die young. Ethically, it is questionable whether the Government should be chasing significant debt repayments from the estates of young adults or those with new families. Moreover, from an economic perspective, individuals who die at younger ages have likely not obtained the full benefits from their education, and so should not be pursued for the associated costs. As such, a minimum age at death before collection applied would also be appropriate — for example, only collecting from the estates of debtors who died aged 60 years or over (the superannuation preservation age for those born after 30 June 1964).

Providing the ATO with discretionary powers to waive some or all of the debts in extenuating circumstances would also be appropriate. Similar powers to release debtors from other tax liabilities in the event of serious financial hardship already exist (ATO 2016b).

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Australian Government

Productivity Commission

SHIFTING THE DIAL

3 AUGUST 2017

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Key points

- Technological advances will create new job opportunities but will also displace some jobs, including occupations previously considered 'irreplaceable'. If the education system, and those in or entering the workforce, are not responsive to changing skill needs, there is a risk of higher unemployment, underemployment and lower earning prospects, which in turn are likely to reduce engagement in the labour market.
- Improving the employability of workers through upskilling and retraining is a necessary
 response to the combined effect of an ageing workforce and technological change. However,
 negative stereotypes and myths about older workers' abilities and their willingness to learn new
 skills create barriers to training opportunities. These need to be addressed if the economy is to
 benefit from their skills and experience through greater participation in the labour market.
- There are no easy ways of ensuring that the current workforce has the relevant skills, particularly given the uncertainty about the effect of technology on the usefulness of existing skills and occupations. However, a number of the reforms canvassed in chapter 3 of the main report will reduce barriers and assist people to upskill and retrain, including:
 - ensuring the schooling system delivers strong foundations not only helps with jobs and income prospects of young people, but also provides a strong basis for education and training throughout life
 - establishing an independent system that enables recognition of, and trust in, new ways of acquiring knowledge and skills that may stimulate further upskilling and retraining. The lower costs and greater flexibility of these new approaches may be particularly relevant for people who have existing job and family commitments
 - introducing graded assessment may assist future learning pathways for students wanting to upgrade their VET qualification to a university degree.
- In addition, consolidation of the growing number of government websites to assist people considering particular occupations and looking to undertake training should make it easier to navigate for the end user. Some of these users may be workers who have not had much contact with the education and training system for a number of years.
- The investment approach to welfare reform used for young adults at greater risk of welfare dependency may also have lessons for the development of employment and skill initiatives focused on older cohorts at high risk of losing their jobs due to structural adjustment.
- There are a range of other initiatives used internationally, such as career advice, learning accounts and tax incentives, that may have merit. However, the rationale, objective, policy design, effectiveness and costs of such measure should be carefully examined prior to their introduction.

1 Risks and pressures in the labour market

1.1 Jobs, change and future living standards

Jobs matter.

For almost all of us, they are more than a source of income, extending to the provision of opportunities for social interaction; a source of self-esteem; or a feeling of contribution to a profession or community.

From an economy-wide viewpoint, growing employment rates and higher labour market participation are primary sources of improved living standards along with the increasing skills and capabilities of workers. Encouraging labour market participation, skills formation and supporting a well-functioning labour market are vital steps that governments can take to ensure that society can maintain or improve its standard of living, particularly in the context of an ageing population.

But labour markets do not stand still.

Occupations, skills and jobs come ... and they go. More than a century ago, lamplighters, icemen, and telegraph operators fell into decline. In the middle of the last century, dunny men and bread delivery vans started to disappear. Towards the end of the century, switchboard operators, typists and TV repairmen became rarer and rarer. Travel agents, bank tellers and supermarket cashiers still exist as occupations, but opportunities in these occupations are diminishing.

Some jobs and occupations may be disappearing, but technology and changing consumer preferences are driving demand for new skills and jobs.

- High-skilled jobs tend to be complementary to new technology raising productivity and the demand for suitably skilled workers. The productivity savings result in lower prices for consumers, higher wages for employees or higher profits, leading to increased demand and more jobs.
- With lifestyle and demographic changes and rising incomes, consumers are increasingly seeking new products and services, particularly when it enhances convenience. The internet, for example, is driving this demand and creating new jobs and occupations, primarily in the services sector. Demographic change has also increased the demand for workers in the care sector, including aged care and childcare.

History has shown that over the long run, technology and other labour market changes have been a friend to many employees, removing jobs that are often unpleasant, physically

tiring, dangerous or tedious. Overall employment persistently grew despite these fundamental technology changes (PC 2016a).

Profound labour market change on the horizon or manageable risk?

While the speed and magnitude of future technological change is contested, even the most conservative estimates suggest that the nature of occupations and jobs are likely to change sufficiently quickly that some skills will become redundant, with workers vulnerable to unemployment, underemployment, poor skills utilisation and lower incomes. The potential acceleration of automation into occupations previously not considered feasible means that a wider group of people may be affected by structural change (chapter 2 below).

Outsourcing is also presenting risks for the nature of jobs. There is increased scope to offshore jobs in the services sector, including in areas previously expected to be safe from outsourcing (such as jobs in human resources). And firms — enabled by exchange platforms like Freelancer — are able to contract out short-term, discreet tasks. The prevalence of the gig economy is often grossly exaggerated. Nevertheless, it may grow in significance, with a greater proportion of workers thus relying on a portfolio of work rather than long-term employment with a limited number of employers (chapter 3 below).

People are also working longer and retiring later. This trend is likely to continue (appendix A below). As noted above, this is generally considered good, as jobs provide income, purpose and social connections, along with the broader economy-wide benefits. But the increased need and desire to maintain strong labour market attachment also brings risks of vulnerabilities, as it is not always possible for people to work longer.¹ Workers in jobs that have a highly physical component (such as labouring or nursing) or whose skills have become redundant, may not be able to continue in these roles to the age when they are eligible to access retirement benefits.² Instead, they may have a material period in which they need to work in alternative jobs, with some workers requiring upskilling or retraining to make this change. Recent tightening of eligibility of social security payments, such as the increase in pension age, has heightened income risks associated with redundancy for older workers.

Collectively, these risks threaten employment opportunities, along with participation rates and Australia's standard of living. Some view these changes in the labour market as a looming crisis, while others see them as a sign that there is a need for a transition process

¹ A substantial share of retirements are involuntary, for example, due to retrenchment and subsequent difficulties in obtaining a job (Australian Centre for Financial Studies 2014). This increases financial insecurity in retirement or in the years leading up to retirement, particularly if workers have not received large redundancy payments.

² The average age of retirement among labourers is approximately 58 years old with 35 per cent retiring prior to 55 years old (ABS 2016c).

to deal with any potential obstacles and barriers (Dunlop 2016; Ferrier, Burke and Selby Smith 2008; PC 2013).

A comprehensive assessment of the ways to foster greater participation and employment, in light of these risks, would consider all aspects of a well-functioning labour market (participation, mobility, regulation and skills formation), as well as the interaction of government policies (such as superannuation and pension eligibility age) in achieving this aim (figure 1.1).



Figure 1.1 A well-functioning labour market

This paper examines one element of this wider issue: skills formation for working-age individuals. In particular, it investigates the role can governments play in creating an environment to cultivate and encourage retraining and upskilling of the population to foster an extended (retiring later and less involuntary retirement) and fuller working life (less periods of unemployment and less underemployment).

While the estimated effects on GDP of increased participation of older workers are significant (box 1.1), concerns over the effects of ageing on material living standards do not per se justify policy initiatives to increase involvement by older people in work. People value retirement and the leisure it brings. Indeed, Figgis (2012) highlighted that many non-professional or low skilled workers viewed retirement as a 'relief' and that work was something that was 'suffered' (p. 10). However, the economic and social benefits of more enduring participation are genuine if people's choices of retirement are involuntary and reflect avoidable obstacles, such as obsolescent skills.

Box 1.1 Greater participation will bring sizable economic effects

The economic effects of greater participation in the labour force can be high.

- PwC estimate that if Australia's employment rate for workers aged 55 years plus (52 per cent) was to increase to Swedish levels (74 per cent), the potential gains could be about \$69 billion or 4.7 per cent of GDP (PwC 2016).
- The Grattan Institute estimated that a seven per cent increase in the mature age labour force participation rate (to bring it to a rate that would still be less than New Zealand's) would raise GDP in 2022 by about \$25 billion or 1.4 per cent (Daley, McGannon and Ginnivan 2012).
- Deloitte Access Economics (2012) estimated that an extra three percentage point increase in participation among workers aged 55 and over would result in a \$33 billion boost to GDP – or 1.6 per cent of national income.

While these exercises highlight the potential economic effects of higher labour force participation or employment, they model quite large changes, but with limited evidence on how such changes would be achieved (with the exception of the Grattan Institute's analysis).

Workers reap personal benefits (financial and non-financial) from staying in the workforce longer. Generally, working provides an income that is above the pension allowance and is an avenue for contributing to superannuation balances, which provides for greater income in the future (AHRC 2012). Approximately three quarters of people in older low-income households received at least 90 per cent of their cash income from government payments, mainly the age pension (AHRC 2016). Working may also provide non-financial benefits, such as purpose and meaning to daily life, as well as social interaction, which can help boost people's confidence and self-esteem (Aylward 2015; Davenport and Kirby 2016).

The main premise of this paper is that, given the likelihood of continued structural change, it is worthwhile encouraging training and education of those in the labour force because it benefits both workers and the wider economy. This reflects the Commission's view that the threats and opportunities posed by new technologies and markets to existing occupations will be manageable and, combined with people working longer, will increase the payoff to upskilling and retraining of workers (figure 1.2). But workers, particularly older workers, face barriers to upskilling and retraining, potentially limiting the uptake of worthwhile skills formation. A more detailed understanding of the main pressures and barriers faced by workers is outlined in chapters 2 to 4 below.



Figure 1.2 Skills formation for existing workers — drivers and implications

Core competencies are changing, increasing the need for ongoing learning

For many future jobs, new skills and knowledge will be needed as part of the core competencies (CEDA 2017). Basic foundations in science, technology, engineering and maths have been highlighted as important, along with business acumen and entrepreneurial skills (PC 2016a). At a fundamental level, all workers will also need the skills to interact with digital technology — whether it is maintaining records in caring professions, taking orders in hospitality, or operating equipment in a processing plant. A range of 'soft' skills (such as communication, empathy, creativity and adaptability) complement other 'harder' skills, and are useful to navigate changes in job requirements (CEDA 2017; Vandeweyer 2016). In short, while an innovative economy requires the development and

use of skills in many disciplines and at a variety of levels, 'there is no skills-related silver bullet' (OECD 2015b, p. 50).

It is well accepted that education in the early years of life is vital. Consistent with this, there has been considerable policy focus on preparing younger cohorts for future labour markets (however, there are signs that Australia's school system is not functioning well (appendix B below)). But a greater commitment needs to be given to ensuring ongoing education and training, including work-based training, so that workers are able to develop new core competencies and skills and be able to navigate the expected labour market changes.

To highlight the importance of ongoing skills formation consider the following situation. A person aged 55 years retiring in 2003 would not, for work purposes, need to understand and use smartphones, social media, the Cloud or modern internet search engines. In contrast, a person aged 65 years retiring 10 years later may have needed to understand these digital tools at work. Accordingly, decisions to change retirement dates affect the knowledge and skills that people need at work.

A matter of definition

The target group of this paper is working age individuals above the conventional age of completing a post-secondary school qualification (either a vocational qualification or a university degree) directly after high school (that is, approximately 25 years old and above). This contrasts with many labour market structural adjustment studies that focus on mature age or older workers — which are generally considered to be people (at least) above 45 years and older.

The broader group has been chosen because potential labour market vulnerabilities are not only a result of age. Some older workers fare quite well in the labour market, working into their 60s and sometimes their 70s, particularly those with a university education (ABS 2016b). By focusing on this broader population there is potential to reduce labour market vulnerability before these workers reach this 'older' category. Therefore, rather than focusing on age alone, it is more constructive to consider the factors that make employability difficult for certain types of workers, such as the relevance of skills for future workplaces (Billett 2011). However, much of the evidence and data, particularly on the barriers to education and training, relate to the mature age workers — those 45 years and older.

2 Automation and future work

Technological developments have been happening for centuries — changing the way people live and work. A key question is the technological prognosis over the next 30 to 40 years, and associated with that:

- the degree to which transitions between jobs can occur autonomously
- the extent to which government policies, from taxes on mobility (like stamp duty), inadequate transport planning and investment, and education and training, may be required.

To determine what policies may be necessary, in particular in the education and training sector, it requires an understanding of the nature of technological change and its timing. This chapter focuses on automation.

2.1 Some see high risks for many segments of the labour market

Some profess 'little doubt' about the increasing effect of technology in the early 21st century (Frey et al. 2016) or that the acceleration of technological achievement is 'unprecedented' (in an ILO paper by Chang and Huynh 2016). The diagnosis is that the associated changes in the nature and type of work will increase the rate of obsolescence of workers' skills, making more jobs redundant than in the past, with workers changing occupations more frequently than ever (Bostrom 2014; Brynjolfsson and McAfee 2012).

These claims stem from expectations that technological developments will move into areas that were previously not considered feasible (non-routine manual and cognitive tasks) (PC 2016a). Not only are machines starting to undertake these tasks, in certain circumstances, they can make better decisions than people, as they are free from factors which often impair people's decision making. For example, Rio Tinto runs two mine sites with driverless trucks that eliminate a 'very high risk role, where employees are exposed to fatigue' (Diss 2015, p. 1).

The concerns of widespread job losses have been underpinned and reinforced by a series of recent empirical studies. These are largely based on a common methodology developed by Frey and Osborne (2013), which rates the degree of vulnerability of hundreds of occupations. Depending on the occupational mix of any country, the studies estimate that somewhere between 30 to 60 per cent of *existing* jobs will disappear in a range of countries, including Australia (Chang and Huynh 2016; Deloitte 2014a; Durrant-Whyte et

al. 2015; Edmonds and Bradley 2015; Frey and Osborne 2013; PwC 2015). Many of these predicted job losses are a combination of the continued automation of jobs that has been occurring over recent decades, along with automation advancing into new areas.

Some offer unsettling predictions of mass job losses with no 'higher ground' for workers to move to (that is, more skilled jobs), as they have in the past. Essentially, they predict that there will not be enough jobs and hours of work (for example Brynjolfsson and McAfee 2012; Dunlop 2016). In that vein, some argue that government should end 'miserable busy-work' or 'job pathway' schemes as there will not be enough jobs to transition to (Dunlop 2016, p. 1). Instead, they suggest that governments need to investigate systems for distributing wealth, including a basic or universal income.

The *timing* of the possible structural adjustment associated with automation is less precise than the *extent* of adjustment, yet is equally important. Frey and Osborne refer vaguely to changes over the 'next decades', but Deloitte and the ILO studies refer to changes over the next 10 to 20 years. The implications for education and training policy are quite different if the pace of change is slower and anticipated.

2.2 But the actual effects will likely be less severe and more amenable to policy action

Fortunately, it is likely that the dire predictions of rapid change suggested by some commentators are misplaced. This increases the prospects for automatic market responses to technological change, as well as the potential for successful policy initiatives to assist in labour market transitions. As several economists observed:

From our perspective, the more extreme of modern anxieties about long-term, ineradicable technological unemployment or a widespread lack of meaning because of changes in work patterns seem highly unlikely to come to pass. As has been true now for more than two centuries, technological advance will continue to improve the standard of living in many dramatic and unforeseeable ways. However, fundamental economic principles will continue to operate. Scarcities will still be with us, most notably of time itself. The law of comparative advantage strongly suggests that most workers will still have useful tasks to perform even in an economy where the capacities of robots and automation have increased considerably. (Mokyr, Vickers and Ziebarth 2015, p. 47)

There are two main of methodological concerns that cast doubt over the scale of the predicted job losses occurring.³

One reason is that the dominant method for calculating vulnerability to automation ignores the substantial variation in the complexity and skills required for tasks within an

³ Atkinson and Wu (2017) are quite scathing of the Frey and Osborne methodology used to calculate job losses noting that they are 'the products of faulty logic and erroneous empirical analysis, making them simply irrelevant to the current policy debate' (p. 1).

occupation and that once this is considered, occupational vulnerabilities are much reduced. One estimate of job replacement based on analysis of the task content of individual jobs rather than occupations suggested that just 9 per cent of jobs on average, across 21 OECD countries were at high risk of automation (Arntz, Gregory and Zierahn 2016). (Nevertheless, they still found a further 20 to 35 per cent were at risk of having at least half the component tasks changed significantly because of automation.) If it is tasks (rather than entire occupations) that are replaced by technology, this would slow the process of making jobs or skills redundant.

Another reasons is that the bleak projections relate to gross jobs, not net jobs. Historically, technological advances have also created new jobs. This is evidenced by the absence of any pronounced downward long-term trends in Australia's employment to population ratio or a sustained increase in unemployment rates (PC 2016a). The degree to which new jobs involve higher skills varies because there are several mechanisms that affect the skill composition of jobs:

- Technology is often complementary to high-skilled labour. This skilled labour, combined with technology, raises the productivity and the demand for skilled workers.
- Technology also creates jobs throughout the economy. Productivity gains arising from technological progress flow through to the economy as lower prices, higher wages for the remaining employees, and/or higher profits to create new demand and associated jobs (Autor 2015).

Multiple factors limiting a job destruction tsunami

Apart from the methodological difficulties of forecasting occupational vulnerability, there are multiple other factors that suggest that a job destruction 'tsunami' is not likely to hit soon.

- The uptake of technology is highly dependent on consumer preferences, their ability to trust technology, relative costs of technology and the regulatory frameworks operating (PC 2016a). Consequently, for many technologies, diffusion is relatively slow. This is suggested by the divergence in apparent productivity levels in given industries between countries and by evidence on the varying productivity levels between businesses (Bloom et al. 2012; OECD 2015a).
- There is evidence that the current wave of technological development is similar to past transitions jobs are being automated at a comparable pace to that of the last century (Miller and Atkinson 2013; Williamson et al. 2015). In this context, it is unlikely that across a whole economy, occupations would be displaced by automation at the rapid pace forecast by pessimists.
- The investment required for widespread automation would also be very large, and it would be hard to see investment of that magnitude across much of the economy over a short period. It would also entail the mass scrapping of existing capital. Investment

growth is currently low relative to past trends, even after accounting for falls in mining investment (Supporting Paper 1).

- Factors other than technology will also influence the nature of future jobs (such as increased demand for aged care services), which often require skills that are difficult to automate (Gahan 2016). It is hard in the foreseeable future to see machines 'intelligent' or not as fulfilling people's need for authentic emotional connections that are required in many caring jobs. Machines might be able to simulate these crudely (like Pepper, an 'empathetic' robot developed in Japan by Softbank), but people know they are programmed not real.
- Occupational risks are moderated by the growth in the Australian labour force and total employment as the population rises. This provides the scope for the share of an occupation in total employment to fall, but for total employment in that occupation to rise (or not fall by much). To the extent that this holds, this provides scope for people to avoid the problems of vulnerable occupations by not entering them when they start their careers, or to develop new skills and move to other occupations while still holding down a job (the latter being the prominent policy issue for this paper).

The empirical evidence highlights the relative importance of factors other than automation to the growth of employment of particular occupations (figure 2.1). While certain jobs have been at risk of automation for some time, the growth and decline in occupations has not always followed predictions (based on their risk of automation). It appears that some apparently high-risk occupations have fared well (or at least grown) in the past decade, notwithstanding that the technologies that make their skills redundant are already in existence (checkout operators, laundry workers, transport and dispatch clerks, general clerks, payroll clerks and real estate agents for example). Moreover, some occupations with non-automatable skills, such as visual arts and crafts professionals, have contracted significantly.



^a The were a limited number of occupational categories at the 4 digit levels that did not include an assigned automation risk from Edmond and Bradley (2015). Rather than exclude these from the analysis, subjective judgments were made about their risks – based on the job type and the risks for similar occupations.

Sources: Edmond and Bradley (2015); ABS 2016, Labour Force, Australia, Detailed, Quarterly, Nov, Cat. no. 6291.0.55.003; and PC calculations.

2.3 Claims may be overstated but still grounds for concern

Although the effect of automation on net employment may be much less than claimed by some, there are reasonably grounded concerns about the impacts of automation on jobs, industries and occupations.

History tells us that structural change can be significant

The historical data — while suggesting less extreme outcomes than the predictions — support the contention that significant structural change can occur over several decades (figure 2.2). The impact of skill level on the composition of the labour market shows that high-skill occupations have increased in significance throughout the three decades from 1986, and that moderate (level 3), rather than lower-skill occupations, have experienced the biggest and continuous reduction in shares (Coelli and Borland 2015). In part, this may reflect that there has been a substantial expansion in low-paid, relatively low-skilled jobs in

community and personal services (for example, child, aged and disability care workers; educational aides; and fitness instructors). Routine manual jobs have declined since at least the mid-1980s, and routine cognitive jobs since the early 2000s (Heath 2016).



a L1 to L5 refer to skill levels

Source: ABS 2016, Labour Force, Australia, Detailed, Quarterly, Nov, Cat. no. 6291.0.55.003; and PC calculations.

The past record of technological disruption shows that some cohorts have been affected more than others, such as male mature-age workers those with limited English, lower educational qualifications, or in blue collar jobs (Murtough and Waite 2000).⁴ Case study evidence also suggests that job displacement outcomes vary considerably across different businesses, depending on the nature of the local labour market, the age of the worker (older people fare worse) and the scale of the displacement (Borland 1998). Longitudinal data show that the likelihood of still being in the labour force in 2011 for a person who was unemployed in 2006 is dependent on age and educational attainment. For example, the likelihood that an unemployed person aged 45-54 years with a postgraduate degree in 2006 was outside the labour market in 2011 was about 23 per cent. Different ages and educational levels produce significantly different outcomes:

⁴ A major reason for the uptake of the Disability Support Pension prior to the 2000s was the long-term unemployment of low-skill, older workers associated with structural changes in manufacturing. Once on the DSP, few ever left to get another job (death and eligibility for the Age Pension being the most common reason for exiting this payment).

- *Age effect*: For an otherwise similar person aged 35-44 years in 2006, the likelihood was about 9 per cent
- *Education effect*: For an otherwise similar person with only school education in 2006, the likelihood was nearly 40 per cent.⁵

It is hard to argue that structural pressures will abate in the future. Therefore, even if there is no 'average' adverse outcome for employment and participation associated with automation, this would provide little solace for specific groups that are more likely to be affected.

Furthermore, even if participation and unemployment rates are not affected by new technologies, wages and hours worked may be affected. Many of the jobs requiring manual dexterity or personal skills that cannot readily be automated (domestic tasks; disability, aged and childcare) are at the lower end of the wage distribution and involve part-time work.

2.4 Other developments that affect occupations

Much of the current analysis of the risks for jobs and wages posed by technological progress assumes that automation of tasks is the predominant form of disruptive technology. That may be the case, but this could overlook some other important technological and economic drivers that affect future jobs, but are unrelated to the sophistication of the tasks involved in those jobs. Appendix C examines two case studies in the education and health sectors, and how occupations, which may be at low risk of automation, may face reduced demand as a result of technology (other than automation), changes in consumer preferences, task redesign and regulation.

⁵ Based on Productivity Commission calculations using the ABS Australian Census Longitudinal Dataset 2006-2011.

3 Digitalisation is changing the nature of firms

Technologies and markets have always shaped the nature of businesses and their labour markets. For example, electricity generation in Australia used to be a municipal function supported by local poles and wires. That changed with the advent of large relatively remote coal-fired generators and associated long-distance transmission networks. It then changed even more with the creation of the National Electricity Market. Just as that market is underpinned by sophisticated communication technologies, often so too are domestic and global supply chains.

While emerging technologies will have many effects on business structures, concern often centres on the growing significance of offshoring and the gig economy, and their implications for skill formation, labour markets and trade regulations.

3.1 Offshoring

Digital technologies have changed the extent and nature of links between geographically-separate businesses, or arms of them, either within Australia or offshore. This has permitted more offshoring of traditionally non-traded services involving skilled jobs like accountancy and IT services, and low-skill jobs such as call centres located in low-income countries using voice-over-IP systems (Deloitte 2014b; Smith 2014).

As offshoring is a global phenomenon, it cannot be assumed that it will lead to overall job losses in the affected high-skill occupations in Australia. Indeed, there is some (albeit dated) evidence that demand for Australian high-skill jobs has increased because of offshoring by other countries (Woods 2007).

Nevertheless, as occurred with competition from low-wage developing economies in basic manufacturing, it seems likely Australia will experience a relative decline in more routine service jobs that do not require face-to-face contact. As with trade liberalisation generally, this can be expected to shift people between jobs and occupations rather than affect aggregate employment. One of the reasons for this is that offshoring lowers production costs for domestic businesses, reduces prices, increasing consumer demand and inducing demand for the types of jobs still required in the home country (for example, non-routine abstract tasks, such as marketing and design).

But it could lead to the stranding of some people with skills that would formerly have been expected to be safe from structural change (such as human resources jobs). Retraining may

be an important resort for such people to maintain employment, and they may have a greater capacity to retrain given their existing skills.

An added 'political economy' argument for government investment in proactive retraining is that the effects of offshoring can fuel demands for regulatory measures to limit its use. Governments can reduce this risk by increasing the labour market prospects of those people who are adversely affected. Others have equally noted that improving skills, rather than regulating offshoring, is the key policy imperative:

Task upgrading occurs because the offshored tasks are less complex than the tasks that remain at home. Because offshoring can lead to productivity gains and task upgrading at home, what policymakers should prioritize is not curtailing offshoring but rather helping domestic workers seize the opportunities presented by task upgrading. Policymakers can do this by supporting domestic workers in building the types of communication and cognitive skills that domestic firms have a hard time finding abroad through forward-looking vocational education for future workers and focused retraining programs for current workers. (Ottaviano 2015, p. 9)

3.2 The gig economy

Businesses are platforms for organising labour and capital. In their traditional form, they typically involve interpersonal relationships — hierarchies, training, career development, monitoring — and can often adapt quickly to the needs of individual employees. The actions of employees are subject to clear managerial direction (one of the key criteria for the legal definition of an employee rather than a contractor).

The gig economy departs from this model. The platform is digital and more impersonal. The rise of platform websites (such as Uber, Upwork, Whizz, Freelancer, Airtasker and 99designs) extends the ability of businesses to break down jobs into components, buying in 'tasks' as needed (PC 2016a). These arrangements can help improve productivity by more accurately matching and scaling resources to the needs of businesses and customers. The worker may have greater independence in the way they undertake their work and the tools they use. This raises the possibility that contracting will rise in significance as a form of employment, though there is no evidence of such a trend in labour market data in Australia.⁶

While it seems likely that the gig economy will grow, contemporary evidence on its significance is patchy and inconsistent — a reflection of different definitions of this part of the labour market, varying survey methods and differences between prevalence rates measured at a point in time and over a period (Brinkley 2016; Taylor 2016). Definitions of

⁶ There is also emerging case law in the United States and the United Kingdom that challenges the preconception that people working under platform arrangements, such as Uber, are contractors. In 2016, the UK Employment Tribunal found that Uber drivers were employees and not contractors, as claimed by Uber (Macinnis 2016).
the gig economy that differentiate it from traditional contracting and informal work suggest that it is currently very small in Australia and most other countries (box 3.1).

Box 3.1 How big is the gig economy?

In its enumeration of the gig economy, the Australian Industry Group suggests that 4.1 million Australians or about 30 per cent of the workforce had 'freelanced' some time in 2014 (Ai Group 2016, based on a 2014 survey by Edelman Berland). An updated 2015 survey found participation to be 32 per cent, an increase that may simply reflect statistical variation in a small sample survey (Edelman Berland 2015). The surveys use a definition of freelancers as 'individuals who have engaged in supplemental, temporary, project- or contract-based work'. There is no requirement in this definition that the person is a non-employee (in the legal sense) or that ICTs have any role in facilitating freelancing. The former is a critical issue in the Australian context because the concerns about gig economy workers often assumes that they are not employees and therefore not covered by the protections of the Fair Work Act and the National Employment Standards. Moreover, a person only needs to have engaged in some freelance work over a year to be counted as a 'freelancer'. Period prevalence rates of this kind do not capture normal routines of work for people or the economic significance of particular working arrangements.

There are similarly high estimates of the significance of freelancing for the United States (34 per cent in 2014) drawing on the same methodologies (an Edelman Berland survey commissioned by Freelancers Union and Elance-oDesk 2014). Surveys that pick up people sometimes selling used goods online and babysitting suggest informal 'work' had increased to about 50 per cent in the United States, but informal work and most accepted definitions of the gig economy are not the same (Bracha, Burke and Khachiyan 2015).

Other research focused on jobs that would more commonly be seen as part of the gig economy find their importance to be much smaller than the above figures suggest (summarised in Brinkley 2016). For example, a Brookings Institution paper estimated that the US gig economy involved between 600 000 to 1.9 million people or 0.4 to just over 1 per cent of total US employment. Using a different approach, McKinsey suggests a possible prevalence rate of 1 per cent. In Australia, using a tightly focused definition of the gig economy suggests that about 0.5 per cent of adult Australians work on peer-to-peer platforms (Minifie 2016).

If the gig economy was growing rapidly, it would be visible in official data on independent contracting. It is not. ABS data suggest that independent contracting increased from 8.5 to 8.7 per cent of employment from 2012 to 2015. The prevalence of independent contracting, however, was lower in 2015 than it was in 2009 (ABS 2014, 2016a). This is not consistent with any marked increase in the economic significance of gig economy employment in Australia, though it is possible that the gig economy is shifting already existing independent contractors from a conventional contracting arrangement to a gig platform.

Overall, the current evidence does not suggest that the gig economy — 'the finding of discrete parcels of work by direct connection between individual providers and customers and clients through a digital platform' (Brinkley 2016) — is anything other than a boutique component of labour markets. However, the prospect of growth seems strong.

While the correctly-defined 'gig' economy is in its infancy, a substantial rise in employment in the industry may lead to more workers having a portfolio of work — something commentators are predicting (Dishman 2017; Wailes 2016). This type of

employment arrangement may place greater emphasis on people taking more responsibility for continuous learning over their lifetime to ensure their ongoing employability.

4 The obstacles to lifelong education and training

A system that minimises unnecessary barriers to workers accessing and gaining skills and qualifications (such as refreshing existing qualifications or gaining new skills) may enable workers to continue working, utilising these skills, beyond the current average retirement age. But some workers currently face a range of barriers to accessing education and training. This chapter examines the nature of these barriers.

4.1 Time and financial cost barriers: will training bring sufficient labour market benefits to justify the costs?

The cost of training include course fees, any foregone income from reduced hours of work and time traveling to classes along with the direct cost of that travel. The financial cost of training, the opportunity cost of the time taken and the perceived return on additional education and training for the individual and their employer can all reduce upskilling and retraining, particularly later in life. In its submission to the Australian Human Rights Commission (AHRC) inquiry into age discrimination, National Seniors Australia summarised the dilemma of weighing up of the costs and benefits of further training:

It can be difficult for a mature-age person to justify the risk of taking time out of employment and taking on debt to invest in the development of skills when the returns of this investment are unknown and they have family responsibilities, existing financial commitments and shortened time frames for paying back loans. (National Seniors Australia 2015, p. 17)

Traditional methods of acquiring skills and qualifications are costly and time consuming. With the deregulation of fees in VET, annual average course costs for students studying diploma level and above qualifications were about \$14 000 in 2015 (Deloitte 2016). For the university sector, the *annual* student contribution for a university bachelor degree ranges from just over \$6000 to almost \$11 000 and taking about 3 to 4 years to complete. Income-contingent loans assist in deferring costs for some courses until a person's income reaches a certain level, but the lengthy nature of formal training remains.

Older workers cite a lack of time as a barrier to participating in education and training. Compared with people aged under 24 years, older workers tend to have more commitments competing for their time, including work (often full-time, necessitated by financial commitments of a mortgage and children's education) and family responsibilities. To undertake training, workers need to find the time — either during working hours (for employer supported training) or outside of work hours. Often the tasks usually performed at these times would still need to be completed, in addition to any training. While not related to formal learning, ABS data on barriers to non-formal learning provide some insight into the relative importance of time as a barrier. For people who wanted to participate in non-formal learning but did not, or participated in non-formal learning but wanted to do more, approximately half indicated that lack of time or too much work was the main reason (ABS 2013b). Men (53 per cent) were more likely to report 'too much work' as the main barrier compared with women (45 per cent).

Some employers believe that training mature age workers is not a good investment as they may leave or retire in the short- to medium-term, reducing the length of time the employer has to recoup their investment in training and skills development (Ferrier, Burke and Selby Smith 2008). However, as outlined in appendix A, working lives are lengthening, providing a longer pay off period for any investment in education and training. Furthermore, older workers are less likely to change jobs than younger, more educated workers — providing more time for employers to reap the benefits of additional workplace training (Billett 2011).

4.2 Employee attitudes as a barrier to training

The attitudes of some older workers about their abilities to undertake education and training can reduce their participation in skills development (Billett 2011; Ferrier, Burke and Selby Smith 2008). Some older workers lack confidence in their learning abilities and can adopt the attitude that they are 'too old to learn'. Lack of confidence can also make older workers unwilling to learn jointly with young people — with older workers fearing embarrassment and failure if younger adults learn faster (Ferrier, Burke and Selby Smith 2008; Keys Young 2000).

Workers' willingness to retrain can also limit the uptake of training. Some workers are reluctant to undertake new training or training in a different field as they are unwilling to relinquish their previous skills and occupation (Keys Young 2000). People often attach personal value, worth and identity to their work, and the skills and capabilities embodied in the tasks they do. To accept that those skills (and jobs) may be obsolete (because of automation, for example) can reduce the value of a person's lifetime of work — something that is often borne out when workers are made redundant (Wood 2014).

Some may be unwilling to move into new fields, viewing those occupations as inferior to previous work. For example, service sector jobs, historically done by women, are sometime considered inferior to manufacturing jobs (Potter and Durkin 2016). Wholesale change can be confronting, and the requirement to make such a change can be overwhelming for workers of any age (Billett 2011).

Upskilling and retraining opportunities may be limited by a lack of familiarity with the learning process and how to study. Workers are a diverse group, particularly in terms of their past exposure to education and training and their own learning skills. Many older workers have not undertaken formal training since leaving school. (About 40 per cent of people over 45 years old have no post-school qualification (ABS 2016b). Others may have low levels of literacy and numeracy and computer skills, limiting their ability to actively participate in work-related skills development and potentially reinforcing a lack of confidence in their own ability to learn (ABS 2013a).

Furthermore, workers may not recognise the future benefits of retraining or upskilling because of status quo bias — in which current circumstances are seen as the reference point from which departures are perceived as a loss. This can be coupled with myopic optimism in which people are overly positive about the future relevance of their current skills. For example, employees may focus on the current positives (such as current job stability and wages) while discounting potential future periods of reduced income because of lower wages, underemployment or unemployment (arising from technological change, for example). Similarly, workers may choose not to undertake training believing they have limited time left in the workforce before retiring, without fully assessing their financial needs for retirement.

4.3 Employers' attitudes to older workers present barriers to training

Some employers believe older workers have a reduced capacity to learn from training compared with younger people (captured by the unfortunate phrase that one 'can't teach an old dog new tricks'). This concern is related to the decline in cognitive skills that accompany ageing. While cognitive abilities do decline with age, some cognitive abilities start to decline in young adulthood (such as speed, reasoning, spatial ability and short-term memory), but other cognitive abilities that rely on the use of pre-existing knowledge and long-term memory (such as language) are much more stable, declining only when people are in their late 70s (Picchio 2015). This is well after the age when an employer would be considering any significant investment in training. Research has found that older workers *can* learn new skills. However, as there are age-related declines in some aspects of cognitive skills, the learning process may need to differ from that offered to younger people to be effective in developing new skills (Billett 2011; Ferrier, Burke and Selby Smith 2008; Picchio 2015). These workers may need longer time or self-paced courses that use multiple instructional methods to aid learning. Moreover, older workers perform better in training that raises their existing skills than in new fields (Picchio 2015).

5 What options are available to government?

If the existing workforce is to have an extended and fuller working life, weathering the potential effects associated with demographic and technological change, it will require governments to give ongoing consideration to strategies that smooth the effects of structural change.

Education and training is one element.

Training and information are the keys to empowering workers to be able to make choices that benefit their living standards. Ultimately, training needs to build confidence, develop foundation skills such as numeracy, literacy and digital skills as well as teach technical and 'soft' skills that can be applied in the workplace.

5.1 Measures to reduce the barriers to upskilling and retraining

To cope with the likely risks and pressures in the labour market, it is necessary to examine both the demand and supply-side settings of the skills formation system, minimising the barriers to upskilling and retraining.

It is crucial for governments to create the right *supply-side* settings for the skills system. That means an efficient, high-quality and flexible education and training system that is driven by the needs of users (the people acquiring the skills and the businesses that need them) rather than the interests of suppliers or legacy models of provision and government funding. That system also needs to be able to respond to the inevitable transitions from job to job and occupation to occupation and the associated skills required that will occur over people's lifetimes.

It is also essential to have policy settings that ensure that the *demand-side* for the right *skills* is not frustrated by poor incentives to train by employees and businesses, excessive costs of obtaining skills, poor information about the skills needed for future work, or weak foundational skills that make such investments virtually impossible.

Let's start with strong foundational skills

First and foremost, to have a workforce that is capable of ongoing learning, they need to have strong foundational skills. This starts with a good school system that ensures people have the key foundational skills like numeracy and literacy, analytical skills, and the capacity to easily acquire knowledge throughout their lives (appendix B). While addressing the current academic performance outcomes of school students will not help those currently in the labour market, it will set up future cohorts to be in a position to be receptive to further education and training (when needed), potentially making them more adaptable and resilient to ongoing labour market changes. The main report makes recommendations on priority reforms in the schooling sector.

The skills and knowledge of older workers appears to largely reflect investment decisions made early in their lives in an economy quite different from the current one (or in the case of immigrants, a country). Notably, in Australia:

- the former immigration policy allowed 457 visa holders to transition to permanent residency even if they had weak English proficiency (PC 2016b)
- older Australians have poorer literacy and numeracy than younger people, with this affecting their employment, wages and productivity (OECD 2016b).

While the Productivity Commission has not assessed the success of current policy initiatives to develop solid foundational skills of adults who did not acquire them when they were younger, it is generally preferable to avoid remedial strategies. In light of this, policy makers, in designing employment-targeted immigration policies, should be mindful that low levels of foundational skills among these cohorts leave such people vulnerable to future labour market changes.

Overcoming cost barriers: embracing flexible, affordable and easily-acquired skills

Traditional, formal methods of acquiring skills and qualifications are costly and time consuming, as discussed above. A modern education and training system needs to evolve to become flexible enough to teach new skills quickly and efficiently. This will probably mean that non-formal and informal education, including emerging forms of learning, will play a larger role in the future skills formation of workers. One of the key advantages of these emerging forms of learning (such as Massive Open Online Courses) is that they provide faster, cheaper and more flexible methods of acquiring knowledge and skills. But currently there is a gap between what is demanded in terms of the method of acquiring skills and what is accepted as a universal signal of skills and ability in the labour market (formal qualifications from traditional institutions, which can take years). A framework or system that enables recognition of and trust in new types of learning is a missing element.

As outlined in The New York Times:

Free online courses won't revolutionize education until there is a parallel system of free or low-fee credentials, not controlled by traditional colleges, that leads to jobs. (Carey 2015, p. 1)

If Australia's education system is to be adaptive to the forthcoming labour market challenges, it is necessary to have an education system that values these new models of learning, particularly as they tend to address the cost barriers of traditional forms of learning. A certification framework will go some way to doing this. The main report makes a recommendation regarding an independent assessment system to stimulate further upskilling and retraining.

Overcoming information barriers: easier access to information

Information barriers can be large for some workers. Governments have taken some steps to overcome the information barriers to skill development and employment. There are a burgeoning number of websites to assist people considering particular occupations and looking to undertake training, including:

- My Future a national career information and exploration service
- My Skills a directory of training opportunities in the VET sector
- Job Outlook a careers and labour market research site
- Quality Indicators for Learning and Teaching (QILT) information on higher education course and graduate employment outcomes.

The Australian Government is also developing a new website to provide a single point of entry for information about higher education admissions policies and processes (Australian Government 2016). There is evidence that improved availability of course outcome information helps people, including disadvantaged workers between the ages of 25 and 54, seek out courses with good expected labour market outcomes (Polidano, Van de Ven and Voitchovsky 2017).

One improvement could be to consolidate the information about training and education into one website. While the current websites are usually linked, they do not provide a single, comprehensive information source for either school leavers or those in the workforce to review their employment and study options. A single platform may make it easier to navigate for the end user — in this case, workers who may not have had much contact with the education and training system for a number of years. A single platform will also make it easier to market to the public providing greater awareness of information available. One advantage of online tools is that the costs are principally associated with development and upgrade, with the incremental costs of access to the tool being zero. Increasing awareness and use of a single platform represents a cost-effective method of promoting careers and training information. However, any such portal must be properly maintained to be useful, with a single agency accountable for its quality and usability.

There is also scope for improvement in the content of the existing tools. The Australian Human Rights Commission (2016, p. 93) found that 'information and guidance available to older people considering formal skills training is inadequate and does not support people to overcome barriers'. It also found that there were gaps in the provision of information for VET courses on the My Skills website. And information is often lacking in granularity:

Currently, graduate occupation information is limited to ANZSCO major group level (for example, Technician and trades workers, Managers, Labourers), which provides no indication to prospective students on the likelihood of their finding work after graduating in the occupation for which the course is designed to prepare them. (Polidano, Van de Ven and Voitchovsky 2017, p. 10)

While the provision of information to help people make education and training choices for work is important, it also involves risks (Polidano, Van de Ven and Voitchovsky 2017). In particular, people may undertake training in response to information about the future demand for particular skills, but the response in aggregate may lead to oversupply. Publicly available information on year-on-year changes in course enrolments could help identify the risk of oversupply for would-be students (and could, in principle, inform any long-term skill projections). A recommendation regarding an improved single website are outlined in the main report.

Improving path ways for upskilling

In the VET system, competency-based assessments provide people with a qualification based on their ability to perform a task to a minimum standard. Chapter 3 of the main report makes a recommendation to introduce graded proficiency for VET qualifications. This is largely motivated by improved information in the labour market to enable more efficient recruitment and job matching and to provide greater incentives for attainment of excellence (which can be rewarded in the forms of better job prospects and higher wages).

In addition to these direct labour market benefits, graded proficiency could also provide extra information to educational institutions that would assist future learning pathways for students wanting to upgrade VET qualifications to a university degree (such as upskilling from an 'enrolled' to a 'registered' nurse). Although, such pathways would not be automatic with the introduction of graded assessment, as a number of barriers would still remain (Gillis, Clayton and Bateman 2008).

Overcoming employer attitudes to barriers to training

Despite age discrimination being unlawful for well over a decade, some older workers are excluded from employment and ongoing education and training because of discrimination. The AHRC (2016) found that:

... too many people are shut out of work because of underlying assumptions, stereotypes or myths associated with their age ... These beliefs lead to discriminatory behaviours during

recruitment, in the workplace and in decisions about training, promotion and retirement, voluntary and involuntary. The cost and impact of this is high, for individuals and for our economy. (p. 5)

With an ageing population and workforce, the cost of discrimination (both social and economic) will grow if left unaddressed. These issues are comprehensively outlined in the AHRC report (2016), along with a range of recommendations. In particular, the AHRC inquiry recommended a national community education and information campaign — developed and delivered in collaboration with business, unions and community organisations — to dispel myths and stereotypes about older people.

Other potential policy options to overcome barriers to training

There are a range of other initiatives used internationally, such as career advice, learning accounts and tax incentives, that may have merit. These measures also seek to overcome barriers to education and training. However, the rationale, objective, policy design, effectiveness and costs of such measure should be carefully examined prior to their introduction (appendix D).

5.2 Lacking a trigger to prompt some workers to retrain

Overcoming barriers associated with workers' willingness to upskill and retrain are somewhat more difficult. The problem facing vulnerable employees is one of creeping gradualism. The risks of job loss grows slowly, varying by place and skill, so that there is no obvious trigger for acquiring new skills before the risks are realised.

A well-functioning education and training system, adaptive to user's needs, may not be enough to induce demand for upskilling and retraining for some workers vulnerable to redundancy. For example, long distance truck drivers are at risk of displacement if automated vehicles are adopted for long haul freight distribution. But they do not know when. It might happen only for some trucks on some routes, or may occur for some companies ahead of others. Regulatory uncertainty about the safety of autonomous vehicles also make prediction difficult. And more importantly, how does a truck driver develop the necessary skills to make a career change when there is limited opportunity to reskill while working? (*The Economist* 2017).

Switching occupations not only involves a gamble in terms of forgone wages and conditions, but it removes people from the familiar setting of their job and their colleagues — workplaces are often valued as much for the relationships they create as their earnings, as noted above. Overcoming these barriers to upskilling and retraining is much more difficult, leaving some people more vulnerable to labour market changes.

Lessons from the investment approach and innovative funding methods

Given the costs associated with people leaving and not re-entering the workforce — in terms of forgone income, lost social connections and purpose, increased reliance on the social welfare system and potentially increasing inequality for society — there is an argument for more intensive, proactive investment to prevent this situation from occurring. Such assistance should not be universal, and instead be targeted at those people facing multiple sources of disadvantage.

The investment approach in the Australian Government's 'Try, Test and Learn' (TTL) program may have lessons for the development of employment and skill initiatives focused on cohorts at high risk of losing their jobs due to structural adjustment. The TTL is an early intervention program that aims to improve the economic and social participation of young carers, young parents and young students at risk of long-term unemployment (DSS 2016). These groups were identified as promising targets for interventions since actuarial assessment suggested that the cost savings from avoiding prolonged welfare dependency were high. The TTL model is not prescriptive in nature, but harvests ideas for small-scale interventions gathered through submissions from the community sector, government, academics, business and individuals. The advantage of many of the ideas put forward under the TTL program is that they are low cost and readily able to be abandoned or scaled up. Many use online platforms and peer support (a 'free' input). Through this initiative, the Australian Government is seeking to develop a body of evidence of 'what works' and to discover how behaviours, pathways or systems can be changed to improve workforce participation (DSS 2016).

While the funding round for TTL is not complete and programs are yet to be implemented, a similar model could be used for workers who may also face protracted periods of welfare dependency after redundancy — particularly if they shift to a disability payment. The evaluation outcomes from the TTL program will provide lessons for the future development of a new program targeting that group.

A Factors contributing to the lengthening of working lives

While population ageing is set to decrease aggregate ratios of employment to population, employment rates by mature-age Australians have been rapidly rising, particularly for women (figure A.1). Increasing employment rates among these groups reflect a range of factors:

- *females entering the workforce*: the greater involvement of females in the labour force at all ages from 25 years and upwards. The higher involvement of women in work was evident for most of the age groups between 25-29 and 55-59 years old in the two decades preceding 2000, while it was more concentrated among older women in the period 2000–2016. Increased female employment rates in the child-bearing years is one contributing factor to rising rates at older ages. This is because once in employment at younger ages, people tend to stay in the workforce in subsequent years. (For men, the increase in employment rates only commenced two decades ago and primarily for older age groups.)
- *healthier people living longer:* rising life expectancy has been accompanied by improved health-adjusted life expectancy. People, therefore, have the scope to work longer without necessarily reducing the share of their lifetime spend in retirement (Kent 2014). This has been reinforced by the occupational shift away from physically-demanding manual jobs, which allows people to work longer with reduced risks of muscular-skeletal injuries
- *a more educated population:* the future 'old' will be better educated. So while 27 per cent of people aged 55-64 years had a university education in 2016, the comparable figure for 25-34 year olds was just under 40 per cent. Given some people acquire university education after age 34 years, it must be the case that by 2046, more than 40 per cent of 55-64 year olds will have such qualifications.⁷ People with higher educational attainment tend to participate in the workforce more than those with lower attainment and retire later
- *financial pressures* associated with changes to the pension system and to greater life expectancy (which creates longevity risk for those not on defined-benefit retirement income plans)
- changing *social norms* about when people should retire.

The implication is that people's post-school working lives have been lengthening, particularly for women, with this trend likely to continue, albeit at a reduced pace (Australian Government 2015).

⁷ ABS 2016, *Education and Work, Australia, May 2016*, Cat. no. 6227.0, table 14.





Change in employment rates (percentage points)^a



^a The employment rate is the ratio of employment to the civilian population in each age group. Source: ABS 2017, Labour Force, Australia, Detailed - Dec 2016, Cat. no. 6291.0.55.001, 24 January.

B Performance of the schools sector is troubling

A good school system ensures that people have the key foundational skills like numeracy and literacy, analytical skills, and the capacity to learn about learning so that they can easily acquire knowledge throughout their lives (Ainley and Gebhardt 2013; Hattie 2016). Many are also calling for schools to teach 'soft skills', such as teamwork, collaboration, leadership and creativity, as it is believed that these skills will be essential to securing and maintaining employment now and in the future (Anderson 2017; Williamson et al. 2015).

In some critical areas, there are signs that Australia's school system is not functioning well:

- National and international assessments of student achievement in Australia show little basic skill improvement over a sustained period; and in some areas standards of achievement have dropped (PC 2016c).
 - Australia's performance in the OECD's PISA tests showed absolute declines in performance in scientific, reading and mathematical literacy, a growing share of lower student performers, and a diminishing share of high performers in all three domains (Thomson, De Bortoli and Underwood 2016).
 - Results from the Trends in International Mathematics and Science Study, show little change in Australian students' achievement since the study began in 1995 (Thomson 2016a).
 - NAPLAN measures of Australian students' reading and numeracy achievement indicate little improvement between 2008 and 2015 (PC 2016c).
- The national participation rates in year 12 physics and advanced mathematics have fallen by more than 30 per cent from 1992 to 2012 (Masters 2016).
- Learner engagement one of the most reliable predictors of gains in learning is low for some students, with approximately 40 per cent of students involved in unproductive behaviours (being inattentive, noisy or anti-social) (Goss, Sonnemann and Griffiths 2017). School attendance is considerably lower for the most disadvantaged students (Ross 2014).

The Commission is not alone in drawing together observations like these (for example BCA 2017; Daley, McGannon and Ginnivan 2012; Thomson 2016a; Wilson, Dalton and Baumann 2015). These trends are cause for concern for a number of reasons.

First, the declining or stagnating results have occurred during a time of considerable policy focus on schooling, including significantly increased expenditure. These efforts have focused on preparing school students for future labour markets through changes to school funding, reviewing teaching methods and curriculums, attempting to raise year 11 and 12

retention rates, testing academic proficiency in schools and implementing strategies to increase the uptake of STEM subjects in schools.

Second, Australia's performance in international studies have either stagnated or decreased, while other countries (including some already high-performing countries) have recorded improvements in student achievement. Between 2009 and 2015, Australia experienced *a decline* in average reading literacy. Exacerbating this result, high performing countries (Singapore is an example close to home) continued to improve despite their already elevated standing (Thomson, De Bortoli and Underwood 2017).

Third, Australia's sustained decline in academic achievement (as reported by the PISA results) represents considerable lost opportunities for individuals in terms of their overall wellbeing and lost economic prosperity for society.

- While Australia's academic achievement is above the OECD average, declining performance over time means Australia's young people *may now be less capable* than previous cohorts. For example, in mathematical literacy, an Australian 15 year old in 2015 had a mathematical aptitude equivalent to a 14–year-old in 2000.
- An OECD projection suggests if all 15-year-old students in Australia attained at least the baseline level of performance in PISA by 2030, Australia's GDP in 2095 would be 10 per cent higher (OECD 2015c).⁸ Moreover, Australia's growing group of low performing students will be increasingly exposed to unemployment or low participation in the future world of work (OECD 2016a). As noted by Thomson (2016b), a prominent expert in this area, '[t]hese students do not have the level of knowledge that will allow them to participate as productive citizens in a modern society' (p. 5).
- The declining proportion of high performing students sits at odds with the skills requirements of an advanced economy, which will increasingly depend on the capability of that group to be employed in highly skilled jobs (OECD 2015b). Basic foundational skills in science and mathematics developed at school are likely to be fundamental to future work.

School workforce and teacher education

To improve skills outcomes, the policy consensus favours direct measures to address the effectiveness of the teaching occurring in schools, the quality of the school workforce and the quality of teacher education. And for good reason, as there are strong links between the ability and aptitude of individuals entering the teaching profession, the quality of their training and their eventual teaching effectiveness (Ingvarson et al. 2014).

⁸ However, poor academic performance is not generally the result of any single risk factor, but rather a combination of various barriers and disadvantages that affect students throughout their lives and consequently will require a range of policy interventions beyond education (OECD 2016a).

There is some evidence that literacy and numeracy levels of the pipeline of new school teachers have declined and, unlike high-performing countries, Australia is not selecting the next generation of teachers from high-performing school leavers (Ingvarson et al. 2014; Leigh and Ryan 2006). Countries with high academic outcomes have tended to pursue deliberate policies to attract the most able people into teaching, including offering salaries and working conditions that enable teaching to compete with other professions (Ingvarson et al. 2014).

A related concern is that many teachers are 'teaching out of field' (that is, they are barely, if at all, qualified in the disciplines they are teaching). For example, in information technology, about 30 per cent of year 7 to 10 teachers have neither studied the subject at second-year tertiary level or above, nor been trained in teaching methodology for that subject at the tertiary level (Weldon 2016). Teaching out of field not only affects students, but anecdotal evidence suggests that it also contributes to teacher attrition (Stroud 2017). Given the high levels of teaching out of field and its unacceptability, it requires special recruitment efforts and targeted high-quality professional development for existing teachers willing to acquire the knowledge and teaching skills in the relevant disciplines.

There are compelling grounds to fix these problems, because not only do they affect the job and income prospects of young people, but they create barriers to subsequent education and training in later life (the focus of this supporting paper). Chapter 3 of the main report outlines reforms needed to improve the performance of the school sector.

C Other developments that affect occupations

This appendix examines two case studies in the education and health sectors, and how occupations, which may be at low risk of automation, may face reduced demand as a result of technology (other than automation), changes in consumer preferences, task redesign and regulation.

C.1 Educators: low risk of automation but ... online provision may disrupt

Educators are regarded as among the least susceptible to automation and therefore largely immune to technologically-based displacement (Edmonds and Bradley 2015). It is certainly the case that (good) educators must keep up to date with developments in their field and modern pedagogic methods, and must cater for the differences in the aptitudes and interests of the people being instructed.

However, online provision of information to people by excellent and highly trained communicators has the potential to decrease the number of trainers required per student, lowering costs without reducing the quality of student learning. Massive Open Online Courses are an example, and are already being used by traditional universities to lower the cost of degrees by reducing direct tuition (chapter 3 of the main report). A meta-analysis of online learning found that on *average* students using online learning tools performed better than those receiving face-to-face instruction, though this may not apply to all students or courses (Means et al. 2009; Smith Jaggars and Bailey 2010).

There is also good evidence that technology can be used as a complement to traditional educational techniques (Tamim et al. 2011) with the prospect that this can allow larger class sizes per teacher. Meta-analysis of the evidence also suggests that learning through gamification, virtual worlds and simulation shows promise (Merchant et al. 2014), which may also reduce the required number of educators per group of students.

The key underpinning advantage of the online and computer environment is cost. Once the fixed costs of a high quality 'course' is developed, the incremental cost of providing it to millions of people is low, relative to incremental costs of traditional learning models.

C.2 Health care occupations: low risk of automation but ... technology and social developments may improve outcomes and lower demand

Technological changes and less regimented regulations may (*when compared with the counterfactual*) reduce the need for non-routine high-level cognitive occupations in health service provision.

- Various meta-analyses found internet-delivered cognitive behavioural therapy (usually with some, but little clinical backup) to be as successful as face-to-face clinical interventions for some conditions.⁹
- Effective communication between caregivers and patients has the prospect (in the United States at least) of reducing re-admission rates by about 5 per cent (Senot and Chandrasekaran 2015). Similarly, health and wellbeing programs aimed at better self-management of chronic conditions have been shown to reduce the frequency and duration of hospital admissions (Hamar et al. 2013).
- Drugs can sometimes substitute for the medical labour force, and allied health professionals can also sometimes substitute for the higher-cost clinicians without effecting the quality of care (to the extent that rules concerning the scope of practice do not preclude this).
- Pharmacists are perceived to have a very low risk of facing automation, but this presumes that they are able to use their expertise in the role they perform in the health system. Robotic dispensers are already in place in retail pharmacies and more complex ones in hospitals. So, despite their education and skills, among the health professions, the pharmacist occupation *is* subject to considerable technological risks, especially if the regulations that give rise to their privileged status to dispense is withdrawn (issues that are explored in chapter 2 of the main report).

Developments of these kinds are unlikely to reduce the absolute number of health professionals (pharmacists aside). This is because the substitution effects will probably be offset by the need for the health sector to grow (a reflection of population ageing and the tendency for richer societies to invest more in health).

Economic incentives reinforce the technological pressures on these occupations. While it may seem harder to replace them, their costs are much higher than other personnel, and so the incentives to reduce or change their role are also strong. This has implications for the required future professional workforce and skills formation of incumbents.

⁹ For example, depressive symptoms (Cuijpers et al. 2011); anxiety disorders and chronic pain (Vigerland et al. 2016); sleep disorders (Seyffert et al. 2016) and post-traumatic stress disorder (Sijbrandij, Kunovski and Cuijpers 2016).

D Other possible policy options to overcome barriers to upskilling and retraining

D.1 Career guidance: assessing skills and providing training advice

In addition to the options outlined in chapter 5 above, government-supported career guidance services could be used to overcome potential labour market disadvantages. The goal would be to assist people to objectively diagnose their current skill levels and aptitudes, assess the relevance of these to emerging market needs, and then provide advice on achieving realistic transitions to alternative jobs and how that may be achieved if further education and training is required. As with any policy, the issue is would it work, for whom, and at what cost?

In 2016, the Australian Government completed a career guidance service pilot — Skills Checkpoint — targeted at workers aged 45-54 years. It provided workers with an assessment of their skills and career interests in relation to their current role or future employment opportunities. The service also provided participants with guidance on transitioning into new roles within their current industry or on pathways to a new career, including any relevant education and training options. An evaluation based on feedback from participants and service providers was broadly supportive of the pilot, but the Commission is not aware of plans to continue the service or roll it out more widely or for more rigours evaluation (DET 2017).

While such a policy may have value, there are major challenges in adopting taxpayer-funded career guidance services, including:

- *additionality*: to avoid providing careers advice to people who would have, on their own account, paid for such a service. Some obvious measures to address additionality are that subsidised services should not be provided to people who have reasonable income, are highly educated or do not have substantial labour market vulnerabilities
- *ability to benefit*: providing services to those people most likely to benefit from the service. This is a less manageable issue. The traits of a person that are likely to lead to high or low value are probably hard to observe prior to providing the service
- *cost-effective:* the recent problems in the VET sector have shown that poor quality, high-cost supply can survive even in a supervised market

- *accuracy of advice:* it would be necessary to have oversight to ensure the advice given was accurate (an issue also reflecting the risk of fraud and the entry by poor quality providers)
- *net benefit*: it would be necessary to confirm that a career guidance service produces better outcomes than the counterfactual. Identifying impacts requires ex post evaluation, and the subsequent adaptation of program eligibility and design.

In this context, and given the absence of strong evidence about the performance of the Skills Checkpoint program, it would be premature to roll out an Australia-wide counselling program. A less risky and lower-cost option would be to continue developing an online tool for assessing people's capabilities and occupational preferences — as described above.

D.2 Lifelong learning accounts

Lifelong learning accounts are like a bank account, but the balance can be used to finance a worker's education and training. They are usually targeted at those that have finished their front-ended education. Funding for these accounts can come from government, an employer or the worker, or a combination of any of these parties. By providing financial incentives, the aim is to motivate workers to participate in skills development by reducing the direct cost of further education, as well as trying to change the mindset of people that education is for the young.

The idea of individual lifelong learning accounts is not a new one. A number of countries, including the United Kingdom, Canada and Singapore, have tried such approaches over recent decades. In 2016, for example, Singapore introduced an initial credit of SGD 500 (about \$485 in Australian dollars) to be used for approved education and training courses. These credits do not expire and will be topped up over time — allowing people to either use the credits or save them for future use (Shanmugaratnam 2015).

While the basic idea has some appeal, there are a number of major issues that would need to be overcome before implementation.

- Such a scheme could be costly. Providing untargeted allowance to all Australians over a particular age (in Singapore, it is above the age of 25) would place undue pressure on government budgets.
- Like career advice, ensuring additionality would be an issue. Targeting could reduce costs and decrease assistance going to people who would have undertaken training anyway.
- Internationally, fraudulent behaviour has been an issue. The system in England was closed after only a short period of operation due to fraud, although not before losses of millions of pounds. Even the relatively new system in Singapore has been subject to fraudulent claims, although they appear to have been detected quickly and their system adjusted accordingly (Chia 2017; Min 2017).

Even if these policy design challenges could be overcome sufficiently, the bigger issue is that any additional entitlement would cut across Australia's relatively open education system, muddying existing funding sources of education and training.

This is not to suggest that government subsidies for post-secondary school education and training could not be improved. Rather, it would be preferable to comprehensively consider funding arrangements for the university and VET sectors, and any interaction, than to tack-on another entitlement.

D.3 Tax incentives for businesses investing in training and development

While the Australian tax system allows some deductions for education and training expenditure (for both businesses and individuals) as expenses against income earned, the use of the tax system to increase education and training is limited compared with direct funding.

European countries, on the other hand, use various tax incentives to foster national education and training activities (ECDVT 2009). These incentives take many forms (rebates, allowances, exemptions) and are directed at individuals and/or businesses to encourage investment in education and training.

One common tax incentive used in Europe are tax credits or rebates to reduce company taxes for businesses that contribute funding to their employees' education and training (ECDVT 2009). A recent proposal by two academics from the Brookings Institution also advocated for the introduction of business tax credits in the United States (Bradford and Burkhardt 2017).

Like a number of other initiatives discussed above, before introducing tax incentives for businesses, policy makers should consider:

- the reasons for any apparent business underinvestment in skills. Regulatory settings or prior inadequate investment in skills formation¹⁰ may sometimes explain business behaviour, and to the extent that this is true, would best be addressed directly, rather than through changes to the tax system
- the type of education and training that would qualify for favourable tax treatment. Arguably, any incentives should be directed at portable skills that can be used across an industry, rather than at highly firm-specific skills, where businesses already have strong incentives to train
- the evidence that the foregone revenue from the tax incentives has induced additional worthwhile investment in training

¹⁰ Businesses may not invest in people with inadequate initial skills.

- the administrative and compliance costs associated with any incentives, especially in validating genuine claims for training
- the effect on allocative efficiency. Even if there is a net benefit from any tax incentive for education and training, policy makers need to be satisfied that the foregone revenue could not have been used to achieve other policy objectives with a greater benefit.

Evidence from Europe indicates (ECDVT 2009) that:

- actual performance information and public evaluation of the effectiveness of tax incentives on education and training is 'practically non-existent' (p. 100)
- the main criticism of tax incentives is that there is little additionality the individuals and enterprises would have been involved in these training activities regardless of the tax incentive
- tax incentives for business tend to favour individuals that already have considerable access to education and training (that is, those that are employed and that have previously undertaken post-school qualifications)
- tax incentives on their own are insufficient, and direct funding of particular parts of education and training will remain necessary.

Overall, the available evidence suggests caution in using tax credits to increase business skill formation. If governments do adopt them, their design should focus on maximising additionality and eliminating fraudulent behaviour. Any widespread adoption should also be preceded by a carefully designed randomised control trial to examine the degree to which they crowd out privately-funded investment and to assess unintended effects.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 9

FUNDING AND INVESTMENT FOR BETTER ROADS 3 AUGUST 2017

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The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

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Funding and investment for better roads

Key points

- Governments have acknowledged the need for reform of funding and management of roads but action has been slow. This partly reflects that the community has not been sufficiently engaged in the discussion, or in decision-making on road services more broadly.
- Reform of funding arrangements is becoming more urgent. Improvements to vehicle technology such as greater fuel efficiency (and electric power), as well as changes in driver behaviour and preferences, have eroded revenue from the primary road-related taxes. The anticipated introduction of autonomous vehicles will exacerbate this effect.
- The funding dilemma presents an opportunity to more fundamentally improve road service provision so that it is more responsive to motorists' actual preferences, networks are used efficiently, and there is greater assurance of value for money on spending.
- Arrangements for road reform were canvassed in the Commission's Public Infrastructure (2014) inquiry. The inquiry recommended implementing Road Funds as the basis of reform efforts to move toward broader road user charging. This review specifies steps that can be taken now to improve road planning and investment decisions, and elaborates on key policy considerations in pursuing more fundamental reform.

1 Introduction

Roads are integral to the day-to-day functioning of cities and the economy. Like electricity, gas and water services, they are an essential service for most people. Roads help connect people to jobs, goods to markets, all suburbs within cities, and regional and remote areas to cities and beyond. The location and type of roads also shape developments around them.

Roads are the most widely and commonly used form of transport, and the single largest infrastructure spending item for governments in Australia. Australia's population has grown by 85 per cent since 1971, while total vehicle kilometres travelled have increased by 220 per cent, most of this in cities.¹ Taxpayers nationally funded \$24.2 billion of road investment and maintenance expenditure in 2014-15, a figure that rose on average by 4.6 per cent per year over the decade to 2014-15.

¹ The first toll road in Australia was built in 1811, running from Sydney to Parramatta. Despite this long history in Australia (the earliest toll roads date back to Darius the Great and the Achaemenid Empire of the 5th century BC), there are only 16 toll roads operating in Australia with a total length of 241 km (BITRE 2016). Australia has around 873 400 km of roads (2015, excluding busways), 356 000 km of which were sealed (at 2011).

There are several challenges facing road service providers. Among them: the need to secure a sustainable source of funding for roads given that receipts from a major source of road-related funding, the fuel excise, are declining due to shifts in technology; and improving how roads are used and delivered. There continue to be prominent instances of poor decision making on road projects, a reflection of weak mechanisms for considering road users' preferences in investment decisions, and the susceptibility of funding to political imperatives.

Governments at all levels in Australia have been considering aspects of road reform for over a decade. The Australian Government has recently committed to investigate more fundamental road regulatory reform. This paper outlines key elements of the current system of road funding and service provision, reform efforts to date, and essential aspects of a more effective and sustainable system of road funding and regulation that should be part of the reform program.

Road funding and regulatory arrangements involve all levels of government. Effective reform will thus require sustained commitment by all governments.

The rest of this paper is structured as follows:

- Section 2 outlines the current road-related revenue, expenditure and funding arrangements at different levels of government.
- Section 3 discusses the problems arising from the current arrangements, and the need for road funding and investment reform.
- Section 4 details the road reform landscape, and outlines steps that would improve outcomes in the short term and that would also advance longer-term reform goals of ensuring road networks are more efficient and funding is more sustainable.
- Section 5 specifies in more detail the impact of autonomous vehicle technologies, and how regulatory structures may respond.
- Section 6 discusses road user-charging pilots based on lessons learned from international and domestic trials and processes as a way of advancing reform.

2 How decisions on roads are made and funded

Revenue

Funding for investment and maintenance in roads comes largely from the consolidated (taxation) revenue of Federal, State, Territory and Local Governments. While there are road-related fees and charges paid by motorists (table 1 and box 1), the vast majority of funds raised through these means are not hypothecated to road expenditure and instead directed to consolidated funds, from which governments allocate expenditure (across a range of areas). There are some exceptions to this in the case of the Federal Interstate Registration Scheme, which is owned by the Australian Government (and administered by the State and Territory Governments), some vehicle registration fees in jurisdictions, and
some tolled public-private roads. However, these revenue sources make up a small fraction of overall funding.

Table 1Annual road fees and charges levied by governmentsa,b,c

Per vehicle, average annual estimates

Charge type	Indicative cost (\$2015-16)
Fuel excise (Australian Government)	607
Registration fees (State and Territory government)	270
License fees (State and Territory government)	22
Stamp duty (State and Territory government)	139
Other taxes (State and Territory and Australian Government) ^c	296
Total fees and charges	1,334

^a Excludes all personal costs of vehicle ownership, including fuel costs, depreciation and maintenance costs, non-compulsory insurance policies and other costs.
^b Updated to \$2015-16 using the consumer price index.
^c Includes Luxury Car Tax, Fringe Benefits Tax, and smaller discretionary items.

Sources: Originally from Infrastructure Australia's Australian Infrastructure Plan (2016), sourced from BITRE 2014 Yearbook 2014: Australian Infrastructure Statistical Report.

Total road-related revenues in Australia were \$26.4 billion in 2014-15. \$11.0 billion was collected through fuel excise, \$5.6 billion through State-level vehicle registration fees, \$0.5 billion through driver licence fees and \$9.2 billion through a range of other taxes.

The absence of a dedicated funding source for roads has been of relatively low concern until recently, with road-related fees and charges raising sufficient revenue to meet notional road expenditure needs (and, indeed, over and above these needs). Revenues raised from road-related fees and charges have, however, fallen as a percentage of gross domestic product for over a decade and are now broadly equivalent to the amount of funding allocated by governments to road expenditure through budget processes (figure 1).

It is projected that road-related revenues will continue to fall in real terms relative to demand for road services (even under conservative assumptions about population growth). This implies, in the absence of policy change, a diversion of funds from other policy areas of the budget, higher debt or increased taxes to maintain service standards, or a reduction in those standards.

The main contributor to the weakness in projected road-related revenues is fuel tax receipts, the largest single road-related charge (accounting for about 45 per cent of total road-related charges in 2015-16). Fuel tax receipts have declined and are projected to continue to fall in real terms due to the improved fuel efficiency of cars, changes in travel preferences of commuters, the emergence of e-commerce, and the anticipated shift toward electric vehicles, which all reduce average fuel consumption.²

² While the debate on the sustainability of fuel excise revenue often focuses on light vehicles, electric and hybrid electric trucks do exist and are likely to become more popular as their range and towing capacity

Box 1 Road-related fees and charges

Road-related fees and charges are levied by the Australian and State and Territory governments. Local governments do not raise any direct revenues from road users apart from parking fees.

The **Australian Government** collects fuel excise from vehicle fuel companies, which is passed onto light and heavy vehicle road users through fuel prices (both diesel and petrol)³. Charges on light and heavy vehicle users are determined differently. For heavy vehicles, a credit is paid equal to the difference between the fuel excise rate and a road user charge, meaning that in practice heavy vehicles only pay the road user charge, and only if the net balance of all fuel tax credits is above zero for that period. Up to 2001, the fuel excise for light vehicles was indexed to the consumer price index in order to maintain the real value of excise collections. In 2001, the excise was frozen at 38.14 cents per litre in nominal terms. It was subsequently unfrozen in November 2014, when the excise was increased to 38.60 cents per litre and the government introduced biannual indexation linked to the consumer price index. The fuel excise was increased to 40.10 cents per litre in February 2017.

The heavy vehicle road user charge and heavy vehicle registration fees are recommended by the National Transport Commission, using what is known as the Pay-As-You-GO (PAYGO) model. The road user charge is set in law following a decision taken annually by the Transport and Infrastructure Council of the Council of Australian Governments (which is not obliged to follow the National Transport Commission recommended rate). It is a backward-looking (*post hoc*) charge to approximate road expenditure attributable to heavy vehicles. The methodology for calculating the heavy vehicle road user charge was recently reviewed. The Australian Government collects other smaller road related revenues, including road-related GST, road-related Fringe Benefits Tax, the Luxury Car Tax, and customs duties on passenger motor vehicles.

Each **State and Territory Government** applies registration charges to light vehicles and have their own systems for determining the charges (for example, they may be based on weight, engine capacity, or accident risk based on where the vehicle is garaged), and may combine these charges with other state levies such as fire and emergency services levies.

Other vehicle and road-related charges include stamp duties on sales of new vehicles and transfers of used vehicles, drivers licence charges and number plate fees.

State and Territory Governments also administer the Federal Interstate Registration Scheme (FIRS) on behalf of the Australian Government. The FIRS is a voluntary registration scheme for vehicles over 4.5 tonnes undertaking interstate trade, and is a budget-neutral scheme for the Commonwealth. FIRS-registered vehicles (at 30 June 2016) represented only 1.65 per cent of the Australian heavy vehicle fleet, and numbers of participants are expected to decline over time, as has been observed since 2007.

Sources: ATO (2017), Austroads (2016), DIRD (2017).

improve. International examples exist in applications of lower weight grades and shorter distance hauls. Electric garbage trucks operate in Beijing, Chicago and France. Industrial applications are present in Holland and Switzerland. Tesla is scheduled to release a battery powered electric truck in late 2017.

³ Cars using Liquefied Petroleum Gas also attract a fuel excise, although it is lower, currently at 13.10 cents per litre.



 ^a Aggregated over all levels of government.
^b Includes work done for and by the public sector.
Source: BITRE 2016, Australian Infrastructure Statistics Yearbook 2016.

There have also been falls in Australian Government customs duties and the fringe benefits tax since the early 2000s. Tariff reductions account for the decline in motor vehicle customs duties, offsetting increases in the import share of vehicles in Australia (ACIL Allen 2016). The overall result has been that road related revenues at the Australian Government level have been in long run decline as a proportion of gross domestic product. Annual State and Territory Government revenues have been relatively stable.

The system of road funding is complicated by State and Territory and Local Governments' reliance on the Commonwealth for funding, with their expenditures roughly double their road-related revenues. Given the absence of hypothecation of most road revenues, there are minimal links between funding for road services and the actual use of roads.

CONCLUSION 9.1

There is a need to reform arrangements for road funding.

If left unaddressed, the existing funding approach for road infrastructure will put increasing pressure on governments to choose between roads and other services, shift further into debt or increase taxes further.

Expenditure and funding

Expenditure on roads is usually categorised into *capital expenditure* (replacing, improving or expanding the network), *operational expenditure* (departmental and regulatory expenditure such as administering transport shopfronts and licensing/registration services), and *maintenance expenditure* (repairs to the road network).

Austroads (2016) categorises road expenditure into two broad categories: that on arterial roads (which predominantly carry traffic from one region to another), and on local roads (which are primarily used for local traffic and access to properties). In general, State and Territory road agencies and local governments are responsible for the capital, operational, and maintenance expenditure on arterial and local roads, respectively. The Commonwealth does not have a direct constitutional responsibility for roads. Rather, its foundational involvement draws on its taxation powers and powers relating to interstate trade.⁴

The Australian Government allocates funds to other levels of government through a number of different mechanisms. It has historically contributed funding to new State and Territory road upgrades (through direct grants and loans), upgrading and maintaining local roads (through untied grants to Local Government), and maintenance of the National Land Transport Network (NLTN) (grants are discussed in the following sections). The NLTN comprises road and rail corridors deemed nationally significant by the responsible minister.

Generally, responsibility for the project management of capital and maintenance expenditure for road assets lies with the State and Territory, and local, governments (for arterial and local access roads, respectively).

The Australian Government provides part or whole contributions to projects based on its investment priorities and largely under the framework set out under the *National Land Transport Act 2014* (Cth), and the supporting National Partnership Agreement on Land Transport Infrastructure Projects (under the Federal Financial Relations Framework). The National Land Transport Act stipulates the conditions under which the responsible minister(s) may approve funding for individual projects. The National Partnership Agreements set out Commonwealth investment priorities and outline the objectives of investment, roles and responsibilities and further conditions and requirements on the particulars of projects.

The schedules to the National Partnership Agreements constitute a considerable portion of the Commonwealth's infrastructure investment program, but do not reflect the full extent of its infrastructure investment. Further details on Commonwealth funding arrangements are outlined below.

⁴ This section was usefully informed by advice from the Department of Infrastructure and Regional Development received as part of this inquiry (DIRD 2017).

States and Territories fund or finance expenditure with own-source revenues and grants from the Commonwealth, and also provide funding to Local Governments. Local Governments fund expenditure through own-source revenue (such as rates) and grants.

After accounting for grant funding, final road expenditure by the Australian, State and Territory (excluding public non-financial corporations) and local governments in 2014-15 was \$4.8, \$12.5, and \$6.2 billion, respectively.

Each level of government has its own prioritisation, assessment and selection framework for roads. At each level of government, the strategic priorities for roads may differ.

Australian Government grants to State and Territory governments

Australian Government grants for road projects are largely provided to State and Territory road agencies under the Infrastructure Investment Program of the National Partnership Agreement on Land Transport Infrastructure Projects.

Grants (or financing support) are provided for major projects — largely on the basis of network deficiency and to deliver national economic objectives, to undertake maintenance and minor works (in this case, grants are usually untied); and to support specific policy aims, such as freight productivity or road safety. For example, under the Infrastructure Investment Program the Australian Government provides funding for the Black Spot Program, which is aimed at reducing accident risk. Funding for this program is allocated based on nominations by local and state authorities for sites that meet eligibility criteria, including accident history information.

Beyond this, the model for Australian Government funding of State and Territory road expenditure is coordinated by the Australian Government infrastructure portfolio, in negotiation with the State and Territory Governments. Historically, State and Territory Governments have brought forward proposals for assessment by the Commonwealth, including through Infrastructure Australia (which reviews projects for which \$100 million or more in Commonwealth funding is being sought, prioritises available funding, and determines models of financial support).

Other funding provided by the Australian Government tends to reflect its policy priorities and the investment needs of the jurisdictions at certain points in time. Examples include the Infrastructure Growth Package of 2014-15, and the current government's City Deals, which, although not specific to roads, contain road-related components.

Australian Government grants to local governments

Grants to Local Governments (via State and Territory governments) include the roads component of Financial Assistance Grants and the Roads to Recovery Program. Both the general and local road components of Financial Assistance Grants are 'untied', meaning local governments have autonomy in how they are spent. The Roads to Recovery Program is aimed at maintaining or replacing road infrastructure assets. In practice, funding is distributed to specific local governments based on their allocation of local roads grants. The Australian Government Minister for Local Government approves allocations.

State and Territory road agency funding to local governments differs by jurisdiction, but generally includes financial assistance to councils for work on council-managed arterials and payments to councils for contract work on state-managed roads. In addition, State and Territory governments also spend directly on local roads in some instances.

A stylised depiction of the current road funding system is depicted in figure 2.

Figure 2 Australia's current road funding and investment architecture



3 The need for road funding and investment reform

Many Australians have become less confident over time about prospects for improvement in transport services. Their highest priorities for improvements were public transport, followed by roads. But whereas Australians are optimistic that public transport improvements will lead to better local transport services, roads are anticipated to be the main reason for their worsening (ITLS 2017). This is perhaps unsurprising. Significant taxpayer funds have, in recent times, been allocated to transport network projects, particularly roads (box 2). In the recent past, major network augmentation and investment projects in major cities (for example the Clyde Road duplication in Berwick, Melbourne (VicRoads 2015)), are likely to have provided some relief on congestion and average commute times in specific areas. However, survey evidence on people's perception of transport and congestion issues suggests a strong *prima facie* argument that over time, and in many congested areas, new capacity has tended only to create induced demand, eroding any observed improvement in congestion.

Box 2 New road funding commitments by governments

The Commonwealth has flagged significant expenditure over the medium term. As one indicator, Infrastructure Australia's Infrastructure Priority List (at February 2017) has over \$21.7 billion in total capital costs listed in association with 10 road-related projects in New South Wales, Victoria and Queensland.⁵ These are either 'high priority' or 'priority' projects for which a full business case has been completed by the proponent (State government) and positively assessed by the Infrastructure Australia Board. There are a further 29 road-related infrastructure 'initiatives' listed in the plan (that is, those for which a business case has not yet been completed).⁶

As a sample of the States:

- the New South Wales Government's 2017-18 Budget includes \$1.5 billion to continue the Pacific Highway upgrade program, \$648 million for road upgrades to support the Western Sydney Airport at Badgerys Creek, and \$609 million for other major road upgrades
- the Victorian Government's 2017-18 Budget lists 12 new road expenditure projects estimated at \$823 million, in addition to an extra \$846 million for the continuation of its level crossing removal program
- the Queensland Government's 2017-18 Budget highlights \$489 million in additional funding for two road projects.

Overall, new road investment is the single largest area of both transport infrastructure spending, and public physical infrastructure investment more broadly. Average annual real expenditure on roads (measured as new engineering work done by the public sector, and the private sector for the public sector) in the five years to 2015 was \$12.5 billion. This compares to investment in railways, and ports and harbours, of \$2.9 billion and \$450 million respectively, while investment in energy, telecommunications and water infrastructure was \$5.9, \$1.7 and \$4.1 billion, respectively. Governments also contribute to private infrastructure in mining and other heavy industries.

Sources: BITRE (2016), IA (2017), NSW Government (2017), Queensland Government (2017), and Victorian Government (2017a).

⁵ These estimates are based on capital costs provided in States and Territories' proposals; that is, based on nominal, undiscounted P50 costs (unless funding was being sought on the basis of P90 costs, in which case the P90 estimate was used).

⁶ Other projects listed in the plan (including for the other States and Territories) are non road related projects.

This is consistent with several theories from traffic engineering, which suggest that additional supply tends to alleviate congestion only in the short term. At the same time, there has been continuing population growth in inner city areas, which has worsened congestion. The avoidable social costs of congestion for Australia's capital cities have risen significantly over time, estimated at \$5.7 billion in 1990, \$9.3 billion in 2000 and rising to \$18.7 billion in 2015, and are projected to increase significantly in the absence of major policy change (BITRE 2015) (updated to 2016 dollars).

It is not clear that funding is being applied to the most urgent areas, given available options for network augmentation and maintenance, which is partly a reflection of incomplete data, particularly at the local government level. Grant allocations to State, Territory and Local governments are not based on any consistent framework to identify priorities according to demand, or performance against consistently developed standards. More fundamentally, the views of road users do not directly inform spending choices, whether on the quality or availability of services, willingness to pay or the relative merits of competing priorities.

Further, there is no explicit price for road services to make the costs of using and providing services transparent, which is critical to inform choices. Recent road and transport funding decisions by governments also highlight missed opportunities to use pricing as a way of funding infrastructure clearly desired by the community (an example in box 3).

Box 3 Victoria's level crossing removals

In June 2014, VicRoads provided the then Victorian Government with a strategic framework for prioritising metropolitan level crossing projects on the Melbourne train network. In November 2014, the incoming Victorian Government sought an electoral mandate to begin removing 50 level crossings identified as posing a safety risk and/or contributing to congestion.

The election mandate sought in 2014 is one indicator that the community may have been willing to pay for the new infrastructure (through, for example, simple cordon charging) given likely improvements to commute times, community safety, train station upgrades, and potentially land values along the main removal sites. The decision making process, however, did not allow for user willingness to pay to be assessed as an option for funding the project.⁷

The removal process began in early 2016. A Level Crossing Removal Authority has since been established to implement the project, and to engage the community on plans. The Victorian 2017-18 Budget papers indicate that funding for the project has been sourced from the proceeds from the leasing of the Port of Melbourne, and additional debt issuance. In 2017, the project was estimated to cost taxpayers \$6.9 billion, upwardly revised from an initial estimate in the 2015-16 Budget of \$5-6 billion (in nominal terms).

Sources: VicRoads (2014), Victorian Government (2015, 2017b).

⁷ The framework noted, however, the potential for land development options and value capture arrangements to be used on a case-by-case basis.

The accountability mechanisms to ensure that the projects with the highest net benefits are chosen are relatively weak. With no consistent framework for allocating grants, projects made possible through such funding can be particularly subject to the political imperatives of the day. Prominent, and not infrequent, instances of poor decision making on major projects (for example, those discussed in chapter 4 in the main report and the Commission's 2014 Public Infrastructure inquiry) have raised serious questions about project selection and delivery.

CONCLUSION 9.2

Current arrangements for road service provision are highly vulnerable to poor decisions and outcomes. The long-lived nature of road assets mean that any sub-optimal decisions can materially, and permanently, reduce community welfare relative to what it would otherwise be.

Local council asset management frameworks

Several studies, including by local government associations, have pointed to deficiencies in the road asset management practices of local councils, particularly in regional and remote areas (box 4).

State and Territory Governments generally require local governments to keep registers of physical infrastructure assets including roads, and provide them with guidance on the management of assets. Local governments are therefore obliged to have an understanding of their road asset base, the condition of assets, and any requirements for investment or maintenance. There can, however, be significant variations in asset management practices, whether across local councils within a State, or across different levels of government. Overall, studies suggest that practices cannot give confidence that assets are being efficiently managed (whether augmented, renewed, replaced, maintained or phased out) or that funds are being allocated to the highest priorities.

The majority of Australian, State and Territory Government grants to local governments for roads are untied, which allows the funds to be spent on what is considered at the local level to be the highest priority. The prudent allocation and use of funds relies significantly on sound asset management frameworks.

Additionally, the capacity of various local governments to efficiently allocate these resources varies, and recent information suggests State Governments can do more to help improve the governance of, and skills within, local councils in their jurisdictions (Pugalis and Tan 2016).

CONCLUSION 9.3

There is scope to improve asset management at the local government level.

Box 4 Local government road asset management

Infrastructure Australia's National Road Asset Reporting Pilot (2013) noted that:

The nation's ... stock of roads is not subjected to even cursory national condition assessment. This represents a difference between roads and all other economic infrastructure (energy, telecommunications, rail, water, etc.) where to varying degrees and in different ways there is asset condition examination and standards of performance to guide funding choices. In practical terms, and notwithstanding complex road grant funding formulae and different jurisdictional road plans, the lack of any asset reports, or a sense of standards that roads are funded to achieve, means that Australia's entire system of road funding more or less comes down to governments throwing several billion dollars of taxpayer money at the road network each year and hoping that the results will be good. This is not an efficient use of scarce taxpayer money.

The Victorian Auditor General's 2014 audit on Asset Management and Maintenance by Councils identified:

... significant deficiencies in asset renewal planning and practice, the quality of asset management plans, the linking of service levels to these plans, the development of asset management information systems, and in councils' monitoring, evaluation and reporting on asset management. The continuing growth in councils' asset renewal gaps remains of considerable concern.

The Australian Local Government Association's 2015 State of the Assets Report⁸ notes:

... confidence levels for [infrastructure] function and capacity is low reflecting the potential for improvement in asset management capacity and planning across [the] three levels of Government in Australia. Without an integrated plan at the national, state and local level, opportunities for smart infrastructure investment will be lost and funding will be reactive, responding to areas of highest perceived local benefit or risk limited by current resources.

The Western Australian Local Government Association's Report on Local Government Road Assets & Expenditure 2014-15 notes:

Federal and State Government initiated studies point to opportunities to reform road investment and funding arrangements ... current arrangements are not sustainable in the long term in regional Western Australia. In order to evaluate models for reform of investment decision making and funding, reliable information about the road asset, its deterioration and use is required. This Report provides an important part of that overall picture. Local Governments have allocated resources to measure and record more information about their assets and the condition of those assets which helps ensure that the right decisions are made, based on sound evidence.

Sources: IA (2013), Victorian Auditor-General (2014), ALGA (2015), WALGA (2015).

Distortions arising from the lack of pricing signals

Motorists pay a significant amount for road services (table 1). Crucially, however, the fees paid neither signal to users an incentive to use the network in a cost-effective manner nor are reflective of the costs of road service provision. The absence of a cost-reflective price for road services means users have limited information on which to base their decisions on road use, while providers have poorer information on which to base investment and asset management decisions.

⁸ Only 230 of the 562 local governments surveyed as part of the ALGA's 2015 State of the Assets Report participated in a simple data collection exercise. The authors note such data should be readily accessible and available.

The lack of cost recovery from users of roads further creates uncertainty on funding, and provides a weaker onus on the part of governments to justify to users what, and how, services are delivered. Together with the determination of expenditure priorities predominantly through budget processes — that is, in accordance with the priorities of the governments of the day — it is unsurprising that questions about the prudence or efficiency of expenditure are not infrequent.

The situation with roads stands in contrast to the provision of other government services, such as electricity, urban water and even other public transport services (buses and passenger rail), where, although arrangements are imperfect:

- the more transparent linking of services and costs that accompanies pricing places more pressure on regulators and road managers to seek efficient methods of regulation and service delivery, and to better tailor services to customer preferences
- prices help users to choose between different transport and or utility service options, where available, and/or to manage their demand and associated costs (for example, through peak and off-peak pricing or other differentiated tariff structures)
- demand management through pricing helps or provides scope to improve the efficiency of asset/network utilisation
- recovery of costs directly from users reduces the taxation burden on those who do not directly or primarily benefit from relevant regulation and services.

For Australia, charging for road use has been narrowly limited to toll roads and notional heavy vehicle charges, neither of which meet the primary purpose of a price, which is to create a known cost of use that allows alternatives for meeting service goals to develop and more informed choices to be made.

Furthermore, poor design of toll road contracts, including misallocations of risk and rewards, have failed to deliver value for money for motorists in several cases. A recent example is Brisbane's CLEM 7 tunnel, which involved an initial fivefold underestimation of traffic volumes, leading to its operator's eventual insolvency (Terrill 2016). Another is Sydney's NorthConnex tunnel, which is partly aimed at reducing truck usage of arterial surface roads and due for completion in 2019. The contract provides that the operator of the tunnel will receive compensation from taxpayers if too few trucks use the tunnel (Saulwick 2017).

CONCLUSION 9.4

Road users pay a significant amount for road services, but this is indirectly through a range of fees and charges rather than a price for usage, such as exists for most other public transport services (and, indeed, essential services generally).

Pricing linked to usage will put road funding arrangements on a more sustainable footing. The transparent linking of services and costs that accompanies pricing will place more pressure on governments to seek efficient methods of service delivery, and to better tailor services to customer preferences.

The big picture: the objectives for road reform

The objective of road reform is to put road service provision on a more stable footing and a shift in policy focus towards consumer-oriented and directed services. In practise this would bring the governance arrangements over roads into better alignment with other transport sectors. Key features of a better system for road funding and delivery include:

- investment and maintenance decisions on roads being directly informed by users' preferences, and pricing that makes transparent the costs of providing services and allows sensible alternatives for meeting service goals to develop
- users' choices between modes, and on the use of roads, being guided by prices that help to allocate finite capacity, resulting in more efficient utilisation of the transport network
- public confidence in the price-setting process through independent vetting of the prudence and efficiency of proposed expenditure, and the quality of services actually provided (such that, for cost recovery purposes, prices only reflect the efficiently incurred costs of providing services that are valued by users)
- stable and adequate funding for road services, which also implies a shift to user charges and away from a predominantly tax-driven model
- clear accountability for decisions and outcomes, facilitated through improved institutional frameworks that embody community consultation and transparency on service costs and quality.

Road reform should allow, over time, differences in service levels depending on user demands and preferences. Creating known costs of use will also make trade-offs on spending decisions more transparent — for example, if a government on behalf of road users, decided to maintain universal access on some part of the network by keeping user charges low, the subsidy to allow this to occur (and the foregoing of investment elsewhere) would be known.

Most, if not all, of the current array of Australian Government and State and Territory road fees and charges should be replaced with a single charge type that is based on how much

and when drivers use roads. Today's technology makes it plausible to price road use by time of day or which roads are being used.

Apart from better alignment of payment for road services with those that most value these services, there are no policy reasons why the average costs paid by road users will increase. Some of the costs paid by road users under the current system, including the costs of waste arising from poor decisions and the cost of poor outcomes, such as lost time spent in traffic (which often comes at the expense of leisure time, or lost earnings) will almost certainly reduce. Many road users will experience lower overall costs, particularly if they are willing and able to alter their usage patterns (such as driving outside of peak hours).

Road user charging can improve broader transport network planning and management

As noted in chapter 4, the funding and charging arrangements for roads are distinct from, and generally lag behind, other forms of transport. Changes to this sector may prompt improvements on parts of integrated road/transport networks where user charging is not fully aligned. This is because user charging creates clearer demand signals, which can help to improve the responsiveness of expenditure to user preferences, providing users with better value for money and potentially additional options for transport.

In some countries, user charging has been introduced to explicitly address congestion. Where this has occurred, the introduction of pricing has generally been accompanied by investment in public transport services.

The Commission does not envisage road user charging being a device primarily to raise excess revenue to improve other transport modes, although it may contribute to this aim. The key emphasis of policy should be a link between those who pay for roads and project selection, via *Road Funds* (discussed below) to create a market-like reallocation mechanism. All road charges would be pooled into Road Funds, ensuring that those who pay get a direct say in the future allocation of monies. Such an arrangement will ensure users have confidence that even if they are not today's beneficiary, they remain represented in the selection of tomorrow's projects and thus a beneficiary in future.

Projects may be road-related, or for other public transport projects. Road users would, however, help determine this via their representative on projects. Governments (at all levels) would have a say also, but via a seat at the same table as user representatives.

Road investment and maintenance decisions are presently made with regard for the impacts on alternative modes of transport, in addition to the efficiency of the existing road network. Under the proposed changes, such considerations would improve with better knowledge of road users' needs and costs.

CONCLUSION 9.5

Core elements of revised governance arrangements over road investments include:

- investment and maintenance decisions on roads being directly informed by user preferences, and pricing that makes transparent the costs of providing services and allows sensible alternatives for meeting service goals to develop
- users' choices between transport modes, and on the use of roads, being guided by prices that help to allocate finite capacity, resulting in more efficient utilisation of the transport network
- public confidence in decision making processes through independent vetting of the prudence and efficiency of proposed expenditure, and the quality of services actually provided (such that, for cost recovery purposes, prices only reflect the efficiently incurred costs of providing services that are valued by users)
- replacement over time of the currently disparate and indirect fees and charges for roads with a singular cost-reflective direct road user charge based on usage.

Steps and policy considerations in the reform process are discussed in section 4 following a summary of relevant reform initiatives.

The impacts of road reform

Changes to governance arrangements to more directly involve users in the determination of road service standards and investment priorities, based on better information on the condition of roads, will help to improve allocative efficiency. Present user dissatisfaction with road services discussed above is one indication that the gain is likely to be significant.

Independent vetting of the prudence and efficiency of proposed expenditure will help to ensure funds are well spent and reduce waste associated with poor project selection.

Lastly, the pricing of roads will enable better management of demand for road services and more efficient utilisation of the road network, which will have positive implications for congestion. Congestion affects labour supply, leisure time, and business operating costs (BITRE 2015; Metrolinx 2008).

Commission estimates of the economic impact of *better asset utilisation*, while necessarily indicative, equate to a permanent increase in output of around 0.7 per cent of gross domestic product in the long run, aggregated over all capital cities (with more of this accruing to cities facing the largest congestion costs).

4 Linking road reform to current transport policy reforms

There is broad acknowledgment of the need to change road funding and investment arrangements in Australia, with many reviews in recent years highlighting the need for reform (appendix A contains additional information on these reviews). However, progress has been slow, with governments focusing largely on heavy vehicle reform.

Status of heavy vehicle road reform

The focus of road reform efforts to date has been on the establishment of user charges for heavy vehicles (the heavy vehicle road reform program, HVRR). The Council of Australian Governments (COAG) Transport and Infrastructure Council (TIC) is pursuing HVRR as an ongoing work stream, following cessation of the Heavy Vehicle Charging and Investment (HVCI) reform project in mid-2014.

COAG agreed to accelerate the HVRR in December 2015. To date, this has involved the development and publication of freight route asset registers and expenditure plans. The TIC has stated it will work to implement independent price regulation for heavy vehicle charges, design and consider a forward-looking cost base for roads, and seek agreement on a range of heavy vehicle user charging trials (COAG 2017).⁹

The timing for this work remains unspecified. Including the duration of the HVCI project (and its predecessor, the COAG Road Reform Program), heavy vehicle reforms have now been continuing for over 10 years.¹⁰ In part, this delay reflects differences of opinion between industry and government on the basis for charging.

Productivity Commission's Public Infrastructure inquiry (2014)

The Commission has previously recommended that State and Territory Governments establish 'Road Funds' to integrate the tasks of road funding and selection (Recommendations 8.1 and 8.2); and undertake pilot studies of distance- and location-based charging for light vehicles (Recommendation 4.1).

⁹ Alongside this, the NTC is also designing a new framework to define, measure and track Australia's land transport productivity. Its aim is to help governments and industry monitor multi-modal productivity performance, help governments improve policy and infrastructure investment decisions, and facilitate operational improvements to the use of transport network. It is due to report to the Transport and Infrastructure Senior Officials Committee in late 2017.

¹⁰ The HVCI project stems back to the Commission's inquiry into *Road and Rail Freight Infrastructure Pricing*, which, in April 2007, gave rise to the COAG Road Reform Program to conduct a review of current heavy vehicle user charges and to investigate the viability of alternative charging models for heavy vehicles.

Road Funds were envisaged as specific-purpose, ring-fenced financial funds that would ensure spending decisions reflected road user preferences (box 5). They would be governed by a body that operated at arm's length from government. This body would determine allocations of funding, be responsible for involving road users in project selection, funding, and road charging decisions, and facilitate post-project evaluation and review of decisions.

Box 5 Road Funds as envisaged in the Commission's Public Infrastructure (2014) inquiry

The purpose of Road Funds as envisaged in the Commission's Public Infrastructure (2014) inquiry was to enhance the sustainability of road service provision in Australia by instituting new institutional and governance arrangements over road related revenue collections, and funding choice. Road Funds would comprise both a specific purpose financial fund into which road-related funds are collected ring fenced, and a decision making body (a board) to determine road funding priorities (with input from road users) and make funding allocation choices given various competing priorities. The key features of Road Funds (Recommendation 8.1) included:

- having the objective of clearly linking road-user preferences with investment and maintenance decisions
- integrating the tasks of road funding and provision
- having a significant degree of autonomy
- having access to adequate revenue to meet the costs of the road network they administer, as required by the relevant road users
- entailing transparent processes for determining the level and allocation of funds
- including an open and transparent procedure for direct involvement of road users and consultation with the broader community on project selection, funding, and road charging decisions
- involving systematic post-project evaluation and periodic review of the arrangements.

It also recommended that the implementation of Road Funds take into account the research and analysis developed for heavy vehicles by the Heavy Vehicle Charging and Investment reform project (which, by the time the inquiry was publicly released, had ceased operations). The HVCI project had, during its operations, focused on user charging and institutional reforms for heavy vehicles. The institutional model proposed by the HVCI combined elements of a Road Fund and corporatised road agency models.

Source: PC (2014).

The Commission's key recommendations were linked in that the pilot studies would be designed to inform a shift in time to direct road user charging for light vehicles, where revenue from user charges would be hypothecated to roads through the Road Funds. Pilots would test the notion of replacing fuel excise and other indirect taxes with road user charges.

The Australian Government endorsed the Commission's recommendations in principle as long-term priorities. The government response noted shifts to user charges as 'the most

significant longer-term reform initiative identified', and was open to the use of the Road Funds model. However, it noted that the immediate priority through COAG was progressing user charging models for heavy vehicles.

In response to Infrastructure Australia's inaugural Australian Infrastructure Plan (IA 2016), the Australian Government has more recently committed to further investigate this issue, in particular to undertake a study into road reform through Infrastructure Australia beginning later in 2017 (Australian Government 2016).

Instituting new funding and investment mechanisms

This section considers initial (and 'no regrets') steps that would facilitate reform, and considerations in developing a detailed road governance reform program. It also outlines how Road Funds could operate in the short and longer terms, in particular how it could align heavy vehicle reform efforts with the broader program of reforms to network governance, and evolve with a longer-term shift in revenue sources from taxes to user charges.

Initial steps along the reform pathway

There are things governments can do in the short term that will help improve governance and provide discernible benefits to road users. Many of these steps are needed as technical preconditions to user pays road pricing, but are beneficial in their own right.

These include better understanding and measuring the asset base, especially at the local level, to clarify service standards and inform investment plans, more transparent setting of service levels, and improved governance arrangements over expenditure decisions.

- The task of measuring the asset base should include identification of roads that should, in fact, be priced, roads that might be subject to community service obligations, as well as clarifying the standards that apply to roads.
 - Governments are already taking steps in this direction with the development of standards to help harmonise the datasets and measurement frameworks used to determine service levels (Austroads 2017). As noted, local governments may benefit from guidance from State and Territory governments on asset measurement and management.
- There is little reason why responsibility for independent vetting of major road expenditure proposals could not be given, in the short term, to existing economic regulators or advisers. They would test the prudence and efficiency of proposed expenditure given stated policy objectives.
- Authorities should restructure governance arrangements to ensure that representatives of those who pay for roads that is, users contribute to project selection and funding decisions.

- Processes to appoint such representatives should be at arm's length to government, while appointees should have the right mix of technical skills and community interests to effectively gauge and promote users' preferences.
- Governments should also hypothecate current road-related fees and charges (that would be replaced by a user charge) to road-related spending. This would help to institute the equity and efficiency benefits of the 'user pays' principle, ensure that funding for roads is spent for that purpose, and help prepare the path to user-charging.

CONCLUSION 9.6

There are several changes to the regulatory and funding arrangements for roads that can be undertaken by State and Territory governments in the short term to improve the quality and value for money from road services. These will also facilitate a subsequent move to road pricing and broader reforms.

SHORT-TERM IMPROVEMENTS INCLUDE:

- restructuring governance arrangements to: i) ensure that representatives of those who pay for roads that is, users — contribute to project selection and funding decisions, and ii) provide for independent appraisal of all major road expenditure proposals
- better measurement of the asset base and identifying roads that should, in fact, be priced
- more transparent setting of service levels, including establishing mechanisms for consulting users
- hypothecating existing road-related fees and charges to a pool from which expenditure would be allocated under the new governance arrangements.

Key considerations under new governance mechanisms

Transitioning from the current system of road funding arrangements to a new system of road funding will require governments to develop and commit to a long-term reform plan. Some key reform considerations include:

- the need to incorporate the heavy vehicle reform program into a broader reform strategy that focuses on the road network as a whole
- how governance arrangements should be designed so that expenditure decisions are made prudently and road network assets are efficiently managed
- the transition to, and design of, road prices
- how a Road Fund model could work in a phased reform process.

Achieving regulatory coherence across all road users

The focus of road reform efforts in Australia on heavy vehicles reflects, in part, that their size and weight impose proportionately larger costs.¹¹ This has given rise to regulatory arrangements that distinguish between vehicle types, but a continuation of this distinction will almost certainly lead to inefficient management of vehicle use and networks as a whole.

The current focus on reforming heavy vehicle charges represents a partial market solution for what is ultimately a network-wide issue. The problem of congestion in cities and large urban centres is predominantly a byproduct of light vehicle use.¹²

Light and heavy vehicles make up roughly 96 and 4 per cent of the stock of registered vehicles, and 92 and 8 per cent of total vehicle kilometres travelled, respectively (BITRE 2016). The road service standards that should apply in cities need to take into account the needs of both heavy and light vehicle users. And regardless of their number, light vehicles, despite lower average costs per vehicle, of course do cause wear and tear on roads. The task of road network management cannot sensibly be distinguished by vehicle types in cities, although prices may be charged differently to different vehicle classes. From a policy perspective, cost-reflective user pricing should apply across all types of road users.

Instituting Road Funds at the State and Territory level represents a desirable way to integrate the current HVRR process into broader road reform. Specifically, Road Funds could initially be established for heavy vehicles then be expanded over time to cover the road network as a whole. This is further discussed below.

Institutional governance arrangements — Road Funds

Road Funds differ internationally, reflecting differing taxation settings, and roles and responsibilities of different levels of government. They appear, however, to be effective vehicles for more closely linking expenditure with user preferences. The model used in New Zealand is one such example (box 6).

Consistent with the overall objectives of changing road governance arrangements, it is envisaged that Road Funds in Australia would provide for:

• the formal involvement of road users in expenditure and financing decisions

¹¹ Heavy vehicles are defined as those with a gross vehicle mass of at least 4.5 tonnes. The effect of vehicular mass on road damage (and thereby expenditure) has been found to vary in a power law with axle mass. The most widely known version of this is the 'fourth power rule'. However, the exact relationship will vary with pavement types, geological conditions and road environments.

¹² Prices and/or restrictions have also been placed on where and when heavy vehicles can use certain parts of the road network, largely restricting their access to inner city areas.

- proposals on new investments to be based on economic appraisal of all reasonable options for achieving the policy goal. If the policy priority was to improve traffic flow, for example, economic appraisal would be undertaken to help justify whether this should be done by increasing capacity and/or constructing ramps, reconfiguring clearways and traffic light patterns, and/or charging based on elasticity of demand
- independent vetting of all proposed capital and maintenance expenditure
- any ministerial decisions overriding these ground rules being transparently disclosed in order to ensure accountability for decisions.

Box 6 New Zealand's road funding model

The New Zealand Road Fund approach initially involved an entity responsible for the management and allocation of road funding, and separate road providers responsible for operating and planning the road network. A single entity responsible for road funding and management of the state highway system — the New Zealand Transport Agency (NZTA) — was created in 2008 in response to issues relating to governance and funding, including lack of clarity on the role of some agencies and inconsistent planning and funding policies.

The NZTA invests in land transport, manages the state highway system (including undertaking the functions of planning, funding, design, supervision, construction and maintenance), and manages funding for the land transport system (including auditing the performance of organisations receiving land transport funding). The NZTA Board is responsible for decisions relating to investment of funds for transport from the National Land Transport Fund, with funds sourced from road users through fuel excise, charges on diesel and heavy vehicles (road user charges), and vehicle registration and licensing fees. The *Land Transport Management Act 2003* ring-fences this revenue for investment in land transport, including building and maintaining State highways and local roads.

State highways are managed by the NZTA. The costs of building and maintaining local roads are shared between the NZTA and local councils. Councils contribute to the cost of their land transport activities from both rates and borrowing.

The New Zealand government's priorities for land transport funding are set out in a Government Policy Statement on Land Transport, which allocates ranges within which road improvements and maintenance can be funded. The NZTA must give effect to this statement. Each local council then prepares a Regional Land Transport Plan, which the NZTA considers when allocating funding to individual road projects. This separation of the Minister from individual funding decisions is aimed at helping avoid perceptions of conflict of interest.

In instances where the New Zealand government wishes to fund projects unable or unsuitable to be funded by existing charges for road users, or to exercise more control over investment than is permitted through the NZTA, it can direct additional funds through the usual Budget processes.

Sources: New Zealand Ministry of Transport (2017), PC (2014).

The Commission envisages that Road Funds would operate at the state or regional level (as aggregations of local governments) given the accountability of those levels of government to the primary beneficiaries of services (PC 2014). The service delivery entity would, in principle, be separate from Road Funds, so that there are clear distinctions between 'policy' and operational tasks, and accountability for respective decisions.

The corporate form of Road Funds was left open in the Commission's 2014 review. This matter would need to be considered by each government as it raises policy questions related to objectives for road services. These include how the goals of efficiency and equity can both be met, and the extent to which subsidies are likely to apply in any broader network pricing scheme (and hence how much expenditure, in practice, would be subject to budget deliberations). These and other matters would have a bearing on how commercial disciplines could be best obtained.

Under this model, responsibility for road funding and investment decisions would lie clearly with State and Territory Governments. The Australian Government would continue to be engaged, however, on decisions relating to areas of the network that are important from a national perspective (for example, to facilitate trade), and linked to Australian Government policy responsibilities (such as airports).

The PC (2014) model assumed that the role of determining projects was the domain of the Road Fund. Under the Road Fund operating assumptions above, the independent regulator would be empowered to not reflect in prices any poorly implemented projects, unapproved projects, or expenditure arising from inefficient management. It could also include incentives for efficiency improvement by road network managers in the design of pricing structures.

Bringing the heavy vehicle reform program into the fold

The HVRR program should be oriented so that it can be incorporated into the broader reform program. Components of HVRR reform efforts to which this applies include:

- the role and functions of any new independent regulator for heavy vehicle charges
- the development and maintenance of asset registers and assessments of service levels (including any requirements for geographic information systems)
- the development of road expenditure and investment plans
- decisions regarding the interaction of funding and investment between different levels of government.

Road pricing - some considerations in transition and design

As noted, current road related fees and charges should, with the introduction of a user charge, be phased out.

Available technologies make it possible to determine when a vehicle moves between different parts of the network, and thus when road user charges should apply, and when they should not. This is an important consideration for three reasons.

First, on privately owned and operated toll roads, users will still need to pay the prevailing toll, but should not be required to pay any additional road user charge above that. Second,

technologies will enable charges to be levied only for those components of the network that governments determine should attract a charge; that is, excluding those components of the network subject to community service obligations. Third, they enable revenues to be attributed to the jurisdiction in which the travel took place.

Pilots have been effectively used in other countries to introduce the idea of pricing to the community, and inform how it could be rolled out. This matter is further discussed in section 6. Notwithstanding the form of consultation and the timing of decisions, technological and other advances mean that scheme rollout may be more efficiently conducted in conjunction with private sector providers. Private sector-designed schemes to trial road user charging technology (for example that proposed by Harrison and King (2017) (box 7) and undertaken by Transurban (2016), box 10) indicate that systems can be developed to provide a coherent system of charging for roads over the network, and that these systems need not be implemented by governments.

Box 7 Clearways' proposal for customer-led demand management

New technologies and developments in key markets like open data and the payments system have made new models of charging for road use possible. In a submission to the 2017 Wolfson Economics Prize, Harrison and King (2017), for example, developed a proposal for a customer-led solution to road user charging, based on an opt-in approach in which drivers initially pay a charge (capped so they are made no worse off than a baseline), and are provided a rebate at the pump for the amount of the fuel tax that would otherwise have been charged. The authors note the potential for such a scheme to engender support for user charging given the ability of participants to save money through behavioural changes (incentivised through dynamic pricing systems).

Though untested, the model suggests that the task of administering a road user charge need not be undertaken by governments themselves. Private providers may be better placed to respond to customer preferences and offer packages and pricing options tailored to individual drivers, and could thereby unlock greater benefits in the administration of road user charging programs. For example, for those who seldom drive or do not drive great distances, or have a history of safe driving practises, the system could be used to lower insurance premiums.

The Clearways proposal has been discussed with the Australian Government and is understood to be subject to consideration as part of broader road reform efforts.

Sources: Harrison and King (2017) and sub. 44.

Tariff structures could take a variety of forms. Ideally, prices would take into account distance travelled, the time of day and vehicle mass, alongside geographical data on the degree of network use, and road surface type/quality. Accompanying policy considerations include technology solutions and large data requirements, accounting for privacy considerations, and determining pricing algorithms.

To date, distance-based charges have been predominantly used in domestic and overseas trials, and represent a potential starting point. Either way, the design of pricing structures should be technologically neutral and able to accommodate advances in technology and data over time.

Additionally, pricing structures will need to account for the fundamentally different driving patterns of some, which may be unavoidable on account of where they live and/or work. This is particularly relevant for non-urban areas, where road use patterns differ substantially compared to urban areas.

Most obviously, lower urban density in these areas means that drivers are less affected by congestion relative to those in cities. Smaller coastal country and inland remote areas also generally have higher average commuting distances, although the same is not necessarily true for those in large regional centres, with for example, Townsville, Bendigo, Albury-Wadonga, Launceston and Canberra-Queanbeyan having lower average distances than Melbourne, Brisbane, Perth and Sydney, reflecting their smaller urban footprint (IV 2016a).

The characteristics of the road network itself are also often different in these areas, reflecting the proportionately greater length of arterial (as opposed to local) roads in these areas. Such roads are generally more costly to maintain. As such, local governments in regional and remote areas (and their state government road agency counterparts) face both lower per capita revenues and higher per capita expenditures relative to local governments in more densely populated urban areas (Austroads 2016).

Governments will need to determine how mechanisms are designed to account for distributional issues, such as the impacts of pricing on regional and remote roads. As for other areas of government services, subsidies may be the practical tool; and for road users in such districts, the signs of change between today's system and the future under direct pricing may be very few indeed. In an economic sense, however, the benefit would accrue from making funding requirements and competing alternatives clearer.

CONCLUSION 9.7

A move to direct road user charging should be accompanied by the phasing out of current road-related fees and charges. Road user charging should not be just an additional tax on users.

How a Road Fund model could work in a phased reform process

Instituting an initial Road Fund model for heavy vehicles

Initially establishing the Road Fund model on the basis of heavy vehicle revenues and expenditures has the benefit of instituting hypothecation for expenditures that are met (at least approximately) by cost-reflective charges. A stylised depiction of an initial State and Territory government-level Road Fund system based on heavy vehicle revenues and related expenditures is at figure 3. This model focuses on heavy vehicle revenues and arterial roads funding and expenditure.

Pre-existing elements of HVRR are also conducive to structuring a coherent road funding and investment framework for all road users, including the development of State-level asset registers and service level information for key routes, and road expenditure and investment plans of governments. These elements, in addition to powers of expenditure proposal vetting, are important for the efficient operation of the Road Fund model.

Once established, several aspects of this framework can be adapted over time to cover the entire road network, and all road users. For example, the development and maintenance of asset registers and assessments of service levels for heavy vehicles can be adapted to develop a broader regulatory asset base.



Figure 3 An initial heavy vehicle Road Fund model

The transition period to this model could be used to agree the precise role of ministers, road management agencies (the expenditure proponents) and economic regulators, and the particulars of the regulatory framework applying to roads. While the broad institutional parameters were set out above, choices can be made on, for example, the extent to which regulators are involved in designing concessional pricing arrangements to achieve social policy objectives, and mechanisms to ensure the transparency of any government directions.

This model could accommodate additional changes to the tax mix to simplify the hypothecation structure of revenues at different levels of government. For example,

real-time monitoring for use and tracking of heavy vehicles could enable State and Territory governments themselves to administer the road user charge component of Pay-As-You-Go (PAYGO), based on a location and distance based charge rather than this continuing to be levied through fuel excise accruing to the Australian Government.

Moving the Road Fund model to cover all road users

A stylised depiction of a Road Fund system based around all current vehicle revenues and related expenditures is at figure 4.

The Australian Government's role will necessarily evolve as such a system takes form. In the longer term, establishing State-level funds and pricing mechanisms will ultimately avoid the need for the Australian Government to design and administer grants.

It will, however, place more responsibility on State and Territory Governments, in collaboration with Local Governments, to manage revenues and investment plans. Given that the sources of road-related revenues are unlikely to change in the short term, however, establishing these funds requires an ongoing need for Australian Government transfers (chiefly for fuel excise revenues).

There would not need to be any immediate change to current systems of charging for road use to implement Road Funds (that is, PAYGO, light vehicle registration and fuel excise). Requiring Local and State and Territory governments to document their asset bases may identify shortfalls in asset maintenance and investment activity, particularly in regional and remote areas (IA 2013), which could require additional or reprioritisation of expenditure.

Acknowledging the current taxation responsibilities of governments, there is an important role for the Australian Government in aiding transition over the period of reform. Distribution of current Commonwealth revenues to jurisdictions' Road Funds should, to the extent possible, reflect the original jurisdictional source of that revenue. For example, fuel excise revenues levied in one jurisdiction would simply be redistributed to that jurisdiction's Road Fund.

Importantly, the reallocation of revenues to States and Territories should leave decisions on how the money should be spent to the States and Territories. An accompanying element of this role will be providing assurances on funding adequacy (for example, a 'no disadvantage' rule) during the reform transition period.



Figure 4 A Road Fund model for all road users with current revenues

Shifting the revenue base to direct user charging for light vehicles

A stylised depiction of a Road Fund system based on road user charges is at figure 5.

In moving from current charges for light vehicle road use to a system of direct user charging (that is, as the sources of revenue flowing into the funds begins to change), the following issues need to be taken into account.

- Whether one-for-one substitution of revenues, and therefore funding adequacy, occurs in practice will depend on factors such as pricing structures employed in the jurisdiction, whether the system is voluntary, and if so, the driving habits of those who do voluntarily move to user charging.
 - Those who do voluntarily move across are those who will more obviously benefit from it; that is, those who do not drive very long distances or very often. A phased approach to these issues is likely to be needed.
 - States may wish to prioritise road user charging arrangements for drivers of electric and hybrid vehicles who presently do not contribute in equal measure to road funding. It may also be advantageous to do so while uptake of such vehicles is both low and concentrated among relatively higher-income drivers.

- Systems will also need to be designed to manage both inter-jurisdictional travel, and use of the system of privately-owned toll roads.
 - Neither present significant obstacles to a system of full network coverage of light vehicles in light of technological developments in recent years (and their continued adoption in modern vehicle fleets). Indeed, trials in the United States and Australia suggest that technological issues, including user concerns about use of personal data, can be overcome.



Figure 5 A Road Fund model under road user charging

The depiction in figure 5 does not predict what reforms may arise for heavy vehicle charging (given this is an active area of government consideration) over any intervening period. It therefore assumes the continued levying of a heavy vehicle charge through diesel excise.

Road Funds do, however, provide an institutional mechanism to reform heavy vehicle charging arrangements at the State and Territory level, and for charges to be levied (and expenditure decisions made) in much the same way as for light vehicles. Ideally, this would involve the continued reform of heavy vehicle charges toward being a direct and cost-reflective charge for use.

CONCLUSION 9.8

Road Funds remain the desired institutional mechanism to effect ongoing reform to the regulatory arrangements for road funding and investment. Consistent with the model proposed in PC (2014), the key functions of Road Funds should be to:

- act as a specific-purpose and ring-fenced financial fund that collects road-related revenues, and directly links road-user preferences with spending decisions
- be an autonomous decision making body (at arm's length from government) that involves road users in project selection, funding, and road charging decisions
- factor in government policy decisions on road related priorities in a transparent manner
- facilitate systematic post-project evaluation and periodic review of key decisions.

Over time, as part of a phased approach to moving toward implementing road user pricing, reforms to Road Funds could be undertaken in three broad stages:

- initially designing Road Funds on the basis of heavy vehicle revenues and expenditures. This would provide a desirable pathway to sequencing reform objectives, and is amenable to future changes in the structure of road-related charges
- augmenting the remit of Road Funds to cover all users by hypothecating all prevailing road-related revenues to expenditure
- effecting a compositional shift in road-related revenues from current fees and charges towards direct user charges, phased in accordance with the uptake of direct charging by users.

5 Adapting regulatory frameworks to emergent technologies

New technologies and business models are rapidly transforming the road transport market. In addition to the ubiquitous example of Uber, other services (including ridesharing services) are increasingly available in Australia, including GoGet, Car Next Door, Flexicar, and Green Share Car. These services can lower the cost of trips relative to owning a car, and generally provide improved accessibility and comfort for those otherwise reliant on public transport, walking or cycling. They also serve to improve the overall efficiency of the vehicle fleet by reducing the amount of time cars spend idle, and in the case of ridesharing, by having more people travelling together in the same vehicle. The Australian market has also seen a degree of specialisation in these services of late. For example, *Shebah* and *SheSafe* operate ridesharing services targeted at women and children.

While all these services potentially reduce the cost of transport services for many individuals, in doing so they could attract higher average demand for trips, as lower relative prices, greater accessibility, privacy, comfort and safety encourage people to travel (on roads) more than they otherwise would.

It is worth noting that to the extent this demand comes from public transport users, or from those who walk or cycle, it could reduce pressures on public transport infrastructure and services at the margin. Just as adding capacity to congested networks tends not to alleviate congestion beyond the short term (the Downs-Thomson paradox), marginally reducing demand (and reallocating it to other parts of the network where the efficiency may not be any greater) is unlikely to result in significant sustained improvements to public transport, and or road, network efficiency.

Looking forward, autonomous vehicles present an opportunity to significantly improve transport safety and the overall utilisation of the national road network. However, the introduction of driverless vehicles can only follow government revision of policies and regulations pertaining to road use, and these can only advance once authorities, in partnership with private companies, adequately test autonomous vehicle technology on public roads. The States and Territories are currently at various stages of trialling these technologies, but they are all a significant way from scaled, real-world trials.

A large part of the regulatory and legislative provisions relating to road use currently rests upon the decision-making capacity of a licensed driver, who it is assumed understands and behaviourally responds to differences in road rules between jurisdictions. This approach will not work in all instances where the obligation to follow various road rules is embodied in the capacities of machines, sensors and the information systems on which they rely. Many rules and regulations will become redundant, while in many areas new ones will be required.

For example, the enforcement of speeding limits is often subject to a grey area, such as in instances where one is speeding up or slowing down between two distinct speed zones (for example, a regional town and a highway leading out of or into it). The rate of acceleration of an autonomous vehicle in these instances ultimately needs to be governed by pre-determined rules.

The issue here is not so much that different States may have different rules (as vehicles' onboard telematics should be able to be used to identify where and how these rules differ and how they apply). Rather, if one jurisdiction has a rule, and another does not, this complicates the ability of any autonomous vehicle to travel safely and lawfully between (state and local) jurisdictions.

Other examples include where autonomous vehicles can stop (or stand) and for how long, as passengers alight. This implies a need for a nationally consistent regulatory framework that facilitates the technological neutrality of road rules across jurisdictions. Road authorities in Australia would desirably consider how autonomous vehicle technologies are introduced and regulated overseas, both to draw on lessons, and to avoid regulatory and or technological barriers that prevent or increase the cost of uptake in Australia.

Where to from here?

COAG's Transport and Infrastructure Council is progressing a range of initiatives aimed at supporting the creation of a nationally consistent regulatory framework for automated vehicles, and to facilitate the testing and trialling of automated vehicle technologies. As part of this work, the National Transport Commission is undertaking work on issues such as needs for data disclosure and access between government and industry, the design of risk management and safety regulations, and legal issues given the current presumption of human driver control in much of regulatory policy and legislation.

One part of developing a regulatory framework for automated vehicles is to define and monitor the road network on which they will operate. Regardless of the initial scale of these networks, a key consideration for network design will be how urban planning and land-use regulations interact with decisions on transport choice. Some issues are immediately relevant, such as the formation of intermodal infrastructure to facilitate mobility, and greater restrictions on the consumption of land from parking spaces in congested areas (which could be facilitated now through better pricing and/or the creation of clearways¹³). More broadly, the network itself could interact with future land uses and the shapes of cities. For example, automated mass transit that allows for high speeds on a dedicated network could enable urban growth in areas at greater distances from centres of employment.

While automotive manufacturers internationally are in somewhat of a race to make autonomous vehicles available to the market (most suggesting around 2020^{14}), governments internationally generally have not established regulatory frameworks for their rollout.

The net effect of greater fleet efficiency that these services present, matched against potentially higher average demand for trips, will determine whether there is greater average road use, and greater strains being placed on road capacity because of new modes of private transport (including autonomous vehicles). While their overall effect on requirements for road funding and investment remains unclear, one way to gauge it is through case studies of cities where uptake of app-based ridesharing services is most advanced (box 8). The experience of New York suggests that these new services have overall elicited significant increases in average demand for trips, even after accounting for declines in taxi and private vehicle use.

¹³ It is notable that many governments have already begun to do this, such as the Streamlining Hoddle Street Initiative and Punt Road Corridor projects in Melbourne, and Sydney's Clearways Strategy, which implies a limit to gains from this sort of change in future.

¹⁴ This estimate relates to so called Level 4 or 5 'fully' autonomous vehicles, as compared to Levels 1 to 3 in which a driver maintains some degree of control over the vehicle. Level 2 vehicles, such as those provided by Tesla and that offer different degrees of 'assistance', are already available in Australia (such as adaptive cruise control that senses the distance to the car immediately in front).

The impact of these services in Australian cities is difficult to predict. Ridesharing services are presently small and have generally not seen the growth witnessed in the United States. In part, their viability and rate of uptake will depend on the regulatory environment in different jurisdictions (as the experience of Uber shows), and the state of competition and innovation within different markets.

Box 8 New York's experience with app-based ride services

In mid-2014, the price of a New York taxicab medallion (the equivalent of a taxi license) was over USD \$1 million. In March 2017, a medallion sale yielded just over USD \$240 000 — a fall of 77 per cent in less than three years.

New York taxicabs continue to lose market share to app-based services like Uber, and other pooled ridesharing services offered by companies like Uber, Lyft, Via and Gett. A recent study of the growth in app-based ride services in New York found that these services, after accounting for observed declines in taxicab and private car rides, have generated *net increases* of 31 million trips for 52 million passengers, or an additional 600 million passenger miles (966 million kilometres) of vehicular travel since 2013 (Schaller 2017). Putting this in perspective, this has translated to an overall 7 per cent increase in vehicle distances travelled in Manhattan, Western Queens and Western Brooklyn, with the majority of this growth occurring in downtown Manhattan.

The study also found that that since mid-2015, and despite the advent of ridesharing services, total mileage continued to grow rapidly because exclusive (that is, personal) trips still dominate, and because most customers are coming from transit, walking and biking. It found that growth in trips, passengers and distances were seen throughout the city as app-based services attracted substitution from not only taxis, but also those who would otherwise use public transport or their personal vehicle, and from people who would not otherwise have made the trip. Migration from public transport translated to increased vehicular travel even if the trips were shared. Trip growth in Manhattan was also concentrated during the morning and evening peak periods, adding to congestion.

Overall, the experience of New York based on these results suggests that there exists significant latent demand for car travel using new app-based services, and that even with ridesharing improving the overall efficiency of the vehicle fleet, substitution from both public and private modes of transport could lead to increases in overall trips taken. The preference for exclusive rides (as opposed to ridesharing) is a clear driver of the results in the study, and this preference (combined with physical limits to the number of ridesharing occupants), likely places a bound on the efficiency gains from such services.

Source: Schaller (2017).

While the experience of New York is obviously not generalisable to all cities, it does suggest that new technologies that improve overall fleet efficiency will not necessarily result in a reduction in average road network use. And to the extent that these technologies imply a shift toward either more fuel efficient vehicles or electric vehicles, they imply continued structural falls in fuel excise revenues relative to expenditure.

It is notable that electric vehicle (including hybrid electric) ownership globally rose from close to zero in 2010 to over 1.2 million in 2015, roughly doubling each year (National

Transport Commission 2016). Moving toward a sustainable source of direct road user charging as soon as practicable will help to mitigate funding imbalances likely to emerge as the uptake of electric and autonomous vehicles continues to grow.

CONCLUSION 9.9

New transport technologies like ridesharing and autonomous vehicles are likely to revolutionise transport, and there are significant opportunities and challenges for the community and governments in adapting to change.

Moves toward creating a nationally consistent regulatory framework for autonomous vehicles will help to incentivise investment, and realise the efficiency and safety gains these technologies offer.

6 Use of pilots to engage the community on reform

There is limited public understanding of the need for road funding reform, partly reflecting the lack of community consultation on infrastructure decisions generally. A good start for reform efforts would be trialling road user charging technologies, which would provide an avenue for engaging the community on road funding issues. The following section considers experiences overseas and some considerations for Australian governments.

International experience: road user charging pilots in the US

Three jurisdictions in the United States (US) have undertaken pilots of road user charging schemes for light vehicles: Oregon; Washington; and California.¹⁵ These schemes remain in the trial phase, and no country or state has fully developed and implemented an operational light vehicle road user charging scheme on a network-wide and non-voluntary basis.¹⁶ California and Washington implemented policy processes after Oregon successfully implemented its own operational pilot (which itself took 14 years). California and Washington's processes, which took 2-5 years, are likely to have benefited from

¹⁵ These three states border each other. They have the highest per capita ownership of electric vehicles in the United States. Electric vehicle charging infrastructure is also relatively dense in that part of the US, which is likely to have encouraged governments to reform Road funding arrangements. In addition to these three states, there are several other states (for example, Minnesota, Iowa, Georgia, Nevada, New York, Texas) that have set up taskforces or other processes to scope the viability of road user charging reform (including assessing design issues), and undertaken tests of user perceptions of road user charging and charging technologies.

¹⁶ Singapore is perhaps an exception to this, but its system more closely resembles a congestion charge and its government exhibits significant control over reform outcomes. Other jurisdictions overseas including London (United Kingdom), Stockholm (Sweden) and Milan (Italy) have also implemented cordon pricing schemes in which the policy objective has been more focused on congestion, liveability and environmental issues.

Oregon 'showing them how to do it' before proceeding (Oregon has been prolific in making public the minutiae of their policy processes).

The context for progressing road user charging pilots in these states is essentially similar to that facing Australia: an eroding revenue base given increased vehicle fuel efficiency and the advent of electric vehicles, equity issues arising from registration and other fixed charges (and also from fuel taxation given differences in fuel efficiency by income and region), and longer-term infrastructure funding viability concerns. These issues affect all levels of government in the United States. As such, the US Federal Government has been active in promoting the adoption of road user charging schemes. The *Fixing America's Surface Transportation Act* (2015) recognised the need to explore road user charging as an option to maintain the long-term solvency of their Federal Highway Trust Fund. The Act created a five-year, \$95 million (USD) grant program, which is eligible to a state or group of states to test the design, acceptance, and implementation of a future road user charging scheme.¹⁷

Common themes have emerged from the three US state trials:

- There was broad consensus on the need to pursue road user charging among the Federal government, the state government bureaucracies, state parliaments, automobile groups and business groups before undertaking pilots.
- Each state initiated policy processes by establishing task forces or commissions to scope the options for road user charging reform, to report the issues publicly, consult, and to design a pilot scheme. At the time of instigating these processes, public perception of road user charging was either unknown or perceived to be negative. Each state's task force has sought to specifically gauge public perceptions to inform policy design.
- Engagement with the public did not focus on productivity or infrastructure efficiency. Rather, processes established the need for road user charging by communicating a funding problem for roads.
- Taskforces were then tasked with implementing pilots of user charging schemes. The resultant pilot programs were or are small and entirely volunteer-based. Participants generally incur no financial loss and are given degrees of freedom in terms of how they report, what they report, and how they pay (privacy being an issue initially).

¹⁷ The fate of the *Fixing America's Surface Transportation Act* (2015) will, in part, be determined by the passage of the US 2017-18 Budget through Congress. The Budget does, however, contain incentives for jurisdictions to consider methods to mitigate congestion, which could see the continuation of recently announced trials. For example, a 'coalition' of states along the Interstate 95 highway, including Delaware, Pennsylvania, New Hampshire and Vermont are planning a trial using the fund. Connecticut (which was initially involved) recently rescinded from the plan following reportedly inadequate consultation and communication with residents.

• All three states implemented processes to study, survey and/or model the distributional equity implications of proposed schemes, either prior to launching pilots (Oregon, Washington) or as part of the pilot process itself (California).

Authorities in the US have generally based their communications on the following points:

- attempting to solve an emerging road funding shortfall by raising registration fees, fuel taxes, imposing tolls, increasing taxes or reducing expenditure on other government services, is neither socially equitable or financially sufficient to cover the funding task
- unless drivers are willing to accept fewer or poorer government services in other areas, or higher taxes generally, their expectations for road services are unlikely to be met unless road charging mechanisms are changed.

Of the three states, Oregon is the most advanced, with a legislated and operational trial of 5000 voluntary drivers, named *OreGo*, where users pay for road access based on a simple distance based charge (box 9). The transition from a volunteer based pilot to a statewide mandatory scheme will be of interest, particularly in relation to managing privacy and equity concerns for drivers who would not otherwise have volunteered, developing pricing structures, and achieving technological neutrality. How this transition is managed could provide useful insights for Australian policymakers.

Box 9 Oregon's OreGo road funding pilot scheme – how it works

In 2001, the Oregon Legislature formed the Road User Fee Task Force, an independent body of state legislators, transportation commissioners, local government officials and citizens, to explore new ways of funding maintenance needs and improvements to the state's transportation system. The Task Force examined the challenges and benefits of a mileage-based road user charge and conducted pilot projects to gather driver feedback on different options. The Task Force scoped a number of elements of road user charge design and engaged the community and business sector in informing perception of and desirable elements of the scheme.

In 2012, the Task Force reached a major milestone, welcoming 88 volunteers for an initial Road Usage Charge Pilot Program. Following completion of the pilot in 2013, Oregon passed *Senate Bill 810,* which effectively established the nation's first mileage-based road user charging scheme for light vehicles to create a new way to fund road maintenance, preservation and improvements. The so named *OReGO* program launched on 1 July 2015. The first phase of *OReGO* is limited to 5000 cars and light-duty commercial vehicles (No more than 1500 vehicles rated at less than 17 mpg; and No more than 1500 vehicles rated from 17 to less than 22 mpg). Participants pay a per-mile fee of 1.5 cents (USD) instead of the traditional fuel tax of \$0.30 (USD) per gallon, and receive a tax credit on their bill for the fuel tax they pay at the pump.

The operator of the program, the Oregon Department of Transport (ODOT) partnered with private sector partners (termed vendors), to manage participants' *OReGO* accounts, and to also provide an ODOT-sponsored option. Volunteers have choice over different mileage reporting options offered by vendors, and their personal information is subject to strict security and privacy measures. Some vendors offer features like trip logs, 'find my car' functions, and 'badges' that reward good driving behaviour.

Source: Oregon Department of Transportation 2015.

Implementing pilots in Australia

The pilots in the US (and the policy processes that preceded them) have been designed to gather information on implementation and design issues. In Australia, Transurban conducted a Melbourne Road Usage Study in late 2016, which gauged a number of issues relating to community perception and pricing systems (box 10). These would be useful to take into account in designing pilots and implementation processes in Australia.

Conducting trials in major capitals leveraging the opening of new (unpriced) infrastructure and testing behaviour under different pricing regimes (for example, refunding users' excise while measuring their use of the infrastructure with a charge) would inform policy design, as well as create knowledge and awareness among the community.

In addition, the following considerations could help trial design and engagement:

- Involving road users, including business groups, community groups, automobile associations, and those with experience in road service infrastructure delivery in the design of the trial.
- Given the probably small scale of pilots relative to the network itself, pilots may not necessarily elicit significant behavioural change from drivers. However, they should facilitate better understanding of user perception and acceptability issues that may affect the rate of uptake and design of a mandatory scheme. These include:
 - attitudes to the use of and proposed protections for personally identifiable information (for example, while many users are likely to accept some degree of tracking of location data given the ubiquity of tracking in mobile devices, some may not)
 - the interaction between road user charging and existing tolls, fees, charges and taxes. For example, providing a rebate on fuel excise charges incurred is a simple way of making clear to road users how a revenue-neutral switch would work
 - providing feedback to participants on costs incurred relative to a baseline cost for usage under their normal behaviour. This can help to convince users that road user charging need not be a more expensive option than what they incur under current policy settings.
- Pilots could test the applicability and efficacy of different technology solutions for tracking use (access to geographic information; local vs state asset management issues and interoperability between states), and to identify solutions that are scalable over the network and technology neutral over both time and vehicle time.
- Pilots could also be designed to test systems to store data, and manage security and privacy issues.

A further useful result of pilots would be replicable and scalable technology solutions for road user charging. Given that some major roads cross borders, the high desirability of seamless charging mechanisms across those borders, and the necessity of coordinated reform (to the extent that national taxes are replaced with road prices) the Australian Government also has an interest in advancing reform and could potentially assist the States and Territories to establish and run pilots.

Box 10 Transurban's Melbourne Road Usage Study

Toll road operator Transurban conducted a pilot of road user charging technologies in Melbourne over 2015 and 2016 (the Melbourne Road Usage Study), involving 1635 private light vehicle motorists. Its stated objectives were to: gauge motorists' knowledge and understanding of the current road-funding system and assess their attitudes and preferences toward user-pays charging options; understand behavioural responses to different charging and implementation options; and to show that technology is not a barrier to implementing a practical user-pays system. A final close out survey was conducted to gauge participants' perspectives.

The 'Usage' model tested participant responses to a user-pays funding model with three charging options: a per kilometre distance charge of \$0.10/km; a two-tiered flat rate charge for a capped number of kilometres at \$0.10/km and \$0.20/km for all excess kilometres; and a simple per trip charge of \$1.00/trip. The 'Congestion' model tested how motorists responded to road charging that used price signals in highly congested areas or at peak travel times. It consisted of two charging options: a time of day charge of \$0.15/km during peak hours (Mon-Fri, 07:00-09:00 and 15:00-18:00) and \$0.08/km at all other times; and a distance and area based cordon charge of \$0.08/km plus \$8.00 access charge per day to enter the cordon area between 07:00-18:00, Monday to Friday (similar to the inner cordon area defined in IV (2016a)).

Participants' individual accounts were set with an initial dollar balance calibrated to their observed 'baseline' driving patterns. Deductions from this amount were based on their charging option and driving behaviour, with drivers eligible to keep any remaining balance at the end of the survey. This points to a number of flaws in design, namely that it does not facilitate loss aversion among participants. It is also unable to elicit behavioural change from any fully-scaled network effects (for example there is no congestion benefit from paying the congestion charge). As such, the Usage' model elicited no significant behavioural change among participants (in average trip numbers, kilometres travelled), however it did identify a small increase in usage for those on the flat rate charging option. The 'Congestion' model also failed to elicit significant behavioural change among participants, under either the time of day charge, or the cordon charge scenarios. The results of user demand should therefore be interpreted with caution. Actual network effects may indeed be significant under a scheme facilitating behavioural responses from all road users (rather than a small, geographically dispersed subset of users).

The study did provide insight, however, into driver education processes and preferences. The educative element helped improve understanding of the road funding system, and participants' driving patterns. Compared to the initial 88 per cent of drivers with little to no understanding of current government fees and charges for roads, 60 per cent of participants preferred a user pays system in the close out survey (the per kilometre distance based charge being the most preferred option). 50 per cent of participants were comfortable with the time of day system of charging, and over 60 per cent with cordon charging.

The study also suggests that privacy issues are manageable (and will differ depending on the policy, with for example, only distance data and a binary indicator of being in or out of the cordon area required for the cordon charging scenario). Notwithstanding some self-selection bias among the participants, 80 per cent were comfortable with global positioning systems being enabled in their car, while 60 per cent were comfortable with the idea of global positioning systems being left in indefinitely (contingent on data being safe and their use specified). Importantly, participants also saw a need for transparency (hypothecation) in the funding system, with revenues being used specifically for transport infrastructure (including public transport). In part, this would mitigate equity issues if associated investment is demonstrable and improves overall access and mobility. *Sources*: Transurban (2016), IV (2016a).
CONCLUSION 9.10

To communicate the need for road funding reform with the community, State and Territory governments should consider the use of road user charging pilot programs, as has been successful in overseas jurisdictions.

Conducting trials in major capitals to leverage the opening of new (unpriced) infrastructure and testing behaviour under different pricing regimes would inform policy design, as well as create knowledge and awareness among the community.

Appendix A: Road reform recommendations to date

In addition to the Commission's Public Infrastructure inquiry (2014), several recent reviews have proposed various types of road user charging and alternative funding models for roads. At the federal level, these include the Harper Competition Policy Review (2015), and Infrastructure Australia's (IA's) inaugural Infrastructure Plan (2016). At the State level, they include Infrastructure Victoria's (IV's) 30 year Infrastructure Strategy (2016b). This appendix briefly summarises the relevant recommendations of these reviews, and government responses to them (where available).

Harper Competition Policy Review (2015)

The Harper Competition Policy Review similarly recommended governments introduce cost-reflective road pricing, subject to independent oversight and with revenues used for road construction, maintenance and safety (Recommendation 3). While it did not specify the exact mode of revenue hypothecation, it noted that as direct pricing is introduced, indirect charges on road users should be reduced, and that the revenue implications for different levels of government require alternative arrangements to those currently in place.

The Australian Government response to Harper similarly supported implementing cost-reflective road pricing as a long-term reform option. The government response noted it would investigate the benefits, costs and potential next steps of options to introduce cost reflective road pricing for all vehicles, noting the current priority of progressing heavy vehicle road reform (Australian Government 2015).

Infrastructure Australia's Infrastructure Plan (Feb 2016)

IA's Infrastructure Plan made a number of recommendations for how to achieve a network-wide road user charging scheme, namely by establishing further reviews into existing funding frameworks for roads and the desired reform pathway, and into the design of a corporatised road delivery model, which it favoured on the basis that it is used in other utility networks. (Recommendations 5.3 and 6.13, respectively). It also sought commitments from governments on reform timeframes (Recommendations 5.4 and 5.5).

In November 2016, the Australian Government announced it would establish a study into the potential impacts of road user charging reform on road users, which will commence later in 2017. The Government considered that the merits of IA's recommendation that Australia eventually move to a corporatised road service delivery model could not be properly assessed until the conclusion of the aforementioned study (Australian Government 2016).

Infrastructure Victoria's 30-year Infrastructure Strategy (Dec 2016)

IV's 30-year Infrastructure Strategy recommended introducing a transport network price regime within 5 to 15 years to manage congestion and obtain the most efficient use of the transport network. It considered that such a regime should incorporate all modes of transport and focus on addressing any implications for equity that arise from the regime (Recommendation 10.2.2). A related research paper released by IV examined the options, challenges and opportunities for transport network pricing in Victoria (IV 2016a), noting that direct road pricing is the first step towards a network-wide pricing regime as it offers the greatest efficiency gains for Victoria's entire transport network, and that road pricing in Victoria should complement efforts toward national road pricing reforms.

IV recommended that the Victorian Government respond to its proposed strategy within 12 months, and indicated that it will develop a five-year plan as part of its response. IV has also indicated it will have an oversight role for the delivery of the Victorian Government's plan.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 10

REALISING THE PRODUCTIVE POTENTIAL OF LAND 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

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Key points

- State and Territory Governments have made good progress in planning reform over the past five years, and are continuing to pursue changes. Despite this progress, there remain some key areas that have not yet been addressed or remain high priorities for continued effort:
 - reducing the number and complexity of restrictions on land use created by overly prescriptive zoning systems, which discourage investment and create unnecessary barriers to business entry and diversification
 - ensuring the coherence of State and Local-level planning strategies and the efficient provision of infrastructure to greenfield or new release areas
 - adoption of the known best practice model for development assessments to reduce unnecessary costs and complexity.
- Stamp duties on property transfers raise the cost of housing, discourage people from moving to more desired locations, and prevent the freeing up properties for more valued uses. They are also one of the most inefficient taxes in Australia. There is a strong case to transition from stamp duties to taxes based on unimproved land value.

1 How land use policies affect city productivity

Planning and land-use policies affect how cities physically develop and function, and therefore many aspects of the perceived 'liveability' of cities and their attractiveness as places to conduct business.

These include the availability of suitable dwelling types, the types, locations and modes of operation of businesses and, through their determinations of the location of activity and facilitative infrastructure, ease of access to jobs, services and attractions. Planning policies also help determine the quality of environmental amenities and other aspects of urban design that affect the use and enjoyment of space, such as the designation of public areas and dimensions of buildings.

Planning policies particularly affect the productivity and growth of cities through their determination of possibilities for the use of land, coordination of different activities, and the management of positive and negative spillover effects from concentrations of people and activity. For example, planning rules determine the allocable locations, types and densities of housing and businesses, and hence the potential benefits to be gained from using land. The location of homes and businesses and their impact on the costs of travel, in turn, are key determinants of other land uses and development. And the ease of commuting and the availability of housing, in addition to earnings, are key influences on city population sizes (Duranton and Puga 2013).

Planning systems also set out how potentially competing objectives for land-use should be met (for example, economic development and the maintenance of social and environmental amenity in an area), and seek to ensure the optimum use of land by helping to manage trade-offs between urban costs, such as crowding and congestion, and agglomeration efficiencies (the flow-on benefits from firms and people being located close together) (Glaeser 2010). More flexible zoning designations supporting complementary land uses, for example, can enable the better sharing of facilities, suppliers and customers, matching of labour to firms, and opportunities for the diffusion of knowledge. How well urban trade-offs are managed are systematically related to productivity and earnings (Duranton and Puga 2013).

The locations of homes and businesses, and proximity to infrastructure, such as transport and communications, further affect ease of access to employment opportunities and services, which can affect socioeconomic outcomes (Kelly and Donegan 2015), and the costs and efficiency of businesses.

In addition, the availability of amenities and quality of the built and natural environments play an important role in creating a sense of belonging and local identity for residents, supporting healthy lifestyles, as well as attracting skilled people to cities. Improvements in Melbourne's city design during the 1990s to make more people-friendly streets, public places and the city more 'green' have led to a substantial increase in pedestrian traffic throughout the day, and subsequent growth in businesses, and its cafe culture, in the city.

With a shift towards smaller and more densely situated housing around established transport facilities and centres of economic activity, there is a growing emphasis on urban design and planning that meets the privacy, amenity, and aesthetic preferences of residents and communities.

The broader effects of planning systems are observed in indicators such as whether people consider there is reasonable access to housing in the forms and locations desired, good mobility and access to desired services, thriving businesses, and an environment that reflects appreciation for the social, environmental and aesthetic importance of urban design.

As noted in chapter 4 in the main report, many of these judgements are necessarily subjective, but indicators of good functioning are likely to show a general perception that cities have retained or improved these features while their populations and economies have continued to grow. In particular, liveable cities attract skilled labour, which is likely to grow in importance as skill-intensive service industries dominate contributions to economic growth in developed countries (Baldwin 2016).

Urban planning responsibilities

Responsibility for urban planning rests with the States and Territories, and Local Governments. States are generally responsible for:

- releasing land for new developments
- strategic plans for metropolitan areas or regional areas
- making provision for major infrastructure
- overarching planning and development policies, such as the broad objectives of and purposes for land use (whether residential, business, recreational or other), with which State or Local approval authorities must comply.

Local Governments generally have responsibility for developing and implementing land use plans at the local level, with local plans expected to be consistent with metropolitan strategic plans or regional plans and applicable State planning policies (figure 1). Local Governments process the vast majority of development proposals.

Urban planning challenges

Policy objectives with respect to planning systems vary, but common aims of all governments are to accommodate population growth, promote economic development, and preserve and/or enhance social wellbeing. Others include adaptation to environmental and other risks, including those posed by natural hazards and climate change, the preservation of biodiversity and historical heritage, or more specific aims, such as maintaining buffer zones around seaports.

Challenges in achieving these aims include, among other things, the long-lived consequences of many planning decisions in cities, with pre-existing uses of land and the path dependence they can cause for adjacent or related activity usually constraining changes in land use, especially in the short term.





Source: PC (2012).

Another is deciding whether and how much to 'build up' in established areas versus 'build out' and extend city boundaries. Increasing the supply of well-located land and providing accompanying transport infrastructure can help to reduce pressure on land and house prices (for example, Lowe 2017a). On the other hand, the better utilisation of land in established areas can realise additional agglomeration benefits, reduce the costs of public infrastructure, which is more costly to deliver the further they are from urban centres, and prevent the creation of distant, socially isolated communities.

As city centres are the places where most jobs are created and offer greater choice and competition in services, the availability of housing close to centres has implications for households' living standards. The reality of this is being seen in some capital cities with the segregation of high education cohorts, who have higher incomes and live near Melbourne's centre, and low education cohorts, who live at the fringes (Daley 2016). Accommodating population growth in established areas usually requires, however, management of the subsequent new set of urban costs and benefits, which may include wider changes to maintain or enhance residents' lifestyles and amenity.

A major factor influencing planning decisions is the preferences of local residents and businesses. A standing challenge for strategic planning is the often unequal distribution of benefits and costs associated with accommodating growth, where the cost of some land uses can be imposed on a few communities while the benefits are more dispersed (increased densification in established areas being a typical example).

As for other areas, technological advance can change how objectives can be met, which requires regulators to consider whether policy settings remain apt over time. The task of managing vehicle traffic and parking, for example, will change with the likely introduction of autonomous vehicles (SP 9), and so development regulations designating land uses, the density of development and activity. An important productivity consideration as cities grow is the impact of land uses and built structures on the ease of movement within, and into and out of, city centres.

Past studies (for example, by The CIE (2013), Deloitte (2012) and DAE (2016)) have noted avoidable costs arising from unclear plans or objectives with respect to city or local area growth, undue restrictions on the development of land, and complex processes for gaining approval to new or changed land uses. Studies show that cities with stringent land-use regulations generally experience higher growth in housing prices and have lower population growth rates (Duranton and Puga 2013; Hilber and Vermeulen 2016). Restrictions on land use or development in desirable locations can also create or increase pressure to develop land in other locations that have high social and environmental value (Nathan and Overman 2011). The need for restrictions, and the benefits and costs they create, should, as for other policy areas, be evaluated taking into account the interests of the community as a whole.

Areas of policy focus

Major Australian cities have generally been regarded well in recent global liveability surveys, which assess the attractiveness of cities from the perspective of globally mobile professionals. For example, Melbourne has been ranked the most liveable city of 140 cities surveyed since 2011 by *The Economist*, while Adelaide, Sydney and Perth have ranked in the top 20 cities over the same period (EIU 2016).

Self-evidently, being amongst the best in the past provides limited guidance on cities' capacity to handle future challenges. There will be challenges in maintaining cities' current desirable attributes as populations grow, with projections suggesting that the majority of this growth will be in Australia's capital cities (some 10.8 million more people by 2050 (ABS 2013)).

There are clearly present areas of stress and suboptimal outcomes, most prominently in relation to housing access (box 1) and the ability of the planning system to accommodate changes in business types and formats.

In Sydney and Melbourne, the supply of new housing has not kept up with demand, which has contributed to upward pressure on dwelling prices relative to income – at the time of writing, at record highs (Lowe 2017b). High house prices can exacerbate social inequality as housing costs in metropolitan cities become unaffordable for low income households (Henry et al. 2009; SGS Economics & Planning 2015).

Access to suitable housing and increases in distances travelled to jobs is a problem in several capital cities. About 60 per cent of net employment growth between 2006 and 2011 was within 10 kilometres of the CBDs of the largest five capital cities, but net population growth located in the same area was approximately half this amount.

In Sydney, the majority of jobs that can be reached in 45 minutes by car are located in the inner city whereas on the city fringes this is the case for fewer than 20 per cent of jobs. Similarly for Melbourne, residents living in the inner city can reach more than half the jobs within a 60 minute public transport trip but residents living in outer urban areas, such as those in the western-suburbs and around Dandenong, can access fewer than one in ten of those jobs (Kelly and Donegan 2014).

There are also concerns in several jurisdictions about the extent to which States' intentions with respect to metropolitan development are being informed by, and reflected in, local decisions — and hence whether broader strategies for managing the growth and development of cities are being realised.

Concerns about restrictions on housing supply, the complexity and prescriptiveness of zoning systems, particularly their impact on business entry and diversification, and the costs and complexity of development assessment processes, have given rise to several reviews of planning systems in recent years (including several Commission studies; PC 2011b, 2012, 2013, 2014d, 2016). Jurisdictions' efforts to address these concerns are considered below.

Box 1 Housing access

Access to housing is a significant indicator of city liveability. The growing importance of inner city areas as centres of employment and services means that those who live (or can afford to move) closer to the city centre are likely to be at an advantage.

The **price of housing** varies across States and Territories. The ratio of nationwide house prices to household income is now at record highs. New South Wales and Victoria account for the majority of this result, however, a key contributor being strong population growth in Sydney and Melbourne. House prices in inner urban areas have increased at a greater rate than outer urban fringes, making it difficult for lower income households to relocate to these areas. In the other States, the ratio of housing prices to income has been below previous peaks and remained relatively subdued. The differences between jurisdictions indicate that economic conditions other than the interest rate level are at play. Noticeably, prices for dwelling in Perth have declined, largely attributed to weak economic conditions and slowing population growth following the end of the mining investment boom.

The **cost of dwelling type** also varies across States and Territories. Price growth for detached houses has been stronger than apartments, particularly in capital cities where there has been an increase in the supply of apartments relative to detached houses. For example, apartment prices in Brisbane declined in the second half of 2016 while the growth in prices for detached houses increased.

Housing price pressure has been attributed to a range of factors, including low interest rates and a sluggish economic environment, which have encouraged increases in investor activity in some cities. Growth in the value of investor finance for dwellings has outpaced growth in owner-occupier finance over the past decade (investor finance for dwellings grew 4.8 per cent p.a. on average over the past decade compared with 2.8 per cent for owner occupier finance). Over the twelve month period to May 2017, the value of investor finance grew by 7.8 per cent compared with 3.1 per cent for owner occupier finance. Investor loans now account for 30 to 40 per cent of new loans.

Supply-demand dynamics have been placing upward pressure on dwelling prices in Sydney and Melbourne relative to incomes for some time. Housing demand has increased by about 40 per cent per year over the past decade, driven by population growth, but supply has not kept up with demand and it is only in recent years that residential construction has responded. For example, the NSW Government has noted that housing construction is recovering from several years of low activity, but the years of low supply production, strong population growth and pent up demand for housing means there remains significant unmet demand.

A Grattan Institute survey of homebuyers also suggests that there are large gaps between **desired and available types of housing** in established areas of Sydney and Melbourne. This survey found that more than 150 000 Sydney households' preferred dwelling types (for example, apartments four storeys or higher) cannot be accommodated by the city's existing housing stock. This reflects both the difficulty in replacing the stock given the disruption it would cause, and the long-lived nature of most detached houses, which has comprised the majority of stock over recent decades (in 1976, detached houses comprised 78 per cent of Australia's dwelling stock; in 2011 the proportion was 74 per cent).

Sources: ABS (2017); Kelly et al. (2011); Kohler and van der Merwe (2015); KPMG (2016); Lowe (2017b, 2017c); NSW Government (2016); PC (2011b); RBA (2016, 2017).

Progress on planning reform since 2011

Many State and Territory Governments have made good progress in planning reform over the past five years (box 2).

The following notable changes have been made or are being pursued at the State-specific level.

The **Victorian Government** reformed its residential, industrial and commercial zoning regulations in 2013 to reduce the number of restrictions and the degree of prescription on the intensity of land uses allowed in each zone type. The Victorian Government further amended its residential zone regulation in March 2017 to reduce restrictions on the height and density of developments (VDELWP 2017b).

In 2017, the **Queensland Government** introduced new planning legislation that includes statutory instruments to better align State objectives and regional plans administered by local councils. The Government has also replaced Queensland Planning Provisions with identified mandatory elements for local planning schemes, which focus on providing consistency of definitions, and zones with purpose statements (QDILGP 2017a).

The **NSW Government** has established a clearer and more integrated hierarchy of State, regional and district plans for the Greater Sydney region, with clearer links to local planning controls. In addition, the Government has simplified the planning system by reducing the number of State planning instruments and the development approval pathway for low-impact residential buildings. The Government has further established a planning database as an electronic repository for planning information and a portal that provides online access to information.

The above and other measures were instituted following failure to achieve Parliamentary approval to a package of major changes to planning legislation in 2013. The Government has since proposed further legislative reforms, including to require decision-makers to give reasons for their decisions, consolidating community consultation provisions, and further improving the assessment pathway for low impact proposals and the coherence and transparency of State and local-level planning. But this package does not include some key 2013 reforms, including on overly restrictive zoning regulations (Allens 2017).

Both the Tasmanian and South Australian Governments are embarking on broader reforms of their planning systems.

The **South Australian Government** is seeking to overhaul its planning system over the next five years. A key aim is to replace the 1500-plus zones and council plans with a more consistent and succinct set of development rules that, among other things, recognises different levels of regulatory risk. The Government established an independent State Planning Commission in 2017 to act as the State's primary planning advisory and development assessment body. It is planning to streamline its development assessment pathways in 2018-19.

Box 2 Recent improvements in planning systems

Sydney and Melbourne have provided for more efficient land release and new housing in recent years. The years of slow supply are likely to be contributing to present high housing prices, however (box 1). In addition, there has been effort by all jurisdictions to reduce the complexity of development assessment processes and improve transparency in decision making. For example, since 2011:

- standard (statutory) planning templates for local planning schemes have been introduced in all but one State, South Australia, which is in the process of transitioning Local Government plans to a standardised format. This move has provided for greater level of consistency between State and local plans
- consistent zoning conventions have been created for Local Governments within the States, with most jurisdictions prescribing a set of permitted zone types and land uses
- fast-tracked development assessment paths, including a 'code-assess' category, are being used in all jurisdictions. The code-assess category fast-tracks development applications by providing preset criteria against which to assess developments, and assurance that consent will always be given if all criteria are met
- capital city strategies have been developed for all jurisdictions, providing greater direction for land planning and a more conducive environment for investment
- all States have sought the greater involvement of independent experts (in architecture, urban design, heritage protection or social planning) and communities in planning decisions
- all States with the exception of Queensland now have supra council planning panels to make determinations on developments that have significant impacts beyond an individual council's boundaries
- all States have introduced online services for submitting and tracking development applications, and local planning schemes are easily accessible online (online services are currently being rolled out in Tasmania.

Sources: QDILGP (2017c); SADPTI (2017b, 2016c); TPC (2017).

The **Tasmanian Government** is intending to replace its 29 interim planning schemes with a single statewide planning scheme that includes a set of planning rules (including zoning and land use codes) from which councils must choose to reflect the objectives of their community. The intention is that local variations will only be allowed to reflect unique local circumstances, but these will be treated as derogations from rather than changes to the State's rules.

The **Western Australian Government** introduced standard 'deemed provisions' in 2015, which set uniform processes for structure plans (plans to coordinate future subdivision and zoning of land) and local development plans, as well as DAs undertaken at the local level. Prior to this, each local planning scheme included its own procedures and processes, resulting in up to 150 different variations.

The **Northern Territory Government** further streamlined its development approval process in 2016.

Progressing reform

The experience of New South Wales highlights the importance of perceived and actual integrity in decision-making processes as a factor in public support for reforms. The NSW Independent Commission Against Corruption, for example, noted that any laxity in process ' ... combined with the motivation of developers to maximise profits ... (would) make the proposed system an easy target for those prepared to use corrupt means to achieve a favourable result' (NSW ICAC 2013, pp. 1–2).¹

Along a similar line, studies have noted that consultation on development strategies is viewed by communities in several jurisdictions as 'superficial window dressing' (for example, Kelly and Donegan 2015, p. 139), contributing to resistance to their implementation.

As with many policy areas, transparency in decision-making, with processes incorporating genuine opportunities for concerns to be voiced and considered, are important to ensure the soundness of decisions and help stakeholder understanding of their rationale. Further, simply put, exposing processes to sunlight has a cleansing effect.

For the purpose of this paper, the Commission has taken as given the need for requisite skills on the part of planning system officials, and well-targeted checks and balances. These are needed for trust in reform proposals as well as to ensure that the reforms produce the benefits intended.

The Commission's stocktake of progress on reform indicates that the following areas remain priorities across jurisdictions:

- reducing the number and complexity of restrictions on land use created by prescriptive zoning systems (section 2)
- better planning and provision for growth (section 3)
- the need to continue moves towards a risk-based approach to assessment of development proposals (section 4).

The paper also considers the impact of stamp duty on property transfers, which affect the efficient use and development of land and housing stock, and imposes constraints on mobility (section 5). From an economy-wide perspective, stamp duties are one of the most inefficient taxes nationally, estimated to cost over 70 cents for each additional dollar collected in the long run. Estimates of the net benefits of reforms discussed in this paper are set out in section 6.

¹ The nature of zoning regulations affects the value of land. In Sydney land zoned for higher density residential development can generally be valued between 10 and 25 per cent higher than land zoned for lower density residential development. Land zoned for industrial uses in Sydney has approximately half the value of similar land that is zoned for residential uses (CIE 2013).

2 Reducing land use restrictions

The majority of development and land use activities (that is, not State-significant developments) is carried out under authority of local planning instruments that list the types of development that are allowed in each zone of a Local Government area. State legislation sets out the types of allowable zones (whether residential, business, rural, environmental protection or other), allowable categories (or purposes) of activity within those zones, and the specific types of developments that may be carried out in accordance with the purpose of those categories of activity.

A longstanding concern is the multiplicity of zone categories and specificity of allowable activities within those categories. For example, New South Wales has eight types of business zone categories, each specifying the types of developments that may be undertaken with the consent of the relevant Local Government. Local Governments use these zoning categories to develop specific plans for their areas, which usually include additional specific types of developments that require consent in accordance with their particular objectives. Local Governments may further specify development parameters, such as building height restrictions and floor to space ratios that apply to specific land uses or zoning subcategories, guided by high-level standards set by the State Government (box 3).

Even the smallest jurisdictions, Tasmania and the ACT, have five to six types of commercial zones, with each having 23 zone types in total. In South Australia, planning schemes are highly variable between councils because the State does not have a standard planning instrument for local plans. Developers must navigate over 500 residential zone types and a combination of some 2500 zones, overlays and spatial layers, which contribute to lengthy approval timeframes and excessive compliance costs (South Australian Government 2015). South Australia is currently moving to a new set of zoning rules (SADPTI 2017b).

Victoria stands apart from other jurisdictions in having fewer business zones (just two), with more broadly-stated allowable uses, as a result of reforms to its zoning system in 2013. As part of its reforms, Victoria also reduced the degree of prescription and restrictions on the intensity of land uses allowed in residential and industrial zones. Within metropolitan Melbourne, authorities may no longer impose floor space limits in commercial zones (VDELWP 2017a; VDTPLI 2013b, 2013a).

The Commission has previously noted that there are limited and identifiable impacts associated with the location decisions of most businesses (commercial, service providers and some light industrial), and few planning reasons why they could not be co-located in a business zone (PC 2011b, 2014d). It is hard to see why 'bulky goods premises' and 'hardware and building supplies' should be treated separately for planning regulation purposes, for example.

Box 3 New South Wales' zoning system

New South Wales has eight overarching zoning categories to which land must be allocated for development purposes — rural, residential, business, industrial, special purpose, recreation, environment protection and waterways. Each of these categories contain subcategories that specify particular land use purposes, or types of allowed activity. There are 35 subcategories in all.

State legislation sets out for each zoning subcategory the objectives for development, the developments that may be carried out without development consent, development that may be carried out only with development consent, and development that is prohibited. Local Governments apply these in developing local plans ('Local Environment Plans') for their areas, and may add to the list of development that is permitted or prohibited in a zone, subject to approval by the Minister.

For example, the NSW *Standard Instrument* — *Principal Local Environmental Plan* provides in respect of 'Commercial Core' zones, one of eight business zone subcategories:

- that their objectives are to: provide a wide range of retail, business, office, entertainment, community and other suitable land uses that serve the needs of the local and wider community; encourage appropriate employment opportunities in accessible locations; and maximise public transport patronage and encourage walking and cycling
- the following permissible developments with the consent of Local Governments: child care centres; commercial premises; community facilities; educational establishments; entertainment facilities; function centres; hotel or motel accommodation; information and education facilities; medical centres; passenger transport facilities; recreation facilities (indoor); registered clubs; respite day care centres and restricted premises.

For Commercial Core zones, the Sydney Local Environment Plan 2012 (for the city of Sydney):

- includes as a further objective the promotion of land uses with active street frontages
- specifies the following additional land uses that may be permitted with its consent: Backpackers' accommodation; Horticulture; Light industries; Sewage reticulation systems; Waste or resource transfer stations; and other development
- includes a lengthy list of prohibited land uses.

The Commercial Core zone does not apply to the Sydney CBD but applies in other centres within the City of Sydney Local Government area.

Local environment plans also specify parameters for development in accordance with high-level standards set by the State Government, including with respect to the height of buildings (for example, to ensure they are appropriate to the condition of the site, promote amenity and the sharing of views) and the floor-space ratio of buildings (aimed at providing sufficient floor space to meet development needs for the foreseeable future, regulating the density of development and land use intensity, controlling traffic, and ensuring that new development reflects the desired character of the locality in which it is located).

Local Environment Plans may also include specific requirements desired by the Local Government. The Sydney Local Environment Plan, for example, provides that development consent must not be granted to the erection of a new building or external alterations to an existing building unless the consent authority is satisfied that the proposed development shows a high standard of architectural, urban and landscape design.

Sources: Standard Instrument — Principal Local Environmental Plan (NSW); Sydney Local Environmental Plan 2012.

For development proponents, the prescriptiveness and differences in treatment of land uses at the local level can lead to different treatment of the same types of land use across council areas.

For example, in South Australia, the 'light industry zone' in the Mount Barker council areas allows 'light industry, service industry, store and warehouse land uses with ancillary commercial land uses' (SADPTI 2016b, p. 171), whereas in Mitcham council, the light industry zone allows 'industries that manufacture on a small-scale and that do not create any appreciable nuisance or generate heavy traffic' (SADPTI 2016a, p. 198). For the 'residential' zone type in Western Australia, the city of Fremantle permits 'aged or dependent persons dwellings' but 'nursing homes' (the most similar use) in nearby Rockingham are prohibited (WADP 2016, 2017a).

The large format retail industry, which sells bulky goods, noted the varying treatment of its type of business in local planning policies in New South Wales, and the lack of flexibility created by the prescriptiveness of allowed activity:

LFR uses generally fall under the land use definitions for 'Bulky Goods Premises', 'Hardware and Building Supplies' and 'Garden Centres'. There is often subjective and varying treatment of these land use definitions in Local Environmental Plans, creating uncertainty as to whether particular developments would qualify as a LFR use. The existing definitions also lack sufficient flexibility to encourage innovation in the retail sector. The lack of flexibility is emphasised by the fact that the definition for 'Bulky Goods Premises' requires LFR operations to involve the sale of bulky goods that require large area for handling, display or storage and direct vehicle access for customer loading purposes. All other Australian jurisdictions only require either 'arm' of the definition to be satisfied ... (LFRA 2015, pp. 11–12)

This contrasts with the experience of the industry in Victoria:

In Victoria, LFR is included within the land use definition 'Restricted Retail Premises' which incorporates both product-based characteristics of the merchandise sold, as well as their physical characteristics. The Victorian system also permits 'Restricted Retail Premises' as an 'as-of-right' use in its commercial zones, which provides certainty and encourages investment. (LFRA 2015, p. 12)

The current orientation of planning systems towards controlling specific types of development means that greater regulatory prescription is required to recognise new types of business or community activities, and is the only means by which Local Governments can give effect to specific objectives for their areas.

The logic of current systems is thus one of increasing regulation over time, with the potential for inconsistent or perverse outcomes inherent given the scope for fine distinctions to be made between types of developments based on particular councils' preferences. In its 2013 attempt to reduce the number and restrictiveness of zoning categories, the NSW Government noted: 'there is diminishing justification for retaining an extensive list of zones that separate and restrict complementary (land) uses that fall within the same broad category' (NSW Government 2013, p. 94).

Tasmania's and South Australia's reforms are seeking to reduce the degree of local variations. At the time of writing, the new regimes had not yet been tested on this element.

By creating barriers to entry and diversification, zoning classes and the prescriptiveness of permitted land uses can also limit productivity improvements in, and competition between, businesses. This ultimately results in higher prices and/or poorer quality and ranges of goods and services for the community (ACCC 2014; Harper et al. 2015; Henry et al. 2009; PC 2011b, 2011a, 2014d). Restrictions on competition can particularly affect outer suburbs, where reduced accessibility to goods and services can reinforce social disadvantage (Leigh and Triggs 2016).

Policy settings that have especially egregious impacts on competition include the creation and enforcement of activity centres (PC 2011b, 2014d), and regulations that require consent authorities to consider the effects of development proposals on established businesses. Activity centre policies set out the types of activities (such as residential, retail, commercial and industrial activities) that are permitted in the core of the centres, as opposed to the periphery or outside. Both types of policies are used to protect shops and shopping centres in designated areas from competition. A typical complaint from a development proponent:

ALDI met with Blacktown City Council's Strategic Planning Unit in February 2012 to discuss the potential for a spot rezoning of the Glendenning site ... Council considers that the site is not appropriate for an ALDI store on the basis that there is potential for adverse impacts to the nearby North West Growth Centre land release precincts of Schofields and Colebee and existing nearby village centres of Woodcroft Plaza and Plumpton. (ALDI Stores 2014, p. 12)

A need to reorient zoning systems towards promoting overall community interests

The need for restrictions should be evaluated taking into account the interests of the community as a whole. This will require a reorientation of the regulatory approach in most States.

Sound regulatory design also suggests that zoning frameworks should provide as much flexibility as possible in how land is used. Fewer land use zones with broadly stated allowable uses would:

- allow new and innovative firms to enter local markets and existing firms to expand, as well as providing greater flexibility to adjust to changing business activities and community preferences
- enable genuinely incompatible land uses to remain separated, but provide scope for complementary uses to develop and compete. Such a move would likely increase options available on where to live and work
- reduce the scope for arbitrary distinctions between activity types at the Local Government level

• as the NSW Government has noted, minimise the need for spot rezoning, which would in turn reduce costs, delays and investment uncertainty (NSW Government 2013).

The scope for inconsistent decisions would also be reduced by a requirement that all governments transparently take into account the costs as well as benefits of proposed development restrictions from the perspective of their communities as a whole.

The Harper Review recommended governments take into account several matters to help ensure that zoning rules and development decisions reflect the interests of consumers and the broader community, including that:

- arrangements that explicitly or implicitly favour particular operators are anticompetitive
- the following are not relevant planning considerations: the impact on competition between individual businesses, the impact of proposed developments on the viability of existing businesses, proximity restrictions on particular types of retail stores, restrictions on the number of a particular type of retail store contained in any local area, and proximity restrictions on particular types of retail stores (Harper et al. 2015, p. 45).

Estimates indicate that the potential benefits of rationalising zoning systems are significant. In a 2013 report commissioned by the NSW Government, The CIE (2013) estimated the potential economic benefits from reduction in land use restrictions for Sydney alone could be in the order of \$8 billion to \$16 billion, which in annualised terms is equivalent to \$665 million to \$1.3 billion per year.²

CONCLUSION 10.1

State, Territory and Local Governments should move to fewer and more broadly-stated land use zones to allow greater diversity of land uses. Such a move is likely to make it easier for new firms to enter local markets and for existing firms to expand, reduce administrative and compliance costs, and enable planning systems to more flexibly respond to changing land use activities.

Governments should apply competition policy principles to land use regulation and policies, which oblige consideration of the impacts of policies from the perspective of communities as a whole.

Regulation that explicitly or implicitly favours particular operators and sets proximity restrictions is unjustifiable.

² Annualised for a period of 30 years at a real discount rate of 7 per cent. This reflects estimates of land value premiums and how quickly these premiums are reduced as land is rezoned.

3 Planning and provision for growth

Urban growth strategies set out how projected population growth will be accommodated, including where new developments or land uses are likely to be required, and policies to achieve community-level objectives. In many jurisdictions, independent bodies have been established to implement urban growth strategies, such as the Greater Sydney Commission and the Victorian Planning Authority.

The viability of new growth areas depends on, among other things, the efficient provision of public infrastructure services, especially transport, which provides connections to established employment, education and health services and retail opportunities (SGS Economics & Planning 2013), and adequate provisioning for diverse land uses and the public amenities that help make those areas desirable places to live. Provisioning is also important given that these features are often hard to retrofit due to costs associated with demolition and interruptions to activity.

Similarly, growth within established city footprints is affected by the extent of provisioning for population growth, such as through the preservation of land for future transport services, and the extent to which plans for greater density include other changes to reduce any negative impacts on residents' lifestyles and amenities (box 4).

Box 4 **Provisioning for growth**

A recent study by Infrastructure Australia (IA) suggested that the protection and early acquisition of seven transport corridors identified in IA's 2016 Infrastructure Priority List could save Australian taxpayers \$10.8 billion (real discounted 2016 dollars) in land purchase and construction costs, and costs associated with disruption when infrastructure is built within developed areas.

On amenity, the Sydney Green Grid strategy provides for joint council and State Government funding of projects that will help to create a network of public green spaces across greater Sydney as the city grows. An example is the Metropolitan Greenspace Program, overseen by the Greater Sydney Commission, which matches funding contributions from local councils to improve open spaces for recreational purposes and to create links between bushland, parks, waterways and centres.

The Victorian Government provides guidance to local councils on preparing an 'open space strategy' but does not provide an overarching green growth strategy for the broader metropolitan area, as each local council is responsible for preparing, implementing and funding its own open space strategy. Some inquiry participants raised concerns that a lack of a strategy for the broader metropolitan area would reduce the likelihood of such amenities being provided.

Sources: Australian Government (2016); IA (2017); Stokes (2016); VDELWP (2015).

The effective implementation of growth strategies at the overarching city and metropolitan levels also relies on the coherence of planning strategies across State and Local Governments and efficient processes for approving developments. This section considers issues raised particularly in relation to new growth districts, and the coherence of State and local planning strategies.

Infrastructure for new growth areas

Infrastructure Australia has noted that State and Territory Governments have made progress in integrating transport services and corridors into long-term strategic plans, but that further action is required to translate these strategic plans into productive infrastructure (IA 2017). A common challenge has been securing required funding. There seems to be some room for improvement in one of the means by which infrastructure is funded, namely development contributions.

Development contributions are upfront contributions that property developers make to State or Local Governments or authorities for community facilities and infrastructure on land they develop. This can be in the form of land transfer ('gifted' to the government), work-in-kind (works constructed and transferred to public authorities), or financial payments (developer charges covering the cost of infrastructure or land provision) (PC 2014c).

There are established principles for the levying of development contributions, including that developers should only contribute to costs and structures that are clearly attributable to the properties being developed, that new residents should not be levied for the capital costs of the facility through council rates and utility charges, since the cost is passed through to them through the purchase price, and that charges should reflect only efficiently incurred costs (see, for example, PC (2004, 2014c)).

There is scope for greater use of market testing of infrastructure costs to help ensure that charges are efficient.

Most jurisdictions have developer contribution systems, where infrastructure is provided by the property developer within a budget set by the Local Government. In New South Wales, for example, the local contributions system allows local councils to set the scope and price for local infrastructure such as roads and open space embellishment without cost rates being specifically market-tested. The developer must agree to provide the infrastructure at the specified price, which provides that any savings in the work can be captured by the developer at the expense of other developers (IPART 2017). Some councils in New South Wales do test the market to inform the costing of local infrastructure requirements, for example, Blacktown Council, but this is not the norm.

Queensland imposes a cap on developer charges, and permits developers to receive a refund for the cost of trunk infrastructure when its costs exceed the council's infrastructure charge (QDILGP 2014, 2017b; QDSDIP 2012). The Local Government Association of Queensland (2014) has raised concerns that this can lead to significant under-recovery of costs. It asserted that Queensland's cap led to a shortfall between developer contributions and the cost of providing essential infrastructure of about \$480 million annually.

Requiring the adoption of a general practice of market testing of services and costs, where cost effective, could improve the infrastructure provision, including by increasing the

potential for discovering innovative solutions and providing better assurance that value for money is being received.

In addition to developer contributions, value capture mechanisms have also been suggested as a way of helping to fund new infrastructure (for a critique of these mechanisms, see the discussion in (Terrill and Emslie 2017)). The complexity of administering value capture in practise has meant that it has not been used in Australia in recent decades. Value capture mechanisms also tend to raise only a small portion of project funding costs.

Alignment of Local and State Government development strategies

As noted, there are concerns in several jurisdictions about the consistency of State and Local planning strategies and decisions.

The scope for misalignment arises from several sources, including different visions for urban areas, particularly how they might accommodate population growth; the scope and sometimes the necessity for interpreting how State strategic plans and statutory planning requirements are to be applied at the local level; and the discretion and authority of Local Governments to determine local land uses in accordance with their particular preferences.

A review of practise suggests that: i) genuine consultation, ii) better guidance from States on their strategic objectives for cities and assumptions for growth, and iii) more mechanical linking of local and State plans would help mutual understanding and alignment of goals.

Consultation and engagement

Better practise on the development of planning strategies includes metropolitan strategic plans being developed with the input of local councils and communities, with State Governments making genuine efforts to involve residents at both the metropolitan and local levels. Equally, there is reliance on councils to actively engaging the community and higher levels of government in their own planning processes. A further good practise feature is the nature and degree of consultation being held in proportion to the scale and scope of likely impacts (CIE 2013).

As noted earlier in this paper, community consultation on planning strategies is perceived as cursory in several jurisdictions. As examples, Local Government representatives in South Australia considered that the 30 Year Plan for Greater Adelaide 'was launched on a public that had missed the start of the conversation and was expected to take a leap of faith to board the urban renewal train.' (Kelly and Donegan 2015, p. 139). Several parties noted considerable community concern about the discretion of Queensland councils to make amendments to local planning schemes that are considered by them to be of a minor nature without public consultation or State Government review (QEDO 2017; QDILGP 2016b, p. 7; Toowoomba Regional Council 2016).

An example of good practice in consultation at the local level is Western Australia's approach of engaging the community on the nature of specific developments. For example, the State has established an advisory group representing residents, business owners and environmental groups to provide input on road extensions proposed in the State's Scarborough Master Plan (WAMRA 2016).

On local leadership, recent work by the Commission into transitioning regional economies (2017) suggests that more successful communities are led by individuals who take an active role in identifying strategies for how to best facilitate development. Local leadership was exemplified in the case of Stawell (Victoria), where the Local Government took a lead role in seeking ways to redevelop and repurpose a gold mine for use as an underground physics laboratory. By engaging the community and working in partnership with the Victorian and Australian Governments, Stawell was able to find a new source of economic growth that built on its existing strengths and resources (PC 2017, p. 135).

Guidance from States

In some cases, councils are seeking, or may benefit from, clearer guidance from States on their planning goals and desired outcomes so as to allow these to be more closely reflected in local development plans, and to support more effective community engagement in planning processes (box 5). As a practical matter, this may be necessary to achieve objectives where there are doubts as to the capacity of Local Governments to fulfil their legislative responsibilities.

A common cause of tensions is proposals to increase the density of housing in existing urban areas close to services, transport and workplaces (notably, a survey conducted by Kelly et al. (2011) found a majority of people in capital cities would not like their neighbourhood population to increase).

Box 5 Ease of integrating State and Local plans

- Pugalis and Tan reported that councils believe the Tasmanian and Western Australian planning systems lack clear State level policy frameworks, which limits the ability for Local Governments to plan strategically. Councils in those States reported they felt like they are 'working in a vacuum' due to the lack of an economic development strategy or guidance on population growth patterns.
- In a report for the Property Council of Australia following a workshop involving leaders in planning and housing at all levels of government, academia, and private sectors, Deloitte Access Economics noted that:

A number of participants indicated a belief that a lack of clarity and direction in State strategic plans were causing excessive assessment effort at the Local Government level as councils sought to meet their, sometimes unclear, requirements ...

Participants opined that strategic plans were typically light on specific details that would assist councils in understanding how particular land was to be developed. This was seen to place the risk of assessment back onto councils who were left to interpret how a development was to be assessed, for example, when subject to multiple overlays.

- The Victorian Auditor General has noted that, while 'local planning schemes allow a clearly expressed strategic vision through their municipal strategic statements, ... the state's planning framework the VPP [Victoria Planning Provisions] has no strategic vision to help integrate and prioritise its nine policy themes and over 87 policy objectives or connect it to the strategic state and regional priorities, such as those identified in *Plan Melbourne* (2014)'.
- The Commission's study on transitioning regional economies noted concerns by the Upper Spencer Gulf Common Purpose Group and Northern Tasmania Development Corporation about lack of coordination in strategic planning across levels of government. This was considered to lead to fragmented planning efforts and a lack of community faith in planning processes.

Sources: NTDC (2017); PC (2017); USGCPG (2017); VAG (2017, p. vii); DAE (2016, p. 21); Pugalis and Tan (2016).

The experience of successful urban renewal programs (see for example, Kelly and Donegan 2015; SGS Economics & Planning 2014) suggests potential gaps in strategy development and/or communication with respect to policy goals, which may be more usefully debated as being the management of population growth, rather than population levels per se. This approach encourages consideration of costs, benefits, and different ways that tradeoffs can be managed. A feature of urban renewal plans in areas of Canada, for example (viewed as exemplary by some), was accompaniment of increases in density with the provision of high quality amenity and public spaces (box 6 describes Vancouver's experience).

Box 6 Urban renewal programs in Vancouver

Vancouver took a highly inclusive approach to strategic planning, which has been noted around the world for its involvement of citizens in building a shared vision for the city.

In the 1990s, Vancouver directly engaged more than 20 000 of its residents in the development of its CityPlan. Residents were initially consulted on the direction and objectives of the city, and were provided a number of growth strategies to deliberate, with trade-offs involved in choosing the different paths made clear. Following this process, residents were engaged at the local level, and the plan progressively developed over four years. A key element of the consultation process was that city officials and planners did not provide a preferred option and consensus was not sought.

The pros and cons of different growth strategies were presented to residents. For example, each neighbourhood was told that the larger the population supported by more dwellings, the bigger the neighbourhood's contribution to government tax revenue and the larger the distribution it would receive to improve the area with community amenities such as libraries. Working with developers and builders, residents frequently opted to get more of the amenities they valued by allowing some buildings to be even higher than required for the area's housing targets.

The planners recognised the need for people to understand that growth could provide benefits. The city is now experiencing reduced commute times in spite of an increase in the city's population.

Source: Kelly and Donegan (2015, pp. 157–158).

Industry groups and other observers have also raised the need for clearer direction on the application of planning instruments by most States and Territories, noting that the necessity for interpretation is a source of avoidable variation in local planning rules (PCA 2015). For example:

- for development application assessments in Western Australia, councils only need 'have due regard to' approved State planning policies 'to the extent that, in the opinion of the Local Government, those matters are relevant to the development' (WADP 2017b). Some councils in Western Australia consider this does not provide sufficient guidance for them to plan strategically (Pugalis and Tan 2016)
- developers in Tasmania have found the State's dwelling code to contain numerous exclusions, which makes it difficult to determine its application, and is subject to different interpretations by local councils (PCA 2015)
- New South Wales currently has 50 State Environmental Planning Policies (SEPPs) (including deemed SEPPs) that specify planning controls for certain areas and types of developments. It is sometimes unclear why and how SEPPs apply. For example, State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, which has the aim of establishing an assessment process for certain mining and petroleum developments is applicable to the Ryde council area, but its relevance is unclear, with Ryde being a highly urbanised residential and commercial Sydney district. The Government is currently reviewing all SEPPs with a view to streamlining them and ensuring their relevance (NSWPE 2016)

 the Victorian Auditor General recently found that a number of Local Governments had prohibited medium-density housing development in areas that the 2013 State Planning Policy Framework had designated as permitting. Local Governments have also created 153 local variations to the new residential zones introduced in 2013, resulting in local schemes being inconsistent with the objectives of the State planning policies and adding unnecessary complexity in planning schemes. The Auditor General has suggested that the State Government needs to provide more guidance and training to Local Governments to support its reforms (VAG 2017).

Notwithstanding that development strategies and proposals are often contentious, there appear to be few consequences for Local Governments that do not ultimately seek to implement State-level policies.

For example, several councils in Victoria have not met local planning statutory review obligations, with some lagging for as long as seven years (VAG 2017). While State ministers generally can influence local planning schemes by imposing conditions when councils submit their plans or amendments to plans for approval, such as changes in height controls or rezoning, the effectiveness of this process relies on enforcement. One legal firm with expertise in urban planning processes reported that local councils in New South Wales do not always apply State conditions, and lack of enforcement is leading to complacency:

Sometimes local councils respond to 'soft power' by pretending to agree, but ensuring efforts are frustrated in the fine detail of plans, policies and approvals. Other times, local councils engage in overt acts of defiance that, in the past, have often gone unanswered by state authorities ... Regretfully, in our experience, gateway determination obligations [State conditions or variations to council proposals to change local planning controls] are routinely breached by local councils. A local council is breaking the law if it breaches its obligations under a gateway determination, however it is difficult (if not impossible) to enforce these obligations in the courts. The (past) lack of enforcement means that gateway determination obligations are frequently not taken seriously by local councils. (Gadiel 2016)

More significant interventions by States — such as calling in developments, or substituting a State body as the planning authority — are, understandably, not often used (Gadiel 2016; PC 2011b). In the first instance, it would seem sensible for State Governments to better engage with local councils, clarify requirements under existing regulations, where needed, and enforce compliance.

Overall, the Commission considers that State planning policies should provide clear guidance on how Local Government strategies should be developed, including specification of policy priorities, preferred methods for achieving them, and that make clear the relevance of State planning policies to which local council must have regard. Guidance should include a clear hierarchy for State and local plans.

This would help to ensure that State policy goals and standards are delivered, reduce the time and the degree of contention involved in setting local plans, and provide greater regulatory certainty to development proponents. Clearer guidance to Local Governments

on States' strategic plans and the application of planning policies will also help to ensure better accountability for decisions at each level of government. In turn, this will facilitate the more efficient resolution of legitimate community concerns and transparent decision making.

Linking of local plans to changes in State policies

In New South Wales, Victoria, Queensland and Western Australia, statutory review periods for local plans are not linked to major State policy changes. At best, local planning schemes are required to be reviewed every four to five years. As part of its ongoing reforms, New South Wales has proposed a legislative requirement that local councils check their local plans every five years to determine if they are still appropriate and fit for purpose (NSWDPE 2017a).

CONCLUSION 10.2

The viability of new growth areas depends on, among other things, provision in growth strategies for the development and delivery of infrastructure and public amenities.

The effective implementation of growth strategies, especially in established urban areas, relies on the coherence of planning strategies employed at State and Local Government levels.

Particular causes for concern are avoidable conflicts between governments on their development objectives, which arise partly due to lack of mutual consultation and the lack of guidance from States on the application of their specific policies. These create risks that development strategies will not be realised, or come at a significantly higher cost.

IMPROVEMENTS WOULD INVOLVE:

- both State and Local Governments genuinely engaging with each other and local communities on the alternatives and implications for meeting development goals, and the different means by which impacts can be managed
- State planning bodies providing clear guidance on how Local Government strategies should be developed, such as through specification of policy priorities, preferred methods for achieving them, clarity on the relevance of State planning policies to which local council must have regard, and the accountability mechanisms applicable in instances of noncompliance
- the establishment of a clear hierarchy for State and Local plans
- governments ensuring adequate provisioning in growth strategies for infrastructure and public amenities, such as public recreational and 'green' space, given that these features are often hard to retrofit.

4 Streamlining development assessment systems

The leading practice model for development assessments (DAs), developed by a group comprising representatives from all levels of government and industry (the Development

Assessment Forum) in 2005, is based on the notion that the degree of scrutiny of applications should reflect the level of risk the development poses.³

The model provides for categorisation of development applications into assessment 'tracks' that correspond to the level of impact, hence assessment required, to make an informed decision. The assessment tracks include (in order from least to highest impact): exempt, prohibited, self-assess (self-assessment by the applicant against clear quantitative criteria), code assess (where the assessor considers the proposal against objective criteria and performance standards), merit assess (expert assessment against complex criteria) and impact assessment (for proposals that may have significant impacts on surroundings) (DAF 2005; PC 2011b).

The types of developments that can be fast-tracked vary between jurisdictions. For example:

- New South Wales has a 'complying development' track, which is a fast track assessment process involving combined planning and building approval for proposals deemed low impact (such as property extensions up to two storeys)
- Victoria has a 'VicSmart' 10-day assessment track for low-risk local developments, which has recently been expanded, but no self-assessment track (PC 2012)
- in Western Australia, fast-tracking is only possible for residential dwellings. Recent reforms have introduced development approval exemptions for compliant residential dwellings
- in South Australia, 'complying developments' are those considered to have a low impact on the local area and an assessment authority cannot withhold approval if all criteria necessary for the development to comply are met
- Tasmania provides for a 'no permit required' status for single dwellings that comply with development standards in the General Residential Zone
- Tasmania, the Northern Territory and the ACT provide zone use tables, which specify the assessment tracks for different developments within any given zone.

Some jurisdictions provide flexibility for assessment authorities to require less information (for example, Victoria) and Queensland encourages pre-lodgement discussions. A 2015 report by the Property Council of Australia (PCA) (2015) ranked the Northern Territory and the ACT as particularly well-performing jurisdictions in terms of their more specific track assessment frameworks.

³ The Development Assessment Forum (DAF) was formed in 1998 to reduce the length and complexity of DA processes. It developed a 'Leading Practice Model', which was endorsed by State and Territory planning ministers in 2005 (PC 2011b). The DAF was established following the Report of the Small Business Deregulation Taskforce recommendations in 1996 for governments to change its DA processes (DAF 2014).

Most jurisdictions have made progress in further adopting fast-track assessment systems over the past five years (box 7).

These reforms have led to efficiency improvements in DA processing across jurisdictions. The mean time taken to process the majority of DAs has reduced from an average of 282 days (for about 60 per cent of all DAs) for the period 2009–2012 (Cordell Information in PC 2014a) to between 48-76 days between in 2012–2015 (table 1). A World Bank report (2017) noted that Australia, proxied by Sydney, had made notable improvements in the time taken to process construction permits.⁴ Australia ranked 2nd in the world on this measure in 2017, compared with 63rd (out of 183 countries) in 2011 (World Bank 2011).

Table 1 Time taken to process development applications Select States and Territories

Jurisdiction	Average gross days taken	Year
New South Wales ^a	71	2014-15
Victoria ^b	115	2014-15
Queensland ^c	72	2011–2012
South Australia ^d	52–66	2014-15
ACT	41-57	2014-15

^a Excludes complying development certificates. ^b Inclusive of weekends and public holidays. ^c This average refers to business days and pre-dates the reforms referred to in this report. ^d Median number of calendar days for category 3 merit assessments, which require publication of a general public notice.

Sources: ACT (2017); NSWDPE (2016); QDSDIP (2013); SADPTI (2015); VDTPLI (2017).

There is nevertheless room for further progress in most jurisdictions. A common theme across jurisdictions is that, where streamlined track-assessments exist, approval times vary between local councils. For example, in Victoria, Melbourne City Council took 74 days to process DAs, whereas Frankston City took 96 days (Victorian Government 2017). These differences may reflect in part differences in the capacities of Local Governments (PC 2011b), as well as the relative complexity of different development types.

⁴ Measured by the procedures, time and cost to complete all formalities to build a warehouse. The reported improvements included streamlined procedures and improved coordination among agencies involved in the process (World Bank 2017).

Box 7 Development assessment processes – recent reforms

The **NSW Government** has made ongoing refinements to the NSW Housing Code exempt and complying development assessment pathways for local developments. These changes have increased the number of fast-tracked development applications or complying development certificates (CDC) from 23 per cent in 2011-12 to 32 per cent in 2014-15 of all development applications and CDC determinations. A new Housing Code effective from July 2017 further simplifies planning rules for complying developments, including one and two storey homes and renovations.

The **Victorian Government** introduced a streamlined process for low-risk local developments, such as simple sub divisions, extensions and building works called 'VicSmart' in September 2014. The key features of 'VicSmart' include a 10 day permit process, non-advertising of applications, a requirement that developments must be located in a specified zone or overlay, and the CEO of the Local Government or delegate deciding applications. The streamlined assessment process was extended in March 2017 for building and works up to \$1 million in industrial areas, building and works up to \$500 000 in commercial areas and a range of low impact developments in rural areas.

The Victorian Government introduced a Smart Planning program in July 2016 aimed at making the planning system easier to understand and more efficient through simpler rules and modern digital tools.

The **Queensland Government** created the State Assessment and Referral Agency (SARA) in 2013. SARA is a single lodgement and assessment point for State development proponents where the State has jurisdiction as assessment manager or referral agency. The Queensland Government's new planning legislation (2016) further changed the legislative instrument governing DA processes from primary to subordinate legislation to allow the system to be more responsive to changes. Reforms reduced the categories of development from five to three, instituted new decision rules for both code and impact assessable applications, and new tools for applicants.

Western Australia and South Australia have committed to establish further track-based development assessment paths, but they are as yet to be implemented. Reforms to date have, amongst other things, focused on the role of expert panels. The Western Australian Government has established and refined the role of Development Assessment Panels to include professionals in the determination of applications for substantial projects at the local level. The South Australian Government established an independent State Planning Commission to act as the State's planning advisory and development assessment body. Part of the Commission's role is to oversee the new Council and Regional Assessment Panels. Similar to Western Australia, these panels mostly comprise accredited professionals.

The **Northern Territory Government** further streamlined its development approval process in 2016 for 'low risk, low impact' development, such as minor commercial additions. This amendment reduced regulatory burden and unnecessary delays as previously minor development proposals required consent through a full planning approval process.

Sources: NSWDPE (2016, 2017b); Northern Territory Government (2016); QDILGP (2016a); WAPC (2014); SADPTI (2017a); VDELWP (2016, 2017c).

A 2016 study suggests that for large or high-value residential projects, where the State planning department is responsible for assessing the DA, there are more speedy response times than where councils make the decision (Shoory 2016). For example, in Victoria, the Minister for Planning is responsible for assessing large-scale projects in the City of Melbourne with a floor space exceeding 25 000 square meters, which has partly

contributed to strong growth in inner city apartments. In Brisbane, it is a large Local Government — the Brisbane City Council — that generally has assessment responsibilities for development within the central business district, and its application of a code-assessment framework to large developments has contributed to apartment growth. In contrast, in areas where the DA process is handled by local councils, with their own specific overlays and zoning restrictions (such as in inner and middle suburbs of Sydney and Melbourne), the approval process is often slower and housing supply takes longer to adjust.

Ideally, DA processes would allow for genuine third party interests to be factored into decisions while minimising the scope for inefficiency. The Development Assessment Forum model recommends that third-party appeals should only be provided in limited cases, and not provided where applicants are assessed against objective rules and tests (DAF 2005).

The approaches of jurisdictions on this matter differ, and are worth assessing against the model's recommendations. For example, Victoria's planning system is more open to third party reviews than other jurisdictions. A higher proportion of planning decisions in Victoria are thus reviewed. In 2014-15, 22 767 of 57 297 permit applications received (39 per cent) were advertised to third parties and 2292 (4 per cent) were subject to review by Victorian Civil & Administrative Tribunal (VCAT) (VDTPLI 2017). In New South Wales, third party objectors must have a 'relevant interest' in the development. In 2014-15, reviews and appeals accounted for 761, or less than 1 per cent, of the 106 077 permit applications received (NSWDPE 2016).

In its 2013 White Paper on planning reforms, the NSW Government proposed that 80 per cent of all DAs should be subject to the fast-tracked approval pathways of either complying developments (proposals deemed low impact that can be approved upon satisfaction of set criteria, such as property extensions up to two storeys) or code assessment (other proposals that could also be approved through set criteria) (NSW Government 2013).

Following the failure of reforms to pass the NSW Parliament, the Government has decided to not pursue code-assessment as a pathway and instead committed to ongoing improvement of the complying development track — an assessment pathway for proposals deemed low impact (such as property extensions up to two storeys). In 2011-12, the proportion of complying developments as a proportion of all DAs was 23 per cent. In 2014-15, this was 32 per cent. A report commissioned by the NSW Government estimated that the benefit of original reforms would be worth between \$358 million and \$550 million per year in reduced risks associated with developments and avoided costs of delay and documentation (CIE 2013).⁵

⁵ An earlier report commissioned by the NSW Government estimated that changes to New South Wales' DA processes from the reforms in the NSW White Paper on planning reforms would be \$174 million per year in avoided costs of delay and documentation (Deloitte 2012). The difference between this and the
CONCLUSION 10.3

There have been improvements in development assessment processes in all jurisdictions but there is still room for improvement in most.

5 Stamp duties

Stamp duties are transaction taxes levied by States and Territories, including on the sale or transfer of land and the sale or transfer of business assets. They are levied on an *ad valorem* basis, such that the rate of duty imposed increases with the value of the property, and are paid by property purchasers.

Stamp duties on residential property add to the price of houses, and can discourage people from moving to locations that may be closer to preferred jobs, family networks and schools (PC 2014b). This can result in increased commuting times and costs (Henry et al. 2009) and the potential effects on mobility become more accentuated the greater are the frictions of moving between work and home. Stamp duties on commercial property further discourage businesses from investing in existing land and capital, and stamp duties on residential property can discourage people from downsizing and encourage overinvestment in upgrading property. All of these factors result in the retention of land for relatively unproductive purposes.

In Sydney, stamp duty on residential property for the median house and unit price as of May 2017 of \$1 198 650 and \$762 590 was \$51 419 and \$29 807 respectively (CoreLogic 2017).⁶ This represents 4.3 per cent and 3.9 per cent of the purchase price, respectively.

The impacts of these costs on community welfare are significant. One study found that a 10 per cent increase in stamp duty lowered housing turnover by 3 per cent in the first year, and by 6 per cent if sustained over a 3 year period (Davidoff and Leigh 2013). Another study in the United Kingdom found that, when stamp duty on housing transactions was suspended for 16 months on lower value transactions (in response to the global financial crisis), there was an 8 per cent increase in property transactions (Besley, Meads and Surico 2014).

Recent Australian Treasury modelling estimated that each additional dollar collected by way of stamp duties reduces the living standards of Australian households by 72 cents in

CIE report was that the earlier report did not incorporate an estimate of the costs of excessive risk arising from the NSW planning system , which CIE estimated at between \$221 million and \$305 million per year.

⁶ Stamp duty on residential property assumes the purchaser is not a first home buyer, who may be exempt, or a 'foreign purchaser', who faces a different rate.

the long-run due to the lower investment and mobility effects (Australian Government 2015).

Stamp duties on the transfer of residential and commercial property also are a relatively volatile revenue source. Stamp duties presently represent the single largest revenue source in most jurisdictions yet receipts depend on activity in property markets and are highly vulnerable to economic cycles.

Recognising the economic costs of stamp duties, South Australia recently started phasing out stamp duty for all non-residential, non-primary production land from July 2016, with the aim of completely abolishing these duties by July 2018 (Revenue SA 2016).

New South Wales abolished duty on the transfer of business assets and declarations of trust over business assets (other than land) from 1 July 2016. The Victorian Government announced the abolition of stamp duty for first-home buyers who buy a home with a dutiable value of \$600 000 or less and a concessional rate of duty to \$750 000 from 1 July 2017 (although this was predominantly for housing affordability reasons).⁷

The ACT, most notably, has moved from stamp duties to greater utilisation of its property-based taxes (discussed below).

A shift from stamp duties to taxes based on land value

Taxes based on land values avoid the imposition of penalties for moving, and the inequity of tax burdens falling disproportionately on those who choose to move, whether for work or lifestyle reasons.

In contrast to stamp duties, broad based taxes based on land value have a low economic cost because land is immobile and cannot be moved or varied to avoid tax (Australian Government 2015). Tax revenue is also more stable because it is not as exposed to the volatility of the housing market.

The Grattan Institute estimated that shifting from replacing stamp duties in all States with a broad based land tax could add \$9 billion annually to GDP (Daley and Coates 2015). The majority of benefits would accrue directly to those jurisdictions from a more productive workforce and the more productive use of land.

Practical considerations

The ACT Government's move illustrates the feasibility of the proposed shift in tax bases, although its task is somewhat more straightforward as both the rating and taxing authority

⁷ The dutiable value of a property is the market value or purchase price less any deductions such as the off-the-plan concession.

for the territory. State Governments and the Northern Territory Government would need to use an alternative to rates-based reform. Moving from stamp duties to taxes on the (unimproved – as discussed below) value of land for all properties (similar to a rating system) would seem to be a sound option.

Indicative calculations suggest that a switch from stamp duties to land taxes based on an assumption of revenue neutrality would result in relatively low land tax rates (box 8).

Box 8 Broad-based land tax rate

The 2011 NSW Financial Audit proposed two alternative methods for transitioning from transfer duty to a land tax. The first scheme proposed a transition from transfer duty to an annual Stamp Duty Replacement Tax (SDRT) levied on the value of all land. The report proposed rates of the annual SDRT of 0.75 per cent of the unimproved land value of properties with land value less than \$775 per square metre and a marginal rate of 1 per cent on land value above this threshold. These rates were estimated to ensure the present value of SDRT payments would equate to the transfer duty that would otherwise have been paid.

The other approach proposed a transition away from transfer duty to SDRT on all properties at a low rate, with gradual increments over time. This is similar to the ACT's scheme. The main advantage of this approach is that budget neutrality can be maintained.

A 2015 report by the Grattan Institute suggested that replacing stamp duties with a levy on unimproved land values would be about 0.4 per cent of unimproved values of all land using Valuer General valuations.

Sources: Daley and Coates (2015); NSW Financial Audit (2011).

The ACT Government's reforms contain the following key elements, from which lessons could be drawn by other governments.

- The phasing out of stamp duties, replacing these gradually (over 20 years) with higher general rates for residents and commercial properties (box 9).
- Inclusion of provisions to not unduly disadvantaging those on low incomes. A Pensioner Rates Rebate scheme provides a concession to eligible age pensioners of 50 per cent on their general rates up to a maximum of \$700. Rebate assistance is limited to a pensioner's principal place of residence (ACT Government 2017).
- A Rates Deferral System allows pensioners and other eligible households to defer all or part of the balance of their general rates. The deferment of rates is also available to property owners receiving unemployment or other benefits, or suffering substantial financial hardship. The deferred amount attracts a low rate of simple interest and is payable on the sale of the property.
- Pursuit of tax reform primarily to achieve greater efficiency, rather than to increase revenue per se (ACT Government 2012).
- The use of unimproved land values as the basis for setting rates (tax), rather than the alternative of Capital Improved Value (CIV). The CIV method bases tax on the

unimproved value of land plus any capital improvements to the land, such as buildings and extensions. Studies suggest taxing capital improvements discourage asset owners from undertaking productive investments (Daley and Coates 2015; Henry et al. 2009; IPART 2016).

A key design consideration in reform, as found by the ACT, is providing for property owners with low recurrent incomes. This matter is considered below.

Box 9 Phasing out stamp duty in the ACT

Tax mix switch

Stamp duty rates on conveyances have been progressively reduced since June 2012, with the aim of phasing out the duty completely over a 20 year period. As part of the reform program, stamp duty on insurance policies were also phased out (and fully abolished in 2016-17). Since the reform program started in June 2012, duty on a \$500 000 property has been cut by 34 per cent. The Territory's 2016-17 budget estimates that, by 2020-21 (the half-way point of the tax reform program), duty on a \$500 000 house will have been cut by 51 per cent.

To replace the loss of stamp duty revenue, the ACT Government increased general rates for both the residential and commercial sectors. In addition, residential land tax (on investment properties) has been made more progressive. Land tax rates were reduced for properties up to \$275 000 in value (attracting, at most, 0.89 per cent), and increased from 1.4 to 1.8 per cent for all properties valued above that threshold. The ACT Government estimated that land tax rates would decrease by an average of \$208 for 76 per cent of properties, while 12 per cent would incur an increase of \$602.

The ACT is somewhat unique in that, as a Territory, the ACT Government can be both the land taxing and general rate levying authority. Thus it could reform the tax mix with relatively little administrative disruption.

In addition to higher general rates, the structure of rates was changed from a flat rate to a two-part marginal rate structure, consisting of a fixed charge of \$555 to all households, and a progressive marginal tax rate linked to land value. Average general rates have increased by about \$452 compared with what they would have in the absence of reform. Increases in the progressivity of the rates system has meant that low-value properties have been less affected by the transition.

Addressing welfare impacts

To address welfare impacts from the new system, the general rates rebate for eligible recipients was increased from \$481 to \$565, and the eligibility criteria for deferring general rates was expanded to include people aged over 65, and land values above \$390 000. As at 2017, eligible households receive up to 50 per cent rebate on general rates up to a maximum of \$700. Households who were eligible for the general rates concession rebate on 30 June 1997 are eligible for the uncapped general rates concession, up to the value of the concession received in 2015-16. The uncapped general rates scheme was frozen at 2015-16 levels from 1 July 2016.

From 1 July 2016, the eligibility criteria for general rates deferral to pensioners is based on the following criteria: aged 65 and over; and the combined income of all property owners must be below the annual average earnings of \$89 300; and the unimproved value of the property must be higher than the 80th percentile value of \$442 000; and property owners must have at least 75 per cent equity in their home. In addition to eligible pensioners, property owners receiving unemployment or other benefits, or suffering substantial hardship, can apply to defer payment of their rates charges.

(continued)

Box 9 Phasing out stamp duty in the ACT (continued)

Impact

The ACT Government estimated that the economic benefit from the reduction in stamp duty would be about \$13.3 million in GSP within the first year of the reform, and provide additional benefits over the transition period.

Since the reform package was introduced in 2012-13, general rates revenue is now the largest component of the ACT's own source tax revenue, at approximately 27 per cent of total revenues in 2016-17 compared with 18 per cent in 2011-12. Revenue from inefficient taxes such as stamp duty on conveyance and insurance policies has declined from 24 per cent of total own source tax revenue in 2011-12 to an estimated 16 per cent in 2016-17. The share is anticipated to decline further as the transition of the tax bases continues.

In general it appears the public is accepting of these changes:

In 2012 the ACT government began phasing out stamp duty over 20 years, and replacing it with higher municipal rates ... The ACT ... opposition campaigned to freeze general rates increases, thereby halting the government's swap of stamp duty for rates. But the (opposition) suffered a 2.6 per cent swing against them, while the vote for the incumbents remained steady. The result shows that the community can be persuaded that general property taxes are better than stamp duties for raising revenues. (Daley and Coates 2016).

Sources: ACT Government (2012); ACT Revenue Office (2017); ACT Government (sub. 41).

A key design consideration – not disadvantaging low income households

A shift to broad based land taxes may detrimentally affect owner-occupier households with low incomes, such as many retirees, who may have less flexibility to move and limited capacity to pay taxes from current income. Options for addressing welfare impacts include concessional rates for tax, the deferment of tax or help via the income support system.

Studies suggest that, on the whole, mechanisms for deferment are preferable to providing concessions as design of the latter would need to take into account the potential for inequitable outcomes arising from the existing tax and transfer systems. For example, if eligibility for concessional rates centred on age pension status, this would result in discrimination between taxpayers based on present incomes, rather than whole-of-life capacity to pay given that the principal residence is not included in the age pension assets test (Daley et al. 2013). Low-income households that do not qualify for or receive the age pension would have to pay relatively higher rates on a whole-of-life basis.

In contrast, deferment of taxes treats taxpayers equally based on land values, and is thus relatively more straightforward. State-based deferral arrangements already exist for seniors paying property based taxes (in this case Local Government rates) in South Australia and Western Australia. Other examples are set out in box 10.

By their nature, land taxes help to ensure that land is used in ways that is most valued by the community (whether this is residential or commercial, and in accordance with preferences within these groups). It is envisaged that the accumulation of deferred debt would therefore prompt property owners to consider, or consider earlier, whether their current or a different property would best suit their needs. In some cases, however, deferment resulting in the accumulation of a large amount of debt may reduce the capacity to move as it reduces the amount available for a new purchase. This suggests that there may be merit in capping the amount of tax that may be deferred. Acknowledging that property is often used as a vehicle for intergenerational wealth transfer (Barrett et al. 2015), capping would also prevent debts accruing to a level that makes substantive differences to bequests.

On the basis of long-term trends, it is probable that rates of growth in the value of residential land would far exceed growth in debt servicing rates, so the latter in itself is unlikely to substantially affect property values.⁸

Debts should attract low rates of interest consistent with the policy objective of deferment, ideally reflecting the cost of revenue deferral to the equity provider (State and Territory Government). Under the ACT rates deferment scheme, the interest rate applied is the 90-day bank bill rate.

Unintended effects from deferment also need to be considered in the design of deferment policies and setting of eligibility criteria, such as restrictions on working hours, which may create labour market distortions. For example, to be eligible for the South Australian Postponement of Rates scheme, a ratepayer must be over 60 years old and work fewer than 20 hours a week in paid employment. Low-income earners working over 20 hours per week may choose to reduce their labour force participation to below the hours-worked threshold to be eligible for the deferment scheme (box 10).

In summary, key elements of reform would include:

- Replacement of stamp duties on property transfers with a broadly-based tax based on land values. The shift to a broad basis is essential to ensure that revenue is raised efficiently and the tax burden is not disproportionately imposed on a few groups.
- In the implementation phase, tax rates that seek revenue neutrality and allows transition over several years.
- Provision for tax deferral for certain low income groups, so that taxes do not force people with less capacity to move. These include people such as owner-occupier retirees, who may be attached to the family home and their community (Daley and Coates 2015).
- Deferred taxes would be paid from estate at death or on the sale of the property (whichever comes first).

⁸ Residential land and dwelling values have increased on average by 8.4 per cent p.a over the past 20 years while over the same period the debt servicing ratio has increased by 1.2 percentage points. However, buyers will factor in the discounted tax liability into the purchase price of the property, which will put downward pressure on prices.

• Interest rates on deferment of taxes should be low, for example bond rates, consistent with the policy objective of deferment.

Depending on the sequence and pace of States undertaking reforms, the Commonwealth may need to be involved in facilitation; among other things to ensure that the Commonwealth Grants Commission's horizontal fiscal equalisation (HFE) process does not provide disincentives to improve the efficiency of State taxes in this way. The Productivity Commission's report into HFE, which will be produced in draft by October 2017, will look at the incentives the current system creates for undertaking such reforms.

Box 10 Examples of deferment systems

- The New Zealand Local Government Act 2002 (NZ) gives local councils the authority to set council rates postponement policies, with the debt secured against the equity in their property. For example, Auckland allows low-income rate payers to postpone a maximum of 80 per cent of available equity in the primary place of residence (different between value of the property and existing debt on the property), with postponement fee charged from when the rate was originally due. It is payable upon sale, death, or relocation. The person must use the property as the primary residence, and, in general, earn less than \$24 470. Some councils restrict eligibility to people over 65 years of age.
- Ontario, Canada, has a Provincial Land Tax Deferral Program for low income seniors and people with disability to partially defer land tax, with the debt payable upon sale or death. They must be in receipt of the Guaranteed Income Supplement (welfare payment) to be eligible.
- Western Australia offers eligible seniors (holding government pensioner or senior card) 50 per cent rebate on council rates, which they may also defer upon satisfying certain criteria. It does not incur interest charges. Debts are payable upon sale, relocation or death where there is no surviving spouse. Deferred charges can be paid at any time but a rebate cannot be claimed when debts are paid. There are no limits on hours worked, but they must be a holder of government pensioner or seniors card.
- In South Australia, Local Governments can offer postponement to people who face hardship, or to seniors under the 'Seniors Rate Postponement Scheme.' This scheme allows rates to be deferred after the first \$500 has been paid. It also requires that applicants have at least 50 per cent equity in their property, and not work more than 20 hours a week. Debts are subject to interest rates and payable on sale, relocation or death where there is no surviving spouse.

Deferment schemes can create some adverse consequences. For example, deferment may crystallise household debt and create a disincentive to move (with similar effects as stamp duty that land taxes intend to avoid). Large accumulated debts may reduce the capacity to move as it reduces the amount available for a new purchase. Where eligibility is based on hours worked or welfare status, this may distort labour market participation and compound the disincentive to work. These factors suggest that there may be benefit in capping the allowable level of accumulated debt, and income earning rules should be more flexible.

Sources: Auckland Council (2017); NZDIA (2016); NZOAG (2006); NZWBPDC (2016); Ontario Ministry of Revenue (2017); Revenue SA (2016); WADF (2016).

CONCLUSION 10.4

State Governments and the Northern Territory should move from stamp duties on residential and commercial properties to a broad-based land tax on the unimproved value of land.

The shift should include provision for low-income households to defer property taxes and fund them from their estate at death or on the sale of the asset (whichever comes first), similar to State-based deferral arrangements for Local Government rates.

6 The impacts of land reforms

Overall, the potential net benefits from reform in these areas are estimated at about \$10 billion per annum in the long term (30 years).

Replacing stamp duties with a broad-based land tax is estimated to provide a benefit of approximately \$8.5 billion per annum in the long run. This estimate assumes that the broad-based land tax fully funds the removal of stamp duties. The benefits arise from people moving to residential properties that better suit their preferences, increasing labour mobility and reducing commuting costs. Benefits also arise from more productive land use and increased investment.

The estimate is based on recent analysis by Independent Economics (2014) and the Grattan Institute (2015). The estimate takes into consideration the transition to a broad-based land tax, assuming for the sake of simplicity a transition period of 20 years, as has occurred in the ACT.

The remainder of about \$1.5 billion per annum arises from reforms to planning and zoning systems — specifically, lower costs associated with development delays, including the holding costs of land, documentation, and development risks. In addition, reducing the prescriptiveness of allowed land use will increase allocative efficiency by allowing land to be applied to more valued uses as preferences change over time.

The estimate is based on jurisdictional planning reform reports, particularly the estimated potential benefits of the New South Wales White Paper Reforms (CIE 2013; Deloitte 2012), and takes into account reforms that have been implemented since 2011, and possible implementation and transition costs.

There is considerable uncertainty in this estimate of planning reforms. On one hand, they are conservative because they do not consider land use restrictions imposed outside of broad zoning requirements, such as building heights. But an observation made by the Commission in its 2011 research report on planning, zoning and development assessment regulations remains relevant:

The state and territory planning systems have ... been subject to rolling reforms, which are often not fully implemented or evaluated before being replaced with further reforms ... (PC 2011b, p. XXII).

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Australian Government

Productivity Commission

SHIFTING THE DIAL

ENERGY 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

Note: After receiving advice from the NSW Government, the Commission has amended its words in relation to contemporary arrangements for gas exploration and development in that state on pages 118 and 122.

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Abbreviations and explanations

Abbreviations

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
ACT	Australian Capital Territory
AEMA	Australian Energy Market Agreement
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
CCGT	Combined cycle gas turbine
CER	Clean Energy Regulator
COAG	Council of Australian Governments
СРІ	Consumer price index
CRNP	Cost reflective network pricing
CSG	Coal seam gas
DIIS	Department of Industry, Innovation and Science
DKIS	Darwin to Katherine Interconnected System
ECA	Energy Consumers Australia
EGWWS	Electricity supply, gas, water and waste services
FCAS	Frequency control ancillary services
FïT	Feed-in tariff
GDP	Gross domestic product
IC	Industry Commission
ICRC	(ACT) Independent Competition and Regulatory Commission
LHS	Left-hand side
LNG	Liquefied natural gas
LRET	Large-scale renewable energy target

NCC	National Competition Council
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National Electricity Objective
NER	National Electricity Rules
NGL	National Gas Law
NGO	National Gas Objective
NGR	National Gas Rules
NSCAS	Network support and control ancillary services
NSW	New South Wales
NT	Northern Territory
NWIS	North West Interconnected System
PC	Productivity Commission
PV	Photovoltaic
Qld	Queensland
QNI	Queensland-New South Wales interconnector
RET	Renewable energy target
RHS	Right-hand side
RIT-D	Regulatory investment test for distribution
RIT-T	Regulatory investment test for transmission
SA	South Australia
SCO	Senior Committee Officials
SRAS	System restart ancillary services
SRES	Small-scale renewable energy scheme
SWIS	South West Interconnected System
Tas	Tasmania
TNSP	Transmission Network Service Provider
Vic	Victoria
WA	Western Australia
WACC	Weighted average cost of capital
WEM	Wholesale Electricity Market (Western Australia)

Explanations

The convention used for a billion is a thousand million (10^9) .
gigajoule (10 ⁹ joules)
gigawatt (10 ⁹ watts)
gigawatt hours (10 ⁹ watt hours)
kilometres
kilowatt (10 ³ watts)
kilowatt hour
million tonnes per annum
megawatt (10 ⁶ watts)
megawatt hour
petajoule (10 ¹⁵ joules)
terajoule (10 ¹² joules)
terawatt hours (10^{12} watt hours)

Key Points

- The Australian energy sector, especially in the east coast, is in a fragile state. While the past reforms that injected competition into the sector and radically altered its structure have served Australia well, the sector has undergone significant change in the last decade.
 - Technological change is radically altering the economics and structure of the sector, particular in the electricity industry.
 - The construction of five LNG trains in Queensland have linked the east coast gas market to the international market.
 - Government policies, particularly those mandating the uptake of renewable sources, have significantly altered the mix of technologies being used.
- In electricity, a lack of stability and uncertainty in climate change policy has created an uncertain environment for investment.
 - This has resulted in insufficient investment in new generating capacity that complements renewable generation.
- Sharp rises in the cost of gas prices and supply concerns are limiting the ability of gas-fired generation to complement the uptake of renewables and constraining the sector's ability to reduce carbon emissions by replacing coal-fired generation.
- No one jurisdiction can fix the issues currently confronting Australian energy markets.
 - Australian governments need to work cooperatively to resolve the issues.
 - Fixing these issues will require sustained commitment from governments, including to an emission reduction strategy.
- Australian governments should set a clear and considered long-term strategic vision for energy markets.
 - This should include a clear transition path from current arrangements.
 - Energy consumers should be central to this vision.
 - A balance will have to be struck between reliable, affordable and sustainable energy.
 Governments to be clear about the trade-offs that they are willing to make.
 - Governments should avoid ad hoc policy fixes.
- A market-driven national emission reduction policy should replace the myriad of existing Australian and state and territory government policies.
 - Governments and opposition parties should commit to an agreed emission policy for a specified period of time to provide much needed investment certainty.
 - This will enable emissions reduction targets to be met in the least overall economic cost.
- The uptake of renewables is having unintended implications for network security and reliability.
 - The renewable generators should bear the costs of ancillary services that the characteristics of their supply impose on the network.
- More effective stakeholder engagement processes should be adopted to allow the moratoria on gas supply to be overturned.
- The cost of not fixing the current mess will be significant, as indicated by the problems that beset South Australia in September 2016.

1 Introduction

Energy is vital to the Australian economy and to the Australian way of life.

Recent developments in the east coast electricity and gas markets have highlighted systemic issues affecting both markets, and have made energy policy a topical issue. Systems that have supported the Australian economy well for over two decades have failed in specific instances or otherwise shown signs of fragility. The South Australian blackouts of 2016 and 2017 highlighted issues with system security and reliability. The disconnection from December 2015 to June 2016 of the Bass Strait interconnector contributed to electricity shortages in Tasmania that required emergency diesel generators to deployed. Electricity and gas prices have also risen sharply, especially the price of natural gas (AER 2017b, p. 52).

This supporting paper explores recent trends in electricity and gas markets to identify areas where policy responses are needed, and canvasses possible ways to ameliorate or address these issues. It supports the 'efficient markets' chapter (chapter 5) of the Productivity Commission's *Productivity Review*.

Microeconomic reform of the electricity industry began on a state-by-state basis in the late 1980s (IC 1998). In 1990, a Special Premiers Conference agreed to establish a national electricity market. Reform of the gas industry commenced shortly afterwards.

Over time, state-based electricity and gas markets in eastern Australia were linked to create quasi 'national' markets. There remain a number of separate electricity and gas markets (most notably in Western Australia and the Northern Territory), as the vast distances have, until recently, made it uneconomic to link these markets.¹ This has resulted in a series of electricity and gas markets of different sizes, structures and regulatory arrangements. Consequently, issues in one market need not automatically translate to other markets.

These industries are in transition. In the case of electricity, governments have legislated significant uptake of renewable energy, and rapid technological change is materially altering the economics of the entire industry. In the case of gas, the development of export facilities in Queensland now link the eastern Australia grid to world markets.

These changes have prompted a significant number of official reviews into the electricity and gas industries. The recent review into the future security of the National Electricity Market (NEM) identified 23 separate studies or reviews that were then currently underway

¹ Work is currently under way to link the Northern Territory gas grid and east coast markets.

or that had been completed in the last five years (Finkel et al. 2016 appendix C). Further reviews have been commissioned in the wake of recent electricity and gas market difficulties. These studies deal with complex technical and economic issues, are frequently lengthy and often deal with aspects of markets.

Some issues are common to both the electricity and gas industries in Australia, while others are specific to either the electricity or gas industry. There are also interactions between many of these issues. Given the sheer number and complexity of these studies and the dynamic nature of current policy in this area, this supporting paper focuses on higher level substantive issues that need resolution before detailed policy prescriptions can be sensibly developed. It draws heavily on existing studies and data sources.

Reflecting this, this paper commences by providing an overview of energy use in Australia to draw out issues of relevance to both electricity and gas markets (chapter 2). It then examines issues specific to electricity markets in general, and the National Electricity Market in particular (chapter 3). It then examines issues specific to gas markets (chapter 4).

The paper does not cover issues pertaining to other sources of energy, such as petroleum products, or nuclear power.

2 Energy

This chapter provides an overview of the electricity and gas industries in Australia and sets out some of the key issues confronting both industries.

The chapter commences by providing an overview of the electricity and gas industries and their importance to the Australian economy (section 2.1) The chapter then outlines the regulatory and institutional arrangements applying to the sector (section 2.2). The chapter then details emission reduction and renewable energy policy applying to both industries (section 2.3). The chapter concludes with a review of energy data (section 2.4).

Issues specific to the electricity and gas industries are discussed in chapters 3 and chapter 4, respectively.

2.1 Overview

Energy is essential to economic activity. The sector is a valuable source of export income, production, investment and, to a lesser extent, employment. Its outputs are also vital inputs into many industries, particularly those in the manufacturing, transportation and mining sectors, and for use by households.

Contribution to economic activity

Australia produced \$202 billion of energy in 2014-15, with over half exported (excluding uranium) (figure 2.1). Of this, \$39 billion was electricity generation and \$35 billion was natural gas. Collectively, these two sources of energy accounted for 37 per cent of energy production by value. The inclusion of transmission, distribution, on-selling and retailing of these sources of energy would further increase the relative size and importance of the sector.

The inclusion of transportation and retailing lifts the sales of electricity and gas — the two energy sectors that are the focus of this paper — up towards \$100 billion in 2014-15 (excluding taxes and margins levied on these sales).



Figure 2.1Australian energy production by value, 2014-15aOutput

In terms of its overall *contribution* to economic activity, value added of the electricity supply sector was \$23 billion in 2014-15, or 1.5 per cent of Australian gross domestic product (GDP) (table 2.1).² As of May 2015, the industry employed 63 000 people (excluding contractors), or 0.5 per cent of total employment. Employment has since declined to 52 000 by May 2017.

² Industry contributions to national production are expressed in terms of the value that they add in production (termed valued added) to avoid the double counting of sales from industries that are used as inputs by other industries.

	Gross industry value added	Value-added share of total economy	Total sales ^a	Employment ^b	Employment share of total economy
	\$m	Per cent	\$m	'000 '	Per cent
Electricity					
Electricity generation	3 910	0.2	18 500		
Electricity transmission, distribution, on selling and electricity market operation	19 573	1.2	39 447		
Electricity supply	23 483	1.5	57 947	63.0	0.5
Gas					
Oil & gas extraction Of which	27 302	1.7	52 297	28.2	0.2
Oil extraction	13 651 0	l _{0.8} d	23 104	_{14.1} d	_{0.1} d
Gas extraction	13 651 0	l _{0.8} d	29 193	_{14.1} d	_{0.1} d
Gas supply	1 769	0.1	4 744	14.2	0.1
Gas combined	15 420	1.0	33 937	28.3	0.2
Total economy	1 617 016 ⁰	;		11 767.9	

Table 2.1 Australian electricity and gas industries, 2014-15

na: not available. ^a Sales valued at basic prices excluding taxes and other margins. ^b Total persons employed, as at May 2015. ^c Total value added for the economy is GDP. ^d Assuming that gas accounts for half of *Oil and gas extraction* value added and employment (see footnote 3).

Sources: ABS (Australian National Accounts: Input-Output Tables, 2014-15, Cat. no. 5209.0.55.001, table 2), ABS (Labour Force, Australia, Detailed, Quarterly, May 2017, Cat. no. 6291.0.55.003, table 6).

Available data suggest that the contribution of the gas sector is somewhat smaller than that made by electricity, at around \$15.4 billion in 2014-15, or 1.0 per cent of Australian GDP (table 2.1).³ Employment by the gas industry was around 28 300 (excluding contractors), or 0.2 per cent of total employment as of May 2015. Employment has since declined to around 19 900 in May 2017.

³ The ABS aggregates oil and gas extraction in many of its publications, including those that provide industry value added (ABS, *Australian National Accounts: Input-Output Tables*, Cat. no. 5209.0.55.001). The supporting ABS product details (ABS, *Australian National Accounts: Input-Output Tables* (*Product Details*), Cat. no. 5215.0.55.001) do not provide sufficient data to separate gas extraction from oil extraction, as the information on some products are not published to protect respondent confidentiality. Historical data (ABS, *Australian Industry, 2010-11*, Cat. no. 81550DO005_201011) suggest that that gas accounted for 43 per cent of *Oil and gas extraction* in 2009-10 and 44 per cent in 2010-11. The value added estimates presented here assume that this historical growth continues such that gas accounts for half of the \$13.7 billion of value added by *Oil and gas extraction* in 2014-15. The estimates of gas sector value added also include \$1.8 billion in value added from *Gas supply* (distribution).

Energy content

Australia supplied 5920 petajoules (PJ) energy in 2014-15 and consumed 4076 PJ (latest available) (DIIS 2016a table A2).⁴ Gas and electricity collectively accounted for 40 per cent of energy consumption (both 20 per cent), and were the second and third largest sources, respectively, after petroleum products (50 per cent). Renewable sources collectively accounted for just under 5 per cent of measured consumption.

In terms of the underlying sources of this energy, natural gas accounted for just under one-quarter of all primary energy, making it the third largest primary fuel source after crude oil (38 per cent) and coal (32 per cent).⁵

Australian energy consumption grew by 2.8 per cent per year from 1960-61 to 2014-15 (figure 2.2). This was higher than the 1.5 per cent growth in population over the same period, but lower than the 3.4 per cent growth in output of the Australian economy. Consequently, energy consumption per person over this period *grew* by 1.2 per cent per year, and the energy intensity of production — the amount of energy consumed per unit of output produced — *fell* by 0.7 per cent.

Total energy consumption (primary energy supply) grew more-or-less continually to 2011-12 (where it peaked at 5954 PJ), and has remained around this level since then.

Energy-intensity of production

The energy intensity of Australian production *grew* by 0.6 per cent per year before peaking in 1977-78 at 5874 gigajoules (GJ) per million dollars of output, after which it *fell* by 1.3 per cent per year to 3653 GJ per million dollars on production in 2014-15.

⁴ Just over 30 per cent of primary energy supplied in 2014-15 was used or lost in converting primary energy sources into the secondary sources that are ultimately consumed (based on DIIS (2016a), table A2).

⁵ Electricity and petroleum products are secondary sources of energy as they are derived from other sources of energy. Electricity in Australia is mainly produced from turbines powered by steam produced by burning non-renewable fossil fuels (mainly coal and natural gas) or from renewable sources — such as from running water (hydroelectricity), the wind (wind electricity) and the sun (solar electricity). Petroleum products (such as petrol, diesel and liquefied petroleum gas) are produced by refining crude oil.





^a GDP: chain volume GDP (reference year 2012-13). Energy consumption: PJ. Energy intensity: GJ per million dollars of production. Energy productivity: million dollars of production per GJ. *Source*: DIIS (2016a table B).

Energy productivity

Energy productivity in the Australian economy — the amount of output produced per unit of energy consumed — remained generally flat until the sector was reformed in the mid to late 1980s. Since 1989-90, the value of production per GJ of energy consumed grew from \$193 million to \$274 million, an increase of 1.4 per cent per year.

Energy consumption per person *grew* at an annual average rate of 1.7 per cent to 2006-07. Since then, per person consumption *fell* by 1.2 per cent per year.

Two other clear trends in this aggregate analysis are:

- First, there has been a decoupling of the growth in production (real GDP) from energy consumption since 1991-92. Before then, the two measures grew more-or-less in step. Since then, real GDP has grown at a faster rate than energy consumption.
- Second, the energy intensity of production has declined more-or-less steadily each year since the second oil price shock in 1979. Prior to that, the energy intensity of production was essentially flat.

2.2 Governance and institutional arrangements

The legislative and institutional frameworks that govern the energy sector have been developed by Australian governments within the constraints imposed by the Constitution (box 2.1).

Box 2.1 Energy policy and the Australian Constitution

The Australian Constitution arguably constrains the ability of the Australian Government to legislate over *energy*, *electricity*, *gas* or the *environment*.

Under the Constitution, state and territory governments have exclusive power over all matters not explicitly shared with or referred to the Australian Government. These matters are set out in sections 51 and 52, respectively.

Section 51 enables the [Australian] Parliament power to make laws for the peace, order, and good government of the Commonwealth with respect to, among other things:

- (i) trade and commerce with other countries, and among the States;
- (ii) taxation; but so as not to discriminate between States or parts of States;
- (xx) foreign corporations, and trading or financial corporations formed within the limits of the Commonwealth;
- (xxix) external affairs;
- (xxxvii) matters referred to the Parliament of the Commonwealth by the Parliament or Parliaments of any State or States, but so that the law shall extend only to States by whose Parliaments the matter is referred, or which afterwards adopt the law.

There is no explicit reference to energy, electricity, gas or the environment in the Constitution.

As such, the constitutional power to make laws over *energy*, *electricity*, *gas* or the *environment* arguably lie with state and territory governments. The Australian Government is also able to make laws on these topics insofar as they relate to the powers conferred to it under section 51 (such as, for example, by imposing taxation or by entering into an international treaty).

Energy reform in Australia has progressed through intergovernmental agreements between the Australian and state and territory governments. The development of national energy laws is achieved through 'template legislation'. South Australia typically drafts and implements the required energy legislation. This law is then applied in the remaining state and territories by reference to the South Australian legislation, with supporting Australian Government legislation as required.

Legislative framework

The legislative and regulatory framework for Australia's energy markets is set out in the December 2013 *Australian Energy Market Agreement* (AEMA) between the Australian Government and all eight state and territory governments. The Agreement provides for national legislation that is implemented in each participating state and territory. All jurisdictions are parties to the gas provisions, and all except Western Australia and the Northern Territory are parties to the electricity provisions.

South Australia is the lead legislator for both electricity and gas, with other jurisdictions enacting legislation to give effect to the South Australian legislation.

The National Electricity Law (NEL) sets out the National Electricity Rules (NER) that govern the operation of the NEM. It also sets out the National Electricity Objective (NEO) which is:

... to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to — (a) price, quality, safety, reliability, and security of supply of electricity; and (b) the reliability, safety and security of the national electricity system.

The Rules set out the rights and responsibilities of the market participants, and aim to regulate how these players behave so that consumers do not pay more than necessary for their electricity. The focus of the Rules is very much on the long-term interest of consumer.

The Law and Rules are supported by the National Electricity Regulations.

Gas is similarly governed by the National Gas Law (NGL) that establishes obligations for gas pipelines, gas wholesale markets and a gas market bulletin board. The Law is supported by the National Gas Rules (NGR) and National Gas Regulations. There is a National Gas Objective (NGO), similar to that for electricity, which also focuses on the long-term interest of consumers.

Institutional arrangements

The COAG Energy Council has overarching responsibility for monitoring and reforming national energy markets. The role of the Council in energy market reform and the associated governance arrangements are set out in the AEMA. The Council is supported in developing national energy market policy by the Senior Committee of Officials (SCO).

The Council has oversight of the three main institutions responsible for the operation of national energy markets (including the NEM):

- the Australian Energy Market Commission (AEMC) the rule maker and market development adviser
- the Australian Energy Regulator (AER) the economic regulator and rule enforcer
- the Australian Energy Market Operator (AEMO) the system and market operator.⁶

⁶ The AEMC is established under section 5 of the *Australian Energy Market Commission Establishment Act 2004* (SA). The AER is established under section 44AE of the *Competition and Consumer Act 2010* (Cth). The AEMO is incorporated as a company limited by guarantee under the *Corporations Act 2001* (Cth), and owned by Australian governments (60 per cent) and industry participants (40 per cent).

The AEMC is responsible for the rules that govern the operation of the market. In order to change the rules, a party formally applies to the AEMC for a rule change. The AEMC seeks input from affected parties on each proposed change. It then publishes a draft determination and seeks feedback before issuing a final determination.

A number of other Australian Government agencies have regulatory responsibilities over specific aspects of the energy sector or have wider regulatory responsibilities that also impinge on the sector. The Australian Competition and Consumer Commission (ACCC) and the National Competition Council (NCC) ensure third-party access to essential network infrastructure to promote competition within the sector. The ACCC also assesses energy-related mergers and authorisations, and enforces general customer and competition protections under the *Competition and Consumer Act 2010* (Cth). The Clean Energy Regulator (CER) regulates Australian Government schemes for measuring, managing, reducing and offsetting carbon emissions.

The operation of other Australian Government agencies also impact on the energy sector. The Australian Renewable Energy Agency (ARENA), for example, aims to accelerate Australia's shift to an affordable and reliable renewable energy future. Their investments impact on the mix of technologies used in electricity generation both directly where they fund new generation, and through the testing and development of renewable technologies.

The roles of each Australian Government agency are outlined in box 2.2.

In addition to these national agencies, each state and territory has its own regulatory agency covering electricity and gas retailing in that jurisdiction:

- Independent Pricing and Regulatory Tribunal (New South Wales)
- Essential Services Commission (Victoria)
- Queensland Competition Authority (Queensland)
- Essential Services Commission of South Australia (South Australia)
- Economic Regulation Authority (Western Australia)
- Tasmanian Economic Regulator (Tasmania)
- Utilities Commission (Northern Territory)
- Independent Competition and Regulatory Commission (Australian Capital Territory).

These agencies, to differing extents, provide independent regulatory advice and decisions to protect and promote the ongoing interests of the consumers, taxpayers and citizens in each jurisdiction. These agencies may also have wider responsibilities, such as covering water, transport and local government.

Box 2.2 Key governance and institutional arrangements

Council of Australian Governments (COAG) Energy Council

The Council has overarching responsibility and policy leadership for electricity and gas markets in Australia, and oversees national energy policy and law. It consists of the energy and resources ministers from the Australian Government, each state and territory government, and New Zealand. The Council was previously known as: the Standing Council on Energy and Resources; and the Ministerial Council on Energy.

Australian Energy Market Commission

The AEMC makes and amends the *National Electricity Rules*, the *National Gas Rules* and the *National Energy Retail Rules* which govern the National Electricity Market, elements of natural gas markets and energy retail markets. Its objective is to promote efficient investment, use and operation of electricity and gas services in the long-term interests of consumers.

Australian Energy Regulator

The AER regulates energy markets and networks (mainly in eastern and southern Australia) under national energy market legislation and rules. Its functions include:

- monitoring wholesale electricity and gas markets to ensure energy businesses comply with the legislation and rules, and taking enforcement action where necessary
- setting the amount of revenue that network businesses can recover from customers for using networks (electricity poles and wires and gas pipelines) that transport energy
- regulating retail energy markets in Queensland, New South Wales, South Australia, Tasmania (electricity only) and the Australian Capital Territory
- publishing information on energy markets.

Australian Energy Market Operator

The AEMO is responsible for the day-to-day management of most wholesale and retail energy market operations in Australia, including:

- the National Electricity Market (NEM)
- the Wholesale Electricity Market (WEM) in Western Australia
- the Victorian Declared Wholesale Gas Market and the Victorian gas transmission system
- retail gas markets in Victoria, Queensland, South Australia, Western Australia, New South Wales and the Australia Capital Territory
- the short-term wholesale gas trading market in Adelaide, Sydney and Brisbane
- the gas supply hubs at Wallumbilla in Queensland and Moomba in South Australia
- wholesale and retail gas markets and the gas transmission systems in Victoria, Queensland, South Australia, Western Australia, New South Wales and the Australia Capital Territory.

The AEMO is also responsible for transmission procurement in Victoria (but not other states) and has a national transmission planning role.

(Continued next page)
Box 2.2 (Continued)

Energy Consumers Australia (ECA)

The ECA was created by COAG to promote the long-term interests of consumers with respect to the price, quality, safety, reliability and security of supply of energy services. The ECA gives residential and small businesses a national voice in the energy market. It conducts research and analysis, identifies issues and works with other consumer organisations, ombudsmen, energy companies, regulators and governments to improve outcomes for consumers.

Australian Competition and Consumer Commission

The ACCC's role in energy markets is in the context of the *Competition and Consumer Act 2010* (Cth), including the enforcement of the competition and consumer protection provisions in energy markets and assessing energy mergers and authorisations.

National Competition Council

The NCC administers the National Access Regime — which deals with general third party access to nationally significant infrastructure that cannot be economically duplicated — prescribed in Part IIIA of the *Competition and Consumer Act 2010* (Cth). Under the National Gas Law, the NCC:

- makes recommendations to relevant Minister(s) on the coverage (regulation) of natural gas pipeline systems
- decides the form of regulation of natural gas pipeline systems (ie. light or full regulation)
- classifies pipelines as transmission or distribution pipelines
- makes recommendations in relation to certain exemptions for 'greenfields' gas pipeline proposals.

Clean Energy Regulator

The CER administers schemes legislated by the Australian Government for measuring, managing, reducing or offsetting Australia's carbon emissions.

Its role is determined by climate change law. It has administrative responsibilities for the:

- National Greenhouse and Energy Reporting Scheme, under the National Greenhouse and Energy Reporting Act 2007
- Emissions Reduction Fund, under the Carbon Credits (Carbon Farming Initiative) Act 2011
- Renewable Energy Target, under the Renewable Energy (Electricity) Act 2000, and
- Australian National Registry of Emissions Units, under the Australian National Registry of Emissions Units Act 2011.

Australian Renewable Energy Agency

ARENA is a commercially oriented agency with the objective of:

- improving the competitiveness of renewable energy technologies
- increasing the supply of renewable energy in Australia.

It was established in July 2012 by the Australian Renewable Energy Agency Act 2011 (Cth).

Sources: Finkel Review (2016, p. 48); Agency web sites.

The role played by each agency partially reflects the extent to which each jurisdiction has signed up, if at all, to the National Energy Customer Framework to regulate the sale and supply of electricity and gas to retail customers. The Independent Pricing and Regulatory Tribunal, for example, plays a smaller role than does, say, the Essential Services Commission, as New South Wales has fully signed up to the framework while Victoria has only partially done so.

Governance issues

Good institutional arrangements and governance processes are vital to the effective and efficient functioning of energy markets.

The Vertigan Review (2015) examined the governance arrangements for Australian energy markets.

At a higher level, the Vertigan Review found that:

... the division of functions established by the current governance arrangements for Australian energy markets is fundamentally sound and that Australian energy market governance is amongst best practice internationally. Australia's energy market governance relies on clearly specified and stable policy and appropriate regulatory objectives, delegation of some roles to specialist institutions and importantly, institutional separation. (p. 7)

It went on to say that:

... scope for improvement exists to adapt to the challenges foreshadowed by two themes that consistently emerged during consultations

- the pace of change in the energy sector is arguably unprecedented; and
- a 'strategic policy deficit' exists which has led to diminished clarity and focus in roles, fragmentation and a diminished sense of common purpose. (p. 7)

The Vertigan Review made 47 recommendations in all, covering setting strategy and determining priorities, rules and rule making, regulatory decision making, market operation and governance processes.

While supporting the role of the COAG Energy Council as the premier policy leadership body with responsibility for the Australian energy market, the Review observed that:

... the Council and SCO appear to lack a focus on strategic direction and are therefore not providing effective and active policy leadership to the energy sector. Whilst the inherent structure of the Council cannot be altered, the Council can improve the visibility, transparency and accountability of its processes and operations to more effectively progress strategic energy market reform. Clear and rigorous criteria should be established for assessing proposals by jurisdictions who seek derogations from otherwise nationally agreed arrangements. (p. 7)

The Review recommended that the COAG Energy Council should develop a greater focus on determining strategic direction and specifying priorities for energy market reform and delegate its other responsibilities. To guide this, they proposed that the SCO should present recommendations on strategic direction, priorities and a work program, with the AEMC taking on an expanded role in initiating the development of this advice.

These are all sensible suggestions and should be implemented.

Governments need to take joint leadership on energy policy and fix the myriad of issues currently confronting the industry (discussed throughout this paper and in other reviews such as the Finkel Review). This cooperative approach to energy policy has worked successfully in the past.

Government should set a clear, overarching long-term vision for energy policy by:

- setting out clear objectives that recognise the inherent tensions between prices/costs, reliability and emissions, and provide clear guidance on acceptable trade-offs now and into the future
- determining the role of each institution and then let them get on with their work, holding them to account for their responsibilities but not interfering
- ensuring that the sector can access the full set of instruments in doing their work not locking in or out technologies, or excluding other solutions by design
- setting out a clear roadmap for reforms ideally with bipartisan and cross jurisdictional commitment.

System security and reliability comes as a cost. In seeking to achieve this long-term vision, a balance will need to be struck with the cost of energy to consumers. Inevitably, trade-offs between the two will have to be made.

Energy market reform requires more than just improving the structure and operation of energy markets. Effective reform will also require consideration of environmental and other policies that might conflict with energy policy to ensure that policies are consistent and coherent (discussed in section 2.3).

The COAG Energy Council should take the leadership role in implementing energy reform. It should be rely heavily on expert advice from the AEMC and the AER.

Institutional responsibilities

The Vertigan Review's recommendations included that the:

- role of AEMC should be reinforced through greater reliance on this institution for the development of strategic advice
- AER should be separated from the ACCC and established as an independent organisation
- AEMO should be left to play its role as independent system and market operator.

Further, the Review also found that with respect to the AER that:

... the AER Board lacks autonomy over the organisation as it is not in full control of the resources required to achieve its tasks and lacks full independence in decision making; and that its culture is not fully conducive to its regulatory role, due to fact that the culture and skills required to regulate an industry differ from those of a competition law enforcement agency. On that basis, the Panel believes the AER's performance could be strengthened by establishing it as an independent organisation, separating it from the Australian Competition and Consumer Commission (ACCC). (p. 8)

In respect of the latter, while the in-principle argument for separation has some merit, institutional change can be costly and disruptive. Making major institutional changes may not be warranted if they impose further uncertainty in the system, and delay the broader reforms required. (For these and other reasons, the Productivity Commission did not recommend separation in its 2013 inquiry into electricity networks.)

The terms of reference for the Vertigan Review did not cover the suitability of wider institutional governance arrangements that impact on energy markets. In particular, it did not cover governance arrangements concerning institutions charged with environmental and other objectives that also impact on energy markets. These institutions include ARENA and the CER.

Responsiveness

In its 2013 review into the regulation of transmission networks, the Productivity Commission raised concerns about the time taken for critical reforms to be implemented. It found that:

Some of the more critical reforms in the NEM have already taken far too long. While the complexities of the NEM, the number of stakeholders involved, and the issues relating to investor confidence noted above, justify a considered and thorough examination of reforms before they are implemented, the current system has sometimes descended into paralysis by analysis. Reform appears to have been frustrated by complex processes, constant and overlapping reviews, and a lack of agreement by relevant governments about either the reforms themselves or the need for more timely progress to a genuinely NEM-wide approach to energy regulation. (PC 2013a, p. 36)

In light of recent issues surrounding the supply of electricity in South Australia and the provision of gas in the east coast market it is timely to review what has occurred in order to learn what happened, why, how it could be avoided in the future, and how best to deal with similar situations if they arise.

The same approach should also be applied to the governance arrangements to assess what lessons can be learnt. Indeed, a number of reviews have been commissioned to learn from these events.

Policy responses to emerging issues should be considered, appropriate and based on sound technical advice that takes into account any wider implications.

CONCLUSION 2.1

The governance arrangements for Australian energy markets need to be more flexible and adaptable to changes in technology and circumstances, both in the short- and long-term. Issues that arise should be dealt with in a timely, efficient and cost-effective manner that does not compromise system reliability and security. Existing processes are long and time consuming. They should be reviewed to see if they can be streamlined and made more timely, especially where more than one agency is involved (including the COAG Energy Council).

2.3 Emission reduction and renewable energy policy

The energy sector is an important source of greenhouse gas (carbon) emissions. Emissions of carbon dioxide, methane and other greenhouse gases are produced when fossil fuels are burned to generate electricity (termed combustion emissions). Methane is also released into the atmosphere at the wellhead when natural gas in extracted and from the coalface when coal is mined (termed fugitive emissions).

Electricity generation is the largest source of carbon emissions in Australia, contributing one-third of all emission in 2015 (Commonwealth of Australia 2017).⁷

International commitments

As a result, the energy sector has a crucial role to play in meeting Australia's carbon emission targets. Under the Paris Agreement, the Australia Government committed in April 2016 to reduce carbon emissions by 26–28 per cent on 2005 levels by 2030. This means that energy in general, and the electricity sector in particular, will be central to Australia achieving this target.

However, achieving the 2030 target may require *substantially* larger reductions in emissions in electricity generation than in the rest of the economy — that is, reductions significantly higher than 26–28 per cent on 2005 levels — if other sectors of the economy are excluded, or face higher costs to reduce emissions.

Despite this interlinkage between carbon emissions and energy, climate change policy in Australia has been developed largely independently of energy policy. In this respect, Australia is not alone (Yarrow 2017). Nor have policies been coordinated across and even within jurisdictions.

⁷ The inclusion of *all* emissions from oil and natural gas would lift the share of total emissions in 2015 from 33 per cent to 37 per cent.

The result is a range of Australian and state government policies to facilitate the uptake of renewable energy and to reduce greenhouse gas emission from the combustion of fossil fuels.

Renewable energy target

The renewable energy target (RET), is an Australian Government policy designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources. It seeks to achieve 33 000 gigawatt hours (GWh) of additional renewable electricity generation by 2020. The scheme consists of two parts, based on the size of the source of the approved renewable energy system involved:

- a large-scale renewable energy target (LRET), covering large-scale systems such as wind and solar farms, and hydroelectric power stations
- a small-scale renewable energy scheme (SRES), covering small-scale systems such as solar photovoltaic (PV) panel systems, small-scale wind systems, small-scale hydro systems, solar water heaters and air source heat pumps.

Under the larger LRET, wholesale purchasers of electricity (typically electricity retailers) are required to purchase and surrender renewable certificates to the Clean Energy Regulator each year to fulfil their legal obligations under the *Renewable Energy* (*Electricity*) Act 2000 (Cth). The number of certificates that need to be surrendered is in proportion (14.2 per cent in 2017) to the amount of electricity they purchase each year. Certificates are issued free to large-scale generators for each megawatt hour of eligible renewable electricity produced above their baseline. Renewable generators get the income from the sale of the certificates to the wholesale purchasers. Once created and validated, these certificates act as a form of currency and can be sold and transferred to other individuals and businesses at a negotiated price.

The RET cost roughly \$1.6 billion in 2013-14 (\$668 million for the LRET; \$932 million for the SRES) (Principal Economics 2015, p. 25).⁸

Collectively, AEMC (2016a) estimate that environmental policies directly accounted just under 9 per cent of retail electricity prices in Australia in 2016-17, ranging from 4.3 per cent (Northern Territory) to 13.9 per cent (Queensland) (figure 2.3).⁹ This translates into \$117 on an average annual electricity bill of \$1356. The renewable energy target contributed 56 per cent of this (the LRET and SRES contributed 37 percentage points and

⁸ This is the derived as the average value of certificates traded in 2013 and 2014 based on the number of LRET and SRES certificates multiplied by the volume-weighted average price of each type of certificate.

⁹ Environmental policies also affect prices indirectly because — as intended — they lead to the closure of emission-intensive generators that can supply electricity at low prices (AEMC 2016a, p. ii).

18 percentage points, respectively). State environmental policies contributed the remaining 44 per cent of the contribution made by environmental policies.



^a Environmental policies cover: the LRET (Australian Government); the SRES (Australian Government); climate change fund (NSW); energy efficiency improvements scheme (ACT); energy saving scheme (NSW); feed-in tariff schemes (ACT, Vic); retailer energy efficiency scheme (SA); solar bonus scheme (Qld) solar feed-in tariff (SA); and the Victorian energy efficiency target (Vic). ^b Qld: South-east Queensland. ^c Northern Territory network charges are not separated into transmission and distribution. *Source*: AEMC (2016a).

An important feature of the Australian electricity market is that, unlike other generators, renewable generators primarily earn their income from the sale of renewable energy certificates rather than from the sale of electricity in wholesale markets.¹⁰ This enables renewable generators to bid into wholesale electricity markets at prices that do not fully reflect their underlying cost of production, and increases the likelihood that their bids will be successful. This has consequent effects on the financial viability of non-renewable generators.

This is how the RET is intended to operate, as renewable power will always be used where it is available (as these generators can afford lower bid prices). But it has unintended consequences in relation to other costs that some renewables impose on the system (see below).

¹⁰ This can have the perverse effect of leading to negative prices for electricity.

Emission reduction and renewable energy policy issues

Well-functioning energy markets require climate change policy to be integrated with energy policy in a clear, consistent and coherent manner. The Australian Government took a step towards this by combining the environment and energy functions within the Department of Environment and Energy after the 2016 election.

The market price of energy — whether it be electricity or gas — is intended to provide appropriate signals for investment and demand-side management. With clear price signals different firms and technologies can compete on the basis of their underlying costs of production such that energy is supplied in the least cost manner.

The current suite of climate change abatement policies in Australia is intended to reduce greenhouse gas emissions. They do not achieve the required cuts in emissions at the lowest possible economic cost and are not technology neutral. Consequently, these policies do not provide the appropriate price signals to energy markets to guide investor and consumer behaviour.

National and state governments have independently made differing commitments to reduce greenhouse gas emissions and/or the uptake of renewable energy by different dates (table 2.2). New South Wales and Victoria have committed to zero net emissions by 2050, while other states have committed to shares of renewable energy. The Australian Government RET is equivalent to 20 per cent renewable energy by 2020. In contrast, South Australia, Queensland and the Northern Territory have committed to a target of 50 per cent by 2025, 2030 and 2030, respectively. The Australian Capital Territory has gone further, committing to 100 per cent renewable energy by 2020.

Despite these commitments, there is uncertainty as to how most jurisdictions will actually achieve these targets. The Australian Capital Territory has detailed how it intends to achieve its target (ACT Government 2016). Some jurisdictions are proposing or investigating policy mechanisms, but others have not outlined how these commitments will be achieved. There is a real problem in a connected system where states set their own targets without fully recognising the system consequences. States may set a high renewable target, relying on base-load in other jurisdictions to manage the production uncertainties. This can lead to the classic prisoners' dilemma — which will result in insufficient base-load to stabilise the system. A NEM-wide target is needed to avoid this outcome.

There is also uncertainty about how the Australian Government will achieve its commitment to reduce greenhouse gas emissions by 26–28 per cent compared with 2005 levels by 2030.

There is also a lack of consensus between political parties. Past commitments have changed as governments or leaders have changed. This lack of clear stable signals concerning emission policy has created an uncertain investment environment and raised concerns around sovereign risk as policies and rules change after investments have been made.

communents				
Jurisdiction	Commitment			
Emission reductions				
Australia	26–28 per cent reduction compared with 2005 levels by 2030			
New South Wales	Zero net emissions by 2050			
Victoria	Zero net emissions by 2050			
Renewable energy				
Australia	20 per cent renewables by 2020			
Queensland	50 per cent renewables by 2030			
South Australia	50 per cent renewables by 2025			
Western Australia				
Tasmania				
Northern Territory	50 per cent renewables by 2030			
Australian Capital Territory	100 per cent renewables by 2020			
Source: Australian Government (2015).				

Table 2.2Greenhouse gas emissions reduction and renewable energy
commitments

Investment uncertainty has also been hampered by a lack of policy stability and consistency. The RET is a good case in point. When it was introduced in 2001, the target of the then Mandatory Renewable Energy Target was to achieve an additional two per cent of electricity generation from renewables by 2020 (9500 GWh). The 2020 target was increased in 2009 to 41 000 GWh of additional electricity supplied by renewables. The scheme was then split in January 2011 into the LRET and SRES. The 2020 target was subsequently decreased in June 2015 to 33 000 GWh. The interim targets also adjust with each change in the 2020 target.

Existing emission reduction and renewable energy policies *already* put an implicit price on carbon.¹¹ By specifying the types of technologies that can and cannot be used, these policies preclude the use of other more cost-effective methods of achieving the desired goal, such as demand-side management and the use of more energy efficient products, with the result that the implied carbon prices will be higher than needed to achieve the underlying emission reduction goal of the policies.

¹¹ There are actually many implicit prices on carbon (sometimes referred to as 'shadow prices') arising from differences in scope, technology and the way that the various emissions-reduction schemes operate.

CONCLUSION 2.2

A commitment by Australian governments and opposition parties to uniform national greenhouse gas emissions reduction targets would substantially reduce the uncertainty that is hampering investment in the electricity sector. Emission targets that are clear and transparent, and remain fixed for a specified period of time, and achieved through a national market based mechanism that is neutral with regard to technology (neither favouring or penalising one form of technology over another) are critical to delivering an efficient electricity system for the future.

2.4 Energy data

Evidence-based policy requires access to comprehensive, coherent, reliable and timely data for the entire energy sector. Data collected according to a consistent framework can support analysis of the sector at different levels and for different jurisdictions. Time-series data can support the identification of longer term trends.

Australian energy data is of mixed quality (box 2.3). There is a lot of very detailed and useful data collected for parts of the sector and some useful aggregate data as well.

Much of the data is granular and becoming increasingly fragmented over time.

The official data sources used in this supporting paper do not make it possible to provide a consistent overview of the energy industry in Australia at a single point in time (such as for 2015-16 or 2016-17). Furthermore, the most recent year for which data are available varies between sources, ranging from a dated 2013-14 to 2107. This makes it difficult to gauge recent industry developments, particularly in a broader historical context. This is particularly an issue for electricity.¹²

¹² The last year for which national electricity data for all Australian states is published is 2014-15 (DIIS 2016a). One table in the national energy statistics (table O) has been updated to 2015-16 (DEE 2017). Some NEM data sources more recent data.

Box 2.3 Australia energy data

A lot of energy-related data is collected and published in Australia.

Very detailed data is published for parts of the sector. The AEMO, for example, publishes detailed wholesale electricity and gas spot market data for each five minute trading interval. These data are downloadable, and much of it is displayed visually. This detailed real-time data is extremely useful, particularly for market participants.

Aggregated data, such as by industry segment or financial year, is also published. The type and nature of these data vary depending on the agency concerned, and frequently reflect the remit of the organisation concerned. Recently, there has been a move towards publishing data on energy in aggregate, rather than for electricity and gas, with some resultant loss of information.

Some published data are the by-product of other specific functions undertaken by the collecting agency. For example, energy data that feeds into the national inventory of greenhouse gas emissions is published annually by the Department of Environment and Energy (last published for the calendar year 2015).

The AER publishes an overview of the electricity, gas and energy sectors in its *State of the Energy Market* (AER 2017b). This report focuses on the states regulated by the AER. It contains little statistical data on the Northern Territory, and less data on Western Australia than on other states and territories. Somewhat understandably given its remit, the AER places greater focus on the sectors that it regulates rather than those that it does not. The report does not contain comparable metrics such as value added, turnover, the value of capital stocks or employment by industry segment — generation, transmission, distribution and retail for the electricity industry, and production, transmission, distribution and retail for the gas industry — that enable comparisons to be made. Published information is generally restricted to the most recent years.

The Department of Industry, Innovation and Science published longer time-series for some energy-related aggregates in its *Australian Energy Statistics* (2016a). The publication is intended to be 'the authoritative and official source of energy data for Australia and forms the basis of Australia's international reporting obligations'. It contained detailed historical energy consumption, production and trade statistics, with some series extending back annually to 1960-61. The most recent published data is for 2014-15.

Numerous 'machinery of government' changes in recent years have meant that the energy function has repeatedly transferred between agencies and, with it, responsibility for collecting and publishing energy data.

The responsibility for energy now lies with the Department of Environment and Energy.

The ABS publishes some energy data, but these data tend to be highly aggregated and more dated. The more detailed energy-related publications have been discontinued. The periodic ABS *Australian National Accounts: Input-Output Tables (Product Details)* provides a limited breakdown of the Australian electricity industry (ABS Cat. no. 5215.0.55.001).

The comprehensiveness and timeliness of data on the electricity and gas industries has deteriorated recently.

Much of these data needed to support public policy is already collected or can be easily compiled from data collected. Electronic delivery mechanisms should enable these data to be released more promptly and enable greater comprehensiveness than publication in hardcopy.

As a result, the time periods reported in this paper vary depending on data availability.

Moreover, the coverage is also often less than ideal. The AEMC, the AER and AEMO publish limited data for the Australian Capital Territory compared with the other eastern states; the Australian Capital Territory is often included as part of New South Wales. Many energy data sources do not include Western Australia and the Northern Territory at all.

The usefulness and quality of the higher-level energy data could be improved for policy analysis in particular by:

- adopting an overarching coherent framework to guide existing data collections
- improving the consistency of energy data collections and publications with wider reporting on economic activity
- adopting an Australia-wide focus that covers all states and territories
- focusing more on the contribution of the sector to wider economic activity
- publishing separate measures, where appropriate, for electricity, gas and energy
- publishing comparable measures for each industry market segment (electricity generation/gas extraction, transmission, distribution and retail)
- publishing the data in a timely manner.

Much of the data required would already be collected by various government agencies. The key issue is that these data are not published, and certainly not in a timely or consistent manner.

There is limited price or value data to enable the cost of the renewable energy target to be accurately assessed over time and the impact of the renewable energy schemes on wholesale electricity prices and on incumbent generators.

CONCLUSION 2.3

The comprehensiveness and timeliness of data for the electricity, gas and energy sectors could be improved to provide a stronger evidence-base to support public policy in the electricity, gas and energy industries and to support wider industry analysis. For example, the publication of price and quantity data for the LRET and SRES schemes would inform the wider public on the effects of both schemes.

3 Electricity

This chapter provides an overview of the electricity industry in Australia and some of the key issues confronting it.

The chapter commences with an overview of the electricity industry (section 3.1) and the NEM (section 3.2) It then briefly outlines the recent evolution of the industry that has given rise to its current structure (section 3.3), before examining some of the issues likely to confront the industry (section 3.4). The chapter then explores some key issues affecting the industry (section 3.5). It then highlights some recent initiatives that will have implications for the industry (section 3.6).

Readers familiar with the industry structure, its evolution and current trends can proceed to the discussion of industry-specific policy issues in section 3.4. Chapter 2 canvases issues that also apply to the electricity industry. Policy issues specific to the gas industry are discussed in chapter 4.

3.1 Overview

The electricity supply industry covers the generation of electricity, its transportation from where it is produced to where it is used (the poles and wires of the network), and its sale to end users (figure 3.1). A range of other activities such as wholesale electricity markets, bilateral contracts and trade in electricity-related financial instruments support these sectors.¹³

The emergence of new more cost-effective technologies and government policies have led to fundamental changes that are challenging this traditional characterisation of the industry. Technological change is widespread throughout the industry, affecting the way that and where electricity is generated, and how it is transported and used. The resulting changes are having widespread ramifications. End users, for example, are playing an increasing role in the generation of electricity. Likewise, the increased use of distribution networks is leading to two way flows of electricity along distribution networks.

¹³ In the ABS *Australian National Accounts* (Cat. no. 5204.0), electricity-related financial instruments are treated as being part of the financial sector rather than the electricity supply industry.



Figure 3.1 Electricity supply chain

Government policies have been central to many of the changes that are directly affecting the industry. These include policy mandated increases in the production of electricity from renewable sources and generous feed-in tariffs.

Regulatory and other changes have been made to accommodate these changes affecting the industry.

Production of electricity

Electricity is produced commercially from the transformation of another source of energy. Energy is lost in this conversion process, such that the energy consumed is less than that produced.

In Australia, most electricity is generated by rotating magnets through electrostatic coils. These magnets are located on turbines that are primarily rotated by:

- steam created by burning fossil fuels such as coal and natural gas to heat water
- natural forces (such as wind and running water).

The production of electricity in this way usually occurs in specially built facilities, such as power stations and wind farms.

Some electricity is also produced by converting sunlight into electrons at the atomic level through the use of PV materials (termed solar PV). This production typically occurs in PV panels located in large-scale solar farms or on the rooftops of buildings.¹⁴

Geographic networks

The electricity supply industry in Australia consists of five geographically distinct networks (box 3.1).

Four of these networks supply electricity entirely within the state in which they are located — two in Western Australia, one in the Northern Territory and one in Queensland.

Only the NEM straddles state borders. It uses high voltage interconnectors to link the transmission networks in Queensland, New South Wales, Victoria, South Australia and Tasmania.¹⁵ The New South Wales transmission grid also services the Australian Capital Territory.

Interstate trade in electricity is only possible in the NEM. This chapter primarily focuses on the NEM unless otherwise stated. However, many of the issues raised may also be applicable to Western Australia and the Northern Territory.

¹⁴ Electricity produced directly by households, such as through the use of solar hot water systems, is generally only recorded in official statistics if it is subsequently sold into the grid. Household use of electricity generated in this way usually shows up in the electricity statistics as reduced demand.

¹⁵ The BassLink interconnector linking the Tasmanian transmission system to Victoria is a submerged high voltage direct current cable.

Box 3.1 Australian electricity networks

There are five main electricity grids in Australia:

- the National Electricity Market (NEM) which runs down the east and south east coast of Australia, covering the much of coastal Queensland, New South Wales, the Australian Capital Territory, Victoria, South Australia and Tasmania
- the South West Interconnected System (SWIS) which covers the south west of Western Australia, extending from Albany in the south to Kalgoorlie in the east and Kalbarri in the north
- the North West Interconnected System (NWIS) which covers part of the north west of Western Australia, servicing Dampier, Tom Price, Port Hedland, Karratha and Roebourne
- the Darwin to Katherine Interconnected System (DKIS) which runs from Katherine to Darwin in the Northern Territory
- the Mount Isa-Cloncurry supply network (Mt Isa Network) which runs from Cloncurry to Mount Isa in Queensland.

Of these, the NEM is the largest electricity network, accounting for 83 per cent of production and consumption in 2014-15 (DIIS 2016a table D).

Production and consumption

Production

Australia produced 258 terawatt hours (TWh) or 928 PJ of electricity in 2015-16 (figure 3.2). Production grew more-or-less continuously at 4.6 per year from 1960-61 to 2010-11. Since then, production has stabilised. Just over one-third of this long-term growth in production can be attributed to servicing the growth in the population (35 per cent).

Electricity production also grew steadily from 1960-61 in per person terms (figure 3.2). However, production per person peaked in 2006-07 at 11.7 megawatt hours (MWh) per person. Since then, production has declined by 9 per cent to 10.7 MWh per person. A range of factors have affected electricity use per person (and hence production), including more energy efficient appliances, increasing use of roof top solar hot water, better insulated buildings, and the continued shift in the share of production toward services.

The *Electricity generation* sector produced \$19 billion in gross industry value in 2013-14 (latest available) (0.5 per cent of GDP), or 31 per cent of the gross value of the overall electricity supply industry (ABS 2016).¹⁶

¹⁶ The remainder was contributed by *Electricity transmission, distribution, on selling and electricity market operation.*



Figure 3.2 Electricity generation, Australia, 1989-90 to 2015-16^a

^a Defined as total consumption of electricity by all states and territories (excludes solar energy). *Sources*: 1989-90 to 2012-13: DIIS (2016a table O), 2013-14 to 2015-16: Department of the Environment and Energy (DEE 2017), table O).

State production

Electricity production in 2014-15 was concentrated in four states: Queensland (27 per cent); New South Wales (25 per cent); Victoria (22 per cent); and Western Australia (15 per cent). The first three of these states form part of the NEM.

Production by fuel type

Most electricity in Australia is produced from the combustion of fossil fuels (85.3 per cent in 2015-16) (figure 3.3). Thermal (black) coal is the major fuel source, followed by natural gas and lignite (brown coal).¹⁷ Coal accounted for 63 per cent of electricity production. The main sources of electricity from renewable sources were hydroelectricity and wind, which collectively accounted for one-tenth of all electricity produced.

The renewable energy sector has undergone strong growth in recent years — both in terms of the amount of electricity produced and as a share of overall production (figure 3.4). Despite this growth, renewables accounted for just 15 per cent of overall electricity production in 2015-16. However, the use of renewables is higher in some jurisdictions such as Tasmania (hydroelectricity) and South Australia (wind).

¹⁷ This predates the 2016-17 closure of the 1600 MW brown coal fired Hazelwood Power Station in Victoria's La Trobe Valley.



Figure 3.3 Share of electricity generation by fuel type, 2015-16^a

^a All states and territories.

Source: Department of the Environment and Energy (DEE 2017), table O).

Figure 3.4 Electricity generation by broad fuel type, Australia, 1989-90 to 2015-16^a



^a Non-renewables: black coal, brown coal (lignite), natural gas, oil products and, up to 2013-14, multi-fuel fired plants. Renewables: bagasse, biogas, geothermal, hydro, solar PV, wind and wood. *Sources*: 1989-90 to 2012-13: DIIS (2016a table O), 2013-14 to 2015-16: Department of the Environment and Energy (DEE 2017).

Generators

There are over 300 registered generators in the NEM. There is a single generator in Tasmania, which accounted for 96 per cent of that state's generating capacity in 2017, with BassLink accounting for the remainder. The remaining NEM regions consist of multiple generators. AGL Energy was the largest generator in capacity terms in three states — South Australia (42 per cent), Victoria (31 per cent) and New South Wales (29 per cent) — while CS Energy was the largest generator in Queensland (35 per cent).The three largest generators accounted for roughly three-quarters of generating capacity in each NEM region outside Tasmania, other than New South Wales, where they accounted for 62 per cent (figure 3.5).

There is a mix of public and private ownership, with most generators in Victoria, New South Wales and South Australia being privately owned. The single generator in Tasmania (Hydro Tasmania) is government owned.



Figure 3.5 Market shares in NEM generation capacity by state, 2017^a MW

^a Capacity is based on summer availability for January 2017, except wind, which is adjusted for an average contribution factor. Interconnector capacity is based on observed flows when the price differential between regions exceeds \$10/MWh in favour of the importing region; the data excludes trading intervals in which counter flows were observed (that is, when electricity was imported from a high priced region into a lower priced region). Capacity that is subject to power purchase agreements is attributed to the party with control over output.

Source: AER (2017b, p. 44).

Consumption

The convention in Australian electricity statistics is for the quantity consumed to equal the quantity produced, with the use of electricity in the production of electricity (own-use) and losses incurred in transportation recorded as part of electricity consumption.

As final consumption of electricity in 2014-15 was 803 PJ, this suggests that these losses accounted for roughly 11 per cent of Australian production in that year.

Households and the manufacturing sector collectively account for almost half of electricity consumption (figure 3.6). Other notable users are mining and the electricity supply, gas, water and waste industries, which both account for just over 10 per cent.



EGWWS: electricity supply, gas, water and waste services. ^a Share of total final energy supply by natural gas.

Source: DIIS (2016a table F).

Three clear trends are evident over the last 40 years:

- residential demand has grown more-or-less continuously (2.8 per cent per year)
- mining demand has grown more-or-less continuously (4.6 per cent per year)
- manufacturing sector demand grew strongly to 2001-02 (4.0 per cent per year), before declining (-1.5 per cent per year).

Interstate trade

Interstate trade accounts for the difference between electricity production and consumption in each state. The direction and extent of this trade varies depending on the spot prices in interconnected states and availability of interconnector capacity. These prices reflect local demand and supply conditions in each state.

Queensland and Victoria were net exporters of electricity in 2014-15, while New South Wales, South Australia and Tasmania were net importers (figure 3.7). Given that their grids are not connected to other states, there was no interstate trade for Western Australia and the Northern Territory.



^a New South Wales includes the Australian Capital Territory. *Source*: DIIS (2016a).

Variation over the course of the year

Production, consumption and interstate trade in electricity vary markedly over the course of each day and throughout the year. These variations are driven principally by the demand patterns of households, not businesses.

The demand for electricity typically peaks in the early evening and is lowest overnight. Over the seasons it is higher on hot days in summer (from the increased use of air conditioners) and on cold days in winter (from the increased use of heaters). Summer peak demand typically exceeds that of winter. Around three quarters of Australian households have air conditioning or evaporative cooling (AER 2015, p. 25).

The use of rooftop solar panels and air conditioners also shifts the profile of electricity sourced from the grid. Understandably, households with rooftop solar panels supply most of their own electricity during the day when the sun shines and, as a result, source less electricity from the grid (figure 3.8). However, this changes in the evening and overnight when these customers source their electricity from the grid. Likewise, air conditioners increase the demand for electricity during daylight hours (particularly in the afternoon).

Figure 3.8 **Typical daily electricity consumption** Average consumption



^a Based on Western Power's Perth Solar City program spanning several [unspecified] years. Raw consumption for each customer by time of day averaged separately for weekdays and weekends and for each season. Averaged over the course of a year. Smoothed.

Source: Data Analysis Australia (2015).

Maximum electricity (peak) demand is closely linked to weather conditions. It also reflects local demand and supply conditions prevailing at the time (such as generator availability). After rising for a decade to 2009, maximum electricity (peak) demand has been generally flat or declined in most NEM regions to 2014-15 (AER 2017b, pp. 26–27). However, maximum demand for New South Wales, Victoria and South Australia rose significantly in 2015-16 (although well below historical peaks).

Queensland continued its almost unbroken trend of rising maximum demand, setting a new record peak on 18 January 2017 (AER 2017b, p. 26).

Significant generating capacity needs to be available to meet these relatively infrequent peaks. Maximum demand accounts for between 70 and 80 per cent of installed capacity in the NEM in most years (AER nd). Strong demand on these days feeds through into higher spot market prices for electricity, which induces extra capacity to come online.

Spot prices in the NEM have exceeded \$5000/MWh on 487 occasions since 2001, an average of 30 times a year across all NEM regions (or 6 per NEM region per year). These price spikes are more common in the hotter states — South Australia (10 per year), New South Wales (7 per year) and Queensland (6 per year) (AER 2017d).

The supply of electricity at any point in time also varies. Renewable sources of energy are particularly susceptible to variations in weather conditions that affect wind strength, the amount of sunshine and water availability. Wind power, for example, is unable to generate when there is no wind or when the wind exceeds maximum acceptable operating levels. All generation and network infrastructure are subject to maintenance down time, equipment failures (which may be more likely under adverse conditions) and climatic conditions (such as bushfires, thunderstorms and cyclones).

The supply of electricity may also vary depending on market conditions, whether generators have market power (either permanent or temporary) and for strategic reasons, such as temporarily withholding supply now in the hope that the rise in future prices will offset the loss from not generating now (a particular issue for hydropower). Individual generators that are unsuccessful in their offer bids are not needed for the timeslots sought.

Subject to availability and suitable conditions, some forms of generation such as hydroelectricity, gas peaking plants and batteries can be brought online to generate electricity at short notice or if directed to do so by the market operator.

Interstate trade can assist in meeting sudden changes in demand or supply within particular NEM regions and enable the more efficient use of generator capacity across the NEM. The scope to do so is, however, limited by the capacity of the interconnectors and their availability.

Distributed generation and distributed systems

Falling costs are making the small-scale (micro) production of electricity increasingly viable. These generators are often modular, and may involve renewable sources of energy.

Distributed generation is when these small-scale generators are located close to the end users of that electricity, thereby bypassing the transmission network and potentially the distribution network as well. New technologies are allowing electricity to be supplied through distributed generation at lower-cost than in the past and potentially with more reliability and security, and with fewer environmental impacts, than traditional power generators.

Falling information technology costs are also making it more viable for localised sharing or trade in electricity between office and residential buildings (termed distributed systems).

Photovoltaic solar panels

Commercial solar farms in Australia are in their infancy. As at March 2017, there was 232 MW of solar capacity installed in the NEM, all located in New South Wales (AER 2017b, p. 33). Growth has been slow given the relatively high costs involved.

In contrast, Australia has high take up rates for photovoltaic panels by international standards (figure 3.9). More than 1.6 million Australian households have rooftop solar panels, with roughly one in four households in the Australian Capital Territory and New South Wales having them installed.

Governments encouraged this uptake of rooftop solar by mandating higher feed-in tariffs for electricity sold into the grid between 2008 and 2012. Since 2012, the schemes have been phased out or closed to new entrants, and replaced by 'market offers' from electricity retailers at unregulated prices. These market offers do not provide the same incentives to install rooftop solar.

Collectively, these panels had an installed capacity of 5286 MW in 2016, equivalent to 9 per cent total installed generating capacity (AER 2017b, pp. 33 & 35).



3.2 National electricity market

The transmission network that supports the NEM is almost 44 000 kilometres (km) long (AEMC 2013). It is over 4500 km from its northern tip at Port Douglas in far northern Queensland to Port Lincoln in South Australia and across to Tasmania (figure 3.10).



Figure 3.10 The National Electricity Market

Source: AER (2017b, p. 23).

In 2015-16, the NEM:

- consisted of 336 registered generators, which collectively had an installed generating capacity of 47 148 MW
- generated 198 TWh of electricity
- supplied 9.6 million customers
- generated \$11.7 billion in turnover (AER 2017b, p. 24).

Generation sector

Installed generating capacity in the NEM *grew* at 2.4 per cent per year from 1998-99 to 2012-13 (figure 3.11). Installed generating capacity then *fell* by 1.8 per cent per year to 2016-17. This reflects that the reduction in capacity with the withdrawal of older coal and gas-fired power stations exceeded the addition of new capacity (mostly renewables) (table 3.1).





Source: AER (Generation capacity and peak demand (nd)).

Year of withdrawal	Power station	State	Year commissioned	Capacity	Fuel type ^a
				MW	
Withdrawal					
2011-12	Swanbank B ^b	Qld	1971	480	CCGT
2012-13	Munmorah	NSW	1967	600	Coal
	Tarong ^{c}	Qld	1984–1986	700	Coal
	Collinsville	Qld	1968	180	Coal
2014-15	Morwell, Brix	Vic	1956	95	Coal
	Wallerawang C	NSW	1976	1 000	Coal
	Redbank	NSW	2001	144	Coal
	Pelican Point ^d	SA	2001	249	CCGT
	Swanbank E ^e	Qld	2002	385	CCGT
2015-16	Northern	SA	1985	540	Coal
	Playford B	SA	1963	200	Coal
	Anglesea	Vic	1969	150	Coal
2016-17	Hazelwood	Vic	1964	1 600	Coal
Announced w	vithdrawal				
2017	Smithfield	NSW	1996	171	Gas
	Tamar Valley ^f	Tas	2009	208	CCGT
2021	Mackay	Qld	1975	34	CCGT
2022	Daadine	Qld	2006	33	CCGT
	Liddell	NSW	1971–1973	2 000	Coal

Table 3.1Withdrawn and announced withdrawal of generation capacity
from the NEM, since 2011-12

^a CCGT: combined cycle gas turbine. ^b Decommissioned progressively between April 2010 and May 2012. ^c Closed 2012 to 2014. ^d Half capacity withdrawn. Announced return to full capacity in June quarter 2017. ^e Placed into cold storage. Expected to return December 2018. ^f Mothballing.

Sources: AER (2017b, p. 40); Generator web sites.

The lack of investment in new generating capacity and extending the economic lives of existing generators partially reflects uncertainty concerning the future investment environment. This uncertain has arisen for many reasons, including:

- recent changes in Australian climate change policy (including moving from tradable emissions permits to a fixed carbon price (carbon tax), and then moving from a 'market-based' emissions reduction scheme to direct action) (discussed in chapter 2)
- uncertainties about how Australia will meet its international commitment to reduce greenhouse gas emissions by 26–28 per cent on 2005 levels by 2030 (discussed in chapter 2)
- uncertainties concerning the availability and price of natural gas as feedstock (discussed in chapter 4)

• increased sovereign risk associated with recent government interventions in the market following the problems in South Australia and Tasmania, and supply uncertainties in New South Wales, Victoria and Queensland.

Many of the power stations withdrawn have been older coal fired power stations built in the 1960s or early 1970s, or smaller combined cycle gas power stations built around the year 2000. These withdrawals include (in decreasing order of size): Hazelwood (Victoria), Wallerawang C (New South Wales), Swanbank B and E (Queensland), Munmorah (New South Wales), Northern (South Australia) and Pelican Point (South Australia). Other coal and gas fired power stations are scheduled to close in the near future, including the giant Liddell power station in New South Wales (capacity 2000 MW), which is scheduled to close in 2022.

At its April 2017 meeting, the Chief Executive Officer of the AEMO briefed the COAG Energy Council that the closure of the Hazelwood power station:

... would not compromise the security of the National Electricity Market next summer [2017-18]. (COAG Energy Council 2016)

Many of these withdrawals have been large power stations, while the additions tend to be smaller.

System reliability

The intermittency of renewable generation¹⁸ makes it difficult for the system operator to ensure that there is always sufficient supply to meet required demand (termed system reliability). The problems of intermittent and variable sources of electricity can be, at least partially, overcome through a variety of means, such as aggregation (bundling), increased use of interconnectors and the use of storage facilities (like dams and batteries).

Dispatchability

Most forms of generation connected to electricity grids can be called on by the system operator to produce electricity when required. The system operator needs to know, among other relevant factors, that the generator exists, its capacity and its physical location. It also needs to communicate with the generator to be able to control its input into the grid.

The system operator can do this for registered generators.

All generators that connect to the interconnected transmission or distribution system are required, unless exempted, to be registered under section 11 of the National Electricity

¹⁸ Hydro is not intermittent, and pumped hydro, where the water is pumped back up to the dam at times where cheap power is available, can be used to generate power to meet peak demand. But hydro is affected by the catchment rainfall, which can vary from year to year.

Law. The main exemption from registration is for small generating systems with a combined nameplate rating of less than 5 MW.

As a result, the system operator is not aware of small generators, such as rooftop solar panels connected to distributed systems, even though they are connected to the grid and may be supplying electricity (typically through the distribution system).

Moreover, these small generators cannot be controlled by the system operator.

This lack of awareness and inability to control their output makes it harder for the system operator to maintain system stability (discussed below).

Responsiveness

Some sources of generation such as gas, hydro, wind and solar can be rapidly brought online to generate electricity. The amount of electricity produced by gas and hydro can also be varied quickly as required by the system operator.

On the other hand, coal-fired power stations take much longer before they can begin generating electricity and it is much harder to vary their output.

Coal power stations are capable of generating large quantities of electricity (with installed capacities of 600 to 2000 MW). They are expensive to build, but, on a per MW produced basis, these 'fixed' costs are typically lower than other forms of generation. However, as they require fuel to produce electricity, the cost of producing each additional unit of electricity (referred to as their 'marginal cost') is also typically higher. The long ramp up to peak capacity means that coal-fired power stations frequently operate 24 hours a day, 7 days a week, so are ideal for providing baseload demand, with other more responsive sources of electricity meeting peaks in demand.

Gas generation tends to have lower fixed costs and higher marginal costs than renewables, but not to the same extent as coal generation.¹⁹

Ancillary services

Ancillary services encompass a range of technical services that are needed to maintain the physical properties of the electricity being supplied, such as its voltage and frequency (box 3.2). These services ensure that there are no surges, spikes and other disturbances that could potentially damage *all* equipment connected to the electricity grid. Ancillary services are vital for power system security.

¹⁹ The marginal cost of some renewable is minimal.

Electricity on transmission networks need to adhere to a standard frequency of 50 cycles per second (termed Hertz). Frequency control services provided by certain generators seek to maintain this by balancing supply and demand in the short-term.

Synchronous generation is important for frequency control. Some sources of electricity, such as coal, gas and hydroelectricity, produce waveforms of voltage that are synchronized with the physical rotation of the rotor in the generator (termed synchronous generation). These generators resist sudden changes, thereby making it easier to maintain grid frequency.

However, some sources of electricity, particularly wind power, do not produce waveforms that coincide the physical rotation of the rotor (termed asynchronous generation). Frequency control services are required to maintain grid frequency.

System inertia helps resist sudden changes in frequency. The output of some sources of electricity, such as coal, gas and hydroelectricity, inherently possess system inertia, but other sources, such as renewables, do not. Changes in the mix of generation over time has made the provision of system inertia more critical, and work is underway to ensure it can be provided as a separate service.

Companies bid to provide these services to the NEM on a competitive basis to ensure that, if needed, they are provided on a least cost basis (box 3.2).

On 7 July 2017, the AEMC announced a review into the market and regulatory arrangements necessary to support effective control of system frequency in the NEM (AEMC 2017b).

Box 3.2 Ancillary Service

Ancillary services maintain the availability and quantity of electricity supplied across networks. They seek to maintain the physical characteristics of the electricity being supplied, such as its voltage, frequency, waveform purity and phase balance. They underpin the physical trade that occurs in the sport market.

Ancillary services are vital for ensuring a safe, secure and reliable supply of electricity to customers. They are essential for preventing damage to all infrastructure connected to the network that may otherwise occur. 20

The AEMO is responsible for maintaining the provision of ancillary services to the NEM.

Ancillary services encapsulate a number of different types of physical services:

- *frequency control ancillary services* (FCAS), which maintain the frequency on the electrical system at any point in time, close to 50 cycles per second (split into six second, 60 second and five minute responses to raise or lower the frequency)
- *network support and control ancillary services* (NSCAS), which control transmission line flows and permit full utilisation of transmission lines by:
 - controlling the voltage at different points on the electrical network to within prescribed standards
 - controlling the power flow on network elements to within their physical limitations
 - maintaining transient and oscillatory stability within the power system following major power system events
- system restart ancillary services (SRAS), which enable the electrical system to be restarted after a complete or partial system blackout.

As electricity is supplied through networks, supply problems in one part of the network can flow through to other users and, in some cases, escalate.

Synchronous generation is important for frequency control.

The manner in which these services are provided, who pays and how much they pay varies depending on the nature of the service provided.

Frequency control involves bringing the demand for, and supply of, electricity back into balance. Regulation frequency control services respond to minor deviations in load or generation, while contingency frequency control services respond to major events such as the loss of a generating unit.

The price of FCAS is determined in a broadly similar way to that used to price electricity in the wholesale market. Companies offer to provide the different types of services required and the price at which they are prepared to supply them. The market operator determines the amount of FCAS service required and selects the companies that minimise the cost of the services. The market clearing price is the bid price of the highest cost company selected. This price is then paid to all companies that supplied the services used.

²⁰ Important infrastructure such as power stations, interconnectors and substations have their own additional security measures such as surge protectors and voltage optimisation to protect them. For example, the surge protector on the Heywood interconnector that links the South Australia and Victorian transmission systems tripped to prevent damage to the interconnector after the loss of other generators following storm damage to the South Australia transmission system in September 2016 (AEMO 2017a).

FCAS services are paid for by different parties depending on the nature of the underlying problem and, hence, the response required. The cost of regulating FCAS is recovered from the causer (causer pays basis). The cost of contingency FCAS that raise and lower frequency are recovered from generators and customers, respectively.

Source: Based on AEMO (2017d).

Wholesale electricity market

The NEM wholesale electricity 'market' consists of five interconnected state-based spot markets (referred to as 'NEM regions') that instantaneously match the supply and demand for electricity in each market.²¹ Interconnectors allow trade between adjacent spot markets up to their capacity. If the interconnectors are down or their capacity is reached, the prices of electricity in adjacent spot markets become separated from each other.

The spot price in each NEM region is determined by demand and supply in that market and the extent of cross-border trade.

Generators submit bids to supply specified amounts of electricity at specified prices for set time periods to the market operator (AEMO). Generators can resubmit the amounts offered at any time (but not their price). Bids are submitted for every five minutes of the day (giving 288 dispatch intervals).

From all the bids offered, the AEMO determines which generators will be deployed to produce electricity, with the cheapest generator put into operation first in order to meet demand in the most cost-efficient way. This is done by progressively dispatching generators in increasing order of their bid price. The dispatching of generators is done in real-time through a centrally-coordinated dispatch process that also takes into account transmission limitations to prevent the network from becoming overloaded.

Spare generating capacity is always kept in reserve in case it is needed.

Should consumption in a NEM region exceed supply, and all other means of meeting that consumption have been exhausted, the AEMO can instruct network service providers to temporarily cut off the electricity supply to some customers, usually a large industrial customer (termed load shedding). This action is only taken when there is an urgent need to protect the power system by reducing consumption and returning supply and demand in the system to balance.

The market price for every five minute trading interval (referred to as the 'dispatch price') is determined by the highest bid price accepted by the market operator for the last MWh of

²¹ There is one spot market for each state in the NEM. The New South Wales spot market also covers the Australian Capital Territory.

electricity dispatched. The spot price in each market is then determined for every half-hour by averaging the six dispatch prices that make up that half hour. All generators dispatched in the half-hour are paid the spot price.

The National Electricity Rules set a minimum (negative \$1000/MWh) and a maximum price for the spot price (\$14 000/MWh in 2016-17 and \$14 200 in 2017-18).

The market operator also manages the financial settlements that accompany the physical flows of electricity. These settlements are based on the spot price.

Wholesale electricity prices vary between NEM regions and over time (figure 3.12). These prices provide signals to market participants to guide their responses and signal the need for possible future investment. Variations in the price over time (price volatility) potentially exposes electricity generators and users to financial risk and uncertainty. Financial instruments can be used to hedge against these risks.



^a Volume weighted average prices; 2016-17 data is for the nine months to 31 March 2017. *Source*: AER (2017b, p. 52).

Between January 2013 and August 2016, average wholesale prices were lowest in Victoria (\$45/MWh) and New South Wales (\$48/MWh) (table 3.2). Average prices were appreciably higher in the remaining NEM regions, with South Australia having the highest average price (\$62/MWh).

Wholesale prices tended to be more stable (less volatile) in Tasmania, New South Wales and Victoria, although Tasmania did experience significantly more price spikes wholesale electricity prices over \$300/MWh — than the two mainland states (311 compared with 22 and 64, respectively) (table 3.2). Queensland experienced the highest price variability (365 per cent from average), but South Australia experienced the highest number of price spikes (610 in total, or an average of 14 per year).

Table 3.2Wholesale electricity market price characteristics by NEM
region, January 2013 to August 2016

	NSW	VIC	QLD	SA	TAS
Average wholesale price	\$47.80	\$44.78	\$59.90	\$61.78	\$59.03
Volatility a	162%	167%	365%	260%	128%
Number of price spikes ^b	22	64	405	610	311

 $^{\rm a}$ Half-hourly wholesale price variations from the average wholesale price. $^{\rm b}$ Half-hourly wholesale prices greater than \$300/MWh.

Source: PWC (2016, p. 13).

While price variability has always been part of the NEM, of particular concern has been a sharp jump in prices in 2016-17 in all NEM regions other than Tasmania. The smallest increase in average prices was 15 per cent in Victoria, and the largest increase was 65 per cent in South Australia (figure 3.12). The increases in Queensland and New South Wales were both in the order of 50 per cent. These large price increases reflected changes in the supply–demand balance and in the mix of generation supply, with gas generation being the marginal producer for longer periods and gas prices being high by historic standards (discussed in chapter 4).

The fall in Tasmanian spot prices reflected a partial unwinding of the higher prices that followed the problems in the previous year with the BassLink interconnector, which was out of operation from 20 December 2015 to 13 June 2016 following a subsea fault in the cable (and some subsequent disruptions).

Transmission sector

Transmission grids

Transmission involves the transportation of electricity at high voltages from the point of generation to the point where local distribution network begins or, for large customers, the point of final demand.

The NEM consists of five state-based transmission networks. Each region has a single 'Transmission Network Service Provider (TNSP)' that is responsible for the overall
management of the transmission network in that region, even if other companies also provide these services (table 3.3).²²

Table 3.3	Transmission networks in the NEM					
NEM region	TNSP	Owner	Network length			
			km			
Qld	Powerlink	Queensland Government	14 756			
NSW (and ACT)	TransGrid	Hastings 20%; Spark Infrastructure 15%; other private equity 65%	13 039			
Vic	AusNet Services	Listed company (Singapore Power 31.1%, State Grid Corporation 19.9%)	6 559			
SA	ElectraNet	State Grid Corporation 46.6%; YTL Power Investments Limited 33.5%; Hastings 19.9%	5 524			
Tas	Transend	Tasmanian Government	3 564			
NEM total			43 442			

The transmission network assets in all states except Victoria are government owned. In Victoria, the network is owned by the private sector TNSP.

In contrast, the majority of companies that actually operate the networks — the TNSPs — are privately owned, with the TNSPs in South Australia and New South Wales leasing the assets from their respective state governments.²³

The transmission networks and the TNSPs in Queensland and Tasmania are government owned.

Interconnectors

Interconnectors are the high-voltage transmission lines that transport electricity between most adjacent regions in the NEM (although not between New South Wales and South Australia). They allow electricity to be imported into a region when demand is higher than can be met by local generators, or when the price of electricity in an adjoining region is low enough to displace local supply.

²² In Western Australia, there are two transmission companies, one for the SWIS and one for the NWIS.

²³ In December 2015, the New South Wales Government leased TransGrid for 99 years to the NSW Electricity Networks consortium — Caisse de dépôt et placement du Québec (24.99 per cent), Hastings (20.02 per cent), Tawreed Investments (19.99 per cent), Wren House Infrastructure (19.99 per cent) and Spark Infrastructure (15.01 per cent) — for \$10.258 billion. The consortium signed an 'Electricity Price Guarantee' confirming that total network charges will be lower in 2019 than they were in 2014.

There are six interconnectors currently in the NEM (table 3.4). Each interconnector consists of connections to allow electricity to flow in both directions. However, as the capacity of the connections are often not symmetric, some interconnectors allow more electricity to flow in one direction than the other.

There are two types of interconnectors in the NEM:

- regulated interconnectors
- unregulated interconnectors.

Regulated Interconnectors

A regulated interconnector is an interconnector that has passed the regulatory test set out in the National Electricity Rules and has been deemed to add net market value to the NEM. The owners of a regulated interconnector receive a fixed annual revenue set by the AER based on the value of the asset, rather than on the usage of the interconnector. The revenue forms part of the network charges levied on electricity users.

Table 3.4	NEM inte	erconnecto	rs		
Name		NEM regions linked	Nominal capacity	Owners	Length
			MW		km
Regulated					
DirectLink (Terrano	ra)	NSW-QLD	North: 107 South: 210	Energy Infrastructure Investments (Marubeni 49.9%, Osaka Gas 30.2%, APA Group 19.9%)	63
Heywood		SA-VIC	East: 460 West: 460		200
Murraylink		NSW-VIC	East: 220 West: 220	Energy Infrastructure Investments (Marubeni 49.9%, Osaka Gas 30.2%, APA Group 19.9%)	104
Queensland to New Wales Interconnect	v South or (QNI)	NSW-QLD	North: 300–600 South: 1 078	NSW Government/ Queensland Government	~235
Victoria to New Sou Wales	ıth	VIC-NSW	North: 1 600 South: 1 600	NSW Government/ AusNet Services	~150
Unregulated					
BassLink		TAS-VIC	North: 594 South: 478	Keppel Infrastructure Trust	375
Sources: AER (201	7b, p. 96);	AEMO (2015).			

All interconnectors in the NEM other than BassLink are regulated.

Unregulated Interconnectors

An unregulated (or market) interconnector derives revenue by trading electricity in the spot market. The owners purchase electricity in a lower price region and sell it to a higher price region, or by selling the rights to revenue generated by trading across the interconnector. Unregulated interconnectors are not required to undergo regulatory test evaluation. BassLink is the only unregulated interconnector in the NEM.

Planning and augmentation

TNSPs are required to account for the costs of system maintenance separately from that of new investment in augmenting the grid.

The AEMO is responsible for planning of the national transmission network. It publishes a 10 year forecast annually to assist market participants assess the future need for electricity generating capacity, demand-side capacity and augmentation of the network to support the operation of the NEM (AEMO 2016a).

Under the National Electricity Rules, TNSPs are required to undertake a market-based cost-benefit test known as the 'regulatory investment test for transmission' (known as a RIT-T) for potential network augmentation and non-network investment proposals.

Under the test, TNSPs are required to assess the efficiency of proposed investment options by estimating the benefits that would result for market participants and consumers, and comparing these to the associated costs. They are required to put forward and evaluate various options including non-network solutions, such as generation support and demand management, and engage in stakeholder consultation. The test is intended to ensure that each individual investment proposal is evaluated on its merits.

Connection

Companies wishing to connect any facility to the NEM — be it a power station, industrial facility or a connection to a distribution network — must liaise with the connecting TNSP, who manage the connection process. The facility must meet the network performance standards required by the system operator. The AEMO is involved in assessing simulation models of power system plant and associated control systems, and commissioning and post-commissioning activities.

Regulation

Transmission networks are highly capital intensive and involve significant costs that do not vary with the quantity of electricity transported. As a result, the average cost of transporting electricity generally declines as output increases. These 'economies of scale' mean that it is typically cheaper for transmission services to be provided by a single company rather than by competing ones. Transmission companies are highly regulated to prevent them from exploiting the market power that arises from these 'natural monopoly' characteristics.²⁴

The approach for regulating electricity networks is set out in the National Electricity Law and Rules. Chapter 6A of those Rules sets out the framework to be used for transmission networks, while chapter 6 does the same for distribution networks.

Prices are set on a state-by-state basis for each state's TNSP. The process differs depending on whether the services being provided are:

- negotiated between the network operator and the customer (termed 'negotiated services')
- open to all customers (termed 'prescribed services').

Negotiated services are usually provided to a single customers (or small group) that connect directly to the grid. These typically include registered generators and large industrial customers. The prices are negotiated with the TNSP in accordance with their Negotiating Framework, which is required by the National Electricity Rules, and approved by the AER.

Prescribed transmission services are subject to revenue regulation by the AER under the National Electricity Rules. This involves: the determination of total revenue that each TNSP can earn; and its translation into the prices levied on network users (box 3.3).

Annual revenue requirements

The AER determines the aggregate annual revenue requirement that each TNSP can earn over a specified period of time (such as for three years) using a 'building-block' approach, which builds up its 'Regulated Asset Base' from past and current approved capital expenditures. The AER then applies an estimate of the cost of financing that expenditure (including a rate of return on that expenditure) — termed the weighted-average cost of capital (WACC) — to these regulated asset bases to determine the revenue that it can earn in each year.

This process requires the AER to make judgements on the efficient level of operating costs together with depreciation and a rate of return on its Regulated Asset Base. This process is costly and contentious, and frequently the basis for legal reviews against the final determination.

The approach is intended to act as a form of 'incentive regulation', whereby the business can keep the balance of its revenue allowance for the regulatory period if it can outperform the revenue allowance by operating more efficiently.

²⁴ The exercise of monopoly power can be exerted in different ways, such as by raising prices, inflating costs or by reducing the quality of services supplied.

Box 3.3 The setting of transmission prices in the NEM

There is a three-step process for translating the maximum allowable revenue that each TNSP can earn into the actual transmission prices levied in each year.

The first step involves the TNSP allocating this revenue across four different types of prescribed activities:

- entry services, which cover assets used to support the connection of generators to the grid
- *exit services*, which cover assets used to support the connection of large customers and distributors to the grid
- common services, which cover services that benefit all customers irrespective of location
- *shared network services*, which covers the use of the transmission network (including transmission power lines/towers and terminal stations) by large customers and distribution companies. These are specified on a 'locational' and 'non-locational' basis.²⁵

The second step involves the TNSP allocating the amount of revenue to each connection point on the transmission network.

The third step involves the TNSP setting the prices at each connection point to recover the required revenue.

The TNSP then submits the resulting draft prices along with their forecast expenditures and the methodology and asset allocations used to the AER for approval.

The AER then reviews and revises these calculations in line with the detailed National Electricity Rules before setting the final prices.

This process involves extensive stakeholder consultation from both the TNSP and the AER with position papers, draft proposals and final proposals being issued (and revised proposals where relevant).

The process of setting the prices to be charged for each regulated activity seeks to balance a number of criteria, including consistency across the NEM, price stability, reflect the underlying costs of providing the service and provide appropriate price signals to guide producer, consumer and investor behaviour in the least distortionary manner.

The general aim is for the charge to reflect the nature of the underlying cost involved, with a cost that does not vary with the quantity of electricity carried (fixed cost) ideally being recovered through a fixed charge and a cost that varies with the quantity of electricity carried (variable costs) ideally being recovered through a usage-based variable charge.

For example, TransGrid recovers the cost of:

- exit and entry services through fixed charges (\$/day)
- non-locational and common services on the basis of maximum demand at each connection point (\$/kW)
- locational services on the basis of a 'modified cost reflective network pricing' methodology that takes into account network utilisation
- shared services on the basis of customer forecast average monthly maximum demand

²⁵ In its 2018-19 to 2022-23 pricing methodology, the NSW TNSP TransGrid distributed its revenue allocation: 4.1 per cent to entry services; 16.2 per cent to exit services; 1.7 per cent to common services; and 78.0 per cent to shared network services (TransGrid 2017, p. 10).

(\$/KW). Sources: AEMO (2017d); TransGrid (2017, nd).

Transmission prices

The process by which annual revenue requirements are translated into transmission prices is summarised in box 3.3. The resulting price structures vary by TNSP across the NEM (figure 3.13).

The cost of transmission across Australia (excluding the Northern Territory) averaged 2.18 cents/kWh in 2016-17 (figure 2.3). This is equivalent to \$114 per household per year, or 8 per cent of residential electricity prices. The cost of transmission is lowest in Victoria (1.45 cents) and Western Australia (1.50 cents) and highest in South Australia (2.80 cents).

Figure 3.13 TNSP pricing structures^a

TNSP	Location \$/kW/r	al Price nonth	Common Service and Non-locational Prices \$/kW		Connection Price	CRNP
	Rates	Billing	Rates	Billing		
TransGrid	\$/kW/mth escalated historical average monthly maximum demand	\$/kW/mth actual monthly maximum demand	historical annual maximum demand	historical annual maximum demand	\$/day	Modified 365 days
Powerlink	\$/kW/mth sum of the average half hourly demand and the nominated demand (moving to opt in nominated max demand only)	\$/kW/mth sum of the agreed nominated demand and the measured average half-hourly demand	\$/MWh or \$/MW/month contract maximum demand or historic energy usage	Historical energy or contract agreed maximum demand	\$/month	Standard 365 days (moving to Modified)
Electranet	\$/kW/day contract agreed maximum demand		\$/MWh or \$/MW/day contract maximum demand or historic energy usage	Historical energy or contract agreed maximum demand	\$/day	Modified 365 days
TasNetworks	\$/MW/mth agreed contract maximum demand		\$/MW/month or \$/MWh contract maximum demand or historic energy usage		\$/month	Modified 365 days
AEMO- Victoria	\$/MW average historical maximum demand on the 10 system peak days	the lower of the contract average maximum demand (if elected), and the actual average maximum demand.	\$/MW/month or \$/MWh contract maximum demand or historic energy usage	the lower of the contract agreed maximum demand, or the energy for the most recently completed 12 month period	\$/day	Standard 10 days

^a CRNP: cost reflective network pricing. Source: TransGrid (2016, p. 17).

Distribution sector

Distribution involves the low voltage transportation of electricity from the high voltage long-distance transmission lines to the end customers, typically households, commercial and smaller industrial users.

There are 16 electricity distribution companies in Australia, each serving a specific geographic area (table 3.5). Only Victoria, New South Wales and Queensland have more than one distribution company connected to the same grid.²⁶

Table 3.5 Electricity distribution companies by jurisdiction ^a					
Jurisdiction	Distribution companies	Customers	Line length	Regulator	
			km		
New South Wales	Ausgrid	1 688 282	41 453	AER	
	Endeavour Energy	968 355	36 468	AER	
	Essential Energy	879 065	191 945	AER	
Victoria ^b	Powercor Australia	777 161	74 452	AER	
	AusNet Services	706 424	44 349	AER	
	United Energy	664 549	12 873	AER	
	CitiPower	327 907	4 505	AER	
	Jemena	321 417	6 252	AER	
Queensland	Energex	1 421 522	53 202	AER	
	Ergon Energy	739 354	152 255	AER	
South Australia	SA Power Networks	858 647	88 808	AER	
Western Australia	Western Power [SWIS]	1 065 355 ¢	93 347 d	Economic Regulation Authority of WA	
	Horizon Power [NWIS]	47 168	7 896 d	Economic Regulation Authority of WA	
Tasmania	TasNetworks	285 325	22 681	AER	
Northern Territory ^e	Power and Water Corporation	84 196	8 375 d	Utilities Commission	
Australian Capital Territory ^f	ActewAGL	184 962	5 312	AER	

Table 2 F atriaity diatribution companies by juriadiationa

^a Ordered within each jurisdiction by customer numbers. ^b Essential Energy also serves a small number of customers in Victoria. ^Ć Residential and small and medium enterprise customers. ^d Excluding transmission network. ^e Power and Water also supplies electricity generation and retail services to 72 remote communities through its not-for-profit subsidiary, Indigenous Essential Services. ^f Essential Energy also serves some customers in the ACT.

Sources: AER (AER 2017b, p. 97); Horizon Power (2016, pp. 4 & 17); Power and Water Corporation (2016, p. 40); Regulator web sites; .Western Power (2016, pp. 3 & 8).

²⁶ Western Australia has two distribution companies: one for the SWIS and one for the NWIS.

Two distribution companies each have over 1 million customers: Ausgrid in New South Wales (1.7 million); and Energex in Queensland (1.4 million). Essential Energy in New South Wales has the longest distribution network at 192 000 km.

Regulation

Distribution companies are regulated by the AER in a broadly similar manner to transmission companies (discussed previously).

Distribution prices

Distribution costs add significantly to the retail price of electricity in Australia. In 2016-17, distribution costs accounted for 38 per cent of average residential electricity prices (AEMC 2016a, p. 191). This is equivalent to \$519 per household per year. Distribution costs are the second largest source of household expenditure on cost incurred by households after 'wholesale and retail [margins]', and 2.3 times the contribution made by transmission costs and environmental policies combined.

Retail sector

Electricity consumers are central to the National Electricity Objective that is at the core of the National Electricity Law:

 \dots to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to — (a) price, quality, safety, reliability, and security of supply of electricity; and (b) the reliability, safety and security of the national electricity system.

Retailing of electricity involves the sale of electricity to final customers, usually households, commercial and smaller industrial users (typically those using less than 50 MWh per year). Retail companies purchase the electricity sold from the spot market or directly from generators through the use of bilateral contracts.

Retail contestability

Historically, retail companies were monopoly sellers of electricity to all households in specific geographic areas. The prices paid by retail customers were set independently by state government pricing authorities, such as the Victorian Essential Services Commission. Their price determinations took into account the costs involved to ensure that the retailers earned a suitable return on their investment. Retail prices typically involved a charge for access to the distribution network and a per unit price, often based on a sliding scale according to the quantity used. While these prices may have varied depending on the time

of use (such as 'peak' and 'off-peak' times), they did not reflect the price of electricity in the wholesale market throughout the day.

Things have changed, with Tasmania being the last jurisdiction to introduce retail contestability on 1 July 2014, so now all customers in the NEM are free to choose their own retailer. Retail customers can remain with their existing retailer on regulated retail prices or switch to a new retailer.

The introduction of retail contestability has resulted in a range of different pricing structures for retail customers, including:

- time-of-use tariffs, made possible by interval (smart) meters that measure a customer's energy use in real time
- pool pass-through arrangements (whereby the customer takes on the risk of wholesale market volatility)
- fixed price contracts (whereby the customer pays a fixed amount regardless of how much energy they use).
- tailored offers to customers with specific requirements (such as households with swimming pools) (AER 2017b, p. 126).

Retailers can also offer other services such as direct load control at times of high demand.

Retailers manage the risks associated with potential price volatility in the wholesale market through a variety of means. They can enter into bilateral contracts with generators to secure price certainty. They can purchase generation assets to supply themselves with electricity. Retailers also use financial instruments (derivatives), such as hedging (discussed later).

The changing nature of the retail sector

Improvements in information technology are increasingly empowering electricity consumers to better understand their own electricity use, make better informed decisions concerning their electricity choices and manage their bills. Smart meters, for example, record details on electricity use (such as the amount of electricity used and time of day that it is used). Applications and web sites have been developed to make this data easier and simpler to analyse (to find the retail plan that best suits them).

The rollout of these technologies may also benefit other sections of the industry, particularly retailers. The rollout of smart meters in Victoria, for example, has reduced the cost to retailers of meter reading.

The result is that retail electricity customers now have a much wider range of choice than they did previously. The retail market is also now more complex than it was. The introduction of rooftop solar panels has also had a material impact on retail markets. These households and business generate much of the electricity they use, thereby reducing their demand from retailers. When their generation of electricity exceeds their own requirements, these customers may sell the excess back to electricity retailers. Some feed-in tariff schemes allow customers to sell all the electricity they produce to retailers and buy what they need back from the grid at cheaper prices.

The falling cost of battery storage will enable households to store their electricity generated for future use. It also allows, if agreed to by the retail customers, companies to manage these batteries (and the electricity generated by any supporting solar panels) and engage in electricity trade on their own behalf or on behalf of the retail customer.

Competition in the retail sector

The introduction of retail contestability means that some retail customers are on market contracts, while others are still on regulated contracts. This share varies markedly by jurisdiction, as does the number of retail companies operating in each market.

Despite this, retail competition in electricity markets is limited and market concentration high. Three retail suppliers — AGL Energy, Origin Energy and EnergyAustralia — supplied over 70 per cent of small electricity customers in southern and eastern Australia as at 30 June 2015 (AER 2015, p. 18).

The AER found that retail electricity markets in Tasmania, regional Queensland and the Australian Capital Territory were 'not yet fully competitive' (AER 2015, p. 18). This reflects ongoing retail price regulation and the dominance of the incumbent retailer.

Retail price regulation

While the AER is the national regulator of the retail electricity (and gas) markets under the National Energy Retail Law, it does not regulate retail prices in any jurisdiction.

Retail prices were deregulated in Victoria in 2009, South Australia in 2013, New South Wales in 2014 and south east Queensland from 1 July 2016. Retailers in these states offer electricity contracts that specify the prices that they are willing to supply electricity at. Customers then choose between retailers. The price they pay will depend on the terms of the contract that they enter into. Retailers can only adjust their prices once every six months. Governments still require retailers to publish standing offer prices that small customers can access.

From 1 January 2017, the retail price of electricity for small customers — those consuming less than 100 MWh per year — is only regulated in rural Queensland, Tasmania and the Australian Capital Territory.

Retail prices

Retail electricity prices in Australia averaged 25.8 c/kWh in 2016-17 (figure 2.3). The Australian Capital Territory had the lowest price (19.6 c/kWh and South Australia the highest (32.0 c/kWh). The average household electricity bill in that year was \$1356.

Network costs were the largest contributor to the average household electricity bill in 2016-17, accounting for accounted for 47 per cent or \$633. The next largest contributor was wholesale and retail combined (45 per cent).²⁷ The cost of environmental policies accounted for the balance (AEMC 2016a, p. 191).

Distribution network costs accounted for 82 per cent of network costs, with transmission costs accounting for the remainder. This means that distribution network costs alone cost the average household \$519 in 2016-17.

In terms of cents per kWh, network costs are highest in the non-NEM jurisdictions of Western Australia (14.8c/kWh) and the Northern Territory (13.6c/kWh) and lowest in the Australian Capital Territory (8.1c/kWh) and New South Wales (10.9c/kWh). As a share of total household electricity bills, network costs are highest in Tasmania (54 per cent) and Western Australia (50 per cent) and lowest in the Australian Capital Territory (41 per cent) and South Australia (42 per cent).

ABS data indicate that real electricity prices grew by an average of 2 per cent per year between June 1990 and June 2016, with nominal prices growing by 4.5 per cent per year and the consumer price index (CPI) by 2.5 per cent (figure 3.14). Real and nominal household electricity prices grew particularly strongly between 2008 and 2013 (9.9 per cent and 12.2 per cent per year, respectively). Since then, nominal prices have remained essentially flat, implying a 1.8 per cent fall in real prices.

Real retail electricity price growth has followed the growth in real retail gas prices, albeit with a lag in the mid-2000s (figure 3.14).

However, the ABS data also indicate that real and nominal electricity prices have risen strongly in the nine months to March 2107 (increasing by 8 per cent and 10.3 per cent, respectively). This growth is significantly higher than that for gas over the same period, although this may reflect a catch-up from earlier growth in gas prices.

The main drivers of higher retail bills in 2016 were wholesale prices and retail margins (AEMC 2016a, p. ii).

²⁷ Western Australia is the only jurisdiction for which the AEMC reports the contribution from wholesale prices and the retail margin separately.



Figure 3.14 Household electricity and gas prices, June 1990 to March

Recent price determinations have involved significant increases in regulated retail prices. The Independent Competition and Regulatory Commission (ICRC), for example, approved an average 18.95 per cent increase in regulated retail electricity prices for small customers in the Australian Capital Territory for 2017-18 (equivalent to \$333 per year). This was based on a 112.36 per cent jump in wholesale market price from \$49.77/MWh at 31 May 2016 to \$105.69/MWh at 31 May 2017 (contributing 13.26 percentage points of the 18.95 per cent) and forward electricity prices (ICRC 2017).

The ICRC final ruling indicated the contribution of different cost components to the average ACT regulated electricity bill (figure 3.15). Wholesale electricity prices and network costs account for two-thirds of the regulated retail price (33.51 per cent and 32.59 per cent, respectively). Environmental policies contributed 17.88 per cent (of which Australian Government LRET and SRES schemes accounted for 7.13 percentage points, ACT feed-in tariffs for rooftop solar contributed 8.89 percentage points and ACT energy efficiency scheme contributed 1.86 percentage points). Retail operating costs contributed a further 6.81 per cent and retail margins 5.03 per cent. The ICRC noted that 88 per cent of these price increases were outside its control (ICRC 2017, p. x & 56).



Figure 3.15 Cost components of ActewAGL's total costs, 2017-18^a Per cent

Financial management

Movements in the price of electricity, and the associated uncertainty concerning future prices, potentially expose many market participants to significant financial risk. Retailers in particular face significant potential financial risk, given that they purchase electricity from the wholesale market at prices that vary, sometimes substantially, while the price at which they sell electricity to many of their consumers may be regulated.

There are two main ways that participants can manage the associated risks. The first is through the use of bilateral contracts, such as an agreement for a generator to supply a retailer a given amount of electricity at some future date for an agreed price. The contracts may also be specified relative to the wholesale spot price (sometimes referred to as contracts-for-difference). Parties to such contracts have countervailing risk profiles. The second is using a range of standardised financial products such as futures and options that are tradable on the Australian Securities Exchange that are linked to the wholesale spot price.

A range of electricity-related financial derivatives such as options and futures enable market participants to better manage these risks by providing greater price certainty and assist them in managing their financial returns. Futures enable participants to agree on a future price for electricity around which they can base their activities. These instruments cover four of the five NEM regions — New South Wales, Victoria, Queensland and South Australia. Financial instruments do not cover the Tasmanian market.

Trade in electricity futures and options has grown over time to exceed the physical trade in electricity. Participants in the electricity-related financial market are broader than those engaged in the physical market, including, for example, brokers and financial services companies.

The use of financial instruments exposes the counterparty to the financial fortunes of the buyer or seller (AEMC 2015b). The use of financial reserves reduces this exposure but does not eliminate it.

In response, the AEMC recommended that the COAG Energy Council implement new measures through developing changes to legislation and submitting rule changes to better respond to the financial distress and failure of *large* participants. The Report contained a number of procedural and governance responses intended to minimise disruptions to consumers and maintain the financial stability of the NEM.

Governance and regulation

The governance and regulatory arrangements applying to the NEM are discussed in chapter 2.

It is worth highlighting that the AEMO undertakes a range of electricity-specific functions:

- managing the physical flows of electricity across all parts of the network to ensure that there is sufficient electricity generated to meet demand at all times²⁸
- ensuring that the technical attributes of the electricity supplied (such voltage and frequency) comply within specified guidelines to maintain system stability
- operating the wholesale electricity market
- managing the financial payments that accompany the physical flows of electricity
- operating the retail electricity markets across the NEM
- forecasting generating capacity, demand and power system requirements
- planning future power system needs and requirements
- providing data and information to support the efficient and effective operation of electricity markets and to enable the assessments of investment requirements
- providing security and other advice.

²⁸ These system stability functions include, among other things, load shedding to reduce excess demand or requiring additional generation to increase supply. As a last resort, AEMO can temporarily suspend the National Electricity Rules and directly intervene in the market.

3.3 Historical development

It is important to understand the evolution of the industry that gave rise to the current market structure and regulatory arrangements to better understand the issues confronting the industry today (discussed in section 3.5).

The electricity industry in each state generally developed more-or-less independently of other states, and largely through government investment.

From the 1950s, power stations were more likely to be located near the fuel source used to minimise transport costs, typically near coal deposits for coal-fired generation or dams for hydroelectricity. The electricity produced was transported to the major urban centres in that state through high-voltage, long-distance transmission lines. Lower voltage distribution networks transported the electricity from the high-voltage transmission lines to end users (households, commercial and smaller industrial users).

For example, most of the major power stations in New South Wales were built near coal deposits in the upper and lower Hunter Valley. Significant transmission infrastructure then transported the electricity produced in the Hunter Valley to users in Sydney.

The development of the Snowy Mountains Scheme in southern New South Wales overlaid this separate development of state electricity systems. The Scheme was built to divert rivers that ran eastwards into the ocean inland to provide water for irrigation and to generate electricity. It consists of: 16 major dams; seven power stations; a pumping station and 225 km of tunnels, pipelines and aqueducts. The hydroelectric power stations are linked into the New South Wales and Victorian transmission systems, thereby enabling trade in electricity across state borders.

Prior to the mid-1980s, the entire process of generating the electricity and transporting it to the end users within a state was undertaken by a state government-owned monopoly. The Snowy Mountains Scheme was run by the Snowy Mountains Hydro-electric Authority (now called Snowy Hydro).

However, by the mid-1980s there were concerns about the inefficiency of these vertically integrated state-owned monopolies, the cost of producing electricity, and the ability of state governments to fund much needed investment.

Electricity market reform commenced in the mid-1980s. The nature, timing and pace of this reform in Australia varied across states, with the eastern and south eastern states generally leading the way. The reform model adopted in Australia closely followed that used in the United Kingdom (particularly in England and Wales).

Reforms initially focused on improving the operational efficiency of these vertically integrated monopolies, including the shedding of excess labour and lowering capital and operating costs.

The next step was to get these vertically integrated monopolies to operate on a more commercially-orientated basis. This was achieved by turning the agencies into public corporations and introducing dividend and income tax equivalent payments to government and other arrangements such as ring fencing their operations to mimic the disciplines faced by private firms (termed 'competitive neutrality').

As some elements, notably transmission, are natural monopolies, the next step was to create separate business units responsible for electricity generation, transmission and distribution before separating these units into separate companies. Competition was subsequently introduced into the generation and retail sectors by breaking the existing companies up into smaller companies and by allowing new entrants. The majority of publicly owned generation capacity was privatised (except in Tasmania, Queensland and, until recently, New South Wales). Some states, such as Victoria, went further and privatised their network infrastructure (transmission and distribution grids). Other states, such as South Australia, went part way by leasing their network infrastructure to private-sector operators, while still retaining public ownership.

The existing state-based electricity grids in eastern and south eastern Australia — initially Queensland, New South Wales, Victoria, the Australian Capital Territory and South Australia and subsequently Tasmania — were linked through interconnectors to form the NEM in 1990. These interconnectors enhanced competition in the generation and retail sectors by enabling the trading of electricity between states. The interconnectors also allowed states to improve their capital efficiency by sharing spare generating capacity (termed 'reserve plant margin') needed to meet peak demand.

The pricing of electricity was also reformed. Cross-subsidies that had existed between different types of users were gradually unwound. The prices charged became more reflective of the underlying costs involved.

A wholesale electricity market covering eastern and south eastern Australia developed following the linking of the state grids (becoming the NEM). A separate wholesale market was established in Western Australia (referred to as the WEM).

Renewable policies such as the uptake of renewables encouraged by the RET and other technological change has seen the industry undergo significant change in recent years that have materially altered the economics of generating, supplying and using electricity (chapter 2). These trends may accelerate.

On the supply side, technological change and higher production volumes have lowered the cost of producing electricity from renewable sources such as wind and solar. Falling production costs and government schemes such as high feed-in tariffs have encouraged many households and businesses to install rooftop solar panels, enabling them to sell their surplus electricity back into the grid. The cost of batteries to store electricity for use when it is most needed is falling. Declining information technology costs are also making it possible for office and residential buildings to share or trade electricity between tenants (termed distributed systems).

On the demand side, the development of smart meters, computerisation and mobile phone applications enable users of electricity to be more informed about their usage and to monitor and alter their use in real time in response to changing prices. Improvements in product design and energy efficiency are also reducing the demand for electricity, as have improvements in building design and building standards. Consumers are responding to lower production costs and are becoming more environmentally conscious and purchasing electric vehicles in increasing numbers (off a very small base). The installation of rooftop solar panels means that those customers do not need to purchase as much electricity from the grid. This, coupled with the falling cost of batteries, will make it easier for households to be self-sufficient in electricity and would access the grid only as a back-up system, or as an active market player.

In terms of transporting the electricity, transmission grids now need to link new power stations located in places abundant with wind and sunshine, which are frequently in different places to where fossil fuels are located.

The introduction of roof top solar panels, battery storage, and other technologies, such as distributed systems, are placing new demands on electricity supply infrastructure. Distribution networks were, for example, designed to supply electricity to end users. These new technologies now enable these end users to sell the electricity that they generate back into the grid. This means that distribution networks and associated infrastructure have to be capable of handling two-way variable flows of electricity. The supply of electricity from these micro-generators also raise issues for electricity markets that seek to match electricity producers with electricity consumers.

This evolution in the industry underpins the issues confronting the industry today.

3.4 Possible future directions

While the industry has undergone significant change recently, these changes are likely to continue into the future, and the industry's structure and governance arrangements will need to adapt to these changing realities.

This section outlines a few of the possible changes confronting the industry to set the scene for the discussion of the policy-related issues confronting the industry that follows.

Electricity supply

The Australian electricity generation sector will continue to decarbonise, with strong growth in renewable sources mandated by the RET and by new policies needed to meet Australia's climate change commitments. Ongoing technological change will support this by reducing the cost of batteries and new generating technologies, with the result that the use of fossil fuels will progressively account for a smaller share of the generation task.

The increased use of renewables and distributed generation will make industry more geographically dispersed, with more of that electricity bypassing the transmission system entirely. This will increase the challenges faced by the market operator in physically managing the flow of electricity across an increasingly complex system while ensuring that the system is secure and reliable. It also poses risks for the transmission network owners, that the regulator needs to consider.

Electricity demand

Technological change will continue to drive improvements in energy efficiency and enable end users to better manage their electricity use.

While currently in their infancy, the demand for electric vehicles is projected to grow strongly. Technological change and increased market uptake will make them more cost effective over time, and decarbonising the transport sector will be important for Australia to meet its climate change commitments. Increased market penetration by electric vehicles will increase the demand for electricity (at least relative to what it would otherwise have been) as the transport sector switches fuel sources from petrol and diesel to electricity (CSIRO 2015). Future population growth will also add to future consumption, but average per capita consumption may continue to decline as building standards improve, and aggregate production is increasingly decoupled from energy demand.

Climate projections suggest that there will be more extreme weather days in the future in general, and more hot days in particular. An increase in the number of hot days will increase electricity demand for air conditioning. With a projected rise in average temperatures, there may also be a fall in electricity demand for heating. Rises in the number and intensity of extreme weather events will also have supply-side implications, such that events like those that gave rise to the recent problems in South Australia may become more common.

3.5 Electricity-specific policy-related issues

Against this background, there are a number of serious policy-related issues confronting the Australian electricity industry. Most of these issues relate to its ability to provide reliable and affordable electricity and to, at the same time, reduce emissions (termed sustainability) now and into the future. These issues are particularly resonant for the NEM.

Some of these issues apply across the industry, while others relate to particular sectors. Many have been raised recently in the context of other reviews, including the Finkel Review.

The numerous issues identified have been developing over a substantial period of time.

System-wide issues

Need for greater certainty

Probably the biggest issue confronting the Australian electricity industry today is the lack of clarity and consistency over future government policy on energy and energy-related environmental issues, such as future climate change policy. These issues were discussed at length in chapter 2.

The result of this lack of clarity is that uncertainty permeates throughout the industry. This uncertainty has led to insufficient investment in base-load generating capacity and in generators that can meet intermittent demand (such as combined gas cycle, although the trends in the gas market has also restrained investment).

Further withdrawals of large base-load power stations such as Liddell in New South Wales will further reduce generating capacity unless significant new offsetting investment occurs.

Australian energy users in general, and large energy-intensive industrial customers in particular, need to know that they will be able to access a reliable and affordable supply of electricity into the future, otherwise the viability of their operations will be adversely affected.

The uptake of renewables and technological change are creating challenges for managing the grid

Many of the issues confronting the industry today, either directly or indirectly, relate to the industry's ability to incorporate new technologies into an industry designed and structured around the traditional model of electricity delivery. There does not appear a clear strategy for addressing the technical and market issues that will arise as new technologies enter the market. Planning for new technologies will be needed to ensure that the rules can adjust to ensure the 'full cost' of different generation, distribution and use technologies will be brought to 'book' in the system.

Renewable generation is located in different parts of the state to traditional fuel sources used for generation such as coal. The transmission networks, which were designed and built to support these traditional sources of generation, frequently require augmentation or strengthening to incorporate these new sources of generation into the grid. The result is a larger and more geographically dispersed electricity network that carries more variable flows.

This makes the task of managing the physical flows of electricity on the network, while at the same time ensuring system security and reliability, more challenging. Some of these additional challenges include:

- the intermittent and variable nature of wind and solar generation make it more difficult to dispatch sufficient generation to meet required demand
- the asynchronous nature of wind and solar generation makes it harder to maintain the physical requirements of the electricity being produced
- the variability in supply makes the provision and pricing of ancillary services more important
- the more geographically dispersed nature of the network means that electricity may be required to flow in directions that differ from when infrastructure was built (this may require some re-engineering of the infrastructure as well as the task of managing contraflows)
- the growth in distributed generation, which is not centrally dispatched or known to the market operator, complicates these tasks (discussed later).

The declining cost of renewables generation, together with increasing volumes being mandated under the RET, means that these challenges are likely to increase over time.

Need for a system-wide focus

As noted, the significant uptake of renewable energy, coupled with rapid decentralised technologies such as wind, solar, batteries, embedded generation, have widespread implications for the entire industry.

The governance arrangements for the industry are adapting and responding to these changes, albeit frequently slowly. The issues increasingly require a 'whole of system' perspective commensurate with a national grid as well as quicker responses. Responses should also be consistent, integrated, economically efficient, based on expert advice and, insofar as possible, technologically neutral.

These emerging governance issues, which also apply to gas markets, are discussed in chapter 2.

Development of a consistent approach across the NEM

As discussed, the NEM arose by linking the transmission systems in Queensland, New South Wales, Victoria, South Australia and, subsequently, Tasmania through the construction of high voltage, high capacity interconnectors. This enabled trade in electricity across state borders.

Significant process has occurred in transitioning away from the former state-based grids.

State markets operate separately from each other when interconnectors are capacity constrained, with the result that spot prices regularly diverge across NEM regions. These

limitations were most evident during the storms that hit South Australia in September 2016.

As discussed in chapter 2, the governance arrangements reflect, at least in part, the rights conferred to the states under the Australian Constitution for energy policy. The role and responsibilities of the three national agencies responsible for governing the operation of the electricity industry in each jurisdiction reflect past agreements reached with state and territory governments. They also reflect the evolution from state-based regulatory systems. As a result, their roles and responsibilities are not the same across all jurisdictions, which may warrant investigation to identify whether improvements can be made.

Generation specific issues

The renewable energy target distorts the operation of the generation market

As discussed in chapter 2, the renewable energy target is intended to increase the share of electricity generated from clean energy sources. It seeks to do this by mandating specified shares of renewable generation to be achieved in specified years. Wholesale purchasers of electricity are required to buy and surrender certificates proportional to the amount of electricity they acquired during the year.

This policy operates independently of wholesale electricity markets.

The wholesale spot price is intended to reflect the underlying economic cost of generating that electricity. The operation of the RET means that this is no longer the case.

The primary source of income for producers of renewable electricity is from the sale of the renewable energy certificates granted to them under the RET rather than from the sale of electricity in the wholesale spot market. This enables them to sell into the spot market at a price that does not reflect their underlying cost of generating the electricity (much of which is the capital cost).

This is at odds with other generators who earn their income from the sale of electricity into spot markets (and through the provision of ancillary services). This gives producers of renewable electricity an advantage over non-renewable generators in selling into the spot market.

This gives rise to two issues. First, the RET is not integrated into the operation of the wholesale electricity markets and does not achieve the desired level of emissions reduction at the lowest overall economic cost (chapter 2). Second, there are network security and reliability issues that affect electricity networks from the growth in asynchronous renewable energy. Under the current market rules the costs of addressing these is not easily transferred to the generators of renewable energy.

Cost-reflective prices should guide market participants

Market prices provide signals to producers, consumers and investors to guide their decisions. Prices that do not adequately reflect the underlying economic costs to society will not be economically efficient, as they will lead to too much or too little of particular activities, such as investment in particular types of generation.

Cost reflective pricing is important for all industries, but particularly in industries where some activities require significant amounts of infrastructure and possess natural monopoly characteristics. However, cost plus pricing regimes must be carefully managed to avoid the incentives for over investment.

The growth in the different types of generators in the industry make it even more important for appropriate pricing so as not to favour one form of generation over another. This is especially relevant given that there are significant underlying differences in the economics of generating electricity between these technologies. The generation sector, for example, consists of different generating technologies in plants of vastly different sizes dispersed across many parts of Australia. The sector includes among other things:

- base load power stations and peaking plants
- large coal-fired power stations and small rooftop solar panels
- gas generators that can be easily controlled and highly variable wind turbines
- registered generators known to the market operator and distributed systems that are not.

Prices provide the means that the AEMO uses to coordinate all these technologies; they direct how much electricity each producer should supply at any point of time and pathways of projected prices determine whether investment is warranted and, if so, what type is required.

The relative competitiveness of each technology should depend not only on their own cost of generating the electricity, but also the costs they impose in relation to connecting to the grid, transporting electricity, other market-related imposts levied on them (such as NEM fees and pricing of ancillary services) and their emissions' intensity.

The growth in distributed generation is creating new challenges

The growth in distributed generation raises many challenges for the electricity system in general, and the market operator in particular.

Distributed generation involves using smaller-scale, sometimes modular, technologies to produce electricity close to where it is needed. Their output tends to be asynchronous and may need an inverter to produce alternating current for connection to the grid.

Such technologies can reduce the cost of producing and transporting electricity to where it is needed, and assist in reducing congestion on the transmission network and improving system reliability.

This gives rise to further geographic dispersion in the production of electricity across the network. Given their smaller output, distributed generators connect directly to the lower voltage distribution network rather than the higher voltage transmission network. This results in two-way flows in electricity along distribution network, rather than the one way flow these networks were designed and built for, and, as a result, may increase congestion on the distribution network.

Larger distributed generators need to be registered to sell into the grid, unless they have an exemption. However, smaller ones do not.

The growth in household rooftop solar panels highlight many of the issues associated with the emergence of distributed generation. Households with these panels can sell the electricity produced into the grid in return for a payment known as a 'feed-in tariff'. Households can also use the electricity produced themselves or, if the panels are not producing electricity or additional electricity is required, they can purchase electricity from the grid in the conventional manner. At any point in time, these households may be selling electricity into the grid, buying electricity from the grid or may be entirely electricity self-sufficient and not using the grid at all.

These rooftop solar panels are unlike conventional generators. They do not participate in the wholesale market and are not required to notify the market operator of the amount of electricity that they wish to supply and times at which supply will occur. Nor are they centrally dispatched.

The result is that these transactions are effectively invisible to the market operator who is charged with dispatching sufficient generation to meet demand, and ensuring system security and reliability. The geographic dispersion of these facilities, along with the less predictable local weather and hence generation, further complicate the functions of the system operator.

The growth in distributed generators and rooftop solar raise many important policy issues. They may increase congestion on distribution networks that were not designed to handle the additional flows of electricity and raise local system security and reliability issues. Distributed generators are generally intermittent in much the same way as renewables are, and still require some other source of electricity as backup. The falling cost of batteries will help in this regard, as will employing a range of different technologies (such as wind and solar). An additional issue is how to achieve efficient cost recovery for use of the distribution network and for the backup sources of supply needed. Regulators will need consider the effect of their pricing formulas on the incentives to invest in and maintain transmission and distribution networks.

As rooftop solar panels, with appropriate storage or back-up capacity, enable households to potentially go off grid entirely, this raises the risk that fewer households (and in general lower-income ones), will be left to cover the costs of the distribution and transmission networks. Going off grid will be more viable as the costs of storage technologies fall further, which, if the network costs are shared only by those remaining on grid, could see this number spiral downward over time. The main concern is that it will be lower-income households that have the least capacity to go off-grid, so should such a spiral arise, governments will have to pay attention to the distributional consequences. Ultimately it will be a matter of economics as to whether it is more efficient for households to use the grid as their 'battery', or to switch to an alternative back-up system.

The AEMC is currently undertaking a review into the distribution market model to set out:

... the key characteristics of a potential evolution to a future that enables investment in and operation of distributed energy resources to be optimised to the greatest extent possible, and identifies the barriers to this occurring. (AEMC 2017a, p. ii)

The draft report was released on 6 June 2017 (AEMC 2017a).

This is an important review for effectively integrating distributed generation into the grid and ensuring that the AEMO is able to fulfil its role as system operator.

Rising gas prices are reducing the ability of gas generation to reduce carbon emissions

As discussed in chapter 4, gas-fired electricity generation accounts for around 40 per cent of domestic gas use in Australia. It is particularly important in Western Australia and Queensland. The cost of natural gas as a fuel source has a material impact on the cost competitiveness of gas-fired generators and their ability to compete in wholesale markets.

Gas-fired generation has lower greenhouse gas emissions per unit of energy than do brown and black coal-fired generation. This means that Australia could reduce its carbon emissions by increasing the share of electricity produced from natural gas.

The certainty that gas generation provides also makes it a suitable counterpart to intermittent renewable sources of electricity such as wind and solar.

However, recent significant rises in domestic gas prices in eastern Australia (discussed in chapter 4) is making gas-fired generation less competitive than traditional coal-fired generation. This has led to a fall in the share of electricity generated from gas in eastern Australia.

The key policy issues are that, while gas has lower carbon emissions than traditional coal generation, these cost increases are constraining the ability of gas-fired generation to play an increasingly important role in reducing carbon emissions and in maintaining network security and reliability.

Wholesale market-specific issues

Strategic rebidding is adding to spot price variability

The National Electricity Rules enable generators to resubmit the quantity of electricity that they are willing to sell at any time up to 15 minutes before the trading period. To avoid strategic 'market testing or signalling' behaviour, the Rules prevent them resubmitting the price at which they are prepared to sell. Generators are required to make these bids in good faith.

However, even volume bid resubmitting can, under certain circumstances, enable generators to engage in strategic bidding.

This has been raised as an issue in Queensland and South Australia (AER 2017b, pp. 54 & 56). In relation to Queensland, the AER stated that:

Opportunistic bidding by large generators has caused periods of spot market volatility in Queensland for several years, typically during summer. In summer 2014-15, for example, generators periodically rebid large volumes of capacity from low to very high prices late in a trading interval, typically on days of high energy demand and when import capability on transmission interconnectors was constrained. By rebidding late in a trading interval, other generators lacked time to respond by ramping up their output. Given the settlement price is the average of the six dispatch prices forming a trading interval, a price spike in just one dispatch interval can flow through to very high 30 minute settlement prices. (p. 56)

This was particularly an issue on hot days and when interconnector capacity with New South Wales was constrained.

This behaviour has continued notwithstanding an AEMC rule determination that became effective from 1 July 2016 (AEMC 2015a).

Network-specific issues

Nearly all electricity network service providers in the NEM — whether they run transmission or distribution networks or interconnectors — are regulated by the AER.²⁹ While there are some differences in the way that they are regulated, the basic approach is similar for transmission and distribution networks.

As a result of this similar regulatory approach, many of the policy-related issues are germane to both sectors.

There have been a number of recent reviews in the regulation of network services.

 $^{^{29}}$ The one exception is the BassLink interconnector which is not regulated by the AER.

The Productivity Commission conducted a thorough and extensive review of the then issues affecting the sector in its 2013 report *Electricity Network Regulatory Frameworks* (PC 2013a). The 871 page report includes whole host of findings and recommendations aimed at improving the efficiency and effectiveness of regulatory regime for the evaluation and development of interregional network capacity in the NEM.

Since then, there have been many policy changes affecting network service. These include:

- a move towards greater regulatory consistency across network sectors
- the adoption of more economically efficient pricing mechanisms to guide producers and consumers and to provide more suitable appropriate investment signals — the use of long-run marginal cost pricing for distribution and cost-reflective pricing for transmission
- the adoption of regulatory investment tests for new investment and grid augmentation (the RIT-T for transmission and the RIT-D for distribution)
- reviewing the pricing of the provision of ancillary services to ensure system security.

It will take some time for these changes to flow fully through the system and for major issues to become apparent.

The recent Finkel Review (2017) identified further issues relating to network services that need to be addressed (section 5.3), covering:

- network incentives
- reducing incentives for network over-investment
- limited merits review
- more equitable consideration of alternatives to network investment
- strengthening the regulatory investment test for transmission.

Instead of covering all the complex issues besetting this key part of the energy sector, this sections canvases some issues affecting network services that are of recent significance.

High cost of network services

One current issue is the high cost of network services (section 3.2).

Network services are regulated by the AER to ensure that the companies that own and operate the transmission and distribution networks do not exploit the monopoly power that may arise from their high fixed and low marginal costs.

Little progress appears to have been made in bringing down network costs, since the time when the Productivity Commission last looked at the issue:

Average electricity prices have risen by 70 per cent in real terms from June 2007 to December 2012. Spiralling network costs in most states are the main contributor to these increases, partly driven by inefficiencies in the industry and flaws in the regulatory environment. (PC 2013a, p. 2).

The AER attempted to reign in network costs (discussed next), but decisions by the Australian Competition Tribunal and the Federal Court have negated their efforts. The complexity and subjectivity of parts of the process have hindered the effectiveness of the AER.

Merits Review appears to work against the public interest

Participants can challenge decisions of the AER in the Australian Competition Tribunal through a 'Limited Merits Review'. Decisions of the Tribunal can then be appealed to the Federal Court.

As the name suggests, the process as envisaged was intended to be 'limited' and only cover selected aspects of the determinations such as rectifying factual errors, the incorrect exercise of discretion, and unreasonableness in the regulator's decision making. However, the process has been used to resist regulatory price reductions.

The *intention* of the review process is for companies to have the right to correct factual errors and the incorrect exercise of discretion as well as other matters of law. 'Unreasonableness' in the regulator's decision is also a grounds for review.

In practice, the process has not lived up to this closely-defined role for reviews. This reflects a number of interwoven factors, including:

- the complex methodology used in making revenue determinations
- the requirement to make subjective assessments about which operating expenditures and assets to include
- the requirement to make subjective assessments about the appropriate parameter values to use (such as, but not limited to, what is appropriate WACC, depreciation and tax rate)
- decisions by the Australian Competition Tribunal and the Federal Court that have effectively made reviews routine rather than the exception
- that regulated companies can selectively choose the issues to be reviewed
- the narrowness of the process that does not take into consider wider implications, such as the impact on customers.

The reviews are narrowly focused, and do not take into account wider implications, such as their impact on the consumers and the wider community. This is contrary to the National Electricity Objective that focuses on the long term interests of consumers.

The consequences of review decisions can be very significant for the network businesses and consumers. Without commenting on whether the particular decisions had merit or not, a good example of this was the ensuing legal tussles that arose after the AER in its 2014– 19 determinations attempted to reduce the allowable revenue earned by NSW and ACT electricity and gas distribution network businesses — Ausgrid, Endeavour Energy, Essential Energy, ActewAGL and Jemena Gas Networks (NSW). The AER determined that the businesses were operating less efficiently than other comparable networks and that the rate of return and corporate tax allowance used were higher than those in the market.

The companies sought a limited merits review of the AER's decisions in the Australian Competition Tribunal, seeking to recover greater revenue from customers.

In February 2016, the Tribunal found in favour of the AER in some matters and in favour of the businesses in other areas. The AER was directed to remake its decisions in relation to the networks' operating expenses, cost of corporate income tax and cost of debt.

The AER subsequently appealed to the Federal Court for a judicial review of the Tribunal's decisions to set aside the network revenue determinations. The AER asked the Federal Court to consider whether the grounds of review were properly established by the network businesses and whether these were correctly applied by the Tribunal.

On 24 May 2017, the Federal Court upheld the AER's appeal in relation to the Tribunal's decision on the cost of corporate income tax, but upheld the Australian Competition Tribunal's findings in relation to the networks' operating expenses and the cost of debt (AER 2017a).

This decision enables NSW and ACT electricity and gas distribution network businesses to collect significantly more revenue from their customers than originally allowed by the AER. This additional revenue is estimated to be in the order of \$2.5 billion (Winestock and McDonald-Smith 2017).

Putting aside the particular circumstances of this case, when the implications of reviews are so big, it is clearly critical that the review process is functioning well. Many are concerned that the 'limited' merits review process has expanded to one in which a regulatory matter is entirely re-prosecuted. The original goal that the review process be confined to matters of error or the inappropriate exercise of responsibility seems to have been mislaid, with the risk that it is compromising the long-term benefit of electricity consumers.

Moreover, the process for making revenue determinations in the first place is time consuming, costly and contentious. Reviews add to the costs involved and further delay this process. The process needs to be clearer, simpler and the decisions of the AER should be binding unless they err in a matter of law. The Limited Merits Review process is clearly not working as it was intended, and needs to be rectified. Recent movement by the COAG Energy Council in this area is welcome. On 20 June 2017, the Prime Minister announced the Australian Government's intention of 'taking steps to legislate to abolish the Limited

Merits Review' to protect consumers and to ensure consistency with other similar utility sectors (Turnbull, Frydenberg and Canavan 2017).

System security

The increasing penetration of wind and solar generation makes it harder for the system operator to maintain a stable frequency of supply — a key requirement for avoiding damaging equipment attached to the grid and for maintaining system reliability.

On 27 June 2017, the AEMC released its final *System Security Market Frameworks Review* report into power system security. The report contained nine recommendations for changes to market and regulatory frameworks to support the shift towards new forms of generation while maintaining power system security. The reforms covering frequency control, extreme power system conditions and system strength are aimed at:

- guarding against technical failures that lead to cascading blackouts
- delivering a more stable and secure power supply.

The AEMC is currently progressing a number of proposed rule changes relating to power system security concerning:

- the inertia ancillary service market
- the rate of change of power system frequency
- the management of power system fault levels
- the generating system model guidelines.

Power system security is important for all electricity users. Generators should fully cover the cost of frequency management and other associated ancillary services that they place on transmission networks.

System reliability

The system reliability problems stemming from the greater use of intermittent generation can be partially managed through a variety of measures including:

- spatial separation, as the wind will be blowing somewhere to generate electricity
- the use of transmission networks and interconnectors, so that electricity can be supplied from other regions
- by bundling different forms of generation, such as using gas-fired generation as a complement to wind or solar
- increasingly, through the use of battery storage technologies (as discussed earlier).

These measures all add to the cost of renewable energy and need to be factored into their pricing.

A diversified mix of generation sources — spanning various intermittent and base load capacities helps ensure supply reliability. This underlines the importance in this paper of the repeated themes that policy settings should reduce unwarranted uncertainty and be technology neutral. Planning and preparedness is part of a policy framework for reduced uncertainty. The Finkel Review recommended that:

- all generators will be required to provide three years' notice of closure
- the AEMO should also publish a register of expected closures to assist long-term investor planning.

Renewable energy has a vital role to play in Australia's energy future, in achieving emission commitments and in replacing ageing power stations. The uptake of renewables should be based on them providing more cost effective supply, with the cost of greenhouse gas emission incorporated into the market.

As market penetration of renewable energy is set to further increase, supply reliability may become more of an issue, particularly for some regions such as South Australia and south western Victoria. The Finkel Review recommended that:

Obligations on new generators will ensure adequate dispatchable capacity is present in all [NEM] regions to ensure consumer demand for electricity is met. They can meet their obligation using a variety of technologies or partnership solutions. The obligation will provide regional investment signals. (p. 10)

The events of the summer of 2016–2017 highlighted that Australia's electricity system is in a fragile state. While natural disasters can happen anywhere and affect supply, the national electricity grid should be strengthened to make the system more robust and resilient. Having reliable electricity supply is an important aspect of this.

Demand-side management

Retail customers should face incentives to engage in demand-side management

Effective demand-side management can be a more cost effective way of dealing with peak demand and the price spikes arising from supply-demand imbalances than investing in supply-side measures, such as building additional generating or interconnector capacity that is only used sporadically.

Cost-reflective prices, especially those that vary throughout the day, provide customers with appropriate signals to engage in demand-side management. Customers may, for example, invest in more energy efficient technology or change the time they use the electricity if the cost of doing so is substantially less than the price of the electricity.

Larger industrial customers, especially those exposed to the wholesale market, already face cost reflective pricing that varies throughout the day and engage in demand-side management. These electricity users can also use financial instruments, such as hedging, to manage the risks and uncertainties that price variability introduces.

Time-of-day pricing needs to be supported by meters that record the time at which consumption occurs. Smart meters and interval meters do this. Smart meters are capable of providing additional benefits such as remote meter reading that reduce the cost of meter reading. They also enable customers to be aware of the prevailing price of electricity in real time.

The economic rationale for the introduction of time-of-day pricing and smart meters for retail customers is twofold.

First, there should be a gain in overall economic efficiency by using society's resources more efficiently. In the absence of time-of-day pricing, retail consumers will use more electricity at times of high electricity demand relative to available supply as they do not face the same incentives to reduce demand, thereby driving up the price for all customers. This, in turn, means that additional generating (and transmission and distribution) capacity is needed in order to meet peak demand that occurs relatively infrequently, but otherwise sits around idly for the remainder of time. In short, the cost to society from consumers reducing their demand should be less than the cost to society of investing in additional capacity that is not otherwise needed.

Second, given that the provision of electricity is a network industry, there may be external benefits that flow through to other parties (externalities) from the use of these meters. For example, the use of smart meters may enable distribution companies to more quickly pinpoint problems with the distribution network. Moreover, these benefits increase with the number of smart meters in use.

The presence of external benefits flowing to other parties is not, in itself, sufficient to ensure an externality that warrants a mandated rollout of smart meters. If the introduction of smart meters results in lower overall costs to retail companies by reducing the net cost of reading electricity meters, then retailers have a commercial incentive to offer to install smart meters at their own expense for willing retail customers.

However, there is some question as to whether the social benefits of rolling out smart meters outweigh their cost in practice.

In evaluating the mandatory rollout of smart meters (advanced metering information) that began in Victoria in 2006, the Victorian Auditor-General was critical of the rollout. He found that the benefits from innovative tariffs, products and demand management was only \$0.23 million from 2006 to 2014, well short of the anticipated benefits of \$9.19 million (VAGO 2015, p. 32). The Report concluded that there was:

... expected to be ... [a] net cost to consumers over the life of the program. (p. X)

A key finding was that the anticipated benefits were overstated, and the costs understated.

There were many issues with the rollout of smart meters in Victoria. A lot of these issues arose from the way the scheme was implemented, particularly a lack of consumer understanding of why the smart meters were being rolled out and how consumers could use the information to reduce their electricity bills. This was noted in the Victorian Auditor-General report which cited market research conducted in early 2014 that found:

... that two-thirds of Victorians did not understand what the benefits of smart meters were and many were still unaware of the link between their smart meter and saving money on their electricity bills. (p. xiv)

The Victorian experience highlights that, for the potential benefit offered by smart meters to be realised, customers need to be exposed to time-of-day pricing.

In its 2013 *Electricity Network Regulatory Frameworks* inquiry, the Commission highlighted the need to link the rollout of smart meters with time-of-day (or critical peak) pricing:

If carefully implemented, critical peak pricing and the rollout of smart meters could produce average savings of around \$100–\$200 per household each year in regions with impending capacity constraints (after accounting for the costs of smart meters). (PC 2013a, p. 21)

The Commission went on to find that a rollout of smart meters had the potential to benefit all jurisdictions (including Victoria) *if* the investments decisions were based on their value to consumers rather than being mandated.

The Commission considered at some length whether the capacity for cost-reflective prices would result in exposure by consumers to the large fluctuations in *wholesale* energy prices that sometimes (albeit rarely) occur for short periods. In concluded that:

..., even if permitted to adopt cost-reflective prices for wholesale energy variations, it is unlikely that retailers would change their current practice of hedging, or contracting with generators (thus smoothing price volatility in the wholesale energy market) for residential customers. This is because such events are not predictable — but can arise from generator failure, strategic behaviour by generators and transmission failures at any time. Consequently, it would be hard to pre-notify consumers of such pricing events.

Nor is it clear that where the pricing events result from such unpredictable events (compared with the predictably high costs associated with network capacity built for the hottest days) that it would be efficient to pass on these volatile unhedged wholesale prices to consumers. Consumers value insurance for such unpredictable events. A retailer that failed to provide such a service would be unlikely to retain customers. Large energy users fall into a different category — and will sometimes agree (with the possible involvement of an intermediary) to voluntary load shedding in return for a fee during high price events, thus lowering their overall costs. Such firms or their intermediaries have the facility to continuously monitor five-minute interval wholesale electricity prices and have the ability to take very rapid action to curtail consumption. Households are unlikely (even with the aid of an intermediary) to ever be able to respond in this sort of manner. (p. 22)

The AEMC changed the National Electricity Rules in 2015 to assist the rollout of advanced metering technology. Retailers are responsible for arranging metering services for small customers, but customers can opt out of having an advanced meter if their existing meter works. The rule changes also enable:

Customers' electricity data, and other services available from an advanced meter, can be provided to other service providers such as energy service companies, with the customer's consent, to enable a range of services which can help consumers understand and manage their electricity use.

The new rules also require retailers and distributors to adhere to minimum standards regarding the format, time frame and cost by which usage data are delivered to customers (or parties authorised by that customer) (AEMC 2015c).

Effective competition requires better informed and engaged retail customers

The rollout of smart meters was one of many issues considered by AEMC in late 2012 with the aim of empowering electricity consumers and giving them more options in the way they use electricity. A central issue considered by the AEMC was whether the rules at the time penalised or otherwise discouraged electricity distributors, retailers and customers from engaging in demand-side management.

A broad suite of detailed measures arose from this review that sought to:

- reform distribution network pricing principles to improve consumer understanding of cost reflective network tariffs and give people more opportunity to be rewarded for changing their consumption patterns
- expand competition in metering and related services to all consumers, putting greater discipline on competitive metering suppliers to provide services at efficient cost and consistent with consumer preferences
- clarify existing provisions regarding the ability of the market operator to collect information on demand side participation to make its market operational functions more efficient
- give consumers better access to their electricity consumption data
- establish a framework for open access and common communication standards to support contestability in demand side participation end user services enabled by smart meters. This will support consumer choice
- introduce a new category of market participant for non-energy services in the National Electricity Rules to facilitate the entry of innovative products for consumers
- reform the application of the current demand management and embedded generation connection incentive scheme to provide an appropriate incentive for distribution businesses to pursue demand side participation projects which deliver a net cost saving to consumers

• establish a new demand response mechanism in the wholesale market option for demand side resources to participate in the wholesale market for electricity.

The recommendations of the Productivity Commission's *Data Availability and Use* inquiry (PC 2017) supports the AEMC's *Power of Choice* program.

Notwithstanding the introduction of retail contestability, the high concentration in some NEM retail markets (discussed in section 3.3) indicates that more still needs to be done to deliver effective retail competition. As the Victoria experience illustrates, consumer education will be an essential component in success of these reforms.

CONCLUSION 3.1

There are many challenges facing the electricity system arising from new technologies, investment uncertainty, declining baseload capacity and the potential for demand peaks that the system may find hard to meet. In response, governments will need to authorise the regulator and market operators to make the changes needed to ensure the ongoing viability of the electricity system. Attention will be needed to:

- make sure that the market rules support a pricing structure that reflects the costs imposed on the system by all market players, including the cost of carbon emission abatement
- where possible, provide consistency across the jurisdictions in the roles and responsibilities of the AEMC, the AER and the AEMO
- ensure that the processes used to review the AER's determinations are closely confined, and do not become an avenue for re-prosecuting regulatory decisions
- assess and manage the risk of stranded transmission and distribution assets, and the implications that this has for consumers
- ensure that consumers have incentives to manage their demand, and access to the technology to do so, and understand the options available to them.

3.6 Recent developments

There has been a lot of recent activity in terms of electricity policy. Much of which has been outlined above has arisen through the normal day-to-day operation of the existing governance arrangements. For example, past regulatory determinations and rule changes take some time to impact on affected participants and the wider economy. Other activity has been in response to the range of issues that have come to the fore in the wake of the power difficulties in South Australia. In the past year, many reviews were commissioned on key aspects of the system.

As a result, there has been too much recent activity to summarise here.

Given this, this section highlights some more pertinent activity. The discussion is not intended to be comprehensive.

ACCC Electricity supply & prices inquiry

On 27 March 2017 the Australian Government directed the ACCC to hold an inquiry into the supply of retail electricity and the competitiveness of retail electricity prices. The inquiry is to investigate:

- the key cost components of electricity retail pricing and how they have changed over time
- the existence and extent of any barriers to entry, expansion and/or exit in retail electricity markets
- the extent and impact of vertical integration
- the existence of, or potential for, anti-competitive behaviour by market participants and the impact of such behaviour on electricity consumers
- any impediments to consumer choice, including transaction costs, a lack of transparent information, or other factors
- the impact of diverse customer segments, and different levels of consumer behaviour, on electricity retailer behaviour and practices
- any regulatory issues, or market participant behaviour or practices that may not be supporting the development of competitive retail markets
- the profitability of electricity retailers through time and the extent to which profits are, or are expected to be, commensurate with risk
- all wholesale market price, cost and conduct issues relevant to the inquiry.

South Australian Government response

The South Australia Government responded to the power difficulties in September 2016 by announcing a package of measures that includes:

- \$150 million for 100 megawatts of battery storage for renewable energy
- building its own gas power plant to have government-owned stand-by power available in South Australia
- new laws to allow the state the power to override the AEMO and require more power to be sent to the state when needed
- incentives to source more gas for use in South Australia
- a new target that will increase South Australia's energy self-reliance by requiring more locally generated, cleaner, secure energy to be used in South Australia (South Australian Government 2017).
Snowy 2.0

On 15 March 2017, the Prime Minister announced plans for a \$2 billion expansion of the Snowy Hydro scheme to provide power for up to 500 000 homes through a new network of tunnels and power stations (referred to as 'Snowy Mountains Scheme 2.0'). The scheme has the potential to increase the 4100 MW capacity of the Snowy Mountains Scheme by 2000 MW (Turnbull 2017b).

The plan is intended to make renewables more reliable and improved network security by filling the gaps caused by intermittent supply and generator outages.

Ministers also discussed recent announcements about the significant pumped hydro energy storage feasibility study for the Snowy Hydro Scheme.

The Finkel Review

On 7 October 2016, the Australian Government commissioned an expert panel lead by the Chief Scientist Dr Alan Finkel to take stock of the current state of the security, reliability and governance of the NEM and to provide advice to governments on a coordinated, national reform blueprint.

The final report of the Independent Review into the Future Security of the National Electricity Market was delivered to the COAG Leaders' meeting on 9 June 2017 (Finkel et al. 2017). A preliminary report was released on 9 December 2016 (Finkel et al. 2016).

The final report contained 50 recommendations covering:

- preparing for next summer (1 recommendation)
- increased security (12)
- a reliable and low emissions future the need for an orderly transition (4)
- more efficient gas markets (4)
- improved system planning (5)
- rewarding consumers (10)
- stronger governance (14).

Some notable recommendations include:

- a package of Energy Security Obligations should be adopted to ensure regional electricity security and address connection standards (recommendation 2.1)
- the COAG Energy Council should direct the AEMC to review the regulatory framework for power system security in respect of distributed energy resources participation (recommendation 2.5)

- an annual cyber security preparedness report should be prepared (recommendation 2.10)
- the Australian Government should develop a whole-of-economy emissions reduction strategy for 2050 by 2020 (recommendation 3.1)
- the Australian and State and Territory governments should agree to an emissions reduction trajectory for the National Electricity Market (recommendation 3.2)
- that a clean energy target be adopted to achieve emissions reduction (recommendation 3.2)
- large generators be required to provide at least three years' notice prior to closure to support the orderly transition (recommendation 3.2)
- AEMO, in consultation with transmission network service providers and consistent with the integrated grid plan, should develop a list of potential priority projects in each region that governments could support if the market is unable to deliver the investment required to enable the development of renewable energy zones by mid-2019 (recommendation 5.2)
- reviews should be undertaken of the regulatory investment tests for transmission and distribution by mid-2020 (recommendation 5.5)
- remove complexities to and improve consumer access to, and rights to share, their energy data (recommendation 6.3)
- an Energy Security Board be established to be responsible for the implementation of the Finkel review and to provide whole-of-system oversight for energy security and reliability (recommendation 7.2).

The Australian Government has accepted 49 to the 50 recommendations — but not the one that counts the most for reducing the uncertainty that hamstrings investment, the recommendation for the adoption of a Low Emissions Target.

4 Gas

This chapter provides an overview of the natural gas industry in Australia and some of the key policy issues confronting it. It does not cover liquefied petroleum gas (LPG), which is a by-product of extracting crude oil. The terms gas and natural gas are used interchangeably.

The chapter begins by providing an overview of the gas industry in Australia (section 4.1). It then briefly outlines the recent evolution of the industry (section 4.2) that has given rise to its current structure (section 4.3). The chapter then explores some of the key policy-related issues confronting the industry (section 4.4). It then highlights some recent initiatives that have important implications for the industry (section 4.5).

Readers familiar with the industry structure and its evolution can proceed to the discussion of industry-specific policy issues in section 4.4. Chapter 2 canvases issues that also apply to the gas industry. Policy issues specific to the electricity industry are discussed in chapter 3.

4.1 Overview

Natural gas is the third largest *primary* source of energy consumed in Australia in 2014-15 (after oil³⁰ and coal), accounting for almost one-quarter (chapter 2). Consumption of gas has also grown at a much faster rate over the last 40 years than either oil or coal.

Australia produced (extracted) 66 421 million cubic metres of natural gas in 2014-15 (DIIS 2016a). The energy content of this production was 2462 PJ and the energy content of gas consumed (used) was 1431 PJ. The main gases produced were: methane and, to a much lesser extent, ethane.

Most of this production was 'conventional' gas (82 per cent). Conventional gas is found in underground reservoirs, often along with oil, and can be extracted using traditional methods, with only a few wells for each basin. 'Unconventional' natural gas requires additional technology for extraction and requires more wells. Coal seam gas (CSG) accounted for 18 per cent of national production, but almost half of east coast production (principally in Queensland to supply LNG exports). In contrast to the United States,

³⁰ Crude oil is subsequently refined to produce other fuels such as automotive gasoline, aviation gasoline, aviation turbine fuel, diesel and fuel oil.

Australia does not produce shale gas despite having significant reserves.³¹ Nor also does Australia produce any 'tight gas' (GeoScience Australia 2016).

Gas fields cover much of Australia, with major basins located on and off the length of the Western Australian west coast and across the Northern Territory border, onshore through the Kimberley and Pilbara regions of Western Australia and down through central Australia into South Australia, Queensland and New South Wales and right along the Victorian coast (figure 4.1).

Production

Large-scale commercial oil and gas exploration began in Australia after the Australian Government introduced a subsidy scheme to encourage petroleum exploration in 1957.

Gas fields were subsequently discovered in the Surat Basin near Roma in Queensland (1960), followed by the Cooper Basin in the north-east of South Australia (1963), in the Amadeus Basin west of Alice Springs in the Northern Territory (1963), at Barrow Island off the coast of Western Australia (1964) and in the Barracouta field in Bass Strait off the coast of Gippsland (1965).

Commercial extraction commenced in the early 1960s (figure 4.2).³² However, output growth over the 1960s was subdued.

With the commercial development of Bass Strait and the Surat and Cooper Basins in the late 1960s, output grew strongly during the 1970s. Commercial extraction commenced in Western Australia in the early 1970s and in the Northern Territory in the early 1980s.

In 2014-15, Australian gas production was concentrated in three states. Western Australia was by far and away the largest producer, accounting for 61 per cent of production. Queensland and Victoria were the next biggest producers (20 per cent and 15 per cent, respectively). Production in South Australia, the Northern Territory and New South Wales together accounted for just 4 per cent of national production (figure 4.3).

Collectively, production from the four gas producing states that make up the east coast gas market — Queensland, Victoria, South Australia and New South Wales — accounted for 38 per cent of national output in 2014-15 (figure 4.3).³³

³¹ CSG is gas extracted from coal beds, while shale gas is extracted from organic-rich rocks such as shale. Tight gas is found in low porosity sandstone and carbonate reservoirs. CSG occurs closer to the surface than shale gas and is easier and cheaper to extract. All shale gas and some CSG requires hydraulic fracturing (referred to as 'fracking') to extract the gas from the rocks (discussed in section 4.4).

³² Prior to the 1960s, gas was manufactured in Australia (dating back to, at least, the 1860s). It was not extracted from the earth as a mining activity.

³³ The east coast market is sometimes referred to as the eastern market.



Figure 4.1 Australian gas supplies and pipelines

Source: GeoScience Australia (2016).

The South Australia and Victorian gas fields are mature fields. Production in South Australia grew strongly from 1969-70 until production peaked in 1989-90. Production subsequently declined steadily between 1989-90 and 2005-06. Since then, production has remained relatively flat. Victorian gas production peaked in 2012-13.

Until 1989, all production supplied the domestic market (such that domestic consumption of gas grew in line with production) (figure 4.2).



Figure 4.3 Share of Australian gas production by jurisdiction, 2014-15



Source: DIIS (2016a table Q1).

Consumption

Consumption by state

Western Australia was the largest natural gas consumer in Australia in 2014-15, accounting for over one-third of total use (figure 4.4). Queensland and Victoria were the next biggest consumers, each accounting for around one-fifth of total natural gas use. New South Wales (including the Australian Capital Territory) was the next largest consumer, accounting for half that of Queensland. South Australia was the largest consumer among the remaining states.

Figure 4.4 Share of Australian gas consumption by jurisdiction, 2014-15^a



^a NSW includes the ACT. Source: DIIS (2016a table Q2).

Consumption by sector

The electricity generation sector was the biggest domestic user of natural gas in 2014-15, accounting for almost 40 per cent of all gas used in that year (figure 4.5). The manufacturing sector was the next largest user (accounting for 30 per cent of demand). The main gas using manufacturing industries are non-ferrous metals processing (such as alumina) and chemicals manufacturing and, to a lesser extent, food processing. Gas is used as a source of power and as a feedstock, such as in the production of polyethylene. Reflecting the strength of the mining industry in that year, the mining sector accounted for 14 per cent of total use. Residential users accounted for 11 per cent of gas use.



Figure 4.5 Share of Australian gas consumption by user, 2014-15^a

The gas use varies markedly by state (DIIS 2016b, p. 31). There are significant differences across states in the use of gas for electricity generation (discussed below). Manufacturing use was highest in Tasmania and New South Wales (72 per cent and 44 per cent, respectively), while residential usage was the main use in Victoria (39 per cent). Mining accounted for relatively high usage in the Northern Territory, Western Australia and South Australia (43 per cent, 19 per cent and 17 per cent, respectively). Residential usage was also high in New South Wales (18 per cent).

In contrast, there was almost no mining use in New South Wales or Tasmania. There was minimal residential use of gas outside of Victoria and New South Wales.

Electricity generation

As noted, the electricity generation sector accounted for almost 40 per cent of natural gas use in 2014-15.

Gas-fired generation was concentrated in two states in 2014-15: Western Australia (246 PJ) and Queensland (166 PJ). These two states accounted for three-quarters of all gas used in generating electricity (figure 4.6).

There was limited use of gas in electricity generation in the remaining states.



In terms of overall state usage of gas, electricity generation was the main user of gas in Queensland, the Northern Territory, South Australia and Western Australia (accounting for 58 per cent, 57 per cent, 45 per cent, and 44 per cent, respectively) (DIIS 2016b, p. 31).

Interstate trade

Interstate trade in natural gas occurs in the east coast gas grid via transmission pipelines that cross jurisdictional borders. Trade can occur at any point in time up to the capacity of the pipeline.

In 2014-15, Victoria was a net exporter of natural gas to the other states in the southern part of the grid. All of the other states - New South Wales, South Australia and Tasmania — were all net importers of natural gas (figure 4.7).

Figure 4.6 Gas use by the electricity sector by jurisdiction, 2014-15^a



Figure 4.7 Implied net gas exports by jurisdiction, 2014-15^a Billion cubic metres

^a Implied net exports includes sales to other states (interstate trade) and exports overseas. Source: DIIS (2016a table Q1 & Q2).

Exports

Australia exports natural gas overseas in its liquid rather than gaseous form given our geographical location makes pipelines unviable. The gas is liquefied by chilling it to -161 degrees Celsius in processing and purification facilities known as 'LNG trains' to reduce its volume by more than 600 times. The resulting LNG is then exported in specifically designed cryogenic tankers. On arrival, it is stored in tanks before undergoing regasification prior to use.

Exports of Australian LNG commenced in 1989, with the development of the North West Shelf off the coast of Karratha in Western Australia.

Western Australia was the sole exporter of LNG until exports from the Northern Territory commenced in $2006.^{34}$

Exports from Queensland commenced from Curtis Island (north of Gladstone) in 2014. Two additional export facilities have since come online (both also on Curtis Island). These developments link the east coast to world gas markets. The three Queensland LNG export

³⁴ The Port of Darwin exports LNG from the Joint Development Zone between Australia and East Timor.

facilities are the first in the world to process CSG. They are partly supplied from their own reserves and partly from gas sourced from the domestic market (discussed in section 4.4).

All up, there are 16 LNG trains in Australia with a combined capacity of 74.1 Mt per year (table 4.1). Two additional processing facilities are also under development — one floating facility in the East Browse Basin, 200 km off the far north west coast of Western Australia, and one at Darwin — with three trains and a capacity of 12 Mt per year (both scheduled for completion in 2018).

		ore raon			
Field	Processing facility	State	Exports commenced	Capacity	LNG trains
				Mtpa	No.
Conventional					
North West Shelf	Karratha	WA	1989	16.3	5
Bonaparte	Darwin	NT	2006	3.7	1
Pluto	Burrup Peninsula	WA	2012	4.3	1
Gorgon	Barrow Island	WA	2016	15.6	3
Wheatstone	Onslow	WA	2017	8.9	2
Onshore CSG					
Queensland Curtis LNG	Gladstone	Qld	2014	8.5	2
Australia Pacific LNG	Gladstone	Qld	2015	9	1
Gladstone LNG	Gladstone	Qld	2015	7.8	2
Under development					
Ichthys	Darwin	NT	2018	8.4	2
Prelude	Floating ^a	WA	2018	3.6	1
State totals ^a					
Queensland				25.3	5
Northern Territory				3.7	1
Western Australia				45.1	11

Table 4.1Australia LNG export facilities

^a World's first offshore floating processing facility. ^b Excluding projects under development.

Sources: Australian Petroleum Production & Exploration Association, Chevron and Inpex web sites, WA DSD(2016).

Australia is the world's second largest exporter of LNG after Qatar (BP 2017, p. 35), exporting 53 million tonnes (Mt) of LNG valued at \$23.7 billion in 2016-17.

LNG exports — both in volume and value terms — have grown strongly, especially since 1990 (figure 4.8). Australian exports were just 14 Mt worth \$5.2 billion a decade ago. As a result, Australian natural gas production now greatly exceeds domestic use (figure 4.2). Export volumes grew by 37 per cent in 2016-17 financial year.



Australia is expected to become the largest LNG exporter by 2020 (DIIS 2016b).

Three Australian jurisdictions export LNG. Western Australia was by far the largest exporter in 2014-15 (92 per cent of all exports by volume), followed by Queensland (7 per cent). The Northern Territory was the smallest exporter (less than 1 per cent) (figure 4.9, left-hand panel).

Half of all Australian natural gas production was exported in 2014-15 (figure 4.9, right-hand panel). Three-quarters of Western Australian production was exported in that year, one-third of Northern Territory production and one-fifth of Queensland production.

The two additional LNG facilities that came online in Queensland led to a dramatic increase in that state's and eastern Australia's export capacity.

More recent data indicates that LNG export volumes from Queensland have grown at a much faster rate for Western Australia (34 and 15 per cent per year, respectively, over the three years to 2016-17) (DIIS 2017). There has been no growth in the share of exports from the Northern Territory.



Figure 4.9 LNG export shares by jurisdiction, 2014-15

Reserves

Reserves are untapped sources of gas. They consist of known deposits that have yet to be developed or, based on their geology, suspected deposits of gas. Uncertainty exists concerning the volume of gas in each basin and the economic viability of extracting it. This is particularly so for unconventional gas whose deposits have yet to be developed and are dependent on additional technology to make them economically viable. This gives rise to uncertainty surrounding the size of gas reserves.

Australia is assessed as having considerable gas reserves, with 279 819 PJ of known identifiable reserves (GeoScience Australia 2016). This is equivalent to around 106 years of production at current rates.

With the development of new technologies and the advance of exploration into proven basins and frontier areas, opportunities remain for new large gas discoveries. Geoscience Australia forecasts that these prospective (contingent) resources may be in the order of 3.5 times total identified reserves (GeoScience Australia 2016).

Conventional gas accounts for the bulk of identified reserves (63 per cent of known reserves, and 70 per cent of contingent reserves) (figure 4.10). Based on current production, known reserves are expected to last for 47 years.

Unconventional sources, particularly shale gas, account for just under three-quarters of Australia's prospective gas resources (figure 4.10).

These gas reserves are concentrated in, or off the coast of, three jurisdictions: Western Australia (56 per cent), Queensland (27 per cent) and the Northern Territory (9 per cent). The east coast gas market states collectively account for 35 per cent of these reserves.



Figure 4.10 Australia's total identified and prospective gas resources GJ

^a Contingent resources: known discoveries that currently are subeconomic. Prospective resources: reserves that are deemed probable (at least 50 per cent likely) to be commercially recoverable. Also known as 2P or P50 reserves.

Source: GeoScience Australia (2016).

In terms of the east coast market, 85 per cent of total identified and prospective gas reserves are in the Surat–Bowen Basin in Queensland, 9 per cent in Victoria (mainly in Gippsland), 3 per cent each in South Australia and New South Wales (AER 2015, p. 92).

4.2 Historical development

Gas fields were initially developed to supply specific domestic markets, typically capital cities, or for export. The former involved linking production facilities to retail markets through long-distance high-pressure transmission pipelines and local distribution networks or to large industrial customers, including electricity generators. The gas tended to flow through these pipelines in one direction.

This trade initially occurred through confidential bilateral, long-term trades between producers and retailers. Gas production tended to involve joint ventures between large private-sector companies. The retailers consisted of a mix of private and government-owned utilities.

Bilateral contracts — often referred to as gas supply agreements (GSAs) — underpinned the development of the gas industry by giving users the confidence to invest in long-lived

infrastructure, and for suppliers to develop or underwrite capital intensive gas production and transmission facilities.

Over time, transmission pipelines were linked to facilitate trade between regions. This linking gave rise to gas grids. There are three such grids in Australia:

- the east coast grid, covering Queensland, New South Wales, Victoria, South Australia and Tasmania (22 pipelines; 13 408 km)
- the west coast grid, covering Western Australian (7 pipelines; 4758 km)
- the north coast grid, covering the Northern Territory (4 pipelines; 2423 km) (AER 2015, p. 112), WA Public Utilities Office web site).

Some major transmission pipelines were re-engineered in 2015 to allow gas to flow in both directions (AER 2015, p. 12). As a result, most of the transmission pipelines in the east coast grid are now bi-directional.

This allows users to purchase gas from almost anywhere on the grid and has given rise to the development of 'gas markets'.

4.3 Market structure

The vertical structure of the gas industry is broadly similar to that of the electricity industry (discussed in chapter 3) — production (extraction and processing to remove impurities — dust, water and heavy hydrocarbons, and gases other than methane, such as helium), long-distance transmission, localised distribution and retail. One material difference is that the storage of gas is already economically viable (figure 4.11).

Large customers (power stations and industrial customers) generally access their gas directly from the transmission network, and negotiate the price paid with gas producers.

Four large retailers — Jemena Gas Networks (NSW), Multinet (Victoria), AusNet Services (Victoria) and Australian Gas Networks (Victoria) — accounted for around 88 per cent of retail customers (based on AER 2015, p. 113). These companies source their supply under contracts with the gas producers. As a consequence, the downstream market has been characterised as possessing 'strong oligopsony characteristics' (DIIS 2016b, p. 34).

Nearly all large customers and retailers must deal with the gas transmission companies to obtain delivery of contracted gas supplies.



Source: AER (2017b, p. 19).

Production

Gas production involves the extraction of gas from the earth's crust and the processing of that gas to remove gases other than methane and any impurities. The production sector also includes exploration to find new sources of gas (termed reserves).

Production can occur offshore or onshore. Offshore production primarily occurs off the north west coast of Western Australia and straddling the Northern Territory border and off the coast of Victoria (primarily in Bass Strait).

One important distinction is between production that occurs offshore and onshore. The Australian Government controls mining beyond a three mile nautical limit, while the states control both the landward side of that limit and all onshore oil and gas production. Most gas in Australia is produced offshore, but transported through pipelines for processing onshore.

Onshore and offshore operations are subject to a three-tier system of licensing:

- exploration permits that allow the search for new reserves
- retention leases that preserve the tenure on as-yet non-commercial discoveries
- production licences that enable the extraction and processing of the gas.

Reflecting public ownership of the underlying resources, Australian governments levy taxes specifically on the extraction of gas in Australia. These taxes form part of the wider taxation of oil extraction and are not reported separately. These taxes are in addition to general taxes levied on the business (such as company and payroll tax).

The main taxes on gas production are the Australian Government's Petroleum Resource Rent Tax (PRRT) and royalties payable to both the Australian Government and state and territory governments. Oil production also incurs excise duty. In 2015-16, Australian governments raised roughly \$2.2 billion from taxes levied specifically on oil and gas production — roughly \$750 million from the PRRT, \$300 million from Australian Government royalties, \$750 million from state and territory government royalties and \$300 million from excise on oil (Callaghan 2017, pp. 38 & 40). These revenue collections are linked to oil prices.

Taxes on the extraction of gas, and to a slightly lesser extent oil, are less than those on iron ore and coal.

Production in each basin typically consists of a number of mining companies (figure 4.12). Many of these mining companies are joint ventures. There is significant foreign investment in the Australian gas industry, including production. The major gas mining companies include: BG Group, BHP Billiton, Chevron, ConocoPhillips, Origin Energy, Santos, Shell and Woodside.



Figure 4.12 Market shares in gas production in the east coast market, 2014-15^a

^a Date for the 12 months to 31 May 2015. NSW CSG basins include the Sydney and Gunnedah Basins. Not all minority owners listed.

Source: AER (2015, p. 94).

Storage

Gas can be stored underground in reservoirs and in pipelines, or post-liquefaction as LNG in purpose built facilities.

Gas storage enhances system security by allowing for system injections at short notice to manage peak demand and emergencies. It also allows retailers a hedging mechanism if gas demand varies significantly from forecast, and is increasingly being used to manage supply and demand fluctuations in the east coast market.

The key storage facilities in the east coast market are:

- Moomba (storage capacity 85 PJ; South Australia)
- Roma (70 PJ; Queensland)
- Silver Springs (35 PJ; Queensland)
- Iona gas plant (26 PJ; Victoria)
- Ballera (10 PJ; Queensland)
- Newstead (2 PJ; Queensland)
- Newcastle LNG (1.5 PJ; New South Wales)
- Dandenong LNG (0.7 PJ; Victoria) (AER 2017b, p. 72)

Wholesale gas markets

Wholesale gas markets have been developed to supplement the use of bilateral contracts.

The six east coast markets can be broadly categorised into three groups. While similar in many respects, the design and operation of each group differs in some important respects.

The first group of wholesale markets are the three short-term spot markets in Sydney (established September 2010), Adelaide (September 2010) and Brisbane (December 2011) that were developed as a means for balancing supply (deliveries into the system) and demand (withdrawals from the system). These markets are referred to as 'hubs' and occur at the interface of the transmission and distribution systems.

The daily price of gas at each hub reflects local supply and demand. Prices can vary between a floor price of \$0/GJ and a maximum price of \$400/GJ. Bids are placed the day before the trade in gas is to occur. Trades are balanced by the pipeline operators, with the AEMO operating the financial-side of the market.

The spot market typically accounts for 15 per cent of wholesale gas sales in Sydney and Adelaide, and 5 per cent in Brisbane (AER 2015, p. 96). Bilateral contracts account for the remainder of wholesale gas sales or through vertical arrangements between producers and retailers.

The second group of wholesale markets is the Victorian spot market that manages gas flows on the Victorian transmission system. It is different from the first group of short-term spot markets in that:

• the maximum price in Victoria is \$800/GJ

- the AEMO manages the physical balancing of gas trades in Victoria, while the pipeline operators are responsible for the short-term spot markets (the AEMO operates the financial side of both markets)
- the Victoria market is for gas only, while prices in short-term spot markets include transmission pipeline delivery to the hub.

The final group of wholesale markets is the Wallumbilla (March 2014) and Moomba (June 2016) gas hubs. The Wallumbilla hub, which is located at the interconnection point for the Surat-Bowen Basin, was developed to support the LNG export facilities in Queensland. It enables buyers and sellers to voluntary trade gas products in spot (balance of day or day ahead) or forward markets. It allows trading for the three pipelines involved: the South West Queensland, Roma to Brisbane, and Queensland Gas pipelines. The Moomba hub is located at the junction of Moomba to Adelaide and Moomba to Sydney pipelines, and was developed to enhance the transparency and reliability of gas supply.

Transmission networks

Transmission networks transport gas under high pressure over long distances.

There are currently 34 gas transmission pipelines in Australia. Collectively, these pipelines are more than 20 000 km in length (table 4.2).

The New South Wales and Northern Territory Governments signed a memorandum of understanding in November 2014 to develop a transmission pipeline connecting the Northern Territory with the east coast market. In November 2015, the Northern Territory Government selected Jemena Northern Gas Pipeline Pty Ltd to build, own and operate the \$800 million 622 km Northern Gas Pipeline to link Tennant Creek in the Northern Territory to Mount Isa in Queensland. Once completed, this will link the Northern Territory to the east coast market.

Like the electricity sector, and for the same reasons, gas transmission tends to be regulated with restrictions on gas trading by pipeline owners, and regulatory limitations on cross-ownership of competitive pipelines.

Pipeline	Length	Capacity	Reverse capacity	Regulatory status
	km	TJ/Day	TJ/Day	
Queensland				
Australia Pacific LNG Pipeline	530	1 560		No coverage (15 years)
Berwyndale to Wallumbilla Pipeline	112	164	276	Unregulated
Carpentaria Pipeline (Ballera to Mount Isa)	840	119		Light regulation
Comet Ridge to Wallumbilla Pipeline	127	950	175	Unregulated
Dawson Valley Pipeline	47	30		Unregulated (revoked 2014)
Gladstone LNG Pipeline	435	1 430		No coverage (15 years)
North Queensland Gas Pipeline	391	108		Unregulated
QSN Link (Ballera to Moomba)	182	404	340	Unregulated
Queensland Gas Pipeline (Wallumbilla to Gladstone)	627	149	40	Unregulated
Roma (Wallumbilla) to Brisbane	438	233	125	Full regulation
South West Queensland Pipeline (Ballera to Wallumbilla)	756	404	340	Unregulated
Wallumbilla Gladstone Pipeline	334	1 588		No coverage (15 years)
Wallumbilla to Darling Downs Pipeline	205	270	530	Unregulated
New South Wales				
Central Ranges Pipeline (Dubbo to Tamworth)	294	7		Full regulation
Central West Pipeline (Marsden to Dubbo)	255	10		Light regulation
Eastern Gas Pipeline (Longford to Sydney)	797	351		Unregulated
Moomba to Sydney Pipeline	2 029	439	381	Partial light regulation
Victoria				
South Gippsland Natural Gas Pipeline	250			Unregulated
Vic–NSW Interconnect	126/120	153	196	Unregulated
Victorian Transmission System (GasNet)	2 035	1 030		Full regulation
South Australia				
Moomba to Adelaide Pipeline	1184	241	55	Unregulated
SEA Gas Pipeline (Port Campbell to Adelaide)	680	314		Unregulated

Table 4.2Major gas transmission pipelines in Australia

(Continued)

Table 4.2 (Continued)

Pipeline	Length	Capacity	Reverse capacity	Regulatory status
Tasmania Tasmanian Gas Pineline	734	120		Upregulated
(Longford to Hobart)	734	125		Onregulated
Northern Territory				
Amadeus Gas Pipeline	1 658	120		Full regulation
Bonaparte Pipeline	286	80		Unregulated
Daly Waters to McArthur River Pipeline	332	16		Unregulated
Palm Valley to Alice Springs Pipeline	146	27		Unregulated
Western Australia ^a				
Dampier to Bunbury Natural Gas Pipeline	1 530	845		Regulated
Goldfields Gas Transmission Pipeline	1 426	202.5		Regulated
Kalgoorlie to Kambalda Pipeline	44	20		Light regulation
Kambalda to Esperance Pipeline	340	6		
Mid West Pipeline	352	10		Regulated
Parmelia Pipeline	416	65.4		
Pilbara Energy Pipeline	251	166		
Telfer Pipeline	443	29		
Total	20 589			
	Pipelines	Length	Share	
	No.	km	Per cent	
East coast	23	13 408	62.2	
Northern	4	2 423	11.8	
Western	8	4 802	27.0	

^a List excludes a number of smaller lateral pipelines.

Sources: AEMO (2016b, p. 18); AER (2015, p. 112, 2017b, pp. 72-73); APA web site.

Distribution networks

Gas distribution networks transport natural gas from transmission pipelines to end users. They typically consist of a backbone of high and medium pressure pipelines running between the 'city gate' (the point of connection to the transmission pipeline) and major demand centres. This network then uses low-pressure pipelines to deliver the gas to retail customers (businesses and homes).

There are currently 11 gas distribution companies operating in eastern Australia. Collectively, their networks are 76 420 km long and supply gas to just over 4 million customers (table 4.3).

	, .					
Network	Customer numbers	Length of mains	Asset base	Investmen t current period	Revenue current period	Current regulatory period
		km	\$m	\$m	\$m	
Queensland						
Allgas Energy	100 000	3 220	na	na	na	Light regulation from July 2015
Australian Gas Networks	92 900	2 700	na	na	na	Light regulation from February 2015
New South Wales a	nd Act					
Jemena Gas Networks (NSW)	1 300 000	25 380	3 022	971	2 101	1 Jul 2015– 30 Jun 2020
ActewAGL	137 800	4 900	343	80	291	1 Jul 2016– 30 Jun 2021
Central Ranges System	7 000	220	na	na	na	1 Jul 2004– 30 Jun 2019
Victoria						
AusNet Services	647 000	10 480	1 362	498	944	1 Jan 2013– 31 Dec 2017
Multinet	687 000	10 030	1 126	897	873	1 Jan 2013– 31 Dec 2017
Australian Gas Networks	648 000	11 000	1 193	431	904	1 Jan 2013– 31 Dec 2017
South Australia						
Australian Gas Networks	423 300	7 950	1 093	527	1 103	1 Jul 2011– 30 Jun 2016
Tasmania						
Tas Gas Networks	12 000	710	na	na	na	Not regulated
TOTALS	4 055 000	76 590	8 139	3 404	6 216	

Table 4.3Major gas distribution networks in eastern Australia

Retail

The retail sector sells gas and gas-related services to smaller customers such as households.

Energy retailers are the main customers of the distribution networks. They buy natural gas in large volumes and on-sell it to consumers. This gas is mostly sourced from gas producers under bilateral contracts. Additional gas can be sourced from wholesale gas markets if needed. Retailers arrange with gas distribution network operators for the supply of gas to end users via the distribution network.

Consumers in all Australian states and territories are able to choose their gas retailer. They can also remain on regulated tariffs, although the number is steadily decreasing. The AEMC has recommended that retail price regulation be removed in Victoria, South Australia, the Australian Capital Territory and New South Wales.

The AEMO operates the gas retail markets in Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia. It manages the systems required for customer transfers (when a customer switches its retailer), delivery point management and balancing and reconciliation (managing the daily allocation of gas usage to retailers to enable the settlement of gas supply contracts).

Regulatory environment

The rationale for gas market regulation is also similar to that for electricity — the presence of large fixed costs and low marginal costs make it unlikely that there will be significant competition in the transmission and distribution of gas. Regulation is intended to constrain companies from exploiting any monopoly power they might have.

As gas is an important fuel source in electricity generation, the same key agencies are responsible for the governance of Australian gas markets as for electricity (discussed in chapter 2). The AER regulates network services in all jurisdictions, except Western Australia, where the Economic Regulation Authority of Western Australia holds this responsibility.

The National Gas Law and the National Gas Rules provide the regulatory framework for gas markets in the Australian Capital Territory, Tasmania, South Australia, New South Wales and Queensland, but not in Victoria.

Significant gas regulation focuses on those transmission and distribution pipelines where strategic behaviour is assessed as being more likely.

The National Competition Council recommends whether a gas distribution network should be regulated based on an assessment of the extent of competition for that service and their significance. The relevant minister in each jurisdiction then decides whether to regulate and, if so, the form of that regulation — light or full.

Covered pipelines may be subject to either:

• *light regulation*, where the pipeline owner determines its own tariffs, access arrangements and other terms and conditions, which must be published on its website. In the event of a dispute, a party seeking access to the pipeline may ask the AER to arbitrate.

full regulation, where pipeline owners must periodically submit their access arrangements to the AER for approval. The AER determines the reference tariffs for the pipeline based on the revenues needed to cover efficient costs and provide a commercial return on capital.

In practice, the industry generally operates with 'light-handed' economic regulation (tables 4.2 to 4.4). Only those elements with strong monopoly characteristics are regulated under the National Gas Law and Rules. This comprises distribution networks, those transmission lines with no direct competitors, and retail prices in a limited number of jurisdictions. Historically, the upstream gas industry has successfully relied on unregulated transactions between private sector producers and public or private utilities.

New pipelines are typically unregulated.

Price regulation	Linkages		
n Competitive			
	Oil production LNG export Storage		
Pipelines with market power are regulated New pipelines typically not regulated	Storage Distribution Barred from trading gas		
Competitive	Production Transmission		
Regulated due to strong monopoly characteristics	Transmission Barred from trading gas		
Competitive except NSW with price controls on some small users	Electricity retail and generation Gas production		
Not applicable	Some vertically integrated with retail and production (eg generators)		
Competitive on world market	Exploration and production		
	Pipelines with market power are regulated New pipelines typically not regulated Competitive Regulated due to strong monopoly characteristics Competitive except NSW with price controls on some small users Not applicable Competitive on world market		

The regulatory framework anticipates the potential for market conditions to evolve, and includes a mechanism for reviewing whether a particular pipeline needs economic regulation, and the extent of that regulation.

Rules made by the AEMC at the end of 2012 introduced a common approach to setting the rate of return for gas (and electricity) networks (AEMC 2012).

Transmission

The gas transmission sector is generally subject to light-handed regulation (table 4.2). This is in marked contrast to the electricity transmission sector, which is highly regulated given that it also possesses strong natural monopoly characteristics arising from the large fixed and low variable costs involved in transportation (discussed in chapter 3).

Most transmission of the 27 pipelines in the east coast grid and in the Northern Territory are *unregulated* (table 4.2). That is, they are not subject to economic regulation (and are referred to as 'uncovered').

All remaining transmission pipelines in the east coast grid and in the Northern Territory are *regulated* to varying degrees (referred to as 'covered').

Four pipelines (15 per cent) are fully regulated:

- Amadeus Gas Pipeline (Northern Territory)
- Roma (Wallumbilla) to Brisbane (Queensland)
- Central Ranges Pipeline (Dubbo to Tamworth) (New South Wales)
- Victorian Transmission System (GasNet) (Victoria).

A further three pipelines (11 per cent) are subject to partial or light regulation:

- Carpentaria Pipeline (Ballera to Mount Isa) (Queensland)
- Central West Pipeline (Marsden to Dubbo)
- Moomba to Sydney Pipeline (South Australia/New South Wales).

Despite the gas market being widely regarded as being heavily regulated, the ACCC (2015) found less than 20 per cent of the transmission pipelines on the east coast are currently subject to regulation under the National Gas Law and Rules. This is at direct contrast to comparable jurisdictions, such as the United States, the European Union and New Zealand, where the vast majority of transmission pipelines are regulated.

Distribution

In contrast to transmission, gas distribution tends to be subject to full economic regulation.

The regulation of gas distribution networks in eastern Australia varies by state (table 4.3).

- *All* distribution networks in New South Wales, Victoria, South Australia and the Australian Capital Territory are *fully* regulated by the AER.
- The two distribution networks in Queensland Allgas Energy and Australian Gas Networks are subject to *light* regulation by the AER.
- The Tasmanian distribution network is not subject to regulation by the AER, but is subject to regulation by the Office of the Tasmanian Economic Regulator.

4.4 Gas-specific policy-related issues

In addition to the issues covered in the energy chapter (chapter 2), there are a number of policy-related issues specific to Australian gas markets. These issues predominantly relate to the east coast market.

Two topical issues are the availability and price of gas in the east coast market. These issues are interlinked.

The recent development of LNG export facilities in Queensland has linked the east coast to wider world markets. This development now gives domestic producers the option of selling their gas on world markets.

The intention was that gas from new developments would largely meet the demand from the LNG export facilities, leaving the amount of gas available for the domestic market relatively unchanged.

This has, however, not been the case for two of the facilities — Gladstone LNG and Queensland Curtis LNG (AER 2017b, p. 81). Not only was the yield less than expected, but the costs of extraction were higher.

LNG exporters subsequently drew on existing fields to source supply in order to fulfil the balance of their export contracts. This additional demand was large relative to the size of the east coast market and this increase in demand led to substantially higher domestic prices, and a reluctance by suppliers to enter into long term contracts. As a result, many domestic consumers had difficulty in securing supply contracts at prices that they found acceptable.

In theory, notwithstanding the use of bilateral contracts and strategic behaviour, arbitrage should ensure that the domestic price of gas will converge over time to the 'LNG netback price' — the export price of LNG less the costs of transport and liquefaction.

Thus, the issues of domestic availability and the domestic price of gas are linked to wider issues affecting current and future east coast production, domestic demand and LNG exports. Considerable uncertainty compounds these issues.

Other important policy-related issues affecting Australian gas markets include:

- domestic gas reservation schemes
- moratoria on onshore gas exploration and production in some states
- misuse of market power
- third party access
- lack of market transparency and information
- the absence of a well-functioning and liquid spot market.

While the discussion that follows attempts to separate these issues in order to shed light on the underlying policy-relevant factors, it should be remembered that they are interlinked.

Domestic availability of gas

The availability of gas in the east coast market is inextricably linked to the construction of the three LNG export facilities (consisting of five LNG trains) in Queensland.

The three facilities are large relative to the size of the domestic market. Their combined installed capacity is 25.3 Mtpa, which is 34 per cent of total Australian capacity. If they operated at 100 per cent capacity, these facilities would be capable of processing around 39 billion cubic metres of natural gas a year.³⁵ This is roughly 50 per cent more than total east coast production in 2014-15.

Furthermore, these three facilities are linked into the east coast grid through transmission pipelines that join the Roma to Brisbane pipeline at Wallumbilla.

The linkage to the domestic transmission system means that, as long as the export facilities have spare capacity and if the domestic price is lower than the netback price, it is more profitable to export gas than to supply the domestic market. Given this, the domestic price of gas would be expected to increase towards the netback price.

Prior to the development of the LNG export facilities, the east coast domestic price of gas was significantly lower than international prices (figure 4.13). For example, prior to the development of the LNG export facilities, the monthly Australian dollar price of gas per GJ at Wallumbilla in March 2014 was roughly one-quarter of the North East Asian spot price — roughly A\$4/GJ compared with almost A\$18/GJ.³⁶ The subsequent strong increase in domestic prices and decline in world oil prices (which gas prices are linked to with a three to four month lag) has seen this gap largely disappear.

 $^{^{35}}$ Based on a gas density of 0.656 kg/m³.

³⁶ Even though the export facilities were yet to come online at this time, the domestic price may still reflect lower domestic gas supplies resulting from LNG exporters procuring supply to meet future export orders.



^a The chart plots the month that LNG production began at each train at Gladstone. The North East Asian spot price index, which covers Japan, China, South Korea and Taiwan, is for delivery in 4–6 weeks, and is composed of 50 per cent volume weighted deal data and 50 per cent average bids and offers. *Source*: DIIS (2017, p. 72).

While it was envisaged that these facilities would be supplied through the development of new CSG fields, thereby matching growth in supply to the increase in demand, this has not been the case for two of the facilities — Gladstone LNG and Queensland Curtis LNG — whose reserves at the time their final investment decision was made fell well short of their productive capacity (AER 2017b, p. 81).³⁷

This has meant that the exporters were competing with other consumers on the domestic market in order to meet their contractual obligations.

As a result, the growth in the demand for east coast gas has outstripped the growth in supply, such that east coast domestic gas prices have risen strongly (figure 4.14). Sydney spot prices have risen by 18 per cent per year since June 2010, and 34 per cent per year since June 2014. Movements in Brisbane and Adelaide gas prices were broadly similar.

³⁷ Queensland Curtis LNG would also have sufficient reserves if all of the significant uncommitted reserves of Arrow Energy are included. Shell is the principal owner of Queensland Curtis LNG (with a 73.75 per cent stake) and owns half of Arrow Energy with PetroChina.



While many expected price increases to occur with the linking to international markets, the increases were quicker and larger than many anticipated. Many large domestic customers have had difficulty in securing new supply contracts and/or have done so at significantly higher prices, particularly as their existing contracts expire or come up for renewal.

Higher gas prices and an inability to secure long-term supply have an adverse impacts on domestic gas users in Australia, with flow-on effects to regional employment and local communities.

These price rises also make it harder for natural gas to replace coal in electricity generation to reduce greenhouse gas emissions, and to provide the stability needed for the grid by quickly smoothing out the intermittent generation from renewables (discussed in chapter 3).

In response to conflicting views between gas producers and customers concerning how well the east coast gas market was functioning and whether there were domestic supply issues, the Australian Government commissioned the ACCC in 2015 to inquire into the competitiveness of wholesale gas prices and the structure of the upstream processing, transportation, storage and marketing segments of the east coast gas industry.

The final Inquiry into the East Coast Gas Market found that:

... many industrial users did experience real difficulties during this period [2012 to the end of 2014] and that they were receiving few, if any, real offers for gas. The offers that they did receive were often at sharply higher prices and on strict 'take it or leave it' terms.

Domestic suppliers were either unwilling or unable to make firm offers for gas supply for 2016 and onwards. They were either already fully contracted, reviewing their supply arrangements and strategies, in negotiation to secure their own supplies or, in the case of the LNG projects, focused on ensuring gas supply for LNG production rather than supplying additional gas for domestic users. This combination of factors led to great uncertainty for industrial gas users in the domestic market. (ACCC 2015, p. 1)

It went on to find that there were:

... now more gas supply offers available in the market, but they are from fewer sources of supply, higher priced, often for shorter durations and with tighter non-price terms and conditions. Other problems also remain in the market. (ACCC 2015, p. 1)

The ACCC concluded that the dramatic changes in the supply-demand balance and new contractual arrangements for conventional gas to support the LNG projects led to this market disruption.

The ACCC inquiry found that:

While it is clear that there are sufficient east coast reserves to meet likely demand for the foreseeable future, it is not at all clear whether these reserves will be developed in a timely fashion to meet demand at any particular point in time. (ACCC 2015, p. 2)

It found that there were three major factors that were feeding into the uncertainty about future gas supplies on the east coast:

- gas flows to the LNG projects were removing gas from the domestic market
- low oil prices were resulting in declining investment in gas exploration and lower production forecasts for both domestic and LNG projects
- moratoria and regulatory restrictions were affecting onshore gas exploration and development, in New South Wales, Victoria, Tasmania and potentially the Northern Territory.

The inquiry recommended:

- reconsidering the approach being taken under regulatory regimes for gas development
- addressing pipeline sector problems that exacerbate gas supply and pricing issues in the domestic market
- improving market operations and increasing the level of market transparency.

Domestic gas reservation schemes

Domestic gas reservation schemes have been promoted as one way of ensuring the supply of gas to the domestic market.

Western Australia has had a gas reservation policy to ensure the availability and affordability of domestic supply since the 1970s.

It is claimed that the east coast market is the only natural gas export market that does not prioritise local supply (DomGas Alliance 2012).

Other countries typically ensure domestic supply by introducing:

- a domestic gas reservation scheme
- restrictions on export volumes
- export permits.

The Australian Government has since introduced what is effectively a threat of restrictions on export volumes (see below). Such measures are intended to prevent the subsequent loss in domestic economic activity, including employment, profits and tax revenue that would occur without such a scheme.

Higher export prices also bring economic benefits to Australia in the form of additional profits, tax revenue and employment. However, gas is subject to lower royalties (taxes on production) than iron ore and coal.

In its 2015 study examining barriers to more efficient gas markets, the Productivity Commission warned that a reservation policy would divert gas supply from the highest prices (and hence value uses), and that the cost of this would outweigh the gains from domestic use:

The integration of the eastern Australian gas market with the Asia–Pacific market represents an opportunity for the Australian community to earn a higher return from its substantial non-renewable resources. This will result in a net benefit to the community. (PC 2015, p. 54)

The Commission went on to state that:

The opening of the export market is creating significant disruption for market participants and will lead to material costs for some gas users, including through higher prices. There are concerns about short-term gas shortages and some gas users have indicated that they are unable to secure supply contracts.

- Policies that seek to counteract the pressures from structural adjustment arising from the opening of the export market, such as domestic gas reservation, could distort important signals for adjustment and are unlikely to be efficient or effective in the long run.
- Governments should be mindful that policies that interfere with market signals could undermine investment incentives, including incentives to bring on new sources of gas supply. (p. 2)

In its *Inquiry into the East Coast Gas Market* the ACCC found that the lack of a domestic reservation policy was *not* responsible for high domestic gas prices:

Gas reservation policies seek to shield domestic users from the effects of linking to export markets. They include policies to require a percentage share of gas reserves or production to be placed in the domestic market, or export controls which require a licence for exporting gas subject to certain conditions, such as a national interest test, which could include considerations of the impact on domestic supply.

In the short term, such policies may reduce prices for domestic users as additional gas is forced onto the domestic market above efficient market demand. These artificially reduced prices weaken the economic incentives for further gas exploration and appraisal. In addition, new gas projects which are scaled to the domestic market may be forced out of the market due to poor economic returns. Over time, reservation policies would reduce the likelihood of new sources of gas being developed, to the detriment of the level and diversity of supply for domestic gas users.

In a market that is facing supply issues arising from LNG, moratoria, and a low oil price, further impediments to gas supply development would be detrimental and so should not be introduced. (ACCC 2015, pp. 7–8)

It recommended that:

Gas reservation policies should not be introduced, given their likely detrimental effect on already uncertain supply. (p. 8)

However, the rise in prices in the east coast market have been unprecedented following the development of the export market. In response the Prime Minister convened a roundtable with gas company executives in March 2017 seeking a commitment to increase the supply of gas to the domestic market at peak times to put downward pressure on prices and ensure that the east coast does not experience the electricity blackouts that affected South Australia.

The Government announced after this meeting that it had decided to impose export restrictions on gas in a bid to ensure there are no domestic shortages. It introduced the Australian Domestic Gas Security Mechanism (which sits within the new Division 6 of the *Customs (Prohibited Exports) Regulations 1958*), that came into effect 1 July 2017 (DIIS 2017). This allows the Minister to make a determination to declare if a year is a shortfall year, which would trigger export controls. The aim is to encourage producers to boost supply for Australian users to avoid controls on export.

Following a meeting with the AEMO in April 2017, the Prime Minister announced that:

... the industry ... with AEMO, have developed a framework to make sure gas is delivered at times of peak electricity demand to prevent blackouts. The arrangement will be in place by 1 October this year well in time to prepare for the next summer.

... The meeting also discussed the agreement of the COAG Energy Council to accelerate gas market and pipeline reforms with rollout to commence from 1 July 2017. The meeting further noted the critical role of the states and territories in enabling gas exploration and development.

To verify the progress in gas supply, the Treasurer has today directed the ACCC to establish a monitoring regime by using its inquiry powers to compel the gas industry to provide information, to underpin a new transparency in the gas market to the benefit of consumers. (Turnbull 2017a)

A key function of policy is to monitor the extent to which this and other policy measures (including those aimed at concerns about the misuse of market power) will increase domestic gas supply and relieve price pressures.

Moratoria on onshore gas exploration and production

New supplies of gas are needed on the east coast to meet the increase in demand arising from the development of export facilities.

Currently, several states have moratoria on exploring or developing coal seam gas reserves — most notably Victoria, Tasmania and the Northern Territory.

Following the O'Kane review, NSW has lifted its prior pause on exploration and development, and has implemented a new set of regulatory arrangements (the 'Gas Plan'). The new framework permits onshore gas exploration and development subject to compliance with the relevant regulations. In this new context, several major projects for development (the Narrabri Gas Project) and potential exploration (the Bancannia Trough and Pondie Range Trough) are under assessment for potential approval.

The Victorian Government has permanently banned all onshore unconventional gas exploration and development, including hydraulic fracturing ('fracking') and CSG. It also has a moratorium on conventional onshore gas exploration and development (extended to 30 June 2020) (Noonan 2017).

In March 2014, the Tasmania Government introduced a one-year ban on hydraulic fracking needed to extract all shale gas and some CSG. The ban has been extended to five-years (Hodgman, Rockliff and Harriss 2015).

Independent reviews

At least four separate Australian reviews and inquiries have independently found that the environmental and social concerns regarding gas exploration and production can be effectively managed through a well-designed, evidence-based regulatory regime.

In her 2014 review of the evidence, the NSW Chief Scientist and Engineer, Professor Mary O'Kane, found that the risks of gas development could be effectively managed with the right regulation, engineering solutions, and ongoing monitoring and research (O'Kane 2014). The NSW Government agreed to all of her recommendations (NSW Government nd).

In November 2014, the Hawke Inquiry into hydraulic fracturing (fracking) in the Northern Territory recommended that:

The substantive weight of agreed expert opinion leads the Inquiry to find that there is no justification whatsoever for the imposition of a moratorium of hydraulic fracturing in the NT. (Hawke 2014, p. 46).

The major recommendation of the inquiry was that:

 \dots the environmental risks associated with hydraulic fracturing can be managed effectively subject to the creation of a robust regulatory regime. (p. x).

The inquiry noted that:

... the level of distrust and hostility towards the unconventional gas industry might seem curious given the NT's history of fracking in conventional reserves, without adverse consequences. (p ii)

A subsequent Northern Territory Government announced on 14 September 2016 a moratorium on hydraulic fracturing of onshore unconventional reservoirs, including its use for exploration, extraction, production and Diagnostic Fracture Injection Testing.

This was followed by an announcement on 3 December 2016 of another independent Scientific Inquiry into Hydraulic Fracturing in the Northern Territory to be headed by the Honourable Justice Rachel Pepper.

Reasons for the moratoria

These four moratoria were introduced in response to strong community concerns around the actual and perceived environmental and public health risks associated with fracking, access to farm land, its impact on agricultural production, and the loss of amenity.

Onshore gas exploration and production are clearly contentious, especially the production of CSG through fracking.

Some of this strong resistance was partly due to the poor early record of some companies in dealing with landholders and local communities (PC 2015, p. 11). The Commission identified that some gas companies had increased their engagement efforts, but found that there was scope to improve the legislated compensation provisions to better reflect the costs to landholders from negotiating land access agreements and from the decline in the value of their properties.

The Commission concluded that moratoria are not costless:

The expected benefits of the moratoria must be weighed against their expected costs — higher gas prices for users and reduced royalty and taxation revenue for governments. (p. 14)
It found that the technical challenges and risks could be managed through a well-designed regulatory regime that was underpinned by effective monitoring and enforcement of compliance (p. 77).

The Commission found that there were more effective models of community engagement than simple bans, which could include a voluntary industry-wide code of practice. It went on to say that:

A well-designed uniform voluntary code of practice outlining the principles and elements of best practice community engagement for the gas industry may improve outcomes and address expectations of future interactions on both sides. Other sectors that have faced similar issues with community resistance, such as the wind energy industry, have adopted this approach. (p. 11)

A voluntary industry-wide code of practice might help the gas industry improve their relationship with the community, but must be accompanied by moves of substance. None of this is intended to question the science and the efforts of Chief Scientists to establish safer practice. But as is often the case, the science is not enough to carry the policy debate.

The gas industry needs to address its relationship with the community to build confidence in the safety of the operations and provide sufficient compensation for disruption and loss of value to the landholder. To build community confidence in gas exploration and production, such a code must go beyond other desirable aspects of gas exploration safety regulation, sound scientific evidence, and monitoring and enforcement of compliance — and include clear guidelines and arrangements to support landholders in negotiating land access agreements.

The ACCC came to a similar conclusion in its *Inquiry into the East Coast Gas Market* (ACCC 2015). While recognising the importance of the environmental and social considerations that underpinned the moratoria, the inquiry found that the moratoria on the supply of gas was one of three main factors contributing to future uncertainty about gas prices (p. 2). It went on to recommend that:

Governments should consider adopting regulatory regimes to manage the risks of individual gas supply projects on a case by case basis rather than using blanket moratoria. Governments should take into consideration the significant effects that moratoria and other restrictions on gas development may have on gas users. (p. 8)

The effect of these moratoria has been exacerbated by decline in exploration and new development linked to falling oil prices and regulatory uncertainty. This has created an increasingly complex environment for many gas market participants (ACCC 2015).

While many of these factors are outside their control, governments have direct control over the moratoria on onshore gas exploration and production.

Adequacy of existing gas reserves

Despite having substantial proven reserves, New South Wales produced just over 3 per cent of the gas that it consumed in 2014-15 (figure 4.7).

There are sufficient proved and probable reserves in eastern Australia to theoretically supply both the domestic and export markets for the next 60 or so years.

However, if the market is divided into the North (Queensland and the Cooper Basin) and the South (Victorian and New South Wales reserves), there are insufficient probable reserves in the South to meet forecast demand, which will require the development of contingent resources, new gas discoveries and/or imports from the North.

In its *Gas Statement of Opportunities for Eastern and South-Eastern Australia*, the AEMO warned that, without further supply, there may be gas shortages in South Australia, New South Wales and Victoria (AEMO 2017c). Domestic gas production is forecast to decline, particularly offshore in Victoria, which is expected to fall by 38 per cent between 2017 and 2021. Reductions in domestic supply are expected to have flow-on implications for the use of gas in electricity generation. The AEMO also warned that there may be insufficient gas to meet the projected need of gas powered generation from the summer 2018-19.

To meet forecast gas demand, the AEMO states that supply from existing fields needs to increase and/or exploration and development of new fields is required.

The pipeline being built to link the Northern Territory to Mt Isa will give the east coast access to additional potential supply. It may also enable east coast gas to be exported through the Northern Territory.

Even if supply were to increase, the AEMO warns that this may not lead to lower gas prices:

Geological challenges of gas extraction are reducing gas well productivity and driving production costs higher, while low cost reserves in eastern Australia are in decline. The increased cost of sourcing new gas supply means additional gas in the market may not translate to lower prices. (AEMO 2017c, p. 21)

Nonetheless, removing unnecessary barriers that restrict the development of lower cost gas fields would still be beneficial.

While clearly flagging these potential risks, the AEMO was not as pessimistic on the outlook for gas in its recent *Energy Supply Outlook* (which replaces, among other publications, the earlier *Gas Statement of Opportunities*) (AEMO 2017b). Nevertheless, the AEMO still found that:

Domestic gas supply and demand remain finely balanced. Whether sufficient gas is available to meet demand will depend on:

• The actual quantities of gas available to the domestic market after liquefied natural gas (LNG) exports.

- The level of domestic gas demand for gas-powered generation of electricity (GPG).
- The adequacy of coal supplies for coal-powered generation. The amount of GPG needed to secure electricity supplies will depend on how much coal-powered generation contributes, particularly in New South Wales. (p. 3).

The AEMO is working with the industry to ensure that sufficient gas available to meet demand, including for electricity generation.

The difference between the two AEMO reports highlight the sensitivity of the east coast market and prices to the level of capacity utilisation of LNG export facilities. The higher the level of utilisation, the tighter the east coast market will be without additional sources of supply.

The restrictions on onshore gas exploration in several jurisdictions is restricting the supply of gas and contributing to the forecast shortages.

CONCLUSION 4.1

The moratoria on onshore gas exploration and production is contributing to gas price pressures on the east coast and there are better ways to address community concerns. Onshore exploration and production should be governed by a well-designed regulatory regime, underpinned by sound scientific evidence, effective monitoring and enforcement of compliance. The processes should be clear and transparent. More effective models of community engagement are preferable to simple bans.

Misuse of market power

As stated, the transmission and distribution of gas involves high fixed upfront costs in constructing pipelines and relatively low operating costs in transporting the gas (marginal cost). These high fixed and relatively low marginal costs mean that there is unlikely to be significant competition in the transmission and distribution of gas to specific locations.

This lack of competition gives gas transmission and/or distribution companies the potential to charge their customers excessive prices. Regulation is aimed at preventing these companies from exploiting any market power that they may have.

In its inquiry of the east coast gas market, the ACCC (2015) found that the regime regulating gas pipelines was not fit for purpose and that pipeline pricing was largely unconstrained by either the threat of regulation or effective competition:

The ability and incentive of existing transmission pipelines to engage in monopoly pricing is not being effectively constrained by competition from other pipelines, competition from alternative energy sources, the risk of stranding, the countervailing power of shippers or the threat of regulation.

The transmission sector is already subject to an access regime under the National Gas Law (NGL) and the National Gas Rules (NGR), but less than 20 per cent of the transmission

pipelines on the east coast are currently subject to any form of regulation. This is in stark contrast to other comparable jurisdictions, such as the United States, New Zealand and the European Union, where the vast majority of transmission pipelines are subject to economic regulation because it has been recognised that pipelines can wield substantial market power. (ACCC 2015, p. 10)

The inquiry found evidence of capacity being withheld by incumbents on some regional pipelines, which restricted competition for supply from other retailers.

The inquiry went on to find that there was 'evidence of monopoly pricing [by pipeline operators] giving rise to higher prices and economic inefficiencies' (p. 8). This pricing had exacerbated the effect of supply tightness on wholesale gas prices. The difference between a competitive market and an uncompetitive market in south-eastern Australia could be as much as \$4/GJ for wholesale gas.

Third party access

As noted, the ACCC found in its *Inquiry in the East Coast Gas Market* (ACCC 2015, p. 10) that the ability of, and incentive for, transmission pipelines to engage in monopoly pricing was not being effectively constrained by competition from other pipelines, competition from alternative energy sources, the risk of stranding, the countervailing power of shippers, or the threat of regulation (p. 10).

The ACCC went on to find that regulation or the threat of regulation was not imposing an effective constraint on the behaviour of a number of unregulated pipelines. The 'coverage criteria' for regulation under the National Gas Law required the exercise of market power to have an effect on competition in a dependent market. However, this criterion was considered unlikely to be met by the majority of transmission pipelines given the characteristics of the market.³⁸

The ACCC inquiry recommended that the coverage criteria should be replaced by a new test to better address the issue of market power and monopoly pricing by focusing on: whether the pipeline in question has substantial market power; it is likely that the pipeline will continue to have substantial market power in the medium term; and coverage will or is likely to contribute to the achievement of the National Gas Objective (NGO) (for example, by promoting efficient investment, operation and/or the use of natural gas services for the long-term interests of consumers of natural gas) (ACCC 2015, p. 10).

In response, the COAG Energy Council appointed Dr Michael Vertigan to examine whether a new test for determining if a gas transportation pipeline should be subject to economic regulation.

³⁸ This mirrors concerns raised by the Productivity Commission over analogous provisions in the access regime set out in Part IIIA of the *Competition and Consumer Act 2010* (Cth) (PC 2013b, pp. 172–173).

The Review found that the principal problem was not whether the existing regulatory test was appropriate and how it should be changed, but rather that:

... parties negotiating for pipeline access and services have unequal levels of bargaining power and information. Consequently, the examination has focused on the most effective and least onerous ways to address this negotiating imbalance, with the objective of delivering more competitive outcomes in the market for pipelines services. (p. 99)

The Review's recommendations were directed at addressing the two principal issues: the information asymmetry between the parties in negotiations; and the superior negotiating position of the pipeline operators.

To this end, he recommended the introduction of an open access regime:

That a framework for binding arbitration, available to all open access pipelines in the event parties are unable to reach a commercial agreement, be introduced into the National Gas Law (NGL). (Vertigan 2016, p. 13)

Arbitration would be activated where negotiating parties were unable to reach a commercial resolution.

He agreed with the ACCC finding that there was little publicly available information on the costs incurred by pipeline operators in providing services and the relationship between these costs and the prices charged for services. Increased transparency provides parties seeking pipeline services with an improved ability to undertake timely and effective negotiations:

That the disclosure and transparency of pipeline service pricing and contract terms and conditions be enhanced, including requiring the provision of information on the full range of pipeline services which are available or sought (not solely focused on forward haul services). (Vertigan 2016, p. 13)

On the appropriateness of the coverage test, the Review recommended:

That no change be made to the current coverage test at this stage. The appropriateness of amending the coverage test should be reviewed within five years after the arbitration framework is operational. (Vertigan 2016, p. 16)

In its December 2016 Communique, the COAG Energy Council welcomed the release of Vertigan Review and indicated they would implement the recommendations.

Contractual congestion

The ACCC also found 'contractual congestion' to be a problem on some routes that prevent prospective shippers from securing sufficient pipeline access despite there being spare physical capacity (ACCC 2015, pp. 80 & 154). This congestion arises because other shippers have entered into Gas Transportation Agreements with the pipeline owner to secure pipeline capacity (termed primary capacity). These agreements can effectively lock-up capacity that the shipper may not ultimately use on any given day. Shippers can

on-sell their unused capacity that would otherwise be lost, but it may not be worthwhile for them to do so given the cost and effort involved, and the risk of being short of capacity (p. 72). A lack of information transparency, search and transaction costs, and the pricing of transportation further also impede capacity utilisation and gas flows (p. 149).

Further, although not widespread, the ACCC found evidence in the case of some regional pipelines that shippers were deliberately withholding capacity in order to improve their competitive position in up- or downstream markets.

Recent changes to the way that the east coast gas market operates, including the development of LNG export facilities, are making the task of allocating gas to where it is valued the most more challenging. This task is increasingly linked to the efficiency with which transportation capacity is allocated and used (AEMC 2016b, p. vii).

Contractually congested assets adversely affect the efficiency with which pipeline capacity is being used to transport gas to where it is valued most highly.

In its *East Coast Wholesale Gas Markets and Pipeline Frameworks Review*, the AEMC subsequently recommended the development of a market to trade spare contracted pipeline capacity. The publication of information on secondary trades of pipeline capacity and hub services is needed to underpin the development of a liquid market (AEMC 2016b, p. viii).

Lack of market transparency and information

The AEMO operates a 'gas bulletin board' that provides information on gas production, fields, storage facilities, major demand centres and transmission pipeline systems in the east coast market. It includes interactive maps. The amount and quality of the information contained on this bulletin board has been extended and improved since its introduction in July 2008.

Despite the operation of the gas bulletin board, insufficient transparency and information has been raised as an issue affecting Australian gas markets.

The prevalence of confidential bilateral long-term contracts for buying and selling gas in Australia does not provide readily observable price signals needed to drive investment. In contrast, prices are readily observable where gas is bought and sold through spot markets, reflecting the interactions between supply and demand.

This lack of observable price signals is exacerbated by a lack of transparency and information about the level of reserves and transport prices.

Producers prefer bilateral contracts as a means of locking in customers before they undertake the significant capital investments (often in the billions of dollars) needed to develop new gas-related infrastructure (the development of new fields, processing facilities and LNG export facilities).

The ACCC found that the lack of consistent, publicly available data on the sector was an impediment to participants, investors, and policymakers and recommended rules enforcing a consistent and transparent flow of information to industry users (ACCC 2015).

The east coast gas market has developed trading hubs as a means to develop gas trading and to balance system flows.

Market-based price signals lie at the core of the COAG Energy Council's vision for Australian gas markets (COAG Energy Council 2014). Central to this is the establishment of a liquid wholesale gas market: that provides market signals for investment and supply; where responses to those signals are facilitated by a supportive investment and regulatory environment; where trade is focused at a point that best serves the needs of participants; where an efficient reference price is established; and where producers, consumers and trading markets are connected to infrastructure that enables participants the opportunity to readily trade between locations and arbitrage trading opportunities.

Achieving this vision requires the development of an efficient and transparent reference price for gas that would reflect underlying supply and demand conditions. The development of a liquid market requires many parties buying and selling gas.

To assist it in developing a roadmap for achieving its vision requested, the COAG Energy Council requested the AEMC to review the design, function and roles of facilitated gas markets and gas transportation arrangements on the east coast of Australia.

The AEMC recommended a gas market development 'roadmap' that brings together recommendations on wholesale and transportation capacity markets, and information provision (AEMC 2016b). The proposed reforms were designed to promote the National Gas Objective.

Central to this is reducing the five existing gas markets on the east coast into two — one in the northern part of the grid and one in the south. The markets would involve continuous exchange-based trading with common processes and procedures to reduce transaction costs and complexity for businesses operating across multiple markets and to encourage greater participation.

These reforms are to be supported by a detailed package of recommendations to enhance the information provided to the market. Pivotal to this was a recommendation for a central repository of information for use by all market participants and the public in the form of a 'Natural Gas Services Bulletin Board'. The package also included recommendations to improve information transparency, including expanding coverage of the Bulletin Board so that a wider range of information is provided and enhancing the reporting and compliance framework. Some of its recommendations require amendments to the National Gas Law and supporting regulations.

The absence of a well-functioning and liquid spot market

While these trading hubs allow for the trading of imbalances and set a daily or intra-day market price, there are concerns about whether there is currently sufficient liquidity and market depth to create a viable spot market for managing the significant financial risks involved.

The use of long-term bilateral contracts limits the opportunities for producers and consumers to actively and reliably participate in spot markets by constraining their ability to adjust the price and quantities of gas being traded.

This lack of liquidity reflects the limited number of participants in each hub and, more broadly, in the east coast market. There are also difficulties in trading gas across the hubs.

Until this liquidity develops, the markets will lack the financial risk management tools that are required to enable all participants to hedge spot market risks and trade without physical gas contracts.

A consequence of the absence of well-functioning and liquid spot market may be to force participants into long-term, rigid commercial arrangements in order to minimise long-term supply and demand risks. This favours concentration and vertical integration and means that new entrants find it difficult to enter the market (DIIS 2016b, p. 36).

The reduction in the number of gas spot markets and the development of a secondary market for pipeline capacity will go some way to increasing market liquidity. Further development of the gas bulletin board and real-time information on gas trades should also assist by encouraging arbitrage, especially if existing pipeline capacity constraints can be overcome. Nevertheless, liquidity and the associated price volatility may remain an ongoing issue.

4.5 Recent developments

The AEMC developed a longer term roadmap for gas market development (AEMC 2016b). It proposed creating two virtual gas trading hubs:

- a northern hub located initially at Wallumbilla, Queensland
- a southern hub in Victoria (to eventually replace the declared gas market currently operating in Victoria).

Each hub would adopt exchange-based trading similar to that already in place at the Wallumbilla gas supply hub. Participants could also buy and sell gas via bilateral over-the- counter trading or long-term contracts.

The COAG Energy Council released a Gas Market Reform Package on 19 August 2016. The package responded to the findings and recommendations of:

- the ACCC inquiry into the *East Coast Gas Market* (ACCC 2015)
- the AEMC Eastern Australian Wholesale Gas Market and Pipelines Framework Review (AEMC 2016b).

The Gas Market Reform Package aims to achieve a liquid wholesale gas market where an efficient reference price provides signals for investment and new gas supply. It consists of 15 reforms covering four priority areas:

- gas supply
- market operation
- gas transportation
- market transparency.

Its recommendations include:

- concentrating wholesale gas trading at two primary trading hubs, a northern hub and a southern hub and improving and unifying the designs of the market at each hub
- developing a gas transportation capacity market to underpin the new wholesale market design
- broadening and improving the quality of market-related information for participants and the public, primarily through a redeveloped Natural Gas Services Bulletin Board
- examining whether a new test for determining whether a gas transportation pipeline should be subject to price regulation through a consultation process
- implementation of the Energy Council Gas Supply Strategy.

The reduction in the number of east coast wholesale markets from five to two should partially assist in providing additional liquidity and market depth, and make it easier to standardise trading rules.

These benefits will need to be balanced against the potential for costs to increase for market participants (buyers and sellers) that currently trade through the three hubs that are earmarked for closure (Sydney, Adelaide and Brisbane).

The adoption of two hubs raises the issue of possible capacity constraints at the interface of the northern and south parts of the east coast network (at Moomba in South Australia). In the absence of an alternative north–south transmission pipeline (such as Sydney to Brisbane or, if the existing pipeline to Tamworth is upgraded, Tamworth to Brisbane), the AER will need to pay closer scrutiny to the pipeline operators to curb any additional market power conferred by the consolidation.

As part of its gas reform package of 5 May 2017, the COAG Energy Council initiated an AEMC review into the scope of economic regulation applied to gas pipelines. The terms of reference request the AEMC to:

... make recommendations on any amendments it considers necessary to Parts 8-12 of the NGR [National Gas Rules] to address concerns that pipelines subject to full regulation are able to exercise market power to the detriment of economic efficiency and the long term interests of consumers.

The Review will cover the rules relating to third party access arrangements, the calculation of revenue and prices, non-price terms and conditions of access, and dispute resolution procedures (AEMC 2017c).

The AEMC plans to publish a draft report in February 2018.

Markets have an important role to play in ensuring the effective and efficient provision of gas in Australia. Given the relatively small number of players involved, these markets need to be designed and developed carefully to ensure that they provide participants with appropriate price signals and economic incentives to guide their behaviour.

CONCLUSION 4.2

There has been considerable activity aimed at addressing the problems that have emerged in the east coast gas market.

- The AEMC recommendations to improve gas market information are welcome. Timely and reliable information is vital for ensuring that all markets operate efficiently and effectively to guide producer, consumer and investor behaviour.
- The Vertigan recommendations to enable more open and consistent access to transmission pipelines also would assist in improving the operation of the market.

Other avenues that have been flagged are worth development.

- Vertigan recommended a future review to examine whether the operator of specific gas pipelines have market power and whether the level of regulation is appropriate.
- There is also merit in exploring the development of a secondary market for trading spare pipeline capacity as a means of enabling gas to be used where it is valued most highly.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 12

AN OVERVIEW OF INNOVATION POLICY 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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Abbreviations

Abbreviations

ABN	Australian Business Number
ABS	Australian Bureau of Statistics
ARC	Australian Research Council
АТО	Australian Taxation Office
BLADE	Business Longitudinal Analysis Data Environment
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DIIS	Department of Industry, Innovation and Science
DST	Defence Science and Technology
ICT	Information and communication technology
INSEAD	Institut Européen d'Administration des Affaires
IP	Intellectual property
ISA	Innovation and Science Australia
NHMRC	National Health and Medical Research Council
NSW	New South Wales
NT	Northern Territory
OECD	Organisation for Economic Cooperation and Development
РСТ	Patent Cooperation Treaty
Qld	Queensland
R&D	Research and development

RDC	Research and Development Corporation
SA	South Australia
SME	Small and medium-sized enterprises
SP	Supporting paper
STEM	Science, technology, engineering and mathematics
Tas	Tasmania
UK	United Kingdom
US	United States
Vic	Victoria
WA	Western Australia
WIPO	World Intellectual Property Organization

Key points

- In 2015, the Australian Government brought many of its separate, but related, policies together under the *National Innovation and Science Agenda*. They established a new body, Innovation and Science Australia, to develop and implement policy to promote innovation.
- Beyond investing in basic research and skills, the jury is out on whether there are specific government policies that can successfully promote innovation and whether this would be material to Australian economic growth. The Commission has previously argued that the government should conduct rigorous evaluations of all government innovation programmes to verify that they are achieving 'additionality' and are cost effective (PC 2007).
- The Department of Industry, Innovation and Science (DIIS) is building a data framework to, among other things, support the evaluation of their programmes, drawing on data from the ATO, the ABS and what they collect from the firms receiving support. This framework (BLADE), which is managed by the ABS and is progressively being made available to researchers beyond DIIS, is an important first step in providing better evaluation of industry programmes. This work should inform this question of what governments should and should not do to stimulate innovation in the next Productivity Review, in 5 years-time.
- In the meantime, there are several areas where the government should take action.
 - A recent review of the Australian economy by the OECD (2017) recommended consolidating the 150 Commonwealth programmes. Many of these schemes are small in terms of the funds involved — with 74 collectively accounting for under 2 per cent of Australian Government expenditure of just under \$10 billion in 2015-16 (with an average expenditure of \$2.6 million). While trials are to be applauded, they are not a valid test if they fail simply due to insufficient scale.
 - A third of the almost \$10 billion public investment in innovation-related activities (including basic research funding) is through the R&D tax incentive. The Ferris, Finkel and Fraser Review (2016) made six recommendations which largely sought to: limit the scope for creative accounting by greater clarity and transparency; reward collaborative research efforts; and better focus support to innovative investments by limiting the cash refund and imposing an intensity threshold while expanding the expenditure threshold to retain the incentive for large firms to increase R&D in Australia.
- The lack of connection between the research and private sector is an issue. Yet trying to make
 academics become entrepreneurs is rarely successful. Critical mass for networks of contacts,
 to attract skilled workers, and to pool risk for investors is well recognised as important for
 building sustainable innovative ecosystems. Governments at all levels have responded with
 investments in maker spaces, incubators, and accelerators that may bear fruit, but it is also
 possible that lack of scale will undermine these efforts. Addressing this is difficult, but greater
 cooperation between governments to build areas of expertise in specific locations would assist
 entrepreneurs and firms in building critical mass.

An overview of innovation policy

Innovation and science are seen as critical for maintaining Australia's high standard of living, ensuring its ongoing international competitiveness, creating jobs and ensuring future economic prosperity. Central to this is the creation and adoption of knowledge, ideas, products, processes and ways of doing business. This requires a culture that values and is open to new ideas and ways of doing things, takes risks and learns from mistakes made.

Technological progress has long been an important driver of economic growth in developed economies such as Australia. This rate of progress has quickened in recent years as technological advances open up new opportunities and lowers the cost of exploiting them. This progress gradually changes the nature of economic activity and society. Such changes challenge the viability of established ways of doing things and existing business models.

Innovation policy seeks to foster, nurture and develop knowledge, and to have these ideas put into practice by business in new and better products, processes and ways of doing business. Governments seek to encourage innovation by investing in the generation of knowledge, supporting basic and applied research and development (R&D), building the skills of the workforce, providing a sound regulatory environment (Supporting Paper 13 (SP 13)), and promoting a culture that values innovation.

The ways in which Australian governments have supported innovation are many and varied. At the basic research and skill development end of the spectrum, governments support research by academics mainly at universities. With a more applied focus, but still on research that may not have immediate commercial applications, government-owned institutions, such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), undertake the research directly. Governments also offer a range of tax concessions, grants and other inducements to the private sector to boost their R&D, and in some cases assist them through the commercialisation process. This assistance is provided on the basis that, without assistance, markets would undertake insufficient R&D, as they would not take into account the external benefits arising to others from their research.

Australian governments have also invested in maker spaces, incubators, and accelerators with the hope of attracting entrepreneurs and building critical mass to attract skills and investors. Together this loose grouping of a wide range of different policies are governments' attempts to support Australian firms to innovate.

The Australian Government brought many of their separate, but related, policies together in 2015 under the *National Innovation and Science Agenda* (Commonwealth of Australia 2015).

This paper seeks to provide an overview of Australian Government innovation policy. It commences by outlining the key Australian Government policies that target innovation (section 1). It then outlines some other Australian Government policies that, while pursuing other objectives, also support innovation (section 2). The paper then provides an overview of a data framework being developed that could support future analysis of innovation policy in Australia (section 3). It then provides some selected statistics on innovation in Australia (section 4). The paper draws some policy-relevant findings from some recent reviews of innovation policy in Australia (section 5). It concludes by raising some issues for Australian innovation policy (section 6).

1 The Australian Government's innovation policy

Government expenditure

The Australian Government spent \$10.1 billion on research and other measures to support innovation in 2015-16 (figure 1).¹ The full list of Australian Government expenditure on innovation, science and R&D in this year is detailed in appendix B.

One-third of this expenditure was directed towards the business sector, primarily through tax measures aimed at encouraging R&D. Government research activities accounted for one-fifth of this investment, with the remainder targeting research (by universities, rural research and development corporations (rural RDCs), cooperative research centres (CRCs) and through grants).

Expenditure across each of these sectors includes a mix of institutional and grant funding.

There were 150 separate Australian Government funded innovation programmes or activities in the 2015-16 budget (DIIS 2016). Expenditure on these initiatives totalled \$10.1 billion. This is a conservative estimate of all initiatives and funding, as it excludes related Australian Government programmes and those of state and territory governments.

¹ Financial data reported in this supporting paper are 'estimated actuals' for the financial year 2015-16, and generally sourced from the 2016-17 budget papers for the Department of Industry, Innovation and Science to enable comparability across programmes. There may be overlap in the expenditures reported across sections, as some funding consists of multiple strands (such as that for the National Health and Medical Research Council (NHMRC)).



Figure 1 Australian Government investment in R&D, 2015-16

Research organisations

Government research organisations

The Australian Government spent \$1.8 billion on the research activities of 16 government agencies in 2015-16 (table A.1 at the end of this paper).

Of these, the two main Australian Government research organisations are:

- the CSIRO (\$750 million) .
- the Defence Science Technology Group (\$464 million).

Funding of the remaining government research organisations totalled \$621 million.

The higher education sector

The Australian Government spent \$3.5 billion on research and innovation undertaken by the higher education sector in 2015-16 (figure 1). The main government funding covers:

- performance based block funding to fund university research (\$2 billion)
- Australian Research Council (ARC) grants (\$816 million) •
- National Health and Medical Research Council (NHMRC) (\$653 million)

• other Higher Education R&D (\$43 million) (figure 2).

Research performance block funding grants were provided to 42 higher education providers in 2016 (table A.2 at the end of this paper), with the single largest recipient being The University of Melbourne with \$185 million.

In addition to research funding, Australian universities received an additional \$19.2 billion in 2015 to fund their teaching and other activities (SP 7).



Figure 2 Australian university research funding by source, 2015-16

Multi-sector

Some R&D is undertaken by more than one sector. For example, NHMRC grants fund research undertaken by universities, medical research institutes, government bodies and hospitals. Other research involves joint public-private sector partnerships.

The Australian government spent \$1.4 billion on multi-sectoral research in 2015-16 (figure 1). The main multi-sectoral research funding agencies are:

- rural RDCs (\$323 million)
- NHMRC (excluding university) (\$193 million)
- CRCs (\$141 million).

Funding of the remaining innovation undertaken by multi-sector organisations totalled \$695 million and primarily covered R&D in the areas of energy, environment and health.

Rural RDCs and rural R&D

Rural RDCs invest in R&D and innovation to improve the profitability, productivity, competitiveness and long-term sustainability of Australia's primary industries. The Rural RDCs act as investment managers, custodians of public and private funds, and service providers to industry and government. There were 15 Rural RDCs in Australia in 2015-16 (table A.3 at the end of this paper). These organisations are primarily funded through statutory R&D levies (or charges) on the commercial production of various commodities, with matching funding from the Australian Government.

Five Rural RDCs are statutory corporations or authorities that are owned by the Australian Government and established under legislation:

- the Australian Grape and Wine Authority
- the Cotton Research and Development Corporation
- the Fisheries Research and Development Corporation
- the Grains Research and Development Corporation
- the Rural Industries Research and Development Corporation.

The remaining 10 Rural RDCs are industry-owned, not-for-profit companies established under Australia's corporations law and declared through regulation as the service providers to industry for specific activities. These Rural RDCs cover: dairy, eggs, forest and wood products, horticulture, livestock export, meat and livestock, meat processing, pork, sugar and wool.

The Australian Government expenditure on rural R&D in 2015-16 was \$323 million. This expenditure consisted of:

- \$279 million on rural RDCs, with the largest Australian Government matching payments being made to: grains (\$68 million); meat (\$60 million); horticulture (\$44 million); and dairy (\$24 million)
- \$44 million on other rural R&D, including research into fisheries, landcare, pest and weed control as well as rural extension and outreach (figure 3).



Source: DIIS (2016).

National Health and Medical Research Council

The NHMRC is the main funder of clinical, health and other medical research in Australia. It also develops advice for the community, health professionals and governments. The Council seeks to promote the development and maintenance of public and individual health standards in Australia.

The NHMRC funds this research by providing grants, usually to universities, medical research institutes, hospitals and government (figure 4).



Australian Government research funding allocated by the NHMRC in 2015-16 was \$846 million. This was split between:

- grant funding for university researchers of \$653 million (part of university funding)
- grant funding of government, medical research institutes and other of \$193 million (part of multi-sector funding).

In addition, the cost of running the NHMRC in 2015-16 was \$41 million (NHMRC 2016).

Cooperative Research Centres

CRCs undertake industry-led and outcome-focused collaborative research partnerships between industry, researchers and the community. They link business with researchers. A CRC is defined as:

... a company formed through a collaboration of businesses and researchers. This includes private sector organisations (both large and small enterprises), industry associations, universities and government research agencies such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and other end users. This team of collaborators undertakes research and development leading to utilitarian outcomes for public good that have positive social and economic impacts. (Cooperative Research Centres Association 2016)

The Australian Government funds CRCs through competitive, merit-based grants program run by the Department of Industry, Innovation and Science.

The number of operational CRCs varies over time, as new CRCs are created and as old ones do not have their funding extended. Each CRC is funded for a fixed term — ranging from two to ten years (with an average of 6.6 years) — and for a specified financial outlay. Some CRCs receive subsequent tranches of funding after their initial funding expires. There were 31 CRCs funded in the 2015-16 budget (table A.4 at the end of this paper).

Funding consists of two streams:

- CRCs to support medium to long-term industry-led collaborative research
- CRC Projects to support short-term, industry-led collaborative research.

Australian Government expenditure on CRCs in 2015-16 was \$141 million.

Research grants

University block research funding

The Australian Government employs a dual approach to funding research undertaken by the higher education sector.

Competitive and other grants support the direct costs of research under the *Higher Education Support Act (HESA) 2003* (Cwlth).

Australian Government expenditure on block grants in 2015-16 totalled \$2 billion (figure 5). This consisted of seven types of grants:

- Australian Postgraduate Awards, which fund scholarships for students of exceptional research potential undertaking a doctorate or master's degree by research (\$282 million)
- *International Postgraduate Research Scholarship*, which fund scholarships for overseas students of exceptional research potential undertaking a doctorate or master's degree by research at Australian universities (\$22 million)
- Joint Research Engagement Program, which fund research-related activities by Australian higher education providers (\$360 million)
- *National Institutes Program ANU Component*, which funds research and research training provided to the Institute of Advanced Studies of the Australian National University (\$192 million)
- *Research Infrastructure Block Grants*, which help fund research infrastructure such as libraries, laboratories, computing centres, animal houses, herbaria, and experimental farms (not including construction of buildings or staff salaries) (\$242 million)



- *Research Training Scheme*, which supports the costs associated by higher education providers in providing research training for domestic students undertaking a higher degree by research (\$684 million)
- Sustainable Research Excellence in Universities, which gives higher education providers discretion in how they fund the indirect costs associated with carrying out research projects supported by the ARC, NHMRC or other national competitive research granting programs (\$239 million).

An eighth block grant, *Research Training Program*, was scheduled to commence in 2016-17 to support the training of the next generation of researchers and innovators by offsetting fees otherwise payable, supporting general living costs and providing ancillary allowances to students.

As part of the National Innovation and Science Agenda, funding arrangements for six of these block grants were consolidated from 1 January 2017 into two:

• *Research Support Program*², which support the systemic indirect costs of research, including the indirect costs, such as libraries, laboratories, consumables, computing centres and the salaries of support and technical staff

² This stream replaced the Joint Research Engagement program, Research Infrastructure Block Grants and the Sustainable Research Excellence grants.

• *Research Training Program*³, which supports domestic and overseas students undertaking research doctorate and research masters degrees. The payments may cover: tuition fees offset; stipend for general living costs; and allowances related to the ancillary cost of research degrees.

The funding grants are administered by the Department of Education and Training.

National Health and Medical Research Centre grants

The NHMRC provides grants to universities, medical research institutes⁴, hospitals and government to fund a wide range of health and medical research. Some grants fund infrastructure and others research. Some grants are annual and others one-off. Some grants are highly targeted (such as for dementia research) and others general. NHMRC grant funding is determined by the allocation in the Australian Government budget.

Current NHMRC grants cover:

- *Grants to Accelerate Research Translation*, which funds research to support the production of scholarly evidence to inform policy and/or practice and the intellectual work to better deal with complex translation pathways
- *Grants to Build Australia's Future Capability*, which funds researchers, research teams and infrastructure to complete health and medical research in Australia
- *Work with Partners*, which seeks to improve the availability and quality of research evidence to decision makers who design policy and to inform the policy process by supporting more effective connections between decision makers and researchers
- *Collaborative Grants*, which assist Australian researchers to participate in multinational research collaborative projects with international researchers to create knowledge and/or translate research
- *Gap Funding*, which helps external organisations that may have funding available to identify fundable research and/or researchers.

The NHMRC funded \$846 million in research in 2015-16 (\$653 million to universities and \$193 million to Government, medical research institutes, hospital and other). This funding was provided by a variety of different grants (figure 6). The NHMRC funded 50 institutions in 2016 (table A.5 at the end of this paper). It funded 986 projects out of the 5519 applications received (a funding rate of 17.9 per cent).

³ This stream replaced the Australian Postgraduate Awards, International Postgraduate Research Scholarships and the Research Training Scheme.

⁴ The Department of Health lists 67 independent medical research institutes in Australia (DoH 2017).



Figure 6 NHMRC expenditure by grant type, 2015-16

Australian Research Council grants

The ARC is an Australian Government agency that seeks to advance Australian research and innovation globally for the benefit of the Australian community. It provides advice to the Australian Government on research matters, administers the National Competitive Grants Program, and administers Excellence in Research for Australia. The cost of running the ARC in 2015-16 was \$26 million (ARC 2016).

The ARC supports fundamental and applied research and research training through national competition across all disciplines. The ARC also brokers partnerships between researchers and industry, government, community organisations and the international community.

The ARC funded \$816 million in research in 2015-16 (figure 1).

The key National Competitive Grants were:

- Discovery programme
 - Australian laureate fellowships (15 awards; \$45 million)
 - discovery early career researcher award (200 awards; \$70.7 million)
 - discovery indigenous (10 awards; \$4.1 million)
 - discovery projects (635 awards; \$244.9 million)
 - future fellowships (50 awards; \$38.6 million)

- Linkage programme
 - industrial transformation research hubs (5 awards; \$15.7 million)
 - industrial transformation training centres (6 awards; \$22 million)
 - linkage infrastructure, equipment and facilities (54 awards; \$38 million)
 - linkage projects (252 awards; \$86.9 million) (ARC 2016, pp. 159–61).

Private sector research

The Australian government funded \$3.4 billion of business sector research in 2015-16 (figure 1). This funding was directed towards:

- R&D tax measures (\$3.2 billion)
- business innovation and other R&D measures (\$236 million).

The funding for business innovation and other R&D includes \$43 million for the Innovation Investment Fund, \$27 million for Accelerating Commercialisation, \$12 million for the Commercialisation Fund and \$7 million for Commercialisation Australia (discussed later) (figure 7).



^a Accelerating Commercialisation: Entrepreneurs' Programme — Accelerating Commercialisation. Innovation Investment Fund includes Innovation Investment Follow-on Fund. *Source*: DIIS (2016).

National Innovation and Science Agenda

The National Innovation and Science Agenda covers a range of related policy initiatives in the areas of innovation and science. It is intended to promote a more innovative and entrepreneurial economy as well as providing an overarching framework for innovation policy in Australia (Commonwealth of Australia 2015).

The Agenda states that the main building blocks for successful innovation in Australia are its strong economic fundamentals, direct access to Asian markets, a global reputation as a trusted source of goods and services and home to some of the highest quality scientific research organisations in the world. It identifies that the main obstacles to overcome are: insufficient access to early stage capital for many start-ups; the lowest level of industry-research collaboration in the OECD; falling student maths skills; and that the government is not leading on innovation, but rather following (figure 8).

Figure 8 Characterisation of Australia's strengths and weaknesses in the National Innovation and Science Agenda



Australia has strong building blocks for success ...

To achieve these goals, the Agenda consists of four key pillars:

- *culture and capital*, which aims to develop an Australia that is confident, embraces risk, pursues ideas and learns from mistakes, and for investors to back these ideas at an early stage
- collaboration, which seeks to encourage Australian researchers and businesses to collaborate to shape future industries and generate wealth

- *talent and skill*, which supports Australian students to embrace the digital age by promoting coding and computing in schools to ensure that students have the problem solving and critical reasoning skills for high wage jobs
- *government as an exemplar*, which aspires to place innovation and science at the centre of the Government and to lead by example by becoming more innovative in how government:
 - delivers services
 - makes data openly available to the public
 - makes it easier for start-ups and innovative small businesses to sell technology services to government.

The Agenda includes 24 policy initiatives, with \$1.1 billion in expenditure over the four-year forward estimates. Just under half of this expenditure targets critical research infrastructure (\$459 million). Other significant expenditure items include:

- sharper incentives for engagement (\$127 million)
- tax incentives for angel investors (\$106 million)
- inspiring all Australians in digital literacy and STEM (\$84 million)
- intangible asset depreciation (\$80 million)
- *Data61*, which is a data innovation group created from the merger between National ICT Australia and CSIRO's digital research unit (\$71 million).

2 Supporting policies

A range of other government policies and expenditures also support or target innovation, research, investment and the diffusion of knowledge.

Intellectual property laws

Intellectual property laws provide an important platform for innovation policy in Australia. These laws aim at 'safeguarding creators and other producers of intellectual goods and services by granting them certain time-limited rights to control the use made of those productions' (WIPO 2004, p. 3).

The underlying rationale for these laws is that creations and ideas, once known, may be copied at little cost which may in turn lead to under-investment in intellectual goods and services, in the absence of intellectual property protection (PC 2013, p. 65).

These laws seek to overcome this market failure by enabling the developer of this intellectual property to, for a specified period of time, prevent others from using this property for personal gain. The granting of IP rights is a driver for innovation, but requires

that the owner of the IP can defend their rights — which can be an expensive process. Secrecy and staying ahead of the market are also ways in which firms can ensure that they benefit from their investment in R&D. But the system also influences the activities of firms and individuals that seek to use intellectual property in the production of their own goods and services. IP can be used as a barrier to entry, and to extract rents from firms that access IP under license. For example, the Commission has argued that a shift in copyright law to fair use could well be a game changer by removing a barrier to innovation in Australia, and that applications of IP should not provide for an exemption from competition law (chapter 5, SP 13).

The intellectual property system covers a diverse range of legal protections including:

- patents
- trade marks
- geographical indications of source
- designs
- plant breeder's rights
- copyrights
- moral rights
- performers' rights
- circuit layout rights.

Each type of intellectual property confers different legal rights to the intellectual property holder, for different durations and different capacities to derive pecuniary benefits from their inventions and creations (PC 2013).

Patent use in Australia

There were 28 605 *standard patent* applications in Australia in 2015, an increase of 10 per cent on the previous year. Patent applications have risen more-or-less steadily since 2006 (IP Australia 2016, p. 8).

Most Australian patent applications came from non-residents, with most being filed under the Patent Cooperation Treaty (PCT). Non-residents accounted for 92 per cent of all patent applications in 2015. US, Japanese, German and the UK companies accounted for 63 per cent of all applications in that year. Australian residents accounted for 2291 patent applications (eight per cent) (IP Australia 2016).

Provisional applications allow applicants to claim an early priority date before filing a standard or innovation patent. Although the number granted has increased slightly in the last three years, the use of provisional applications has declined substantially since 2006 (by three per cent per year). There were 5343 provisional applications filed in 2015.
Innovation patents have a lower application fee, last up to eight years and do not require examination unless the patent needs to be enforced. In 2015, 1828 innovation patent applications were filed in Australia. Of these, Australian residents accounted for 61 per cent of filings. Most non-resident applications came from China, the US and Taiwan. These three countries accounted for 77 per cent of nonresident applications (30 per cent of all innovation patent applications).

The innovation patent system has proved more harmful that helpful. Its lower threshold has increased the prospect for gaming the system and the number of low value patents, reducing its credibility to attract finance. The Commission recently recommended that the innovation patents system be abolished (PC 2016).

One-third of all IP applications were from Australian small-to-medium enterprises, mostly in the area of trade marks (figure 9).



Funding of higher education

The teaching-side of higher education adds to the pool of human capital available to undertake future innovation, research, investment and the diffusion of knowledge. This human capital is subsequently further developed by engaging in innovation and research (such as through post-doctoral research).

Under current funding arrangements, university students cross-subsidise research though tuition fees (in particular from international students and Commonwealth-supported domestic students). This funding mechanism can distort university incentives, and can affect the quality of education provided (see chapter 3, SP 7).

Extension services

Australian and state and territory governments provide some extension services to facilitate the dissemination of knowledge and innovation amongst business. Historically, these services have been primarily focused on the agricultural sector, but more recently funding has been directed towards small business.

Other government grants, expenditure and initiatives

Innovation and Science Australia

Innovation and Science Australia (ISA) is an independent statutory board that provides guidance on innovation, science and research across the Australian Government. It is chaired by Bill Ferris, with Chief Scientist Dr Alan Finkel as Deputy Chair. The Board includes innovators, scientists and entrepreneurs with track records of success.

ISA also promotes investment in industry, innovation, science and research in Australia, including showcasing successful innovators, entrepreneurs and researchers. It is charged with directly engaging international, business and community sectors to improve the overall performance of the national innovation and science system.

Global Innovation Strategy

The Global Innovation Strategy is a \$36 million, four year plan to advance Australia's international industry, science and research collaboration. It aims to:

- establish five 'landing pads' in global innovation hotspots to support entrepreneurial Australians (\$11.2 million)
- provide seed funding to support global small and medium-sized enterprises (SME)-to-researcher collaborations to enable viable projects to grow and test commercialisation through the *Global Connections Fund* (\$4.9 million)
- provide funding to assist Australian businesses and researchers to collaborate with global partners on strategically focused, leading-edge research and development projects through the *Global Innovation Linkages* programme (\$16.5 million)
- build strong regional linkages in the Asia-Pacific through the *Regional Collaborations Programme* which supports multi-partner activities that facilitate greater science, research and industry collaboration in delivering innovative solutions to shared regional challenges (\$3.2 million).

This strategy funds a number of programs.

Landing pads

Landing pads provide market-ready start-ups with a short-term (90 day) operational base where they can access entrepreneurial talent, mentors, investors and a wider connected network of innovation hubs in global innovation hotspots — Berlin, San Francisco, Shanghai, Singapore and Tel Aviv.

Global Connections Fund

The Global Connections Fund supports global SME-to-researcher collaborations to enable viable projects to grow and test commercialisation in industries of strategic growth in Australia.

The fund consists of two types of grants:

- *Bridging Grants* larger grants of up to \$50 000 designed as seed funding capital to enable viable projects to grow in scope and scale, test commercialisation and proof-of-concept activities
- *Priming Grants* small grants of around \$7000 to enable Australian SMEs and Australian researchers to meet and collaborate with international partners to further develop their ideas.

The grants are administered by the Australian Academy of Technology and Engineering.

Global Innovation Linkages programme

The programme supports groups (or consortia) of Australian industry and research organisations with grants of up to \$1 million over a maximum period of four years, to engage with international partners in key economies to undertake research and development projects.

Regional Collaborations Programme

This programme, administered by the Australian Academy of Science, aims to deliver solutions to shared regional challenges in the Asia-Pacific region through multi-partner research and collaboration activities.

Entrepreneurs' Programme

The programme is intended to drive business growth and competitiveness by supporting business improvement and promoting economic growth through research connections and commercialisation of novel products, processes and services.

Regional Collaborations Programme Accelerating Commercialisation (AC)

Accelerating Commercialisation is part of the Australian Government's \$482.2 million Entrepreneurs' Infrastructure Programme. It replaced Commercialisation Australia in November 2014.

The programme provides grants of up to \$1 million to commercialise novel products, processes and services. It aims to help Australian entrepreneurs, researchers, inventors, start-ups, commercialisation offices and small and medium enterprises address the challenges associated with commercialising novel intellectual property in the form of new products, processes and/or services and bringing them to market.

The priority areas for the scheme are: advanced manufacturing; food and agribusiness; medical technologies and pharmaceuticals; mining equipment, technology and services; oil, gas and energy resources; and enabling technologies and services that support one or more of these industries.

3 Data

Business Longitudinal Analysis Data Environment

The ABS and DIIS have developed the Business Longitudinal Analysis Data Environment (BLADE) methodology to link detailed information on the characteristics and finances of Australian businesses through a common identifier (the ABN). Integrating administrative data with directly collected survey data increases the capacity of the research community to undertake firm-level analysis and improves the evidence base for policy development and evaluation.

The government administrative data covered includes:

- Australian Taxation Office (ATO) data Business Activity Statements (BAS), Business Income Tax (BIT), and pay as you go (PAYG)
- DIIS data programme data
- IP Australia data.

BLADE is managed by the ABS. It has been used by the DIIS in a number of studies. It is progressively being made available to researchers beyond DIIS, and its value will grow

with use as new variables are added, the data is cleaned, and metadata descriptions improved. BLADE is suited to analysing business performance and dynamics, business demography and characteristics, and the prospect of linking it with employee data to create a longitudinal employer employee dataset is attractive. The range of policy relevant research produced in New Zealand, where such a data resource is available, illustrates the potential value of BLADE to helping build the much needed evidence base for industry and labour policy.

With regard to innovation, BLADE can be used to analyse the impacts of innovation activities on firm-level performance and productivity through the integration of additional data with ATO data. It also has the potential to improve the evaluation of innovation programs run by the DIIS. This work should inform this question of what governments should and should not do to stimulate innovation in the next Productivity Review, in five years-time.

4 Some relevant statistics

International rankings

Australia ranked 19th out of 128 countries and economies in the 2016 *Global Innovation Index*, down from 17th in the 2015 Index (Cornell University, INSEAD and WIPO 2016). Australia ranked well in terms of the inputs to innovation, particularly its infrastructure (6th), human capital and research (9th), institutions (10th) and market sophistication (10th). Australia ranked poorly in terms of knowledge and technology outputs in general (32nd) and knowledge diffusion in particular (107th).

The *Global Competitiveness Report 2015–2016* ranked Australia 23rd out of 140 world economies in terms of innovation. Australia ranked:

- 8th for quality of scientific research institutions
- 17th for availability of scientists and engineers
- 21st for university-industry collaboration in R&D
- 21st for PCT patents, applications/million population
- 25th for capacity for innovation
- 27th for company spending on R&D
- but only 70th for government procurement of advanced technology products.

The 2015 *Global Start-up Ecosystem Ranking* report ranked Sydney as 16th best city in the world in terms of 'start-up ecosystem' (Schwab 2015). Across the five criteria, Sydney ranked:

• 6th on talent

- 10th on start-up experience
- 16th on funding
- 17th on market reach
- 20th on performance.

Who does what in innovation?

A common perception is that intellectual property rights benefit large Australian firms that have the financial resources to fund the research and to defend their legal rights in court.

The actual situation is not as straightforward as this suggests:

- investment in intellectual property accounted for 10.4 per cent of all Australian private investment in fixed capital in 2014-15 R&D accounted for 4.9 per cent and computer software 3.9 per cent (ABS 5206.0 reported in IP Australia (2016, p. 25))
- 53 per cent of patent applications in 2015 were by Australian SMEs, up from 43 per cent in 2006 (IP Australia 2016, p. 26)
- firms aged over 10 years old file proportionately more intellectual property applications than do firms that are younger (IP Australia 2016, p. 27)
- older firms tend to file around three times the number of patents of younger firms (IP Australia 2016, p. 28)
- there were 732 licences, options and agreements executed and 2236 active in 2014. Australian universities account for most licences, options and agreements in Australia.⁵ These agreements generated \$136 million in licence income for their Australian owners (DIIS 2015, p. 8)
- there were 15 463 research contracts, consultancies and collaborations in 2014, valued at \$1.8 billion (DIIS 2015, pp. 10–11)
- firms that take out intellectual property rights have higher ten-year survival rates than those that do not the 10-year survival rate for firms that take out IP rights is in the range from high 70 to low 80 per cent, depending on the right, compared to an average of 65 per cent across all firms in the Australian Business Register (figure 10).
- firms that have taken out IP rights are less likely to have cancelled their Australian Business Number or GST registration than those that do not (25 per cent compared to 35 per cent, respectively), which aligns with the finding that firms with IP rights tend to live longer than firms without (DIIS 2015, p. 28).

⁵ A licence agreement formalises the transfer of technology between two parties, where the owner of the technology grants rights to the other party. An option agreement grants the potential licensee a time period during which it may evaluate the technology and negotiate the terms of a licence agreement. An assignment agreement conveys all rights, title and interest in the licenced subject matter to the named assignee.



^a ABR: Australian Business Register. PBR: plant breeders rights. *Source*: IP Australia (2016, p. 29).

5 Selected studies

Public Support for Science and Innovation

In its *Public Support for Science and Innovation* report (PC 2007), the Productivity Commission found that there were:

- ... widespread and important economic, social and environmental benefits generated by Australia's ... public funding support of science and innovation.
- On the basis of multiple strands of evidence, the benefits of public spending are likely to exceed the costs.
- But, given a host of measurement and methodological issues, it is not possible to provide anything other than broad estimates of the overall return to government contributions.

The report identified that major improvements were needed across the sector, including some key institutional and program areas.

The Commission's analysis suggested that many investments that produce spillovers have sufficient private returns for firms to invest without support'. However, although it is difficult to estimate with any precision, the overall return to total and business R&D was found to be high (PC 2007, p. XIX).

Review of the R&D Tax Incentive

The R&D Tax Incentive seeks to encourage industry to invest in R&D activities that might otherwise not be conducted through the provision of refundable and non-refundable tax offsets (\$0.9 billion and \$2.3 billion, respectively, in 2015-16 (DIIS 2016)). It replaced the R&D Tax Concession in 2011.

The rationale for the incentive is to encourage additional R&D that, while it may not be viable for an individual company to ordinarily undertake this R&D, the outcomes of the R&D may have a wider benefit to Australian society.

The 2016 Ferris, Finkel and Fraser Review was asked to identify opportunities to improve the effectiveness and integrity of the R&D Tax Incentive, including by sharpening its focus on encouraging additional R&D spending. The review was completed in April 2016 (Ferris, Finkel and Fraser 2016).

The Review found that R&D activities were a key driving force of productivity and economic growth. The R&D Tax Incentive was part of a mix of innovation policies that sought to improve the quality and quantity of R&D investments in Australia, and accounted for around one-third of government support for innovation.

However, the Review found that the R&D Tax Incentive fell short of meeting its stated objectives of encouraging additional R&D (additionality) and producing spillovers and made six recommendations to be considered as a package of measures to improve the overall effectiveness and integrity of the programme while encouraging additional R&D:

- 1. retain the current definition of eligible activities and expenses under the law, but develop new guidance, including plain English summaries, case studies and public rulings, to give greater clarity to the scope of eligible activities and expenses
- 2. introduce a collaboration premium of up to 20 per cent for the non-refundable tax offset to provide additional support for the collaborative element of R&D expenditures undertaken with publicly-funded research organisations. The premium would also apply to the cost of employing new STEM PhD or equivalent graduates in their first three years of employment. If an R&D intensity threshold is introduced (see Recommendation 4), companies falling below the threshold should still be able to access both elements of the collaboration premium
- 3. introduce a cap in the order of \$2 million on the annual cash refund payable under the R&D Tax Incentive, with remaining offsets to be treated as a non-refundable tax offset carried forward for use against future taxable income
- 4. introduce an intensity threshold in the order of 1 to 2 per cent for recipients of the non-refundable component of the R&D Tax Incentive, such that only R&D expenditure in excess of the threshold attracts a benefit
- 5. if an R&D intensity threshold is introduced, increase the expenditure threshold to \$200 million so that large R&D-intensive companies retain an incentive to increase R&D in Australia

6. that the Government investigate options for improving the administration of the R&D Tax Incentive (such as adopting a single application process; developing a single programme database; reviewing the two-agency delivery model; and streamlining compliance review and findings processes) and additional resourcing that may be required to implement such enhancements. To improve transparency, the Government should also publish the names of companies claiming the R&D Tax Incentive and the amounts of R&D expenditure claimed.

The review found that the areas of improvement identified would be likely to generate greater benefit for the Australian economy. In particular, although collaboration was not a focus for the programme, the panel suggested the modest existing levels of collaboration between industry and research institutions represented a lost opportunity and that providing a higher tax offset could encourage greater levels of collaboration.

6 Some key policy issues

Australia is assessed as having good innovation infrastructure, public-sector organisations and human capital by international standards. Despite these strengths, Australia does not perform as well in terms of commercialising its ideas and innovations and in terms of diffusion as other countries. Recent government initiatives are placing greater emphasis on targeting the so called 'valley of death' where conceptual ideas need to be turned into working prototypes in order to demonstrate that they work, and the costs of scaling up production assessed, including the costs of the equipment and processes needed for manufacture. Developing a business case that can convince potential investors that the risks are manageable and the prospects for an above-market return are good is an essential step in successful commercialisation, and one often neglected by Australian want to be start-ups.

The lack of private sector innovation in Australia is likely to reflect the confluence of many factors. Possible explanations include that Australia:

- has been able to develop a relatively good standard of living through primary production (agriculture and mining) without the significant innovation (although in these sectors investment in R&D is acknowledged to be relatively high)
- has a relatively small domestic market
- lacks proximity to many larger markets (and incurs higher transport costs)
- has relatively small venture capital markets compared to other countries.

Identifying the actual underlying causes and the appropriate policy remedies requires analysis. An issue worthy of further investigation, is how other countries with a better track record at innovation, R&D and commercialisation (such as Israel and Singapore) have managed to overcome similar issues. More work is also needed to better understand the challenges for entrepreneurs in developing a viable business case for their product.

Notwithstanding the need for more work in this area, some higher-level policy-relevant observations can be made.

Need for programme consolidation

A recent review of the Australian economy by the OECD (2017) recommended consolidating the 150 Commonwealth programmes. Many of these schemes are small in terms of the funds involved — with 74 collectively accounting for under two per cent of Australian Government expenditure of just under \$10 billion in 2015-16 (with an average expenditure of \$2.6 million). While trials are to be applauded, they are not a valid test if they fail simply due to insufficient scale.

Need for rigorous programme evaluations

Beyond investing in basic research and skills, the jury is out on whether there are specific government policies that can successfully promote innovation and whether this would be material to Australian economic growth. The Commission has previously argued that the government should conduct rigorous evaluations of all government innovation programmes to verify that they are achieving 'additionality' and are cost effective (PC 2007).

The Australian National Audit Office is currently undertaking a performance audit to assess the effectiveness of the design process and monitoring arrangements for the National Innovation and Science Agenda. The audit is scheduled for completion in September 2017.

Such evaluations should not just cover the probity of the processes followed and the expenditure involved but also whether the programmes are meeting their intended objectives in the most efficient and cost-effective manner. Having a longitudinal business data set (BLADE) should provide greater scope for more rigorous evaluations than could be undertaken in the past.

Need to target innovation activity that would not otherwise occur

The rationale for much innovation policy is to target R&D that would not otherwise occur.

As outlined above, the Ferris, Finkel and Fraser Review (2016) found that the R&D Tax Incentive fell short of meeting its stated objectives of encouraging additional R&D (additionality) and producing spillovers.

These observations apply not just to the R&D Tax Incentive but to innovation and R&D policy more widely. Targeting such activity that would otherwise occur delivers no additional benefits for taxpayer funds or the wider community.

Other OECD recommendations

In its recent assessment of the performance of the Australian economy, the OECD made some recommendations aimed at boosting the outcomes from R&D:

- put a greater weight, as envisaged, on collaboration in university funding
- develop a more coordinated approach to industry placements for research students to strengthen the linkages between research and business sectors
- assess research outcomes and impacts in the same way across public-sector research organisations
- develop a more integrated, 'whole-of-government' approach to science, research and innovation and consolidate innovation support programmes
- make the R&D Tax Incentive more effective (OECD 2017).

A Research institutions

Table A.1 Australian Government research agencies, 2015-16

\$ million; Estimated actual

Agency	Abbreviation	Budgetary outlay
Antarctic Division		93.9
Australian Astronomical Observatory	AAO	11.9
Australian Centre for International Agricultural Research	ACIAR	94.1
Australian Institute of Aboriginal and Torres Strait Islander Studies	AIATSIS	0.8
Australian Institute of Criminology Research Program		3.0
Australian Institute of Marine Science	AIMS	40.5
Australian National Maritime Museum	ANMM	0.2
Australian Nuclear Science & Technology Organisation	ANSTO	192.6
Bureau of Meteorology Research Activities	BoM	24.3
Commonwealth Scientific and Industrial Research Organisation	CSIRO	750.2
Defence Science and Technology	DST Group	464.3
Geoscience Australia		121.3
Great Barrier Reef Marine Park Authority	GBRMPA	1.0
National Measurement Institute	NMI	7.5
National Acoustic Laboratories	NAL	4.3
Supervising Scientist		14.0
Total		1 835.9
Source: DIIS (2016).		

	Developed and a second
Higher education provider	Budgetary outlay
Australian Catholic University	6.9
Batchelor Institute of Indigenous Tertiary Education	0.4
Bond University	3.8
Central Queensland University	6.0
Charles Darwin University	14.6
Charles Sturt University	9.7
Curtin University of Technology	41.3
Deakin University	29.1
Edith Cowan University	11.5
Federation University Australia	4.0
Griffith University	38.1
James Cook University	25.8
La Trobe University	29.4
Macquarie University	39.5
MCD University of Divinity	1.5
Monash University	155.1
Murdoch University	18.6
Queensland University of Technology	50.2
Royal Melbourne Institute of Technology	34.1
Southern Cross University	7.9
Swinburne University of Technology	18.4
The Australian National University	105.2
The Flinders University of South Australia	27.7
The University of Adelaide	87.3
The University of Melbourne	185.0
The University of Notre Dame Australia	1.5
The University of Queensland	176.6
The University of Sydney	180.9
The University of Western Australia	91.3
Torrens University Australia	49.5
University of Canberra	9.3
University of New England	15.8
University of New South Wales	164.0
University of Newcastle	41.3
University of South Australia	34.7
University of Southern Queensland	8.3
University of Tasmania	43.2
University of Technology, Sydney	27.0
University of the Sunshine Coast	4.8
University of Western Sydney	18.2
University of Wollongong	36.1
Victoria University	11.4
Total	1 814.4
Source: DIIS (2016).	

Table A.2Research block grants by higher education provider, 2016
\$ million; Estimated actual

Table A.3	Rural Research and Development Corporations, 2015-16
	\$ million; Estimated actual

Ownership	Cooperative Research Centre	State ^a	Budgetary outlay
Government owned	Cotton Research and Development Corporation	NSW	b
	Fisheries Research and Development Corporation	ACT	19.2
	Grains Research and Development Corporation	ACT	68.2
	Grape & Wine Research & Development Corporation	SA	b
	Rural Industries Research and Development Corporation	NSW	12.4
Industry-owned	Australian Egg Corporation Limited	NSW	1.8
	Australian Livestock Export Corporation Limited	NSW	С
	Australian Meat Processor Corporation	NSW	С
	Australian Pork Limited	ACT	С
	Australian Wool Innovation Limited	NSW	12.5
	Dairy Australia Limited	VIC	23.6
	Forest and Wood Products Australia Limited	VIC	4.3
	Horticulture Innovation Australia Limited	NSW	43.8
	Meat & Livestock Australia	NSW	60.4
	Sugar Research Australia Limited	QLD	b
Total			269.0

^a State of headquarters. ^b Not reported separately, but forms part of the collective total of \$22.8 million. ^c Not reported

Sources: Department of Agriculture and Water Resources (2016); DIIS (2016).

Sector	Cooperative Research Centre	State	Grant years	Committed funding ^a
Aariculture	CRC for High Integrity Australian Pork (Pork CRC)	SA	8	19.86
giranara	CRC for Sheep Industry Innovation (Sheep CRC)	NSW	5	15.50
	Dairy Futures CRC	Vic	6	27 72
	Invasive Animals CRC	ACT	5	19 70
	Poultry CRC	NSW	7	27 000
	Plant Biosecurity CRC	ACT	6	29.65
Environmental	Antarctic Climate and Ecosystems CRC	Tas	5	25.00
services	Bushfire and Natural Hazards CRC	Vic	8	47.00
	CRC for Contamination Assessment and Remediation of the Environment (CARE CRC)	SA	9	29.10
	CRC for Low Carbon Living	NSW	7	28.00
	CRC for Water Sensitive Cities	Vic	10	30.00
	Space Environment Research Centre	ACT	5	19.84
Manufacturing	CRC for Cell Therapy Manufacturing	SA	6	20.00
	CRC for Polymers	Vic	5	14.50
	Excellerate Australia (Automotive Australia CRC)	Vic	5	26.00
	Rail Manufacturing CRC	Vic	6	31.00
Medical services	Cancer Therapeutics CRC	Vic	6	34.01
	CRC for Living with Autism	Qld	10	31.00
	CRC for Alertness Safety and Productivity	Vic	7	14.48
	CRC for Mental Health	Vic	7	23.11
	CRC for Aboriginal and Torres Strait Islander Health	Vic	5	25.00
	HEARing CRC	Vic	5	28.00
	Oral Health CRC	Vic	8	30.25
	Wound Management Innovation CRC	Qld	8	27.93
	Young and Well CRC	Vic	5	27.46
Mining & energy	Deep Exploration Technologies CRC	SA	8	28.00
	Energy Pipelines CRC	NSW	10	17.48
Social & economic	Capital Markets CRC	NSW	10	32.35
development	CRC for Remote Economic Participation	NT	7	32.50
	CRC for Spatial Information	Vic	8	32.19
	Data to Decisions CRC	SA	5	25.00
^a Total funding com	mitted (not funding in 2015-16).			

Table A.4 Cooperative Research Centres funded in the 2015-16 budget

Source: DIIS (2016).

Administering institution	State	Applications	Funded	Amount
		No.	No.	\$m
ANZAC Research Institute	NSW	11	1	0.1
Australian Catholic University	NSW	23	1	0.1
Australian National University	ACT	106	25	19.7
Baker IDI Heart and Diabetes Institute	Vic	122	22	16.6
Bionic Ear Institute	Vic	11	3	1.9
Bond University	Qld	7	1	0.3
Cancer Council Victoria	Vic	8	3	1.6
Centenary Institute of Cancer Medicine and Cell Biology	NSW	33	5	3.5
Central Queensland University	Qld	8	1	0.3
Centre for Eye Research Australia Ltd	Vic	25	4	1.7
Curtin University of Technology	WA	72	5	3.9
Deakin University	Vic	85	9	6.6
Edith Cowan University	WA	17	3	2.9
Federation University Australia	WA	5	1	0.4
Flinders University	SA	95	8	5.0
Florey Institute of Neuroscience and Mental Health	Vic	101	18	27.5
Garvan Institute of Medical Research	NSW	78	16	13.4
Griffith University	Qld	89	5	4.2
James Cook University	Qld	33	5	3.4
La Trobe University	Vic	77	15	7.0
Macfarlane Burnet Institute for Medical Research and Public Health	Vic	34	13	14.6
Macquarie University	NSW	67	12	6.8
Melbourne Health	Vic	16	1	0.1
Menzies School of Health Research	NT	33	8	10.2
Metro South Hospital and Health Service	Qld	3	2	0.8
Monash University	Vic	622	111	86.7
Murdoch Childrens Research Institute	Vic	158	41	23.9
Murdoch University	WA	10	1	1.3
Queensland Institute of Medical Research	Qld	121	23	45.5
Queensland University of Technology	Qld	107	11	5.9
RMIT University	Vic	30	3	2.4
South Australian Health and Medical Research Institute (SAHMRI)	SA	33	7	4.0
St Vincent's Institute of Medical Research	Vic	45	12	9.0
Swinburne University of Technology	Vic	11	2	0.7
The George Institute for International Health	NSW	7	3	0.2
University of Adelaide	SA	257	27	17.8
University of Melbourne	Vic	581	124	103.9
University of New South Wales	NSW	426	86	59.5
University of Newcastle	NSW	164	28	18.4
University of Notre Dame	WA	7	1	0.2
			(Continued	next page)

Table A.5NHMRC competitive grant recipients by institution, 2016

Table A.5 (continued)

Administering institution	State	Applications	Funded	Amount
University of Queensland	Qld	445	83	51.2
University of South Australia	SA	108	22	13.8
University of Sydney	NSW	557	107	116.2
University of Tasmania	Tas	60	7	5.0
University of Technology Sydney	NSW	33	2	0.2
University of Western Australia	WA	253	48	35.9
University of Western Sydney	NSW	41	2	2.6
University of Wollongong	NSW	49	5	2.9
Victor Chang Cardiac Research Institute	NSW	20	4	3.6
Walter and Eliza Hall Institute	Vic	159	39	24.9
Total		5 519 ²	^a 986	788.4

^a Total includes 56 applications from institutions that did not receive funding in 2016: Asbestos Diseases Research Institute (5); Charles Sturt University (4); CSIRO (5); Ear Science Institute Australia (1); Institute for Breathing and Sleep (3); Southern Cross University (1); Sydney West Area Health Service (1); University of New England (5); University of Southern Queensland (1); University of the Sunshine Coast (11); Victoria University (15).

Source: NHMRC (2017).

B Innovation programmes

Table B.1Australian Government innovation expenditure by
programme and portfolio, 2015-16

\$ million; Estimated actual

Programme / Activity	Portfolio	Budgetary outlay
R&D Tax Incentives – Refundable	Industry, Innovation and Science	2 340
R&D Tax Incentives – Non Refundable	Industry, Innovation and Science	850
NHMRC Research Grants	Health	846
Australian Research Council (ARC) – National Competitive Grants Program	Education and Training	816
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Industry, Innovation and Science	750
Research Training Scheme	Education and Training	684
Defence Science and Technology Group (DST Group)	Defence	464
Joint Research Engagement Program	Education and Training	360
Australian Postgraduate Awards	Education and Training	282
Research Infrastructure Block Grants	Education and Training	242
Sustainable Research Excellence in Universities	Education and Training	239
Australian Nuclear Science & Technology Organisation (ANSTO)	Industry, Innovation and Science	193
National Institutes Program – ANU Component	Education and Training	192
Australian Renewable Energy Agency (ARENA)	Environment and Energy	169
National Collaborative Research Infrastructure Strategy	Education and Training	150
Cooperative Research Centres Programme	Industry, Innovation and Science	141
Automotive Transformation Scheme	Industry, Innovation and Science	132
Biomedical Translation Fund	Health	125
Geoscience Australia	Industry, Innovation and Science	121
Australian Centre for International Agricultural Research (ACIAR)	Foreign Affairs and Trade	94
Antarctic Division	Environment and Energy	94
Grains	Agriculture and Water Resources	68
Meat Research	Agriculture and Water Resources	60
Carbon Capture and Storage (CCS) Flagships	Industry, Innovation and Science	44
Horticulture Research	Agriculture and Water Resources	44
Innovation Investment Fund including Innovation Investment Follow-on Fund	Industry, Innovation and Science	43
Australian Institute of Marine Science (AIMS)	Industry, Innovation and Science	40
DFAT Aid Research and Development	Foreign Affairs and Trade	37

(Continued next page)

Table B.1 (continued)

Programme / Activity	Portfolio	Budgetary outlay
A Competitive Agriculture Sector – boosting farm profits through rural R&D	Agriculture and Water Resources	29
Entrepreneurs' Programme – Accelerating Commercialisation	Industry, Innovation and Science	27
Other Rural Research	Agriculture and Water Resources	25
Bureau of Meteorology Research Activities	Environment and Energy	24
Dairy Australia Limited	Agriculture and Water Resources	24
International Postgraduate Research Scholarship	Education and Training	22
National Environmental Science Programme	Environment and Energy	22
ICT Centre of Excellence	Industry, Innovation and Science	21
Fishing Industry Research	Agriculture and Water Resources	19
Office of Water Science	Environment and Energy	18
Supervising Scientist	Environment and Energy	14
Wool Research	Agriculture and Water Resources	13
Rural Industries R&D Corporation	Agriculture and Water Resources	12
Industry Growth Centres Initiative- Commercialisation Fund	Industry, Innovation and Science	12
Australian Astronomical Observatory (AAO)	Industry, Innovation and Science	12
Coal Mining Abatement Technology Support Package	Industry, Innovation and Science	11
Health Surveillance Fund – Research Centres	Health	10
Collaborative Research Networks Program	Education and Training	9
Household, Income and Labour Dynamics in Australia (HILDA) Survey	Social Services	9
Carbon Farming Futures – Filling the Research Gap	Agriculture and Water Resources	9
Longitudinal Survey of Australian Children (LSAC)	Social Services	8
Drug and Alcohol Research	Health	8
National Measurement Institute (NMI)	Industry, Innovation and Science	8
Commercialisation Australia	Industry, Innovation and Science	7
Support for Cancer Clinical Trials	Health	7
Square Kilometre Array Radio Telescope Project	Industry, Innovation and Science	7
Defence Future Capability Technology Centre Program	Defence	7
Australian Climate Change Science Programme (ACCSP)	Environment and Energy	6
National Landcare Programme Innovation Grants	Agriculture and Water Resources	5
Priority-driven Collaborative Cancer Research Scheme	Health	5
Higher Education Research Promotion	Education and Training	5
Three dedicated Prostate Cancer Research Centres (two centres funded from 2008-09 and a third from 2013-14)	Health	5
National Low Emissions Coal Initiative	Industry, Innovation and Science	4
National Acoustic Laboratories	Health	4
	(Contin	ued next page)

Table B.1 (continued)

Programme / Activity	Portfolio	Budgetary outlay
Forestry	Agriculture and Water Resources	4
Carbon Farming Futures – Action on the Ground	Agriculture and Water Resources	4
Payments to Austroads/ARRB Transport Research Ltd.	Infrastructure and Regional Development	4
Carbon Farming Futures – Extension and Outreach	Agriculture and Water Resources	4
Industry Growth centres Initiative - Project Fund	Industry, Innovation and Science	4
National Climate Change Adaptation Research Facility (NCCARF) – support	Environment and Energy	3
Great Barrier Reef Foundation – contribution	Environment and Energy	3
Competitive Pre-Seed Fund	Industry, Innovation and Science	3
Longitudinal Study of Indigenous Children (LSIC)	Social Services	3
Australian Institute of Criminology (AIC) Research Program	Attorney-General's	3
Entrepreneurs' Programme – Innovation Connections	Industry, Innovation and Science	3
Australia-India Strategic Research Fund	Industry, Innovation and Science	3
Establishment of an ICT-enabled Research Laboratory – Commonwealth Assistance	Industry, Innovation and Science	3
Australian Sports Commission (ASC) Research Programs – Intramural	Health	3
Australian War Memorial – Official Histories	Veterans' Affairs	3
ANROWS core funding	Social Services	2
Australian Biological Resources Study	Environment and Energy	2
Australian Longitudinal Study on Male Health	Health	2
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) – Radiation in Health Care – Safe and Better Use	Health	2
Australian Sports Commission (ASC) Research Programs – Extramural	Health	2
Centres of Excellence – Biosecurity Risk Analysis and Research	Agriculture and Water Resources	2
Clean Technology Innovation Programme	Industry, Innovation and Science	2
Department of Veterans' Affairs Applied Research Program	Veterans' Affairs	2
Environmental Water Knowledge and Research	Environment and Energy	2
Global Connections Fund	Industry, Innovation and Science	2
International Whaling Commission Southern Ocean Research Partnership	Environment and Energy	2
National Disability Research and Development Agenda	Social Services	2
National Health Survey	Health	2
ANCAP-Vehicle Testing/Stars on Cars	Infrastructure and Regional Development	1
ARC Linkage Grant – Creating the conditions for collective impact: transforming the child serving system in disadvantaged communities.	Social Services	1

(Continued next page)

Table B.1 (continued)

Programme / Activity	Portfolio	Budgetary outlay
Australian Civil-Military Centre – Research and Lessons Learnt	Defence	1
Australia Consensus	Education and Training	1
Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS)	Education and Training	1
Australian Institute of Criminology (AIC) – Criminology Research Grant Program	Attorney-General's	1
Australian Institute of Criminology (AIC) – National Drug and Law Enforcement Research Program	Attorney-General's	1
Australian Longitudinal Study on Women's Health	Health	1
Australian National Preventive Health Agency Research Fund	Health	1
Building a New Life in Australia (BNLA) Longitudinal Study of Humanitarian Migrants (Australian Institute of Family Studies)	Social Services	1
Bush Blitz Strategic Taxonomy Grants Scheme	Environment and Energy	1
Cancer data to improve cancer care	Health	1
Commonwealth-ANU Strategic Relationship	Education and Training	1
Established Pest Animals and Weeds Initiative	Agriculture and Water Resources	1
Great Barrier Reef Marine Park Authority	Environment and Energy	1
Giving Australia	Social Services	1
Improving lung cancer outcomes	Health	1
Joint Force Integration – IMD Study	Defence	1
Maintaining support for women with gynaecological cancers	Health	1
Mechanical Fuel Load Reduction Trial	Agriculture and Water Resources	1
Natural Resource Management Planning for Climate Change	Environment and Energy	1
National Survey on Community Attitudes to Violence Against Women (VicHealth and then ANROWS from June 2016)	Social Services	1
National Centre for Immunisation Research and Surveillance	Health	1
Phoenix Australia – Centre for Posttraumatic Mental Health	Veterans' Affairs	1
Primary Health Care Research Evaluation and Development – Primary Health Care Research and Information Service	Health	1
Research under the National Framework for Protecting Australia's Children 2009–2020	Social Services	1
Veteran Health Research	Veterans' Affairs	1
R&D Refundable Tax Offset	Industry, Innovation and Science	-25
Total		10 124
Source: DIIS (2016).		

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 13

REGULATION IN THE DIGITAL AGE 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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Key Points

Digital technologies can provide new and better ways of regulating.

- A single digital portal can provide an intelligent interface that allows the user to identify all the regulatory permissions and requirements needed to do some specified task.
- Greater cooperation is needed between government departments and across jurisdictions to share data and implement the machine learning needed to get the full value out of the 'one-stop-shop' approach to regulating.
- Digital service standards can greatly assist agencies to adopt a common approach to digital activities, with benefits to all who engage with the agency, including clients, other agencies, and firms seeking to develop service offerings.
- RegTech has the potential to greatly reduce the compliance costs of regulation in some areas. Regulators can facilitate the development of RegTech through timely approval of services as compliant, machine-readable regulation, and information sharing systems.
- The internet is reducing the cost of collecting and disseminating information that can lead to
 much better informed consumers, able to impose greater discipline on producers. Where there
 is potential for substantial harm, government action may be needed to ensure that the
 information made available to consumers is credible. This could allow a more light-handed
 regulator approach if combined with effective avenues for complaints and access to redress.

Digital technologies are also challenging regulations and regulators, whose slow response can pose a barrier to innovation, and that may still need to act to manage new risks and facilitate new opportunities.

- Regulators should move to a 'Yes, if' approach, unless consumers would struggle to understand the risks poses by the new product, these risks are material, generic regulations do not offer adequate protection, and/or competition would be significantly reduced.
- FinTech could be boosted by more rapid progress in adoption of digital identities, portability of customer data, sharing of credit history data, requiring firm exit strategies, and liberalising payments regulation.
- For the internet of things to thrive, greater coordination of systems and standards is needed to
 ensure interoperability as well as optimising the investment in supporting infrastructure and
 cybersecurity.
- Governments are the collectors and curators of much data, and could stimulate new
 opportunities by making this data available in forms that still protect the security of data and the
 privacy of the data sources. Governments can also make better use of data to improve their
 delivery of services and functioning of government.
- Providing consumers access to their own data will enhance their choices, driving innovation as well as efficiency though greater competition. Policies to encouraging more sharing of data in the private sector should also see the development of more differentiated services to the benefit of consumers who are less well serviced by the current providers.
- While limited by international agreements, moves to a less restrictive IP regime could stimulate innovation. Fair dealing in copyright law is particularly restrictive and should be replaced by fair use.

This supporting paper reinforces the observations made in chapter 5 of the Productivity Review. It considers the ways governments can make markets work more efficiently and improve firm productivity, largely through the lens of the challenges and opportunities offered with digital technologies. It considers ways in which governments can:

- reduce the burden of regulation and with this costs to businesses and the economy
- empower consumers to make markets work better
- facilitate innovation, looking in particular at two areas FinTech and the internet of things (IoT).

1 Minimising the burden of regulation

As digital technologies can provide new and better ways of regulating, the time is right to put pressure on governments and regulators to lift their game. Regulators can adopt digital solutions to streamline communication that will lower the cost of engagement, develop lower cost compliance monitoring tools (RegTech), and enhance market mechanisms by giving consumers better and more effective avenues of redress to impose market discipline on producers.

Digital services offer ways to lower the costs of engaging with regulators

Simplifying and streamlining how business engage with regulators and government is a theme that has run through all of the Commission's regulatory reviews. As ACCI (sub. 37) notes:

A major frustration for the business community is the time taken to navigate important information and services. Public services are fragmented and difficult to navigate. (p. 18)

Single portals for information, applications, and reporting lower costs

Digital services offer a way of providing a much more seamless and integrated process for business seeking information, approvals, notifications and other compliance requirements. They can provide an intelligent interface that allows the user to identify all the regulatory permissions and requirements needed to do some specified task. This interface could offer the user of one link — for example to purchase a recreational fishing licence — others that may be of value — such as information on fishing locations.

To be useful for businesses (or potential businesses), one site could provide the interface to a number of agencies, prompting the user to ensure that they are aware of the full range of regulatory interactions they will need to satisfy, listing all the information required, providing the submission interface, and directing that information to the relevant agency. Machine learning will improve this service over time, so that someone who wants to start a hairdressing business in Bateman's Bay not only gets the list of federal and state requirements such as occupational licencing, tax arrangements (BAS and PAYG), award requirements, occupational health and safety, public and professional liability insurance, but also local government zoning rules, and other requirements.

There has been progress on the development of at least a single portal for information and routine applications in Australia. For example, the NSW Government has introduced onegov.nsw.gov.au where most services that individuals and businesses want to use can be accessed. They have also introduced a single point for all government procurement. Queensland has a business and industry portal, which does link through to individual services. South Australia has a single entry point. Victoria was the first state to sign up to the Commonwealth's myGov portal as a single authentication platform (in 2014) (Cowan 2014), but their rollout of Service Victoria (along the Service NSW line) has been slower than expected (Donaldson 2017).

The different approaches raise the question of why, like in the rollout of myKi and Opal, each state feels the need to develop their own unique system. But at least the objective was similar, unlike the Australian Government, which abandoned the single GOV.AU website that was being developed by the Digital Transformation Office — now the Digital Transformation Agency (DTA) — in favour of trimming the 1500 websites and lifting digital standards (Cowan 2017; Towell 2017). The 2017-18 Budget included funding to the DTA to develop a single platform payments system, a simplified system for handling digital notifications, and the 'Tell Us Once' service that will update residents' details across all Commonwealth agencies (Australian Government 2017b).

But more could still be done. This includes better linking Commonwealth and state regulators for businesses that need to meet regulatory requirements at both levels of government. There may well be a case for the Australian Government to delegate the interface for some of their regulatory responsibilities to state and territory governments, if they are the likely first point of contact for firms seeking to undertake new activities. There are moves to develop an end-to-end approvals process for business transactions across all three levels of government, with a test to be undertaken with Parramatta Council and the NSW government (Riley 2017). All levels of government should have an interest in speeding this process, and states that have yet to develop their own single portal should piggy-back on this development rather than reinvent yet another wheel.

Implementation of digital solutions requires buy-in from the different regulators (and their policy departments). This, rather than the technology, can be the bottleneck that slows the process and adds costs. The need to change processes to manage and respond to a digital flow of information can be challenging for agencies and requires skills in change management that may not be available. Risk averse organisations can also be reluctant to delegate even an interface to others, while concerns over the implications for the future of the agency can hinder cooperation. To overcome these sources of reluctance, governments need to fund the transition, and to make it clear that delivery of the one-stop, end-to-end, regulatory communication and approvals process is not negotiable.

Digital standards can make it easier for business to engage

There are models, such as the UK Digital Service Standard, that can assist regulators to develop online services that are easy for businesses (or the general public) to use (box 2). These standards will make government agencies much more responsive as circumstances change, and provide much greater scope for agencies to actively manage the risks associated with online services. Critical elements are the development of in-house capacity and control to allow a continuous improvement model.

Using open source code also brings in much more expertise to assist when problems arise, as well as saving time and money by not reinventing already well tested platforms and code. The model of agencies paying firms to deliver a black box IT solution locks in obsolescence and should not be used except for one-off needs.

Adoption of standard business reporting (SBR) would facilitate the uptake of other digital technologies. SBR is a standardised approach to online or digital record keeping, which incorporates standardised terms used in government legislation and reporting. When it is built into account keeping software, it allows businesses to generate, check and submit reports to government using AUSkey (a secure reporting portal). SBR enabled reports include common Australian Securities and Investments Commission (ASIC), Australian Taxation Office (ATO) and superannuation reports, and payroll tax reports for jurisdictions. The Commission assessed the potential benefits of SBR as in the order of \$500 million a year (PC 2012).

The Australian government has been trying to promote the adoption of SBR since 2010, yet uptake has been slow. This appears to be largely due to lack of awareness, as it was hard to trial SBR and the observability of benefits were low (Lim and Perrin 2014; PC 2012).¹ But it may well be that businesses do not see sufficient value in changing existing processes just to access this functionality, so adoption rates reflect the pace of accounting software updates. As awareness grows and more software is developed that uses the SBR functionality, adoption rates should increase. But it is an illustration of the chicken and egg problem, where low awareness dampens both demand and supply responses — business need to see value in changing their software so that developers see value in investing in applications, which in turn deliver the value businesses need to see.

¹ The 'diffusion of innovation' model explains the rate and profile of adoption in terms of relative advantage, compatibility, complexity, trialability and observability.

Box 2 UK Digital Service Standard

- Understand user needs develop a deep knowledge of who the service users are and what that means for the design of the service
- Ongoing user research plan for ongoing user research and usability testing to continuously improve the service
- Have a multidisciplinary team with the skills to design, build and operate the service, with oversight by suitably skilled managers with decision making responsibility
- Use agile methods build your service using iterative and user-centred methods
- Iterate and improve frequently build your service so it can be iterated and improved on a
 frequent basis and make sure that you have the capacity, resources and technical flexibility
 to do so
- Evaluate tools and systems to choose tools and systems that will be used to build, host, operate and measure the service, and how to procure them
- Understand security and privacy issues evaluate what user data and information the digital service will be providing or storing and address the security level, legal responsibility, privacy issues and risks associated with the service (consulting with experts where appropriate)
- Make all new source code open and reusable publish it under appropriate licences (or provide a convincing explanation as to why this can't be done for specific subsets of the source code)
- Use open standards and common platforms where available including GOV.UK Verify as an option for identity assurance
- Test the end-to-end service in an environment identical to that of the live version, including on all common browsers and devices, and using dummy accounts and a representative sample of users
- Make a plan for being off-line to manage the event of the digital service being taken temporarily off-line
- Make sure users succeed first time create a service that is simple to use and intuitive enough that users succeed the first time
- Make the user experience consistent with GOV.UK build a service consistent with the user experience of the rest of GOV.UK including using the design patterns and style guide
- Measure and report on performance collect and analyse performance data to guide continuous improvement, identify key performance indicators, including the key four ones, and report on this data
- Test with the minister test the service from beginning to end with the minister responsible for it.

Source: UK Government (2017).

CONCLUSION 13.1

Greater coordination is needed between state and territory and the Australian governments to make better use of the digital opportunities:

- in linking the entry portals for business and others to:
 - support a 'no wrong entry' system in regard to regulatory information
 - offer integrated (end-to-end) application processes for all regulatory licensing and approvals
- adopting AI methods to improve the quality of the advice and service provided to businesses and others seeking information on regulatory requirements
- providing clear guidance on digital standards to all agencies that are technology neutral, consistent across agencies and jurisdictions, and are supported by the business community.

RegTech can improve the performance of regulators

RegTech describes digital solutions that enable firms to meet regulatory requirements at considerably lower cost — embedding 'compliance by design'. At the World Economic Forum in January 2017, for example, participants were told that 'as many as 50 000 finance sector compliance jobs' could be replaced by RegTech solutions (Head 2017). ASIC held a forum in early February 2017 with RegTech companies to explore opportunities.

There are many digital technologies that could improve the ways in which regulators monitor compliance and assess risk. These include blockchain, cognitive computing, the internet of things (IoT), open source and Application Programming Interface (APIs), the cloud and big data. Even digital technologies such as pre-filled forms, and the ability to check whether information entered is likely to be accurate (at the low-tech end of RegTech) can help firms with meeting compliance requirements, such as making sure that customers know what they are signing up to.

At the high-tech end, sensor data could allow some businesses to automate how they prove compliance with regulatory requirements by directing data straight to the regulator. The ability to share data in real time, or closer to real time, would allow regulators to quickly identify if risks are emerging and to advise the firm accordingly. It also means that they only need to contact firms if problems are identified. Compliant firms would not need to do additional reporting. Over time, the data provided could be analysed to better assess where risks actually do eventuate and the consequences of both the regulatory response and the failure to manage a risk (which may well be far less than anticipated). This would enable a much more informed risk-based approach to regulating.

There is value to governments in RegTech solutions. The ATO is developing a single touch payroll system that will require employers (with more than 20 employees) to report payroll and superannuation online as payments are made. This is an example of what can be done with digital technologies, providing better information to monitor compliance, such as the payment of employee superannuation (which can be a problem for failing firms, and end up costing the Government as well as employees). ASIC's Innovation Hub, established in 2015, reported engagement with 30 RegTech companies (Head 2017). The NSW Government has recently released a new digital strategy, with commitments to make the client the centre of service delivery (Bajkowski 2017b). An important aspect of this strategy is to ensure that all legislation enables digital by design — that is, it will not prevent new digital technologies and business models from being adopted.

The private sector sees benefits in investing in RegTech solutions — as demonstrated by the establishment of the RegTech Association in March 2017 (Eyers 2017). The members of the Association see scope in providing apps and other software solutions to firms that will enable them to meet their regulatory obligations, including (but not limited to) reporting requirements.

Machine learning offers the opportunity to distil information on regulatory requirements in a way that can be tailored to the needs of individual firms. If regulators work with RegTech firms, such as by making de-identified data on regulatory actions and compliance available for analysis, intermediaries can assist firms to be compliant for least cost. Data 'matching' where red flags are identified from the regulator's data and these are shared with RegTech firms, rather than data sharing, reduces the scope for misuse of the firm level data. By providing information on the characteristics needed for compliance and those that are problematic, the intermediaries can use their firm-level data to identify the advice they need to give to their clients. The upshot will be that regulatory outcomes improve at a lower cost to business.

Engagement with regulators will be needed to ensure the development of this new set of intermediaries. There is concern in the industry that regulators can be too slow to act, so the big firms, that are potential clients for the new platforms, develop their own solutions (Head 2017). Open access technologies are to be preferred, and regulators should ensure that APIs or other interfaces allow others to read and write data to the regulator's system. The scope to improve regulatory compliance at a lower cost is considerable.

There are challenges that come with trying to design regulation in a way that enables the RegTech applications. Specific rules (such as 'the three measurable things will be done') can be easier to implement (particularly with RegTech) compared with broader principles (such as a requirement to be fit for safe use by an 'average' person). But specific rules are less flexible and have the risk of leading to tighter regulation and higher regulatory cost overall (as tight standards can limit entry or limit the ability to differentiate products). Whereas RegTech will make application of specific rules cheaper, this may move regulation away from the more principles-based approach.

One way this tension could be addressed is to enshrine the principles in the primary legislation and allow regulators to offer guidelines that provide a machine readable interpretation, as well as the more nuanced principles approach, on the understanding that the machine readable rules are subject to change if firms are found to be evading the regulatory intent. Here too, a balance is needed that requires policy departments to provide clear guidance to regulators on how to proceed.

The courts can also play a role here, as they can be called on to interpret how the principles enshrined in legislation apply in practice. The common law system allows for courts to provide guidance on how regulation should be applied. This would be another route through which regulators can update their approaches as technology changes.

For RegTech to develop it needs:

- timely approval or recognition by regulators that the tool delivers on reporting or other regulatory requirements
- machine readable regulation that is not ambiguous or open to interpretation
- private and public information systems that can transfer and share information in real time
- cultural change in regulators 'from policeman to coach'.

Finance is one of the most prospective areas for RegTech. Once proven it has potential to be applied across many industries.

CONCLUSION 13.2

For the RegTech industry to thrive and deliver lower regulatory compliance costs, governments need to provide:

- regulation is digital by design
- a regulatory framework that welcomes digital solutions
- access to deidentified regulatory data, under secure unit record conditions.

Policy departments need to provide guidance to regulators on the balance between moving toward more specific rules that support RegTech solutions and a principles-based approach, given that specific rules have the potential to create unintended distortions.

2 Empowering consumers makes markets work better

A regulatory system that empowers consumers, through information and effective complaint and redress systems, helps bring market discipline to bear on providers. Digital technologies can greatly address the source of market failure known as 'information asymmetry' — where providers know a lot more about a product than their consumers are able to find out. For this to reduce the need for regulation, the information must be credible, and redress for harm suffered as a result of purchasing a product must be accessible.

Digital technology can support the provision of credible information

Where the seller knows more about the product (good or service, including labour) than the buyer, the market outcome can be less than ideal. It matters most where transactions are infrequent so the opportunity to learn is low, and they involve financial or other risk to either party to the transaction. In such cases governments can:

- ban or put limits on who can undertake what activities, for example by licencing of professions. While these approaches can be required where the risks and associated costs are high, requirements to meet certain minimum standards can drive up costs, and prevent informed consumers from making a quality-price trade-off that they might prefer.
- mandate provision of information, such as energy ratings information on whitegoods, and food labelling. This imposes costs on firms to provide this information in the form required, and getting agreement on labelling requirements can be hotly debated. The food labelling health 'stars' system, for example, fell well short of the intent of its advocates (Lawrence and Pollard 2015).

Easier access to information can reduce the need for government to intervene, and perhaps deliver enough confidence in the consumer's capacity to know what they are buying to reduce the need for some bans and other restrictions on activities.

The internet reduces the costs of disseminating information. Platform-mediated exchanges, such as Uber and Airbnb, that match buyers to sellers (of ride services and accommodation respectively) aggregate the experiences of users, overcoming the problem of knowing the performance of a provider when their service is used only once by most consumers. The impact of reports of poor services on a provider's reputation and future sales provides a discipline to deliver as promised (PC 2016a).

Whether better access to information will resolve as many problems as has been claimed (for example, Thierer et al. 2015) needs to be examined. In some areas, such as a ride-sharing service — where the quality of a service is easy to assess, the risk of a very bad outcome is low, and there are many repeat users reporting on their experience — this is undoubtedly true. But there are other areas, such as the proficiency of an orthopaedic surgeon, where this presumption is harder to make. This can be because information alone may not be sufficient to inform choice where decisions have to be made in times of duress, or processing the information into decision criteria goes beyond the capabilities of most consumers.

Where consumers are not in a position to exert discipline through their own purchasing behaviour or unable to share information that affects the reputation of the brand, performance metrics can still encourage producers to lift their game (SP 3). This has been found to be a factor in provision of medical services in the United Kingdom, as hospitals and doctors that were reported as below average have lifted their game not just to protect their reputation, but also from professional pride in what they do (chapter 2). Here too,

digital technologies offer ways to disseminate information at a much lower cost. The challenge is to do this in a nimble, low-cost way.

With sufficient access to data, firms may well develop as intermediaries, playing the role of trusted brokers. TripAdviser, for example, has become the bible for some travellers, and unlike 'Let's Go' and other travel information, it is likely to reflect the latest information. Crowdsourcing the information also reduces the scope for businesses to mislead consumers.

These features give users reasonable confidence in the information, but in other situations information quality is harder to establish. For example, if consumers can struggle to assess the quality of the service rather than their individual outcome (a slow recovery from a hip operation may not be the surgeon's fault) or feel compelled to be positive in their response, some form of quality assurance for the information provided is required.

In other cases, too much information can confuse. Aggregator websites (for example, for insurance) can assist in providing comparator information, but often the products vary across so many parameters that it is difficult to compare like-with-like.

The responsibility for minimising risks with bad outcomes and certifying the accuracy (or at least authenticity) of information could be assumed by the industry. But this poses some risk that certification can be used as a barrier to entry. A social organisation might be able to take on the role, although they too may have a particular perspective. Where these types of 'market' solutions pose unacceptable risks, information provision mediated by government can help the market function for efficiently.

Governments may need to be involved in the provision of information to consumers on the performance of a provider or product in any of the following situations:

- providers need to be legally required to provide the information that is, they would not do so voluntarily
- all feasible indicators of performance could easily be gamed so their accuracy will be doubtful without penalties for false or misleading information
- the consequence for consumers of a poor choice is high information alone may be sufficient where the issue is that consumers would have made a different choice (such as not to have a medical procedure if it has been found to be ineffective), but it might be inadequate where the consequence is actual harm — for example, procedures being undertaken by health practitioners who were not competent in the procedure
- the choice of a good or service is one-off and it is difficult for consumers to change provider making the initial choice more important (such as for university education SP 7)
- Government is a substantial funder of the service, either directly or through tax or other subsidies.

Where there are well known behavioural biases,² information can be tailored to provide the right nudge to avoid these biases. As firms will make use of these biases to sell people things that they don't need or that are inappropriate to their needs, and/or that cost more than they should, government intervention may be required to ensure that information is designed to help overcome these inherent biases. Requiring credit card bills to prominently display the full amount owed (rather than the minimum repayment), and providing information on the total cost of just making the minimum repayment, is an example.

Government should also encourage firms to increase their provision of information in digital form. For example, the UK Competition and Markets Authority found that it was not enough to remove regulatory impediments to consumers to switch banks, and that comparable information on products was needed. (The ability of consumers to access their own data is discussed below). In response, they mandated the retail banks to provide an API that allowed access to information on all the products offered by the bank to retail clients (Nicholls 2017).

As a major collector of information on firm behaviour, regulators should consider how their data could be used to provide information to help consumers assess performance of industries, firms and products, either directly or by providing it to a third party that could offer an advisory service. As with RegTech, requirements to deliver information in hardcopy should be reassessed, as digital delivery can lower costs for producers and makes it easier for information to be made available.

Complaints registers can be an important feedback mechanism

Regulators can also assist in publicising poor performance through open consumer complaints registers. The Commission's recent study on Australian Consumer Law (PC 2017a) concluded that a publicly accessible register of information on consumer complaints and product safety incidents would enhance consumer protection. Recognising the potential for vexatious complaints and proportionality the Commission laid out a set of principles that should guide the register (box 4). They did not go as far as recommending that a national complaints register be established, noting that NSW Fair Trading will evaluate the NSW Complaints Register after 12 months of operation.

² The main causes of cognitive biases affecting market choices are bounded rationality and cognitive dissonance (reflecting time inconsistency in choice, as in the purchase of clothing and food that are never used), use of heuristics and attribute substitution (where choice is made on only one or a few attributes or assumed attributes, such as red cars go faster), and being guided by emotion (as the upselling of funeral packages indicates).
Box 4 Principles to guide a complaints register

A public complaints register should have the following features:

- appropriate vetting mechanisms to minimise listing of frivolous or vexatious complaints
- detailed information about the complaint or incident, such as identifying the product and the nature of the problem. Personal details would be omitted for privacy reasons
- information on the resolution or outcome of the complaint. This should be as fulsome as
 practicable and could include: how the complaint was resolved and in whose favour, or if it is
 still pending; scope for the business to provide a response; and details on the actions of the
 regulator (such as whether the complaint has led to the regulator taking some form of
 enforcement action)
- a mechanism to place complaints and incidents in context, for example, by weighting them against sales volume. Clearly there are practical difficulties in determining this information for all suppliers or products, but there should at least be scope for businesses to provide this information as part of their response
- appropriate consultation, with both consumer and business groups, both in the development stages and to subsequently review the effectiveness of the register.

Source: PC (2017a, p. 164).

CONCLUSION 13.3

Digital platforms offer new ways to collate and compare information, which can better inform consumer choice. Governments may need to prompt industries to ensure that information is accurate and made available in a way that supports comparability. In making information available, governments should be aware of the cognitive biases and work to ensure that information is provided in way that assists consumers and businesses to make more efficient choices.

Redress must be provided by effective consumer protection regulation

While improving the information available to consumers enhances their ability to impose market discipline, these mechanisms work best where there are strong consumer protection measures in place. That is, market participants that seek to exploit consumers, workers and other organisations face sanctions, and those harmed have the right to and can access redress. This requires consumer protection regulation with teeth, and regulators that have the capabilities (skills, culture and resources) to implement the regulation.

The main areas of law that govern consumer protection are:

• the Australian Consumer Law (ACL), which replaced 20 federal, state and territory fair trading laws from November 2011, is administered and enforced jointly by the Australian Competition and Consumer Commission (ACCC) and state and territory consumer protection agencies (with the involvement of ASIC on relevant matters)

- The Australian Securities and Investments Act 2001 and the Corporations Act 2001, which apply to financial products and services (including banking services, credit, insurance and superannuation) are administered by ASIC
- The Fair Work Act (2009) administered by the Fair Work Commission. There are also a range of other laws that help protect workers, such as the Safety, Rehabilitation and Compensation Act (1988), and state laws.

In addition to these broader laws there is specific consumer protection at a national level through laws relating to the: National Credit Code, telecommunications and media services, therapeutic products, food standards, and trade measurement. Consumer protection is delivered through the ACL and these laws are enforced by a large number of institutions.³ The effectiveness of these institutions depends on their ability to gather and act on information where consumers' rights have been violated. From a consumer's perspective, their confidence in the market depends on the effectiveness of the regulators, and on their ability to apply for and receive redress should they suffer unforeseeable harm from their purchase of a good or service.

It is worth noting that the systematic defence of consumer rights does not ensure all consumers who suffer harm will get redress. No system is perfect, and limits are needed to prevent consumers from exploiting the system. There is also a balance to be achieved as consumers need to be motivated to do due diligence on their purchases, and not rely on the system to protect them from the consequences of their own choices.

Nevertheless, the threat posed to firms by the consumer protection system and exposure to fines and redress can be a critical incentive for firms to deal fairly with consumers, and hence for the market to operate effectively (box 5). It is unclear if the Australian system is adequate in this regard.

The ACL is currently being reviewed (by Consumer Affairs Australia and New Zealand) to see if the law is working as intended, reducing the risk of consumer detriment, while minimising the compliance costs. As input into this broader review the Productivity Commission has recently completed a review of the multiple regulator model, which was found to be working well, albeit with scope for improvement. This review emphasised the importance of a well-functioning consumer redress system, noting that it matters for consumer confidence to send a signal to businesses on the need to comply, and that it can be used to assist regulators to identify systemic consumer issues (PC 2017a, p. 241). Problems were identified with:

³ For example, the Age Care Complaints Commissioner deals with complaints about the quality of care in residential aged care services that receive funding from the Australian Government. The Advertising Standards Board can hear claims of false or misleading advertising. The Australian Press Council responds to complaints about print media (including websites). Consumers with problems with any health or allied health practitioner can complain to the Independent Health Services Commission in each jurisdiction.

- the limited powers of the state and territory ACL regulators, most of whom cannot compel businesses to participate in dispute resolution, nor make determinations
- gaps in the alternative dispute resolution (ADR) arrangements, such as those offered by industry ombudsmen
- the ACL reliance on civil litigation as the main avenue for consumers to seek redress. While statutory and industry ombudsman can provide redress, the ACCC does not. Indeed, consumers may be unaware that any action has been taken.

Box 5 Improving consumer protection requires regulators with teeth: the example of financial advice

The need for improvements in consumer protection in the finance, insurance and superannuation industry is well illustrated by the cases of exploitation of vulnerable consumers, such as by STORM Financial. The then Government responded to concerns about the way in which financial planners were renumerated in the Future of Financial Advice (FOFA) reforms that were made mandatory from July 2013. These were subsequently amended and a revised weaker Bill (the Corporations Amendment (Financial Advice Measures) Bill) passed in March 2016.

These revisions limited the ban on 'receiving benefits that could influence the advice' to 'personal advice' and removed 'promoting basic banking and insurance products' from conflicted remuneration. As most clients seek general advice, these changes have been labelled as 'unhelpful and unfair', given that about 70 per cent of financial advisers are owned by or related to the four big banks and AMP (Smith and Poologasundram 2014).

Recommendations to strengthen product issuer and distributor accountability, and lift standards of competency and transparency for financial advice were made in the Financial System Inquiry (Murray 2014, chap. 4). In response, the Government commissioned the Ramsey Review, and announced in the 2017 budget they will establish the Financial Complaint Authority (AFCA) (Australian Government 2017b). The AFCA will replace the current three financial ombudsmen, and provide more resources to address customer disputes with banks and other financial intermediaries. It remains to be seen whether this new regulator will be an active deterrent to poor behaviour by the banks and other firms offering financial advice.

The cost of civil litigation, and the lengthy processes, puts redress out of scope for many people. Unsurprisingly, consumer complaints have been found to be the highest area of unmet legal need (PC 2014). The Commission recommended an independent review of consumer ADR mechanisms to be tasked with addressing these problems (recommendation 6.2).

The Commission's inquiry into Access to Justice made recommendations to improve third party litigation funding and make it less risky for law firms to take on litigation for retail clients (PC 2014, chap. 18) (box 6). The Commission also made recommendations to streamline and strengthen the ombudsman and complaints system (PC 2014, chap. 9). The Government has yet to respond to these particular recommendations.

Box 6 The Commission's Access to Justice recommendations

In its 2014 Access to Justice Arrangements report the Commission noted the potentially large gains from early and informal solutions, including through ombudsmen and alternative dispute resolution. It recommended that:

- government and industry raise awareness of ombudsmen, including among providers of referral and legal assistance services
- governments look to rationalise the ombudsmen services they fund to improve the efficiency of these services
- courts incorporate the use of appropriate alternative dispute resolution in their processes, where they are not already doing so, and provide clear guidance to parties about alternative dispute resolution options.

The Commission also noted that aspects of the formal system are contributing to problems in accessing justice, including 'creeping legalism' in tribunals, uneven reforms in the court system, the adversarial nature of the system and that not all parties are on an equal footing. It recommended that:

- tribunals enforce processes that enable disputes to be resolved in ways that are fair, economical, informal and quick. Restrictions on legal representation should be more rigorously applied
- all courts examine whether their processes for case management, case allocation, discovery and the use of expert witnesses are consistent with leading practice
- statutory obligations be placed on parties and enforced to facilitate just, quick and cheap resolution of disputes. Targeted pre-action protocols may also assist
- a more systematic approach is required for determining court and tribunal fees, in which fees are set to recover a greater proportion of costs, depending on the characteristics of the parties and the dispute. Fee waivers should continue to be provided for disadvantaged litigants.

Other recommendations focused on improving legal assistance services for disadvantaged people, data collection and reporting, assisting the 'missing middle', and improving information for consumers.

Source: (PC 2014).

CONCLUSION 13.4

Regulators demonstrable capacity to act to enforce consumer protection laws is key to consumers having confidence in the market. But the ability to address systemic risks is not sufficient — consumers need access to redress. In addition to responding to the recommendations of the Ramsey Review that seek to address concerns in financial services, the Commission's Access to Justice report made a number of recommendations aimed at improving the capacity of people to seek redress for harms. These reforms have the potential to improve consumer confidence in the market system.

Regulators need to become more consumer centric

While consumers (and workers) can turn to the current system to seek redress, it is the activity of regulators responsible for enforcing consumer protection regulation that determines how much it disciplines firm behaviour. STORM and other financial imbroglios have led to doubts about the capacity of regulators to enforce the law. The Murray Inquiry recommended that all regulators of financial institutions undergo periodic capability reviews to assess if the regulator has the 'skills and culture to be effective in an environment of rapid change'. The ASIC Capability Review (Australian Government 2016) found large gaps between the external expectations of ASIC and ASIC's own view. The Government has responded by strengthening powers and resources of ASIC (Morrison 2016a). The regulator's response to the 34 recommendations has been positive, but to achieve a more risk-based mindset will take culture change — which has to come from the top.

The culture of the regulators responsible for enforcing consumer protection regulation is important. They need to be consumer centric in identifying and acting on systemic risks (such as those that arose with the structure of compensation for financial advisers), but not so reactive that they prevent products being on the market that would be valued by consumers who are aware of the risks. To do this regulators need clear guidance on the acceptable levels of risk in the system so that they can offer firms permission to innovate. This guidance should be set out in the Minister's Statement of Expectations, and the Regulator's Statement of Intent should set out how much risk is considered acceptable, and the scope for those who are disaffected to seek redress (PC 2011). While the level of performance reporting by regulators has increased it is governments holding the senior management of the regulators to account against expectations that will drive cultural change. And it is the Minister's job to explain to the Australian public why some risk must be borne, not to blame the regulator when idiosyncratic events within the defined risk profile do occur, as they will on occasion.

CONCLUSION 13.5

Capability reviews of regulators can be an effective tool to prompt reform, but culture change has to start from the top. Ministers need to make the Government's risk appetite clear in the Statement of Expectations, and hold regulators to account in delivering against their responding Statement of Intent.

3 A regulatory system that facilitates innovation

Although there is some debate about the potential of digital technologies to transform economic activity in the way that railways, electricity and the telephone have done in the

past,⁴ few dispute the acceleration in the pace of change. For example it has been estimated that it has taken an average of 16.1 years to reach IP saturation (defined as 3 or more IP addresses per person), compared with 100 years for steam power and 60 years for electrification (Ackermann, Angus and Raschky 2017). This pace poses challenges for regulators that have to ensure that the technologies and products do not pose an unacceptable personal, environmental, or social risk (box 7).

Box 7 Some digital developments that are challenging regulators

Some of the challenges for regulators are:

- Being an early mover increases the probability that the firm's IP drives the standard, so to be successful in fast moving markets, firms may need to be able to clear the regulatory hurdles quickly (Brynjolfsson, McAfee and Spence 2014).
- Market power from networks poses new challenges. For example, where a firm can develop
 a network of users, this provides data that can be used to enhance the product, as Google
 has done with its search engine. For firms offering intermediation services, such as Airbnb,
 the network the extent of the connections they can provide is a large part of the
 service. This gives some firms considerable market power that may need to be regulated.
- There is greater scope for firms to outsource the lower value-added parts of the production
 value chain, enabling concentration on the design and development and the marketing and
 distribution ends. This can make it difficult for firms to identify the regulators with which they
 must engage.
- When a firm takes on more of an organising role, either coordinating outsourced activities along the whole value chain, or acting as a platform to mediate exchange (as with Uber), it can be unclear what party is responsible for upholding the regulations. For example, if Uber drivers are considered independent contractors then they face regulatory requirements, while if they are employees then the firm is responsible.
- There can be uncertainty about what party faces the legal liability for a product that causes harm, where the design of a product, its manufacture, and its marketing are all outsourced. Ponoko, a New Zealand firm, which produces on-demand manufactured goods, has 12 digital 'maker centres' operating in the United States, the European Union and New Zealand (PC 2016a). For a regulator, this raises questions about where liability for a faulty product would lie — at the software point or the point of 3D printing.

A regulatory system that is responsive would be quick to resolve these questions, but if regulators are risk-averse, they may err on the side of subjecting all parties to the same regulation. A regulatory system that is responsive and permissive would respond to actual risks. To illustrate the point, we focus on developments that pose regulatory challenges — those that affect the adoption of the IoT and the development of FinTech.

⁴ See for example Schwab (2016) who labels digital technologies the 'fourth industrial revolution' while Gordon (2015) argues that digital technologies lack the transformative power of previous revolutions.

Removing barriers to innovation

Market opportunities for new technologies and products can have only brief windows of time in which a firm needs to move rapidly to establish their product. So being able to ensure that new products meet regulatory requirements quickly can be critical in bringing them to market. This requires a highly responsive regulatory regime that also gives consumers confidence that the risks are managed. With digital technology accelerating the pace of change, regulators can struggle to be responsive, creating an environment of uncertainty that can hamper innovation.

Regulatory issues that can pose a barrier to innovation include:

- regulation that dictates the type of technology that must be used, or process followed
- regulation that bans some types of technology (or uses of technology) that may have been problematic in the past, even where those risks have fallen and can now be managed
- high costs of, and delays in, seeking and gaining approvals for new technologies, processes or outputs
- the public nature of intellectual property (IP) applications combined with delays and costs that erode the first mover advantage
- the risk that new technologies will not be approved (or that approval will be delayed) or that technologies will subsequently face high barriers to entry, reducing the incentive to innovate.

Many of these issues arise out of a lack of clarity about what regulator is responsible for new technologies — they can fall between the cracks or, more problematically, be in a contested space between regulators. Approaches may differ between jurisdictions, adding another layer of complexity. Coordination between regulators to resolve these issues quickly is needed (see below).

One question is whether a positive list approach to regulation — where activities require permission to occur, or outcomes have to be approved — acts as a barrier to new technology. This is the 'No, but' approach to regulation, where 'but' defines what a firm must do to be compliant — sometimes at a highly directed level. In a rapidly changing business environment, it can be very hard for regulators to keep the list up to date with activities that are compliant with the objectives of the regulation.

A negative list approach, where permission can be assumed unless something is prohibited, could reduce regulatory uncertainty for innovative activities. This is a 'Yes, if' approach, where the 'if' is about achieving the objectives of the legislation rather than how these objectives must be satisfied. Such an approach was proposed by the IPA (sub. 15), which cited its submission to the Commission's inquiry into Business Set-up, Transfer and Closures (the 'Business Inquiry'):

Permissionless innovation is critical because it allows market trial-and-error, learning and experimentation. Regulators must understand that no one knows the future of technology, or what it must be used for. What is historically evident is that this can be determined by the free market. (p. 19)

The ATA (sub. 19) also support implicit permission recommending a:

... policy approach that considers the current contribution of disruptive technologies to productivity by allowing for "bottom-up, organic, self-regulating institutions" before "introducing top-down government control."(p. 7)

The Harper Review suggested that innovation in service delivery should be encouraged through positive, flexible regulatory frameworks, that 'market regulation should be as 'light touch' as possible, recognising that the costs of regulatory burdens and constraints must be offset against the expected benefits to consumers' (Harper et al. 2015, p. 24). Where emerging technologies and delivery models disrupt infrastructure markets, governments should respond quickly to ensure regulatory settings maximise productivity growth and reflect the long-term interests of customers. The Commission's Business Inquiry recommended that 'regulatory holidays' be allowed for innovative new products, noting that this would require a legislative framework allowing fixed-term exemptions with safeguards. They also pointed to the need to review industry specific regulatory approaches (PC 2015a).

Some (such as Thierer 2014) have argued that digital technologies will encourage industries to self-regulate. The ATA (sub. 19, p. 7) points to the greater potential for self-regulation through agencies such as the Australian Digital Currency Commerce Association. Self-regulation by industry can be encouraged by the threat of government action if industry fail to address risks. This threat of action should extend to situations where some industry players seek to exclude competitors in the way they establish self-regulation. Regulators need to continue to be vigilant in overseeing the consequences of self-regulation and need to have the power to act if self-regulation is anticompetitive, or otherwise failing to meet its objectives.

Some technologies are just difficult to regulate. For example, as they are created in the cloud, the supply of bitcoin and other digital currencies are hard to regulate directly. And while it could be possible to apply anti-money laundering measures (such as customer due diligence) at the point at which they are used for payment, it could be difficult to require reporting of suspicious activity, as identification can be avoided (Shillito and Stokes 2015).

In these cases, regulators need to work with industry on how to best identify risks. For example, the Australian Transaction Reports and Analysis Centre (AUSTRAC), which is Australia's anti-money laundering and counter-terrorism financing regulator and specialist financial intelligence unit, undertakes data matching exercises to inform payments providers of their risk exposure. AUSTRAC have identified the need for a high-level guiding legislative framework and an agreed set of rules that determine the operation of the algorithms encoded in the software, to ensure that new technologies, such as blockchain, are adequately regulated in their application to financial data (Australian Treasury 2017).

Given the risks of new technologies can be considerable (for example in the area of chemicals), it would be unwise to simply switch to a negative list across all regulators. In testing whether permission could be the default (the 'Yes, if' approach), regulators (and government) need to consider whether:

- consumers would struggle to assess the quality of the product (information asymmetry)
- consumer protection regulation and the institutions that administer it are adequate to manage the risks to consumers (similarly, whether occupational health and safety and workplace relations laws adequately manage risks to workers, and environmental laws manage the risks to the environment)
- the harm to consumers (or workers or the environment) that could be caused would be material
- it would restrict competition by locking in a proprietary technology, or providing control over data that would be essential for others to enter the market.

For firm activities that do not pose these risks, consumer protection regulation may well prove adequate, and permission could be assumed. However, in other areas, specialist knowledge may be required (such as in electrical safety) to be able to assess the risks. As regulators tend toward risk aversion and are less likely to give permission where they have any doubts, it is likely they need to be 'nudged' toward a less restrictive approach. Policy departments could provide guidance to their regulators on the thresholds they should apply.

The Commission's Business Inquiry also looked at how regulators could respond to the challenge of innovative products. They concluded that some regulators, such as ACCC and ASIC, have the power to provide a conditions-based regulatory exemption, providing it meets a public benefit test. They suggested that this model would reduce the need for constantly reviewing and updating regulation in order to accommodate some new product — which has been described as a patchwork approach. The Commission went on to recommend:

All jurisdictions should provide a legislative framework for fixed-term exemptions to specific regulatory requirements that deter entry by business models that do not fit within the existing regulatory framework. Such regulatory exemptions should be disallowable instruments and subject to public review prior to expiry.

Legislative safeguards should be put in place to ensure the regulatory exemption does not lead to a material increase in the risk of adverse outcomes to consumers, public health and safety, or the environment.

More generally, governments should:

• continually review industry-specific regulatory approaches to assess whether they remain relevant and provide a net benefit to the community and are the most effective and efficient means by which objectives can be achieved

• ensure that regulation and regulators are flexible and adaptive in the face of evolving technologies and business models and properly funded for this task. (Rec 8.1)

This requires governments to put their trust in their regulators. As such, ensuring that regulators face the right sets of incentives and are adequately resourced will be critical. Rankin (sub. 26) questioned how much Australian regulators have done to 'create the institutional structures and regulations that will enhance long-term productivity and innovation'. (p. 4). Another question is how much control (and resources) regulators have to be able to play this facilitative role. The slow regulatory response to the development of FinTech in Australia provides an illustrative case study.

CONCLUSION 13.6

Regulators, by construction, are risk averse. If governments want regulators to take a more permissive approach they will need to provide clear guidance on what kinds of activities in the areas they regulate could proceed without requiring prior permission. The regulators could then make this information available in an easy to use format so that firms are able to check if they need to seek permission for an activity.

FinTech — a case study of how regulation must be adaptive

FinTech — the application of digital services in finance — has been heralded as offering lower cost financial services, and to a broader range of clients than are served by the current financial system. FinTech is not limited to start-ups — the major players are also investing in digital products — but it does offer an opportunity to level the playing field in an area where the big players have long had a competitive advantage.

World-wide, FinTech is estimated to have attracted USD20 billion in investment in 2015, a 700 per cent growth over the previous 3 years. In Australia, FinTech was responsible for an estimated \$247 million of capital raising in 2016, and has been estimated to grow to \$4.2 billion by 2020 (Australian FinTech 2016).

The Australian Government has also argued that Australian firms are well placed to provide FinTech services into Asia, and that China Australia Free Trade Agreement includes elements aimed at improving access for Australian financial services, including 'provisions on transparency, regulatory decision-making and streamlining of financial services licence applications' (Australian Government 2017a). The Australian Government formed the Fintech Advisory Group in Feb 2016, but many in the industry have been arguing that, while the intent might be there, progress is far too slow.

FinTech proponents argue that they are limited by lack of access to bank data and face barriers doing business because a banking licence is required to conduct certain types of transactions. A survey in 2016 found that 40 per cent of FinTech companies surveyed had at least one financial services license, which took an average of 6 months to acquire and cost \$61 000 in legal fees (EY 2016).

Another example of where progress has been slow is on legislation to support crowdfunding, as the first legislation precluded all but publicly listed companies. The proposed amendments to allow private equity access to this source of capital is considered by many to impose reporting requirements and revenue limits that are too restrictive. At time of writing, the amendments had not been passed (Sadler 2017a).

The finance sector is heavily regulated because the individual risks of a bank or non-bank financial company can become risks to the system. This arises as the financial system is highly leveraged, so a loss of trust in one financial provider that spreads to other providers can put the system at risk as lenders seek to recall their funds to convert them into less risky assets, such as cash or foreign financial products.

The Australian Prudential Regulatory Authority (APRA) and the Reserve Bank of Australia (RBA) are the main regulators in the financial system, although ASIC also plays a role in regard to governance, competition and consumer protection. A major task of the regulators is to maintain system stability. Yet, to build a healthy FinTech sector, regulators need to allow new types of services and products, some of which will fail. Hence, regulators have to balance risks to system stability with the productivity gains that come from greater competition in financial services. The formation of the Digital Finance Advisory Committee in 2015 by ASIC, members of which are drawn from across the FinTech community, is one means of providing input into getting this balance right.

The first task of the regulator is to ensure that FinTech customers are fairly protected — facing enough risk to make the customer suitably sceptical of product claims, but not enough to prevent them making transactions that are in their interests. One approach is to provide a pathway to transfer customers to other providers when a provider fails. This is important for products such as peer-to-peer lending, where the platform could fail while both the debtors and the creditors are willing to continue the relationship. The US regulatory authority, the Office of the Comptroller of the Currency (OCC), has gone part of the way by informing firms that they 'may also require a company to have a clear exit strategy' (Klein and Knight 2017).

The second task of the regulator is to provide the most level playing field possible. The Australian Government moved in this direction with announcements in the 2017-18 Budget. Actions include relaxing the 15 per cent ownership cap for innovative new entrants, and lifting the prohibition on use of the word 'bank' by authorised deposit taking institutions (ADIs) with less than \$50 million in capital (APRA are reviewing prudential licensing arrangements). Two areas where progress had stalled were also addressed — namely the removal of the double taxation on digital currency (which was treated like a separate product for GST) and extending the crowded sourced funding legislation to include proprietary companies (the recent legislation only covered public companies).

Ownership or control of data can pose a considerable barrier in an industry where people's historical transactions are an important part of assessing their credit risk. Given the need to provide a new account number for all connected digital transactions, lack of portability of account numbers raises the costs for consumers to shift providers. Australian banks have

been cautious on the sharing of data, for security as well as commercial reasons. The NAB is the first to launch a developer portal for APIs in late 2016. Westpac and ANZ have called on the Australian government to create data sharing standards via a licencing regime (Eyers 2016).

These developments fall well short of the openness required of the banking system in some other countries. The UK Competition and Markets Authority open banking reforms require banks to allow customers to be able to write to, as well as to read their data by 2018. As a result, individuals, small firms and not-for-profit organisations have been able to switch accounts for free since 2013, using a 'current account switch' facility operated by Bacs, a company responsible for Direct Debit and Bacs Direct Credit in the UK (Payments UK 2017). The formation of this company was the industry response to the government demand that they make it happen within two years of the Independent Commission on Banking report (HM Treasury 2013).

The likelihood of progress in this area has improved. The 2017-18 Budget announced a move to open banking by 2018. This follows recommendations from the Commission's inquiry into Data Availability and Use (the 'Data Inquiry') that consumers be able to obtain their data on request, which, as part of a comprehensive right, they could transfer to designated third parties (PC 2017b, rec. 4.1). Applied to bank data, this results in the ability to share account data with other providers. To enhance the value of this capability, the Commission suggested that banks build APIs to facilitate data sharing with customers. In relation to credit providers, the Commission recommended that the government legislate mandatory participation in comprehensive credit reporting in 2018, if voluntary participation failed to achieve 40 per cent coverage (rec 5.5). The Budget announcement was that banks will be required to provide customer transaction histories on request, and Treasury has been funded (\$1.2 million) to undertake an independent review to design the system.

The third task of the regulator is to develop sound legal foundations for FinTech activity. For example, only Government can introduce a biometric identity standard, which is valuable in reducing identify theft, and can substantially reduce the costs to consumers of switching service providers (currently 100 points of ID are required). Building on the standard business reporting, unified open aggregated financial data standards are also something that government is well placed to introduce. While the industry may eventually be able to develop such standards, the industry regulators can be more proactive.

The Australian Government is also moving in this area with the announcement in the 2017-18 Budget of funding to the DTA, which would allow it to develop further the GovPass digital identity system. This will be launched as a beta in 2018, and will be opt-in, but could provide a considerable boost for FinTech products where accurate identity is critical to managing cyber security (see below).

The RBA's new payments platform is designed to make it easier for customers to switch providers, but there are concerns that it lacks the flexibility and consistency of the UK approach (Nicholls 2017). This platform, which is to be launched in October, will allow

payment to be sent in real time 24/7 using a mobile number (currently payments require a BSB and account number). It also will support sending more than 18 characters of data (so you can finally type enough to identify what payment you are making). This expanded ability to send data, including links to other documents, such as invoices, will facilitate straight-through processing for businesses.

One area where further simplification is possible, raised in the discussions at the Productivity Conference, is to move away from the regulation of interchange fees and credit transaction surcharges (first introduced in 2004), to a system that allows direct charging for customer card fees. Under this system, merchants would not face a fee. Rather, the card provider would set the fee to the consumer. As this would be disclosed to the consumer at the point of sale, they could choose which card they wish to use. Competition should see consumers look for low transaction fee cards, which would drive down the fees over time.

The regulators may need permission to be proactive in this space. ASIC introduced a regulatory sandbox that allows firms to test new financial products with a limited number of sophisticated (wholesale) consumers, in December 2016. The Australian Government has since announced an extension of the sandbox to allow retail (not just wholesale) products to be tested (Morrison 2016b). As at the end of May 2017, only one product has used the ASIC sandbox, suggesting either that it is poorly designed, or that the appetite for trialling products is less than the proponents of FinTech have claimed (Sadler 2017c).

The 2017-18 Budget also included considerable additional resources for the regulators — the APRA, ASIC, and the ACCC (box 8).

Box 8 2017-18 Budget additional resources for financial regulators

The budget directed additional resources to a number of regulatory areas that are relevant to FinTech:

- \$4.2 million to APRA over 4 years to make Authorised deposit taking institutions more accountable (focusing on senior managers accountability) – with an offsetting increase in the APRA levy to pay for this.
- \$2.6 million and additional powers to APRA to monitor provision of credit by lenders that are not ADIs, partly offset by Financial Institutions Supervisory levies
- \$28.6 million to APRA for new regulatory activities offset by an increase in the FIS levies
- \$13.2 million for ACCC to establish a unit to undertake regular inquiries into specific financial system competition issues (a House of Representatives Standing Committee recommendation) – offset by an increase in APRA levy
- \$4.3 million to ASIC to monitor the AFCA offset by increase in levies of \$3.6 million under ASIC industry funding model
- \$16 million to ASIC to improve financial literacy offset by \$12 million from statutory levies
- \$4.5 million to ASIC to implement and monitor extension of crowdsourcing partially offset (\$3.4 million) by increase in charges from related entities
- \$7.9 million for ACCC to monitor and report on prices, costs and profits in insurance products for northern Australia.

Source: Australian Government (2017c).

The Murray Inquiry identified the lack of any forum to provide a system wide view on the regulatory approaches that would best meet the needs for system stability and consumer protection, and support market development through innovation. The report point to the statutory mandate on some Asian monetary authorities to 'promote and market financial sector development, including streamlined entry points for new entrants' (Murray 2014, p. 149).

There may be tentative steps in this direction. At a RegTech Roundtable, ASIC Commissioner John Price was reported as saying that RegTech offered an 'Opportunity to move from a rear view mirror to a learning and predictive approach — to change the role (of regulators) from policeman to coach' (Head 2017).

AFMA (sub. 32) asks what happened to the recommendations in the Johnson Report (Australian Financial Centre Forum 2009). The then government established a Financial Centre Taskforce to monitor the implementation of the recommendations in the report and to report every six months on progress towards developing Australia and a leading financial centre.

One of the recommendations was that an Asia Regional Funds Passport be established. This would involve a 'commonly agreed set of licensing arrangements, investment restrictions and, where possible, offer conditions that would allow complying funds registered in one passport country to be offered in each of the other passport countries' (Bowen and Sherry 2010). A memorandum of understanding was signed by the Finance Ministers from Australia, Japan, Korea, New Zealand, the Philippines and Thailand in September 2015, and the Joint Committee met for a second time in April 2017, with the aim of effective implementation by the end of 2017. The time lags involved point to the challenges in implementation, rather than agreement on the broad policy direction. Governments should ensure that regulators have the scope and incentives to respond more quickly.

The process of Treasury consideration and policy formation, followed by budget allocations and permission, can be too slow for the FinTech industry to thrive. However, this process is needed if the risks posed are high and there is uncertainty about the right policy direction. The 2017-18 Budget is a big step in the right direction, but there could be merit in the idea proposed by Rankin (sub. 26):

My recommendation is that Government considers instructing APRA, ASIC and the RBA and all government departments and statutory bodies, to adopt and fund Innovation Offices modelled on the OCC policy - to help establish institutions and regulatory structures, which encourage and facilitate productive innovation by industry. (p. 6)

CONCLUSION 13.7

If Australia is to be a leader in FinTech, the Australian Government and the financial system regulators will need to be more responsive. Areas where progress could be accelerated include:

- establishing digital identity protocols
- allowing portability of customer data
- sharing of credit history data
- developing strategies for transferring liabilities and assets where business models fail but the underlying relationships are sound, which includes requiring firms to have clear exit strategies
- liberating payments regulation
- providing regulators with greater guidance and scope to react more quickly to changing technologies.

Greater coordination by regulators is needed

There is an urgent need for better coordination across regulators in some areas. For example, the ASIC Capability Review (Australian Government 2016) noted that the level of coordination between regulators was an external constraint on ASIC performance.

Government needs to ensure that regulators and regulations:

- are not contradictory or overlapping and that areas of responsibility are clearly communicated (see below)
- share data and information, including with the businesses they regulate (see below)

• are coordinated by an overarching strategy that has at its heart creating a regulatory environment that is permissive, low cost and easy to navigate.

These strategies will often need to cut across jurisdictions, as digital technologies are rarely applicable to only one jurisdiction.

A national coordination role can be vital where states have the responsibility for regulation. For example, in Australia, national strategies have been developed in health (immunisation, tobacco use reduction, asthma), transport (road safety, port infrastructure, maritime safety), security (identity security), and international education.

Yet, there are other areas where there is a call for better coordination. The Australian College of Road Safety (sub. 34), in making their case for the funding of the Australian National Road Safety Strategy, argue that an overarching coordinating mechanism is needed, despite a range of government collaborative mechanisms (they list, for example, Austroads, National Transport Council, Heavy Vehicle Regulator, National Road Safety Partnership, BITRE (p. 8)). ACCI (sub. 37) make the case for a National Freight and Supply Chain strategy, to 'increase supply chain efficiency, connect our cities and regional centres and support fast-growing regional hubs to be as productive as possible' (p. 9). This was recommended in Infrastructure Australia's 15 year plan, as integrated planning and investment is needed to accommodate the expected 86 per cent growth in land freight, and 165 per cent growth in containerised trade between 2011 and 2031 (IA 2016). Such national approaches need to be developed in conjunction with industry and to be as least restrictive as possible.

Governments can also provide core services where comprehensive data are needed. The private sector is unable to operate where some element of compulsion is required to get the coverage needed. For example, Raymont (brief sub. 2) suggested that the government establish a single place to update addresses and phone numbers, which can then write to all the organisations you select to update their records. This could also be used for changing names, which as Body (brief sub. 2) reported, involves considerable effort. A number of other comments made in regard to this review also asked why MyGov does not facilitate updating addresses for people across all their government interactions. (This does seem to be addressed by the initiative funded in the 2017 Budget).

Digital technologies can make cooperation and coordination easier. For example, Cullen (brief sub. 7) asks why we do not have a national driver's licence. Scott (brief sub. 10) would extend this to vehicle registration, and Corr (brief sub. 13) to boats and firearm licences. Ligett (brief sub. 18) reports on the unnecessary cost of having to register with the Teachers Registration Board when moving state. Teachers are part of the COAG mutual recognition agreement, which recognises that the standards in one jurisdiction are sufficient for licensing in another. So in this case, it is not the standards that are the problem, but the ability to send data — which is why digital technologies should make the mechanics of mutual recognition much easier. Several respondents also asked why road rules could not also be amalgamated, with the more liberal rules being adopted (such as the

ability to turn left on red unless otherwise signposted, and a zip requirement for merging traffic, using blinking orange lights at night when traffic is very light).

Digital technologies are creating new areas where national coordination is needed. For example, it has been reported that, in the United States, 23 states have introduced 53 pieces of legislation to regulate self-driving cars 'all of which include different approaches and concepts'. Further, for the legislation that has been passed, 'none of those laws featured common definition, licensing structure or sets of expectations for what manufacturers should be doing' (Urmston, cited in West 2016).⁵ Common definitions and standards are needed to ensure system interoperability, while coordination on infrastructure can substantially lower costs.

Although the market will sort things out eventually (for example, VHS rather than BETA became the video standard), the transition can take considerable time and many firms can be left with products that are no longer viable, even if they are a better technology (as some argue BETA was). This matters, not because firms fail, but because more rapid adoption has considerable economic value. For example, it has been estimated that a 10 per cent increase in Internet Protocol addresses per capita corresponds to an 0.8 per cent increase in GDP per capita (Ackermann, Angus and Raschky 2017).

The Internet of Things — a case study on the need for coordination

The IoT is a challenging area for government, as many aspects of the market potential are unlikely to develop efficiently without cooperation between firms, as well as between firms and government. The core of the IoT is connected sensors that are used to collect data, which are then shared with the network of other devices. It is more than the fridge ordering milk when supplies are low, as the value comes in the ability to use big data to optimise specified outcomes. This could be smoothing power usage across electricity grids, minimising delays along transport routes, or alerting airlines to when their planes need attention on landing (which they do using an information tool called Airplane Health Management; Maggiore 2007).

The IoT market in Australia has been estimated by the International Data Corporation (IDC) to be worth \$18 billion by 2020, connecting 2.7 million commercial vehicles, 1.8 million health care appliances, and interestingly 1.7 million pets (Lim 2017). In a survey, 81 per cent of organisations rank common data and connectivity standards as extremely or very important, as were open software standards for 63 per cent of respondents. It appears that Australia is lagging similar countries (such as New Zealand) in setting out the rules to support the development of the IoT.

⁵ The US National Highway Traffic Safety Administration has drafted guidelines for uniform regulations, which will help to overcome this problem. But some of the requirements, such as requiring a driver in the front seat, may hinder the introduction of the technology (West 2016).

The complexity of the regulatory environment facing firms that want to invest in the IoT is considerable, as is the complexity for regulators.

- There are uncertainties about what regulators are responsible for activities that increasingly cross traditional industry boundaries. Digital technologies are undermining the traditional definitions of industries, not least the distinction between manufacturing and services (PC 2016a). For example, trucking companies buy tyre miles for their trucks rather than tyres, and logistics firms offer customers real time tracking of their packages along with delivery. The IoT data are used to offer a service, raising questions about whether to regulate the service (tyre monitoring) or the thing (tyres) or both, or neither. These new ways of doing business cut across industry and regulator lines of responsibility.
- As many of the services where the IoT can improve outcomes lie in highly regulated industries such as electricity, water utilities, and smart cities, they are entering markets that already have a complex regulatory environment. In some cases, there are major infrastructure investments and legacy systems that IoT solutions will undermine. Providers can struggle to maintain a full range of services if the more profitable elements are captured by new providers. Equity can be an issue, as better off consumers can link into solutions that minimise their costs, while other consumers cannot afford access.
- Opportunities also lie in areas where government is a major service provider (such as education and health) where sharing data, in particular at a unit record level, can provide for joined up services and better service selection. However, access to such data faces legislative and cultural barriers. Some solutions to this problem are set out in chapter 2, and recommendations made in the Data inquiry (PC 2017b). Moreover, as these services are funded, at least in part, by government, the funding arrangements will affect the incentives for individual firms to offer connected products.
- While there is considerable scope to use the IoT data to better design effective services and products, the data need to be shared to maximise their value, so underinvestment by individual providers is likely. For example, a smart grid is needed to integrate renewable sources of generation, and to manage demand (for example by switching air conditioners to fan only in periods of peak electricity demand). No single generator, or retailer, will make the investment needed, as the benefits accrue across all in the system (SP 11). Scale is also an issue. Networked data provide the greatest value where they include all sources of information rather than a subset of customers or users.
- Related to the need to ensure data are shared is the potential for the IoT to increase the share of the market that is served by vertical relationships (industry verticals). These occur where consumer demand for two products is closely related. Strong compliments, such as the iPhone and the mobile phone service, if dominated by one firm can potentially reduce rather than increase competition. The need for regulators to scrutinise whether such relationships are restricting competition has been recognised in the United States, and should be on the radar of the ACCC and ASIC in Australia (Sallet 2017).

Australia is not alone in facing these regulatory challenges, and can learn from developments in other countries. For example, in 2016, the Developing Innovation and Growing the Internet of Things (DIGIT) Act was introduced in the US House and Senate, which funds a broad working group to 'report on policies and practices that hinder IoT development, propose policies to improve federal agency coordination on IoT issues, and identify opportunities for federal agencies to make better use of the Internet of Things' (New and Castro 2016, p. 10). Also in the United States, the Smart Cities and Connected Communities framework, released in 2014, provides a guide to coordinate federal agency investment and collaboration for smart city technology (The Network and Information Technology Research and Development Program 2014).

Some areas that have been identified to support the IoT (New and Castro 2015) are:

- radio frequency allocations so that mobile devices (whether as part of vehicles, phones, or other devices) can communicate. For example, tollway payment is much easier if one device can communicate with all toll sensors, an outcome in which Australia has been a leader, with toll payments systems linked in New South Wales and Queensland (ITS Aus 2012).
- spectrum allocation, especially where Wi-Fi is not adequate to support the volume and/or speed of data transmission required. For example, farmers can establish their own local WiFi to support precision farming, but may compete for the spectrum to do so. Even where there is no competition for spectrum, interconnectedness between the personal area, local area, metropolitan area, and country wide networks can be required to support the IoT activity (Stratix 2015)
- open access code and standards that support large scale deployment of sensor networks across different infrastructure types and locations (Linux was developed as open source and is used to run android phones)
- cybersecurity standards and resources.

Failure to resolve these types of issues quickly slows the development of the IoT. A report for the Netherlands government identified a need for international harmonisation in standards, such as spectrum frequencies, to facilitate interoperability of the technologies (Stratix 2015). This is needed for achieving economies of scale, and would promote trade in technologies. It reports that the United Kingdom has made the 870-876 MHz the 915-921 MHz spectrum available for license-free use, with the latter potentially dedicated to IoT. Other issues to consider are potential spectrum bottlenecks, due to too many applications requiring data transfer at any point in time. For example, in cities there could easily be 2600 connected devices per square kilometre, all competing for the same spectrum (Stratix 2015).

In Australia, 25 organisations (including government agencies) formed the Internet of Things Alliance Australia in July 2016 (Coyne 2016). It aims to focus on spectrum availability and management, network resilience, industry verticals, data sharing and privacy, and fostering IoT start-ups. As it stands, this looks more like a list of the members' current areas of concern than a concerted effort to identify and address where

coordination is needed. It will be important that this does not become a forum to lock in proprietary technologies and that a true cooperative approach seeking open source solutions is developed.

Coordination across the levels of government on regulatory approaches can assist firms to take full advantage of the fast moving world of digital technology. The Australian government could support the development of the IoT by developing a national strategy, in consultation with the state and territory governments.

CONCLUSION 13.8

Coordination across the levels of government on regulatory approaches can assist firms to take full advantage of the fast moving world of digital technology. The Australian government could support the adoption of the internet of things (IoT) by developing a national strategy for the IoT in consultation with the state and territory governments.

Forging common standards can reduce costs

Common standards across jurisdictions can reduce costs for users and assist firms to sell into other markets. The failure to standardise electrical plugs, voltage, emergency beacons, and (most famously in Australia) the rail gauge across states, illustrate the barriers that different standards can erect. Occupational licencing, which expanded rapidly in the United States over the past decade, has been credited as playing a role in reducing competition (Kleiner 2015).

In Australia, despite many attempts by COAG, and reviews by the Commission of mutual recognition arrangements between Australian jurisdictions and New Zealand, there remain areas where agreement to recognise the standards of other jurisdictions cannot be reached (PC 2015b). There is still a balance to be sought, as the costs of seeking mutual recognition (or the more challenging agreement on harmonisation of standards) can outweigh the benefits. For example, HIA (sub. 28) raise the cost of red tape in the building industry, but also point out that regulatory harmonisation across jurisdictions might cost more than it delivers in benefits.

Open standards encourage innovation

Open standards should be encouraged for regulators, and Australia should look to other countries that have already solved the problem. For example, HyperCat is an open standard for the IoT developed cooperatively by an industry working group in 2014 with USD12.2 million funding from the UK government's Technology Strategy Board. In 2015 HyperCatCity was developed by the same group to encourage the adoption of the HyperCat standard by firms working on smart city initiatives. Adoption of open standards

used in other countries not only speed transformation at home, it means that Australian firms have a base from which to compete in other countries.

... Nation-specific standards limit the ability of international companies to enter domestic markets and actually reduce domestic firm's ability to compete internationally. (New and Castro 2015, p. 6)

The suggestion that Australian governments and their regulators be open to adopting international standards is not new. The Harper Review commended 'COAG's recent decision to examine whether international standards can be more commonly accepted in Australia and the Australian Government's recent reforms announced in its Industry Innovation and Competitiveness Agenda' (Harper et al. 2015 Part 3 p. 45). The Review urged governments to review product standards that are directly or indirectly mandated by law as a priority (recommendation 10). The Commission's report on Regulation of Agriculture (PC 2016d) argued that there were significant gains in time to market and cost savings by accepting US and European standards and approvals in agricultural and veterinary chemicals.

Where standards are proprietary, having a seat at the table benefits firms

In some areas, having a 'seat at the table' when international standards are set (such as those that allow for interoperability) is important for firms to ensure good market access for their products. Patents that need to be used to comply with a technical standard are designated as Standard Essential Patents (SEPs). SEPs are meant to be licensed on a 'Fair, Reasonable and Non-discriminatory' basis. What this means in practice and how it is determined by the courts varies across jurisdictions, so being able to influence these SEPs can provide a competitive advantage. For example, Apple and Google have both bought companies to get patents that gives them a seat at the 5G standards setting table.

Governments could assist firms to be aware of such international standard setting, and where national interest is at stake, could be more proactive in representing Australia's interests.

Standard approaches to digital identity can save costs

Digital identity is another area where common standards could greatly reduce costs for individuals, business and government. While Australians are historically suspicious of a single personal identifier, such as a social security number, digital identity is about lowering the cost and improving the accuracy of identifying an individual in electronic transactions. Currently, passwords are the main way in which identity is established in a digital transaction. Banks and government agencies require a 100 point check when opening an account, or applying for a passport. AustraliaPost is reported as having estimated the costs of processing identity as up to \$11 billion across the Australian economy (Bajkowski 2017a).

The DTA and AustraliaPost have recently established a partnership to ensure that their systems are interoperable. The DTA is developing GovPass that will allow people to do all the transactions that they have previously done at the government shopfront electronically. Digital identity would also greatly facilitate consumer mobility across different suppliers, and can help address the concerns raised by the banks in regard to data sharing.

CONCLUSION 13.9

Adopting international standards can save both regulators and firms considerable time and money. The decision on whether a standard is suitable could be facilitated by the Australian Government developing a positive list of foreign testing agencies where they will recognise the product approvals by these agencies as meeting Australian standards.

Governments should work together to establish an agreed digital identify standard.

Improving access to data

Data are increasingly seen as resources that can be mined to produce valuable new products. Governments are the collectors and curators of much data, and could stimulate new opportunities by making this data available in forms that still protect the security of the data and the privacy of the data sources. Governments can also make better use of data to improve their delivery of services and functioning of government. This theme is taken up in chapter 2, where data form the core of delivering integrated health services. In addition, as control over data also brings market power, governments can play a role in facilitating access to data by competing firms, where lack of access would otherwise trap customers into poorer quality services than available elsewhere. Greater access to this data also provides raw material for firms to mine to produce new information services that can be applied in diverse areas (from managing electricity consumption to planning the ideal holiday).

The benefits of improving access to data are potentially very large

Public service agencies collect a considerable amount of information, on locations (geospatial), people, and businesses. Although there are costs to providing free data (in ensuring quality and privacy are maintained and any forgone fees), the direct savings to those accessing the information, and to those that do not have to provide the same information again, are considerable. For example, the G-NAF, a geocoded address database of all physical addresses in Australia was developed by a not-for-profit consortium (PSMA Australia) of the Australian and state and territory governments in 1993. It had been available on a fee for service basis to government departments and industry, but large parts of G-NAF have recently been made available on the opendata.gov website. By making this information openly available other firms can develop value-adding tools.

The benefits of greater data sharing across governments and service providers can save service providers' and clients' time and, more importantly, allow for a much better service to be delivered. For example, health services can be coordinated through the electronic health record (chapter 2). There are many other areas of public services where coordination would reduce the need for people to provide repeat information, and allow services to be better targeted and tailored to individual need.

There is also scope for much greater application of public sector data in other areas, which can be used to inform choice (improving consumer discipline) and to develop new services. For example, OzCoast uses geospatial data from Geoscience Australia to provide a wide range of mapping services.⁶

The benefits generated by ABS, from 2008, in making its publications and statistics freely available online (under Creative Commons licensing) provide an indication of the potential return from improving access to data. For an annual cost to the ABS of about \$3.5 million, the costs saved by the direct users of the data were estimated to be \$5 million (the net gain due largely to less time taken to access data, as the savings on fees were a transfer from the ABS to the users). However, it is the substantial increase in the use of the data and the value of its applications that delivered the biggest benefits — conservatively estimated as \$25 million (Houghton 2011). These estimates imply a return of about five times the investment cost (by the ABS and users). Top down approaches to estimating the value of 1.4 per cent (from studies reported in Houghton 2011).

There is also considerable value in freeing up the use of commercial data. Indeed aggregators, such as Quantium, already compile datasets from social media, loyalty cards and other sources to provide information services to firms on their customers, and the nature of different markets. Much of this is used to target advertising, but it also guides firms in developing products that will better suit what consumers want. This all happens without government intervention (although to the extent that people are unaware of how their data are traded and applied, some oversight might be warranted).

Where policy intervention is needed is where data are a source of market power for the firm that collects the data. Firms can be reluctant to give up this source of advantage. Lack of access to their own records can reduce the ability of consumer to switch suppliers, while lack of access to information about the market can reduce the ability of suppliers to offer new products that will compete in existing markets. This is not a zero sum game — the benefits to consumers of getting a preferred product are large. For example, the Australian Communication and Media Authority estimated that the industry behaviour changes

⁶ A new initiative in the 2017-18 Budget is funding for Digital Earth Australia for an open access online platform for satellite imagery. This is the sort of initiative that it is difficult for a firm to value capture, given the ease of sharing.

following the revised Telecommunications Consumer Protection Code (along with number portability codes), delivered benefits of at least \$545 million a year (ACMA 2015). The gains to consumers of greater portability of their own data in areas such as banking, insurance, electricity, water, and other utilities are likely to be of at least this magnitude.

The Commission has provided a roadmap for reform

The Commission's Data Inquiry (PC 2017b) canvassed all these issues, making a number of recommendations that, if followed, will unleash considerable scope for improvements in service delivery. The Inquiry concluded that governments could stimulate innovation and new opportunities by:

- making the substantial data that they collect and curate more readily available in forms that still protect the security of data and the privacy of data sources
- empowering consumers to use and benefit from their own data.

Data that allow performance monitoring and comparison of government activities is a fundamental starting point. Governments themselves can make better use of data to improve delivery of services and enhance their own functioning and efficiency (SP 3).

Access to data more broadly would enable capable and trusted researchers to play a more active role in developing solutions to seemingly intractable problems. This can be achieved through early and routine release by governments of non-sensitive datasets, and the adoption of robust processes for assessing and managing risks associated with other datasets to better allow sharing. This theme is also taken up in chapter 2, as data are at the core of delivering higher quality, integrated health services.

In addition to these benefits from improved access, the Commission's Data Inquiry highlighted its role as a potential barrier to competition, but also an important enabler of consumer control and choice.

The central plank of the Commission's report and recommendations was an overarching data access law (a Data Sharing and Release Act) that would give consumers — individuals and small businesses — a comprehensive right to access their data and direct that they be provided to third parties. This would enhance competition by enabling consumers to have their data (such as that accumulated over years by their bank or telecommunications company) transferred to potential alternative suppliers.

The ability to drive competition in this way will likely significantly increase in value as data collection continues to grow. The benefits of the comprehensive right could extend beyond competition between existing providers by enabling further innovation in products and services. The Commission's report recommended allowing each sector to develop its own rules about what data the comprehensive right will apply to, and how they will release that data.

Estimates of the *incremental* value of greater access to public data are highly speculative and assumption based, but Lateral Economics (2014) estimates gains of 0.27 per cent of Australia's cumulative GDP over 5 years or over \$4 billion annually. Moreover, reforms that allow consumers greater control over sharing their data could be worth over \$1.5 billion a year through greater, and better-informed, choice in banking, insurance and utilities.

CONCLUSION 13.10

The recommendations made in the Commission's inquiry into Data Availability and Use will make a substantial change in how consumers can access and direct their data, which should strengthen competition across a range of services, not least financial services.

Greater availability of the data that governments' collect will provide a new resource to which firms can add value. This should help to drive productivity improvements across a wide range of industries in the future.

The Australian Government is currently considering its response to the report.

Improving the treatment of intellectual property

As a net importer of intellectual property (IP), Australia would benefit from a less restrictive IP rights regime. The impact on incentives to invest in research and development (R&D) that form the foundation of the IP law are also likely overplayed by firms with existing commercial interests. And many smaller firms face major barriers in using the system to protect their IP once obtained, as deep pockets are often necessary. While international agreements severely restrict the scope for the Australian government to overhaul the IP protection system in Australia, there is still scope to improve the current arrangements. The Commission, in a major review of the IP system completed in 2016, found that the Australia's patent system 'grants exclusivity too readily, allowing a proliferation of low quality patents, frustrating follow-on innovators and stymieing competition' (PC 2016b, p. 2).

The recommendations that expected to deliver the greatest benefit related to:

- less prescriptive provisions on the fair use of copyrighted material (replace fair dealing with fair use)
- clarifying the law on geoblocking, which the Commission regards as a restraint on trade rather than protection of IP
- a higher inventive threshold test for patents and restructure of patent fees
- enhancing the role of federal circuit court to improve access to enforcement mechanisms, especially for small and medium sized firms
- expand safe harbour schemes, allowing use of IP that will not be considered to violate the IP rules, such as one off use of a design under copyright
- reforming extensions of term for pharmaceutical patents.

It is hard to estimate the benefits of the Commission's IP Inquiry's recommendations. Some reforms would lower costs in the IP system, but much bigger gains would arise from greater innovation and diffusion. Even were IP reform to increase MFP by just 0.01 percentage point this would raise annual GDP by \$190 million (after taking account of general equilibrium flow on effects). The output gains from IP reform may exceed this.

While copyright encourages investment in creative works by allowing creators and rights holders to exploit their value, the IP review noted it is poorly targeted and broader in scope than needed. It provides the same levels of protection to: commercial and non-commercial works; to those no longer being supplied to market; and to those where ownership can no longer be identified.

A system of exceptions to copyright enables limited use of copyright material without the authorisation of rights holders. However, the IP review found Australia's current exceptions for fair dealing are too narrow, inflexible and prescriptive. They do not reflect the way people consume and use content in today's digital world, nor do they accommodate new legitimate uses of copyright material. For example, the existing law only introduced limited permission to make a personal-use copy of a videotape in 2006, which was 26 years after VCRs were introduced, and 8 years after the arrival of DVDs, which superseded VCRs. As a result of the existing prescriptive exceptions, a representative consumer is estimated to infringe the copyright of non–commercial and commercial works over 80 times a day(PC 2016b).

Problems caused by the current prescriptive system include: frustrating the efforts of online businesses seeking to provide cloud computing solutions; preventing medical and scientific researchers from taking full advantage of text and data mining; and limiting universities from offering flexible Massive Open Online Courses.

Moving from the current legislated mechanisms that only enable use of copyright material in tightly defined situations ('fair dealing' exceptions) to a principles-based system, as operating in the United States and other countries, that considers whether use of copyright material would harm the right holder's interests ('fair use'), would allow Australia's copyright arrangements to adapt to new circumstances, technologies and uses over time. A 'fair use' system would also unlock many opportunities and avoid unnecessary payments. For example, moving to 'fair use' would avoid the current situation where education and government users pay \$18 million dollars per year for materials that would be accessible under fair use provisions (chapter 3).

The consultation draft of the Copyright Amendment (Disability Access and Other Measures) Bill that was released in December 2015 proposed expanding the safe harbour protection from copyright infringement to include search engines, universities and libraries (Department of Communications and the Arts 2015). However, the provisions relating to

safe harbour were subsequently removed from the bill,⁷ with the Government noting it would further consider feedback received on the proposal (Fifield 2017). The removal raised concerns from a number of tech firms, particularly those that offer two-way platforms that allow users to upload their own content, which is then purchased by other users, such as Redbubble and Envato (Sadler 2017b). The inclusion of fair use provisions in Australian copyright law (as recommended by the Commission in its IP Inquiry) could address this problem by allowing use of copyright material in a way that does not affect the revenue stream from the intellectual property rights of the creators.

An issue that was raised by both the Commission's IP Inquiry and the Harper Review is that conditions in registered designs, copyright, eligible circuit layout rights, and licences and assignments of patents are currently exempted from most of the competition law prohibitions by subsection 51(3) of the *Competition and Consumer Act 2010* (CCA). Both the IP Inquiry and the Harper Review recommended repealing the section, noting that commercial transactions involving IP rights should be subject to competition law in the same manner as transactions involving other property and assets (Harper et al. 2015; IP Australia 2016).

CONCLUSION 13.11

While restricted in how much it can tailor the IP system to better suit Australia's needs, the Australian Government could reduce costs and improve incentives for inventiveness by adopting the recommendations made by the Productivity Commission in its 2016 inquiry into Intellectual Property Arrangements.

Cost sharing arrangements can be poorly designed

It can be difficult to get the balance right in cost sharing arrangements that cover regulatory costs and community service obligations (CSO). Passing all costs onto the regulated entities can allow the regulator to indulge in inefficiencies, while failure to pass on the regulatory costs to regulated businesses effectively means the public pays for regulation that ultimately benefits regulated entities.

Ideally, the public pays to enforce regulation that delivers public goods, while the businesses pay for regulation that enhances their industry's functioning and reputation. While a CSO that benefits a particular community with a low capacity to pay is best funded by taxpayers, it is not clear that the costs of a CSO that benefits high-income communities should not be passed onto these communities. These situations arise where the challenge is achieving collective action, rather than seeking to alleviate economic

⁷ The Bill, which was introduced on 22 March 2017, passed both houses of parliament unamended and received Royal Assent on 22 June 2017.

disadvantage. Where a CSO applies to a broader community who benefits from the regulated services, then passing the costs onto consumers via a levy on the regulated entities can be more efficient and fair. If industry, rather than taxpayers bear the cost of the CSO, they have an incentive to ensure that it is delivered as efficiently as possible.

Testing the incentives created by the proposed cost sharing arrangements — to gold plate (or skimp) on compliance activities or the delivery of the CSO — should be an essential element in developing cost-sharing arrangements. This should occur alongside consideration of administration costs and the simple practicality of enforcing payment. The Commission's inquiry into Marine Fisheries recommended that seafood processors across all jurisdictions pay licence and accreditation fees that reflect the efficiently incurred costs of regulating their facilities (PC 2016c). The recent Commission's inquiry into Telecommunication Universal Service Obligations (PC 2017c), recommended that consumer subsidies to meet affordability and accessibility are best funded through general revenue. However, given the wide user base, availability gaps in areas other than remote areas experiencing disadvantage should be funded by industry levies. Broader application of these principles could improve the operation of some markets where CSOs are imposed.

Facilitating improvements in cyber security

One of the challenges for governments in managing the new data-centred economy is cyber security. Australia was ranked equal 3rd (with Oman and Malaysia) behind Canada and the United States in the 2014 Global Cyber Security index and dropped to 7th in the 2017, overtaken by Singapore, Malaysia, Oman, Estonia and Mauritius (ITU 2017).

The global cyber security index is built on five pillars: legal, technical, organisational, capacity building and cooperation. In the 2017 rankings Australia ranked well on legal and technical elements, but is conspicuously behind the other nations in the top 10 on a range of other measures (including bilateral and multilateral agreements, international participation, public-private partnerships, and interagency partnerships) (ITU 2017).

Australia does not rank well in the areas where coordination is required — locally, globally, and across the public and private sectors. Yet coordination is necessary in order to take a system-wide approach, and prevent knee-jerk responses to security violations. Clarity is also needed about how to provide protection against cyber-attack (including what regulations can help to manage risks) in order to provide a secure platform for innovative activity. For example, security concerns could quickly undermine the development of the IoT in Australia.

Half of all IoT things coming into the home are going to be produced by companies that are less than 3 years old. They are going to have access to your Wi-Fi, data and devices. Now, do you think those companies are seriously considering security? The answer is most probably, no. (Cisco's Kevin Bloch cited in KPMG 2016, p. 8)

Much of the benefit of improving access to data also hinges on being able to manage the cyber security risks. This will be critical in sharing data, to ensure that data integrity is

maintained, and to prevent its release to any parties other than those intended by the person exercising their comprehensive right. The banks have raised concerns about cybersecurity in their resistance to sharing data. For example, open APIs help people to change bank services, keeping their account numbers and/or making the change to digital-only payments seamless. Their widespread rollout would help address the problem raised by McCullough (brief sub. 37) when moving home loans between banks, but is resisted by some banks on the grounds of cyber security. Such number portability is highly desirable, but can also offer opportunities for scammers.⁸ The Commission's Data Inquiry recommended that sector-accredited release authorities be tasked with ensuing that governance standards (include cyber security) are up to the task.

The global cyber-attack in May 2017, which affected more than 200 000 computers across 150 countries, including hospitals in the United Kingdom, illustrates the importance of vigilance. In early 2017 the Australian Cyber Security Growth Network was set up with \$31.9 million in funding over four years to 'bring together businesses and researchers to develop the next generation of products and services that are needed to live and work securely in our increasingly connected world' (DIIS 2017). A recent review of the first year of the strategy concluded that progress had been 'undermined by the ad hoc nature of government's communications and insufficient expectation management with industry partners' (Hawkins and Nevill 2017, p. 3). This review made a number of recommendations including better communication with the private sector, a more 'flexible and adaptive' approach with easurable and time bound annual plans, and better baseline research.

Following the finding of a lack of cybersecurity preparedness in two of three major data handling departments (ANAO 2017), and recommendations following the 2017 Census events, the 2017-18 Budget included \$10.6 million for the DTA to build a cyber security governance capability, overseeing management of cyber security in the public service. The Digital Investment Management Office in the DTA has responsibility to ensure that all large Australian government technology projects will provide value for money by providing a much greater focus on costs and risks. These projects include developing the systems for GovPass and a 'tell us once' capability to share data across Commonwealth agencies.

One of the reactions to concern about cyber security has been to require that data be stored locally. This is the case in Australia, with the electronic health record data. Other countries have introduced more restrictive laws, not just for security reasons, but because of the misplaced view that restricting the flow of data across borders will provide commercial advantage to local firms. Such 'data mercantilism' policies can be costly, as they prevent firms and individuals taking advantage of lower cost data storage and restrict the parties can offer to add value to data. For example, recent estimates put the cost of the United

⁸ Mobile phone number portability has been exploited by scammers who have used it to steal identity and redirect banking verification codes (Winterford 2011).

States' restrictions at between 0.1 and 0.36 per cent of GDP. The cost of cloud services in Brazil and the EU have also increased by 10 to 54 per cent following the introduction of data localisation policies (Corey 2017).

Governments need to provide leadership to coordinate cybersecurity responses, but this must include testing proposed regulatory action to manage risks with the industry players and ensuring that the costs as well as benefits are considered.

CONCLUSION 13.12

Leadership across all areas of cyber security is needed. It will be important that 'knee jerk' reactions, such as restricting the cross border flow of data, are not imposed as the costs may well exceed the benefits. Harnessing local and international expertise to be prepared to respond as challenges arise would be a sensible investment.

Market development — do regulators have a role to play?

There is a live and valid debate about the role that regulators can or should play in market development. Clearly, poor regulation and regulator behaviour hampers market development, but whether regulators should be proactive in promoting market development is a different question. This supporting paper has argued that there can be circumstances when regulators can be tasked with some aspects of market development. These include:

- keeping up with technological changes and designing regulations and regulatory systems that take a risk-based and education-based approach. This includes adopting an outcomes-focused approach to regulation what firms have to achieve to be compliant rather than specifying how they must be compliant (although offering explicit 'how to comply' guides can be of considerable value to small firms, so a differentiated approach can assist in encouraging new entry)
- recasting regulations into machine readable form, and designing compliance requirements so that they can take advantage of the opportunities offered by new technologies
- providing benchmarking services to their regulated entities to help them assess their performance. And more generally, providing information back to the regulated industry or firms so that they can see how the information they provide works to deliver on the objectives of the regulation be it levelling the playing field to improve competition or consumer, worker and investor protection
- compelling the provision of information to consumers in standardised forms
- improving complaints systems and the effectiveness of redress, to build the confidence of consumers in the relevant market and help the industry quickly identify and manage risks that could otherwise attract heavy-handed regulation

- developing national plans to guide investment in infrastructure, notably to support the IoT and develop cyber security systems
- coordinating industry to develop common standards, including the adoption of international standards and using powers to compel where industry cannot self-organise
- adopting the recommendations of the Data Inquiry, including compelling firms to transfer client data at the client's request, as well as improving access to public sector data
- adopting the recommendations of the IP Inquiry, not least changing copyright law from 'fair dealing' to 'fair use'.

Whether governments should go beyond setting and enforcing the rules depends on how much they could add to market development, and how much this would conflict with their regulatory responsibilities. In some cases, these responsibilities will align, but in other cases there will be tension between the roles, and regulatory capture is a real possibility. In asking whether governments should go beyond what is largely a risk management role (to provide information and manage market power, as well as setting allowable risk levels) to take on a market development mantle, they should be guided by the answers to the following questions:

- Can industry work together to resolve the problem? If they can, then government's job is to set the parameters they must achieve, not to intervene. An example is the Data Inquiry's recommendation that industry achieve at least 40 per cent credit history sharing by a specified date to avoid a mandate. This is a good example of how to focus the minds of industry to co-operate to resolve these issues.
- What is the risk of regulatory capture? Co-design of regulations with industry can help shift the regulatory attitude from a 'No, but' to a 'Yes, if' approach, as industry will be better than regulators at understanding the risks that can arise and what parameters will work to mitigate these risks. This requires an alignment of objectives, in particular through most of the industry benefitting from the risks being well-managed. This is the case where it is industry reputation, rather than firm reputation, that matters most for consumer confidence in the products. For example, a single adverse event relating to one airline can affect the demand for aviation services generally.
- Which markets are being held back by current regulation and regulator behaviour? Industries where technology is moving rapidly and introducing new risks and opportunities, such as biotechnology and Fintech, could find themselves hamstrung by regulatory regimes that were designed for a very different world. Regulators may well struggle to keep up, and their legislation may prevent them from adapting to the changing industry they regulate. Co-design has risks of capture, but the alternative is to either strangle nascent industry to the detriment of the economy, or to let activity that may well need to be regulated (to create a healthy long-term market) go ahead unchecked. Co-design of regulations and the compliance regime is needed for timely action, but good governance is critical to avoid regulatory capture. This must include transparency about the co-design process (who, what, when and how). Checks and

balances to ensure that the regulations maintain a level playing field must be built into the co-design process. This includes release of exposure drafts of regulation.

CONCLUSION 13.13

Governments should be cautious when being proactive about market development. But there can be situations, such as in establishing some standards, where governments need to act to provide coordination that is lacking.

Ensuring that consumers, workers and investors have adequate protection, that regulations impose only necessary distortions to markets, and that regulators engage with regulated entities and take a risk-based approach to compliance and enforcement, remains the best way that governments can support productivity growth.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 14

COMMONWEALTH-STATE RELATIONS 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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Key points

- The scope of activities jointly covered by the Commonwealth and States is extensive, with expenditure on health, education and road transport alone accounting for nearly 40 per cent of government spending in 2015-16. Governments are also jointly involved in regulating or overseeing reform in many markets and policy areas, among them energy supply, water resource management, freight transport markets and national security.
- The quality of institutional processes and relationships between governments affect the quality of services and regulation produced by them. They are also key factors affecting governments' own productivity, an increasingly important factor in Australia's overall productivity performance.
- Intergovernmental relations in Australia reflect the dominant financial position of the Australian Government and its increasing involvement in areas that were traditionally the responsibility of the States and Territories. This is a result of the Commonwealth's relative revenue-raising strength resulting from historical events and High Court decisions, as well as social and economic changes that have resulted in a converging of local and national interests.
- The high level of States' financial reliance on the Commonwealth has long raised concerns about autonomy and accountability for decisions. In recent years, there has been an increase in the proportion of tied (conditional) payments to States, and funding considerations have come to dominate the dynamic of intergovernmental relations.
- All federal systems have some level of vertical fiscal imbalance (VFI), and completely
 eliminating it does not seem feasible. Improving the efficiency of tax bases at the State or
 Commonwealth level would increase the level of funding available to the States, or for
 distribution. However, this may not significantly relieve underlying pressures on
 revenue-sharing.
- A joint commitment to address revenue-sharing pressures is required if there is to be a reduction in the scope for inefficiency arising from imbalances in taxing power.
- Regardless of the level of VFI, the existence of large areas of shared responsibility and the likelihood that there will be new areas of shared interest in future require governments to agree to solve issues in the national interest. This can be aided, but not substituted by, institutional mechanisms to support government cooperation and accountability.

Commonwealth-State relations

1 Introduction

Australia's federal system of government has been in place since 1901. The formal rules of Australia's federal system are set out in the Australian Constitution. It assigns certain exclusive powers to the Commonwealth and specifies areas of shared responsibility by the Commonwealth and the States. Responsibility for all other matters is left to the States (box 1).

Box 1 The division of powers under the Australian Constitution

The division of powers under the Australian Constitution provides the Australian Government with:

- a small number of *exclusive* powers mainly in respect of customs and excise duties, the coining of money and holding of referendums for constitutional change
- a large number of areas under section 51 where it can exercise powers *concurrently* with the States. However, to the extent that State laws are inconsistent with those of the Commonwealth in these areas, the laws of the Commonwealth prevail (section 109).

State Governments have responsibility for all other matters.

While the list of legislative powers for the Australian Government does not mention a number of specific functions (such as education, the environment and roads), this does not preclude action by the Australian Government in these areas. For example, while the Australian Government has no specific power in relation to the environment, it can legislate in this area under its external affairs power in support of any international agreement covering the environment. The government draws on its taxation powers and powers relating to interstate trade to intervene on roads.

Section 51 enables the states to voluntarily hand over responsibilities to the Commonwealth for certain areas. For example, in 1996 Victoria handed over arbitration power to the Commonwealth. It also enables the States to cooperatively enact identical legislation to the Commonwealth to set uniform standards (for example in regard to the offshore oil and gas industry and air safety regulations.

Sources: PC (2006); Constitutional Centre of Western Australia (2017).

The scope of activities jointly covered by the Commonwealth, States and Territories is extensive, with expenditure on joint health, education and road transport responsibilities alone accounting for nearly 40 per cent of all government spending in 2015-16. Governments are also jointly involved in regulating or overseeing reform in many markets and policy areas, among them energy supply, water resource management, freight transport markets, agricultural sectors such as fishing and national security.

The quality of institutional processes and relationships between governments affect the quality of services and regulation produced by them. They are also key factors affecting governments' own productivity, an increasingly important factor in Australia's overall productivity performance given the relative growth in services that are procured or delivered by governments (SP 2). Lifting prospects for future growth in national income and living standards will require concerted, and in many areas, joint, action by governments.

The Constitution does not set out any 'rules' to manage Commonwealth-State relations or institutional structures to facilitate these relations. As a result, arrangements for cooperation between the Commonwealth and the States have evolved over time to respond to the various economic and social challenges that have arisen.¹

Presently, there is markedly more harmony among first ministers (COAG) in dealing with social policy and national security issues than on economic reform issues (box 2). Confidence between governments on the latter seems low — reflected, for example, in the reaction to a new competition policy reform agenda at COAG in December 2016, and current disputes over energy supply. There has, however, also been less success in this forum for some time on market-based reforms.

Box 2 Tensions between governments are not new

In any federation there is always likely to be some tension between governments as the interests of sub-national and the national governments will not always converge. Tensions between the Commonwealth and the States and Territories are not new and have existed to a varying degree since federation. In some circumstances, tensions have been beneficial, leading to greater contest in policy ideas, for example in some areas of the provision of aged care services. The desire, therefore, is not necessarily that tensions be removed, but that governments be willing and commit to resolve issues in the national interest.

Some participants have suggested that intergovernmental processes have deteriorated to a point that Constitutional amendment should be considered. The evidence belies this, with cooperation evident on a range of issues, such as counter-terrorism, organised crime and domestic violence. The Commission also understands that Ministerial Councils on Health, Agriculture, Treasury and Transport work reasonably well, as do officials in preparation and follow up. In areas covered by this Report, consultation by the Commission across senior representatives of governments involved in both bilateral and full national exchanges indicate that there is a willingness to acknowledge the merits of other positions and work to effect change.

There are clearly fissures, however, and there has been limited coordinated effort on longer-term reform issues, especially market-based reforms, in recent years.

Source: PC (2006).

¹ Australian federation came about from process of deliberation, consultation and debate to address the increasing inefficiencies of having six separate colonies operating alongside each other, a recognition of the need for a national government to deal with issues such as trade, defence and immigration and a growing sense of Australian national identity (PEO 2017).

There will inevitably be instances of political difference. Of more concern in this Review is any persistent failure of governments to address looming risks to the wider public interest. Recent form suggests the need for serious renewal of commitment among governments to work cooperatively if prospects for growth in living standards are to be materially advanced.

At least two structural matters deserve closer attention in considering renewal: the underlying trends that have changed the nature of federal relations, which have implications for how governments allocate roles and responsibilities for solving problems; and the high level of reliance by States and Territories on Commonwealth funding, which creates a range of inefficiencies.

2 Structural drivers of federal arrangements

Increase in areas of common interest

The increase in the Commonwealth's policy reach into areas that have traditionally been the responsibility of the States is a product of several long-term phenomena:

- High Court decisions such as the Uniform Tax cases (1942, 1957), the Tasmanian Dam case (1983), the State tobacco tax case (1997) and the Pape case (2009), which have expanded the Commonwealth's powers, including to raise revenue (box 3)
- social and economic changes (for example, the freer movement of people, goods and ideas, globalisation, the influence of trade agreements on domestic policy), which have broken down or blurred traditional boundaries between jurisdictions and linked local and national interests (the construction of a major port and the efficient functioning of cities is now seen as a local, state and national issue; concerns about the impact of inefficient taxes on economic growth drove the replacement of a range of State taxes with the GST in 2000, further shifting revenue-raising power to the Commonwealth) (Wilkins 2007).

There is likely to be continuing evolution in the matters deemed to be of common interest across governments. There are also continuing changes in how public services are demanded and can be delivered. These imply that negotiation on the roles of different levels of government are highly likely to be a periodic feature of intergovernmental relations for the foreseeable future. But governments have not addressed this in any systematic way.

Added to this in recent times is the era of social media and immediate communications for all — creating a pressure for instantaneous decisions — which has left governments in an invidious position: try to meet people's expectations and do so in real time; or try to explain why this might be undeliverable and risk the judgment of failing to communicate or failing to appreciate the issue (or generally, both).

Box 3 Milestones in the shift towards the Commonwealth's dominant financial position

The Constitution sets out transitional financial arrangements between the Commonwealth and the States. These provided that for at least the initial ten years of federation three-quarters of all customs and excise revenue raised by the Commonwealth would be returned to the States (section 87) and that after five years following the imposition of uniform customs and excise revenue, the Commonwealth would return all surplus revenue to the States (section 94). However, financial power soon began to shift to the Commonwealth:

- The Surplus Revenue Bill 1908 permitted the Commonwealth to pay all surplus revenue into trust accounts initially to finance pensions. The Surplus Revenue Bill 1910 ended reimbursement of customs and excise revenue to the States and replaced this payment with a per capita grant of 25 shillings.
- During the First World War the Commonwealth began to levy income tax and estate duties.
- In 1923 the Commonwealth began the provision of specific purpose grants with road grants to the States.
- The Loan Council was established in 1927, which provided for the Commonwealth to raise all loans on behalf of the States.
- The Commonwealth Grants Commission was established in 1933 to allocate assistance to the States to provide greater equity in service provision.
- Uniform taxation was introduced in 1942 to enable the Commonwealth to take control of the income tax base, primarily to fund the war effort. The Commonwealth announced in 1946 that these arrangements would continue. Challenges to these arrangements by Western Australia, Victoria, South Australia and Queensland were dismissed by the High Court on the grounds that section 51 of the Constitution gave the Commonwealth power to make laws in regard to taxation.
- Specific purpose payments increased following the Second World War, and by the 1970s were used in a range of areas including health, education, transport and urban and regional development.
- In 1997, the High Court of Australia ruled that State and Territory business franchise fees on petrol, tobacco and alcohols that had been in place for nearly 20 years were Constitutionally invalid (under section 90 only the Commonwealth can levy an excise fee).
- Under the relevant intergovernmental agreement, revenue from the GST introduced in 2000 is collected by the Commonwealth and passed back to the States and Territories (on the basis of fiscal capacity relativities estimated by the Commonwealth Grants Commission).
- More recently, the Chaplains case (2012) clarified limits of Commonwealth policy reach, finding that, in most cases, the Commonwealth requires some form of legislative authority in order to expend public money.

Source: James (2000).

Over the past three decades, the model for achieving national reform has shifted from broadly cooperative, focussing on resolving select matters spurred by common concerns, such as dealing with the land rights implications of the High Court's decision in the *Mabo* case and improving productivity in the wake of the early 1990s recession, to one that is more ad hoc, with many more matters now subject to intergovernmental agreements.

The reliance on funding transfers from the Commonwealth to deliver State core services and to incentivise reform has come to dominate the dynamic of intergovernmental relations (below).

Commonwealth influence on policy through funding

The States have long had a high level of dependence on financial transfers (figure 1). In 2015-16, the States and Territories collectively raised 55 per cent of their total revenue. By jurisdiction, this ranged from just under 30 per cent for the Northern Territory to just over 70 per cent for Western Australia (PM&C 2015).

This misalignment between revenue and expenditure by the different tiers of government, or vertical fiscal imbalance, is not uncommon in most federal systems, but Australia has a relatively high level of VFI compared to most other federations (figure 2).

The potential tensions between governments associated with heavy reliance by the States on Commonwealth funding was recognised as early as 1902. In a letter to *The Age*, Future Prime Minister Alfred Deakin wrote: 'The rights of the states have been fondly supposed to be safeguarded by the Constitution. It left them legally free, but financially bound to the chariot wheels of the central government' (PM&C 2015).

The existence of VFI per se is not necessarily a problem, and it can provide certain benefits. For example, there are economies of scale in tax collection in having the central government collect the majority of tax, which reduces the administrative burden of tax collection. There can also be lower compliance costs for businesses that operate across jurisdictions in dealing with a single set of rules and a national tax collection agency.

VFI also provides the national government the capacity to equalise fiscal capacity between State governments to enable them to provide a similar level of services. It further provides the national government with the financial capacity to address issues that spill over jurisdictional lines, for example environmental issues that cross borders, such as those relating to water management in the Murray-Darling basin.

However, it has long been recognised that a high level of VFI can create a range of inefficiencies. The incentive for the States and Territories to become more efficient in the provision of services is muted when they do not have to tax their citizens for funding of relevant expenditure. At the same time, a heavy reliance on grants creates a lack of certainty in budgeting and planning as these grants can be unilaterally reduced to meet the changing priorities of the Commonwealth (PM&C 2015). The imposition of conditions on the use of funding may further limit States' autonomy and blur accountability for outcomes.



Figure 2 Vertical fiscal imbalance in selected federations

(Defined as central government grants as a per cent of sub-national government revenue)



Source: PM&C (2015).

Of the funding provided to the States and Territories by the Commonwealth in 2015-16, 46 per cent was tied funding (specific purpose payments, including for health, education and housing). Specific purpose payments as a share of grants have grown since 2000, reflecting the Commonwealth's desire for assurance on the prudence and/or efficiency of spending and, with its increasing interest in policy areas, to incentivise reform through control of payments (figure 3).



The remainder of grants (mostly provided from GST revenues) are untied, but subject to equalisation arrangements to address disparities in fiscal capacity between the States and Territories (horizontal fiscal equalization (HFE)).

The current HFE arrangements involve adjustments to the amount of GST revenue returned to each State and Territory. Although a system originally designed to affiliate the less populous states more closely to the federation, it is now a source of considerable tension at times within the federation (Pincus 2010). Common concerns have included that equalisation creates disincentives for recipient States and Territories to improve revenue raising capacity through tax reform and increase efficiency in service delivery and that HFE has created a 'grant dependency' in some jurisdictions. A separate Productivity Commission inquiry is presently examining HFE.

The Commission was told that funding is often the focus of and a major lubricant for intergovernmental cooperation. However, in recent times budgetary constraints have limited the ability of the Commonwealth to 'pay' for new reform on any significant scale.

The situation contrasts with the National Competition Policy program, where financial payments from the Commonwealth to the States were an ancillary, though important, reform tool whose rationale was based in the revenue that States might forgo for undertaking reforms.

The Commission was also told that some matters are being elevated to COAG not because of their policy importance but because they have funding implications, which under budget constraints require authorisation at first ministers' level (especially if trade-offs are required across portfolios).

Significant time and resources are devoted to negotiating and monitoring adherence to the terms and conditions of funding agreements. In health and aged care, the mix of funding and policy responsibilities among the various tiers of government has undermined the capacity for genuinely integrated care (chapter 2). More generally, concerns have been raised periodically about duplication or the need for better coordination of effort, uncertainties about whether value for money is being achieved, and accountability for outcomes.

Several have criticised the gatherings of First Ministers (the Council of Australian Governments (COAG)) as now being overly adversarial, too transactional, overburdened with agenda items and focused on arguments about funding.

3 What can be done?

Addressing the pressures of VFI

Improving the efficiency of tax bases at the State or Commonwealth level may increase the level of funding available to States, or for distribution, respectively. However, neither of these are likely to be sufficient in themselves to address the pressure of a high level of VFI.

The existing Constitutional arrangements and the High Court decisions since federation make it highly improbable that VFI could be eliminated completely and the States and Territories be in a position to raise all the revenue required to fund their own spending. One estimate is that the States and Territories would need to increase their own taxes and charges by about 90 per cent to displace all Commonwealth grants (Pincus 2010).² And simply increasing the 'pie' may not significantly reduce underlying pressures on how the pie is divided.

² This would vary considerably by jurisdiction. More contemporary estimates suggest that in 2015-16, Western Australia would have had to increase their own revenues by an estimated 60 per cent, New South Wales by about 90 per cent, Victoria by 110 per cent, Queensland 164 per cent, South Australia 200 per cent, Tasmania over 280 per cent and the Northern Territory by over 550 per cent to displace all Commonwealth grants (Commission estimates based on State and Territory budget papers).

A more fundamental change is required, therefore, having its objective the relief of pressure arising from revenue-sharing arrangements.

Past attempts to increase the fiscal autonomy of the States and Territories have failed, for practical and political reasons (box 4). A joint commitment to change is, nevertheless, required in order to reduce the scope for inefficiency and poor outcomes — including the stalling of other reforms requiring joint government effort — arising simply from imbalances in taxing power.

Box 4 **Previous attempts to improve the States' fiscal position**

The Commonwealth made an offer to withdraw from the income tax arrangements in 1934. This was rejected by the States, and on this occasion Robert Garran stated:

We thank you for the offer of the cow,

But we can't milk, and so we answer now -

We answer with a loud resounding chorus:

Please keep the cow and do the milking for us. (Garran 1958, quoted in (PM&C 2015) p, 9)

In 1970, the States proposed a scheme to allow the States to levy income tax, but this was rejected by the then Prime Minister as it would undermine the Commonwealth's ability to influence macroeconomic policy. In 1978, the Commonwealth made an offer to the States to levy income tax surcharges or an income tax levy. This offer was declined, partly because the Commonwealth did not offer to lower its rates of income tax to 'make room' for the States to levy income tax. But in rejecting the Commonwealth's proposal, the then Queensland Premier, Bjelke Petersen, also commented that, 'the only good tax is a Commonwealth tax' (Pincus 2010).

More recently, at the COAG meeting in April 2016 the Commonwealth indicated its intention to resolve the longstanding problem of VFI and improve state autonomy. The communique from the meeting noted that:

There was not a consensus among the states and territories (states) to support further consideration of the proposal to levy income tax on their own behalf. (COAG 2016, p. 2)

The communique further noted that leaders agreed to consider proposals to share personal income tax revenue with the States to provide them with a broader revenue base that grows in line with the economy, reduce the number of tied grants and provide the States and Territories with greater autonomy and flexibility to meet their ongoing expenditure needs (COAG 2016).

This Report proposes a joint commitment by governments *that does not necessarily seek to add to the tax burden* and, rather, relief from structures that are inimical in the longer term to efficient government. In this vein, there should also be less reliance on funding as a primary incentive for change, a mechanism that is also limited by its reliance on Commonwealth budget flexibility.

Division of roles and responsibilities

There are a number of well-established principles for the division of roles and responsibilities between governments, such as subsidiarity and fiscal equivalence. There is scope for differing views as to how to apply these principles in practice (box 5).

Box 5 Who should do what? — The principle of subsidiarity and fiscal equivalence

The principle of subsidiarity is often drawn on to provide guidance as to the appropriate level government for a particular function. Under this principle, responsibility for a particular function should, where practicable, reside with the *lowest* level of government. This is based on the following considerations:

- sub-national governments are likely to have greater knowledge about the needs of the citizens and businesses affected by their policies
- with decentralisation of responsibility and decisions it is easier to constrain the ability of elected representatives to pursue their own agendas to the disadvantage of citizens they represent
- intra-national mobility of individuals and businesses exposes sub-national governments to a reasonable degree of intergovernmental competition.

A key issue in applying the subsidiarity principle is to establish the meaning of 'where practicable'. Although the public finance literature provides some guidance, there is considerable scope for differences of view in relation to the appropriate assignment of many expenditure, tax and regulatory functions (PC 2006).

There is also broad support for assigning responsibility to the *highest* level of government (the national government) where:

- there are significant interjurisdictional spillovers associated with the provision of goods or services at the sub-national level
- there are sizeable economies of scale and scope arising from central provision or organisation or readily identifiable areas of shared or common interest (for example, defence, international or external affairs and social welfare support)
- different rules or regulations are likely to give rise to high transaction costs with insufficient
 offsetting benefits (for example, regulation of companies, transport, the financial sector and
 trading provisions covering weights and measures)

Another consideration in assigning roles is fiscal equivalence. This requires that each level of government should be able to finance its assigned functions.

Sources: Productivity Commission (2006); Kasper (1995).

The assignment of functions is rarely 'clean cut' and most federal arrangements display varying degrees of exclusivity and overlap in the assignment of functions. Australia's federal arrangements have displayed competitive federalism as well as collaborative approaches (box 6).

Box 6 **Competition and cooperation in a federation**

Competition between subnational governments is considered a strength of a federal system as it provides the incentive for governments to develop better policies and service delivery to meet the needs of mobile individuals and businesses. This horizontal competition is based on the discipline imposed on governments by the possibility of citizens and businesses 'voting with their feet' in response to policy differences. However, such competition is likely to be dampened where there is a lack of accountability and transparency as to which tier of government is responsible for providing particular services.

Competition may deliver perverse outcomes where it results in decisions leading to net costs to the State. In the past, concerns have been raised in this respect in relation to interstate 'bidding wars' to attract major projects and events and the use of special tax exemptions and concessions to attract businesses.

There is also vertical competition, where the national or subnational government governments enter a specific area in direct competition with the other level of government (for example, some State Governments introduced their own transitional programs to assist elderly people transition from hospital to the home) (PC 2005). Although, such competition can impose costs in terms of duplication and overlap, it can also potentially result in improved service delivery, or provide a means of testing a new model of service.

However, there are significant shared and overlapping responsibilities. The Constitution provides not only for exclusive powers assigned to the Commonwealth, but also a large number of areas under section 51 where the Commonwealth can exercise powers concurrently with the States. In light of this, governments in Australia have developed an extensive array of intergovernmental cooperative arrangements. These arrangements have largely recognised shared responsibilities and objectives and the need for effective cooperation and coordination to achieve policy outcomes.

The high point of such arrangements in Australia is often regarded as linked to the work of the Special Premiers' Conferences and COAG during the 1990s in delivering the National Competition Policy reforms (PC 2006). This cooperation was underpinned by a desire to, in some cases, have a consistent national policy and supporting set of regulations and rules in some markets; in others, to reduce or remove rules that increased costs and restricted the movement of people and goods. More broadly, the NCP program sought to improve the efficiency of the economy by promoting competition in a range of industries. Payments by the Commonwealth to the States and Territories facilitated implementation of reforms.

Is there a 'best model' to assign responsibility?

In any federation there is no universally optimal model for assigning functions. Importantly, changing social, technological and economic conditions may make it necessary to review such roles and realign responsibilities from time to time. For example, policy issues such as climate change mitigation policy were not high on the agenda of governments 20 years ago. Other issues are also likely to emerge in the future making it impractical to determine 'who should do what' until such issues actually arise.

Existing policy issues are also likely to see shifts in responsibility. For example, the Commonwealth is now seeking to be involved with the States and Territories in improving the productivity of cities. And although the overall historical trend has been for increased Commonwealth involvement in many policy issues, some other areas are beginning to go against the trend. These tend to be in service areas, such as human services, where there are advantages from the local delivery of services and in having the providers of these services close to their clients.

The most recent attempt to substantially recast the relationship between the Commonwealth and the States was through the *Intergovernmental Agreement on Federal Financial Relations* (2008). National agreements made under the auspices of this overarching agreement define the objectives, outcomes and performance indicators of particular areas, and seek to clarify the roles and responsibilities of governments to guide them in delivering services in key sectors — including health, education, skills and workforce development, disability services, affordable housing and Indigenous reform (box 7). These arrangements have provided greater clarity on roles and responsibilities, but have not fundamentally altered intergovernmental dynamics.

In the spectrum of policy issues from the purely local, such as rubbish collection and the maintenance of street trees, to national issues, such as defence, there is a large area in the middle where although functions can be carefully negotiated, cooperation is likely to be necessary to ensure the effective delivery and efficient funding of services.

Box 7 Intergovernmental Agreement on Federal Financial Relations

The Intergovernmental Agreement on Federal Financial Relations was agreed to by the Commonwealth and the States and Territories in 2008 to consolidate and partially address the proliferation of small SPPs made by the Commonwealth to the States and Territories. It also sought to foster collaborative working arrangements, with more clearly defined roles and responsibilities.

Under the new arrangements, a wide range of specific Commonwealth-State agreements were subsumed into six National Agreements across the key areas of health care; education, skills and workforce development; disability services; affordable housing; and Indigenous reforms. Payments linked to these agreements are indexed annually and funding distributed to States and Territories by share of population.

In addition to the National Agreements, there are also the National Specific Purpose Payments (SPPs) in three service delivery sectors (skills and workforce development, disability and affordable housing).

The Agreement also provided for National Partnership payments to be made to the States and Territories to support specified outputs or project, facilitate reform or to reward those jurisdictions that delivered on nationally significant reforms or service delivery improvements. There are also Project Agreements that provide a simpler form of National Partnership for low value or low risk projects.

Until 2014, the COAG Reform Council (CRC) assessed whether the pre-determined milestones and benchmarks had been achieved before the Commonwealth made payment. Since the CRC was dismantled, the relevant Commonwealth Minister is now responsible for assessing the performance requirements to receive National Partnership payments.

Health and education account for about two-thirds of all funding for SPPs. National Partnership payments accounted for just over a quarter (26 per cent) of SPP funding.

Although there was some initial success in decreasing the number of funding agreements between the Commonwealth and the States, the number eventually increased. By 2010, the 6 National Agreements had been joined by 51 National Partnership Agreements and 230 Implementation Plans (National Commission of Audit 2014). As at 2016, there were 7 National Agreements, nearly 30 National Partnerships and nearly 50 project agreements (CFFR 2016).

The Agreement also sets out that the Commonwealth will make the payment of the GST revenues collected by the Commonwealth to the States and Territories in accordance with the principle of horizontal fiscal equalization.

Sources: COAG (2016); National Commission of Audit (2014).

CONCLUSION 14.1

VFI has been a feature of Australia's federal arrangements for some time. However, the reliance on funding transfers from the Commonwealth to the States to undertake core as well as reform activity has come to dominate the dynamics of the relationship.

Eliminating VFI does not seem feasible, although improving the efficiency of the national tax base, at both the Commonwealth and State levels, would potentially increase revenue available to the States, or for distribution.

Fundamentally, there is a need for relief from the revenue-sharing pressures created by the States' very high level of financial dependence on the Commonwealth.

Support for intergovernmental cooperation

The current peak intergovernmental body COAG, has existed since 1992. It meets on an 'as needed' basis and considers issues arising out of Ministerial Councils, the initiatives of the Commonwealth generally with respect to national reform, and issues requiring the cooperation of governments.

Although COAG played a key role in delivering major reform in the past, such as the NCP, there has been, as noted, some criticism of its current effectiveness.

In addition, the agenda of COAG is considered to be perennially overcrowded, raising concerns that COAG cannot deliver on its many commitments. This partly reflects the need to resolve portfolio-level issues that raise funding implications, as noted, leading to issues taking longer to resolve than necessary. But the Commission was told it also reflects an unwillingness of first ministers to delegate decision-making to their ministers.

In some cases, there may be scope for the States and Territories on their own to develop a solution to problems — for example, in the use of mutual recognition to address regulatory inconsistencies (PM&C 2015). Again, the issue of what COAG versus other ministerial forums should consider is not a new issue. Not long after the inception of COAG — in a review of Commonwealth-State reform processes for the Department of Prime Minister and Cabinet — it was noted that COAG's agenda needed to be focused on a few issues of significance that required the attention of heads of government. This would require officials to recommend what is suitable and what should take precedence (Weller 1995).

In regard to Commonwealth-State relations more broadly, the Commission was told that trust had been undermined where agreements between the Commonwealth and States — in particular as to the level and timing of funding to be provided to the States for infrastructure — had not been adhered to following a change of political leadership at the Commonwealth level.

The shared responsibility held by both the Commonwealth and States and Territories for many policy areas require effective arrangements to manage intergovernmental relations. There are some lessons from history as to the drivers of effective intergovernmental cooperation (box 8).

Box 8 What has driven effective cooperation?

Effective cooperation between the Australian and States and Territories governments to a large part has been driven by common external causes and/or crises.

For example, the First and Second World Wars drove significant cooperation between the different tiers of government. More recently, the fear of economic stagnation that emerged in the 1970s along with reforms being undertaken by New Zealand in the 1980s provided the momentum for the Hilmer reforms of the 1990s. Other issues, such as Mabo, that rendered state borders irrelevant and required a policy response at a national level have also driven effective cooperation between the Australian and State and Territory governments.

Many inquiry participants commented that the commitment of individuals at both ministerial and bureaucratic level was crucial to the implementation and success of reform efforts.

Even after COAG had only been in place for a few years, in explaining the behaviour that had made progress possible, a review of Commonwealth-State reform processes found that, '... it is apparent that where the approach has been negotiable, cooperative and reiterative COAG has worked best' (Weller 1995, p. 13).

Effective cooperation and collaboration is also required in the implementation of agreed policy. For example, in regard to Australian and State and Territory Governments cooperation in health policy, previous experience highlights that for cooperation to be effective there needs to be a recognition of 'who is responsible for what' to ensure the necessary structural, legislative and regulatory changes can be implemented (Australian Centre for Health Research and TPG International 2010).

Changes to institutional arrangements have also arisen out of cooperative efforts to solve policy problems. COAG itself came into existence in the 1990s during a period of heightened cooperation between governments. The transition from Premier's conferences to the establishment of COAG and its related councils and the subsequent range of intergovernmental agreements delivered highlights this cooperation. Not all cooperation takes place within the formal COAG council system as portfolio ministers also meet to discuss and progress matters of shared interest. Without first ministers present and being out of the political spotlight, these meetings and forums often provide the opportunity for ministers in similar portfolios to focus on policy outcomes.

Stakeholder suggestions to improve the functioning of COAG meetings include:

- giving State and Territory Governments greater influence in the operations of COAG. It has been suggested that this be through an intergovernmental agreement recognising COAG as a partnership between governments. Practically, States and Territories would be more involved in setting meeting dates and the agenda, rather than relying on the Prime Minister and the Commonwealth to drive it. It has also been suggested that administrative support for COAG be at arm's length from the Australian Government
- to improve accountability and transparency, COAG and the Ministerial Councils should make public their agendas, work programs and intended outcomes, as well as achievements against those intended outcomes on an annual basis (BCA 2006).

There has been some experimentation with the bodies supporting COAG. The main Secretariat resides with, and is funded by, the Australian Government in the Prime Minister's Department. The secretariats supporting the ministerial councils usually reside in, and are funded through, the relevant Australian Government portfolio. An independent body, the COAG Reform Council (CRC), was established in 2006 to assist COAG to drive national reforms by improving accountability on the performance of governments. The CRC was abolished in 2014.

Between 2008 and 2014, the CRC reported annually on the outcomes agreed to through COAG. This involved benchmarking the performance of governments against outcomes specified under the National Agreements.

Since then, there has been a range of interim reporting arrangements led by the Department of Prime Minister and Cabinet with assistance from other agencies (COAG 2016). The payments made under the National Partnerships to the States and Territories for meeting agreed objectives are now assessed by the relevant Australian Government portfolio minister. The Australian Government recently restored independent monitoring and reporting on performance against COAG agreements by transferring this function to the Productivity Commission (2017-18 Budget).

In addition to the changes to the operation of COAG meetings suggested by stakeholders, there are also the guiding principles for cooperation as communicated by the Premiers and Chief Ministers in 1991 that still provide a sound framework for cooperation by governments (box 9).

While institutional supports are necessary and can facilitate the efficient conduct of meetings, such supports clearly cannot substitute for a willingness among first ministers to cooperate in the national interest.

Box 9 Federation principles — Premiers and Chief Ministers' conference Adelaide 1991

- **Australian nation principle**: all governments in Australia recognise the social, political and economic imperatives of nationhood and will work cooperatively to ensure that national issues are resolved in the interests of Australia as a whole.
- **Subsidiarity principle**: responsibilities for regulation and for allocation of public goods and services should be devolved to the maximum extent possible consistent with the national interest, so that government is accessible and accountable to those affected by its decisions.
- **Structural efficiency principle**: increased competitiveness and flexibility of the Australian economy require structural reform in the public sector to complement private sector reform: inefficient Commonwealth-State division of functions can no longer be tolerated.
- **Accountability principle**: the structure of intergovernmental arrangements should promote democratic accountability and the transparency of government to the electorate.

CONCLUSION 14.2

Australia's Constitutional arrangements and the shared responsibility held by both the Commonwealth and States and Territories for many policy areas call for effective intergovernmental cooperation.

The level of cooperation between the Commonwealth and the States has varied markedly over the past 20 years, and while there has been an absence of cooperation on several major policy issues, circumstances have not deteriorated to a level where the 'system is broken'.

The operation of COAG meetings could improve. However, institutional supports for COAG can have little impact without the political will to cooperate in the national interest.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

5 YEAR PRODUCTIVITY REVIEW

SUPPORTING PAPER NO. 15

CORE BUSINESS AND CAPABILITIES 3 AUGUST 2017

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

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Key points

- Continued attention to sound targeting, design and implementation of public policy is needed to improve the living standards of all Australians.
- Several recent reviews have highlighted avoidable mistakes in programs resulting in significant costs and harm, a reflection of poor policy design and/or delivery.
- Problems typically arose where standard due diligence processes, such as stakeholder consultation and policy appraisal, were not adequately undertaken, often due to haste.
- Other themes from recent reviews include a culture of excessive risk aversion in public services, the centralisation of decision-making at senior levels of the public service, and the need to improve the core skills of staff in policy development and program delivery.
- Some effort has been made to re-orient public sector management frameworks to focus more on capabilities and the prudent management of tasks and risks (and less on compliance with rules per se), but significant change is hard to discern.
 - Ultimately, Ministers and agency heads need to encourage indeed, require the sort of organisational change that is needed to obtain sound policy advice and administration.
 - There is also a need for greater accountability for advancing already accepted public sector reform initiatives.
- Budget disciplines help to allocate resources efficiency, and more efficient government contributes to the broader efficiency of the economy.
- There has been a deterioration in national finances, largely driven by the Commonwealth's financial position. Notwithstanding that unusual economic conditions have made revenue forecasting difficult, there are measures that can be taken to assist budget management.

Core business and capabilities

1 Background and focus of this paper

The quality of what emerges from government depends significantly on the quality of intangibles used to produce its outputs — the human and knowledge capital, governance structures within governments and between levels of government, and processes for policy development, delivery and review. These go to how decisions are made on the scope of government activity, and how specific interventions are chosen, designed and implemented, which are key determinants of governments' own productivity and how well they set policy affecting others'.

This paper considers public service capabilities and performance with respect to two key disciplines on governments — due diligence requirements on proposed and existing policies, and budgets (box 1). The former draws on a review of recent reports on government performance, including reports by audit offices, reviews of the capability of agencies, and commissioned reviews following concerns about administrative or policy outcomes (box 2). Budget disciplines are considered in the context of their role in allocating resources efficiently as well as broader concerns about the sustainability of public finances.

The picture provided by reports are necessarily indicative of current practice. They do, however, highlight some core features of, and trends in, practice, particularly at the Commonwealth level, the main focus of this paper.

2 Policy development and evaluation

The Commission is conscious that few comment when governments function well and the reverse occurs when things go wrong. However, there is sufficient evidence from recent reviews of government performance to indicate that the continuation of approaches in several areas will not serve us well.¹ Of particular importance is evidence of non-adherence to standard requirements for due diligence on policies (box 3), and a culture of excessive risk aversion in public services leading to the belated discovery of mistakes and centralisation of decision-making.

¹ The focus of this section is predominantly on Commonwealth administration, where there is comparatively more information on sector-wide performance.

Box 1 Key disciplines on governments

Due diligence requirements on proposed policies and the impact of policies are, simply put, aimed at ensuring government interventions achieve their intended effect, and do so in a way that increases overall community welfare.

They thus oblige policy makers to consider, among other things, the nature of the problem; whether it is amenable to (and sufficiently large enough to warrant), government intervention; if so, alternative ways of achieving desired policy objectives — having regard to the relative costs and benefits of proposals, and changes in markets and players' incentives that policy change and design might prompt; how risks will be managed; and, over time, whether the policy intervention remains suitable.

Critical supports for these considerations are consultation with stakeholders and use of evidence to the extent possible.

Policy appraisal disciplines are important also because most public sector bodies are subject to weak threat of failure or takeover, and few price signals to help align demand and supply of services. With muted incentives for performance, there is significant reliance on transparency — the opening of decision-making processes and the basis for final decisions to public scrutiny — to prompt improvement and hold governments and the public service to account.

Budget disciplines require similar considerations in support of requests for funding of programs. At an aggregate level, the strength of budget constraints influences government productivity via the incentives created to improve program design and efficiency. They affect the efficiency of the economy more broadly as public spending translates into current and future tax burdens.

If budget and policy due diligence processes work well:

- they increase the prospects for effective and efficient government and therefore genuine improvements in community welfare, a rational allocation of resources among the many tasks governments must undertake, and sensible choices about what should be undertaken by the private sector
- at the macro level, they ensure more efficient government, which contributes to the broader efficiency of the economy. Internal disciplines further help to ensure that governments run a balanced budget over the macroeconomic cycle, which reduces upward pressure on interest rates and Australia's vulnerability to external shocks.

The potential benefits from achieving even small improvements in policy design and delivery are highlighted by the sheer size of government budgetary expenditure — \$429 billion in 2015-16 for the Commonwealth alone, and \$560 billion for all governments combined (net of federal-state transfers). (Australian Government 2017a, 2017c)

Box 2 Selected reviews of performance and capabilities

Blueprint for Reform of Australian Government Administration (Ahead of the Game) (2010)

The Advisory Group looked at ways to improve Australian Public Service (APS) performance in the provision of services, programs and policies for the Australian community. It recommended greater citizen involvement in design of government services. Also, that the APS strengthen its capacity to provide strategic policy and delivery advice, invest in capability through improved human resource management, strengthen the focus on efficiency and quality by building a reliable evidence base on the efficiency of public agencies, and remove red tape. The Government accepted all of the Advisory Group's recommendations.

Report on large government policy failures (Shergold review) (2015)

The review was asked to recommend ways to enhance the capacity of the Australian Government to design and implement large public programs and projects following a series of major failures. The review made 28 proposals relating to the provision of robust advice, supporting decision making, improving risk culture, enhancing program management, greater public service diversity and adapting to changing policy environments. The review confirmed findings from the *Ahead of the Game* report regarding the need to improve experience through mobility programs, and the concerns of capability reviews regarding public sector project management skills and program management practices. The Government did not formally comment on the specific proposals but instructed Secretaries of Departments, through the Secretaries Board, to consider the report and its conclusions. (More detail in box 4)

Independent Review of Whole-of-Government Internal Regulation (Belcher review) (2015)

The Belcher review found that many internal Commonwealth regulatory requirements were appropriate and efficiently administered but there was also evidence of over regulation, inefficient regulation, and unclear and inaccessible regulations and guidance. It also observed that there was a culture of risk aversion, which is reflected in a disposition towards over-regulation of both the public sector and regulated industries. Recommendations to address these issues included removing duplication of reporting, improving access to information, clarifying guidance and better ways of engaging with risk. The Review confirmed the findings of many capability reviews (below) regarding excessive risk aversion and centralised decision-making. The Secretaries Board agreed to implement all 134 review recommendations, although it noted that some required consideration by the government. (More detail in box 5)

Capability Reviews of Commonwealth agencies (2011–2016)

Capability reviews of all departments and key agencies arose out of a recommendation of the *Ahead of the Game* report. The reviews were to be conducted on a regular basis to assess strategy, leadership, workforce capability, delivery and organisational effectiveness. Common findings included significant levels of risk aversion and centralised decision making at senior levels, which restricted innovation. Many departments were observed to struggle with project management. While some agencies collected vast amounts of data they failed to use that data profitably because they lacked the skills or because of dated IT systems.

Independent reviews of recent programs (various)

Reports by Commonwealth and State audit offices, commissions of inquiry and parliaments on programs including: the (VET) FEE-HELP scheme; Victorian East West Link Project; Queensland's shared IT services; New South Wales' Learning Management and Business Reform project; Centrelink Online Compliance Intervention system; the Home Insulation and Building the Education Revolution programs, and management of contracts.

Box 3 Policy development rules

Policy development rules generally ask for justification for the proposed policy direction (including the canvassing of options); an assessment of the impact of the policies on those affected; the views of stakeholders; information on how policies will be implemented; key sensitivities and risks and an assessment of regulatory, regional and financial implications. In most jurisdictions, there is also a requirement for cabinet submissions to include a Regulation Impact Statement which, among other things, requires assessment of the net impacts of the proposal.

Generally, all major policy or expenditure proposals are considered by Cabinets and/or their committees. Cabinet processes usually oblige cross-portfolio consultation on the merit and impact of proposals, input from central agencies for a whole-of-government perspective and compliance with due diligence standards.

Specifically, common causes of avoidable mistakes or circumstances where the costs of programs were significantly reducible included:

- cabinet processes not being adequate (for example, the Home Insulation Program, where decisions were made by a cabinet subgroup that did not include the minister responsible for the program)
- unnecessary haste leading to poor planning and inadequate stakeholder consultation (as occurred with the National Broadband Network tender process)
- proper appraisals not being undertaken or advice offered by them not being heeded (for example, the Vocational Education and Training (VET) FEE-HELP scheme, where strategic and operational risks, which ultimately led to extensive fraud, were known but not adequately addressed in the scheme's design)
- the complexity of issues not being matched by staff capabilities (as occurred with many information technology contract projects)
- excessive risk aversion on the part of staff, leading to, among other things, the non-reporting of risks or mistakes for fear of being blamed, or the provision of advice presumed to be what governments want to hear (for example, as observed in the case of the Victorian East-West Link Project).

While the reviews represent only a partial picture of government activity they suggest some underlying risks to policy design and delivery.

- The Australian Government review *Learning from Failure* (Shergold Review, box 4) found that pressures to respond quickly to policy problems are not uncommon, which can override proper planning and the usual safeguards provided by cabinet processes.
- Many of the 21 capability reviews of Commonwealth departments and agencies reported excessive risk aversion leading to the centralisation of decision-making and suppression of policy innovation and ideas at lower staff levels. With limited experience of judging the taking of risk when the costs are small and predictable, the ability to handle crisis (when they are large and unpredictable) is increasingly challenging.

Box 4 2015 Shergold Review

The Shergold review *Learning from Failure* was commissioned to provide an independent assessment of government processes for the development and implementation of large public policy programs and projects. It examined recent large public policy failures and made 28 proposals for improvement in six areas: providing robust advice; supporting decision making; creating a positive risk culture; enhancing program management; improving exchanges between the Australian Public Service, private sector and academia; and embracing adaptive Government.

Among the main proposals:

- Cabinet submissions should include a ministerial statement outlining the policy's purpose, expected outcomes and anticipated implementation risks. Ministerial staff standards should be tightened and Ministerial staff should have regular joint forums with public servants to build understanding of their respective roles.
- Public services should embrace experimentation by undertaking controlled trials on how best to deliver government programs. Demonstration projects would allow different approaches to be tested with programs fine-tuned, scaled up and rolled out more extensively in response to the findings. This would be a reversal of the default position that new policies lead directly to large scale roll-out.
- Public services must become more agile, not just in responding to immediate crises, but in planning for the longer-term future. Evaluation must be recognised as an ongoing process rather than being regarded as an end-of-process sign-off.
- Institutionally, talent and expertise should be brought in from outside the public services and, conversely, senior public administrators should spend time in the private, community or academic sectors. Public servants also needed to work collaboratively with business and the not-for-profit sector sharing evidence and expertise.
- Government structures should be more adaptive and organisationally flexible. Where services are delivered by outside providers, the public service should allow contractors more flexibility to take their own approaches to service delivery against agreed outcomes.

The Australian Government responded to the report in February 2016 and tasked the Australian Public Service Commission (through the Secretaries Board) to ensure the Australian Public Service had the capability to design and deliver major policy initiatives effectively, efficiently and safely.

Sources: Hunt (2016) and Shergold (2015).

- The Belcher review of Commonwealth public sector internal red tape found a proliferation of public sector rules to be symptomatic of deeper attitudes of risk aversion and a regulatory stance characterised by a default to regulation as a policy lever (box 5). Perhaps unsurprisingly, the review's overarching recommendations for the public sector were similar to that required of governments' regulatory approach toward other sectors, including that regulation be the minimum needed to achieve objectives, proportional to the risks to be managed, and regularly reviewed. Red tape imposed on regulated sectors remains an area for improvement (box 6 and appendix B).
- Several reviews have highlighted gaps in policy development and program management capabilities, and further noted that the sheer workload demands on public

servants, including that arising from the expanding number of cabinet submissions dealing with increasingly complex problems, leaves little room for strategic thinking.

It is apparent that it is not for want of guidelines and procedural rules that poor policy development and mistakes in implementation occur. Problems arise when rules are not adhered to. But it is clear also that rules are only good if they are able to be applied and applied *well* — a function of will, capabilities and their practical use.

The sections below consider further:

- the themes arising from reviews
- some measures to support advancement of public sector reform, and policy development and delivery.

Box 5 Belcher review of Commonwealth internal regulation

The Belcher review was commissioned by the Secretaries Board in 2015 in response to a perceived proliferation of regulation in the Commonwealth public sector. Regulation was defined as any mandatory requirement applying to public sector agencies or any guidance, practice or procedure that is treated as such.

The review observed that the level and volume of internal regulation was growing (its complexity was not measured). It measured 8000 separate requirements in over 600 documents printed on more than 14 000 pages. The review considered that this trend reflected a regulatory stance characterised by a default to regulation as a policy lever and an absence of a proportional approach to regulation.

It found, for example, that 'regulatory creep' has resulted from failure to adjust compliance activity thresholds to levels of risk. For instance, if the threshold for reporting procurement contracts (originally set in 2005) was increased to match international obligations, the compliance burden of contract reporting would be reduced by almost 70 per cent while the value of contracts reported would only fall by 3.7 per cent.

There were some examples of good practice. For example, the Australian Taxation Office had reduced its external consultation arrangements from 68 committees to 8, internal management committees from 45 to 22, operational risks from 270 to 106, staff practice policies from 178 to 55 and internal compliance documentation by 87 per cent since 2013.

However, the review found systemic evidence of internal over-regulation, inefficient regulation, unclear and inaccessible regulation; and a culture of risk aversion. Risk aversion was seen as a common cause of over-regulation, with agencies taking on additional regulatory tasks because they viewed policy guidance material (such as from the Australian National Audit Office) or requirements set by regulators as a minimum compliance standard.

The Belcher review made 134 recommendations, directed primarily at the Departments of Finance, Prime Minister and Cabinet and Attorney-General, and the Australian Public Service Commission. The Secretaries Board agreed to implement all recommendations, noting that some required consideration by Government.

Source: Belcher (2015).

Box 6 The compliance costs of external red tape

Much of the focus of the Commonwealth's recent red tape reduction program has been on reducing business compliance costs — achieving the objectives of the regulation at least cost to business. The most recent report on progress claimed an estimated \$4.8 billion in cost reductions from the introduction of the program in 2013 to the end of 2015 (Australian Government 2016). But inquiry participants suggest that red tape burdens remain significant (for example, Institute of Public Affairs, sub. 15, p. 12).

Compliance costs are only part of the burden imposed by regulation. Unintended distortions, such as changes in incentives to invest or innovate, or the introduction of barriers to adopting new business models, can be more costly to the economy. Indeed the costs of regulation can be many and varied.

Governments need to ensure that harmful regulation is amended or removed and the costs imposed are minimised. But the more challenging task is to find the right balance between the costs imposed by regulation and the benefits that it delivers to the community, workers, consumers, and to the efficient functioning of the market, which is of benefit to business. Digital technologies can offer new ways to improve this balance (SP 13).

The Regulatory Impact Statement (RIS) process, undertaken by governments in relation to new regulation that imposes compliance costs on business and the community, is meant to test the net benefit of a regulation as well as identify the least-cost regulatory approach to achieve the stated objective. But past practice suggests that RISs may sometimes be offered as justifications after the event, or avoided (PC 2012).

Regulators that minimise the costs imposed while effectively managing the risks would provide firms with a competitive advantage relative to their international peers. This can be achieved by regulators taking both a:

- risk-based approach this is a proportionate approach to compliance and enforcement which includes targeting those activities and firms that pose the greatest risk
- education approach seeking to ensure firms know what they need to do and providing the flexibility to let firms try new ways of doing business.

Public sector capabilities

A cultural shift seems to be needed

Reviews have highlighted that due diligence rules are crucial but not sufficient for managing projects well, which also requires skills to match the complexity of issues, sound judgment, and initiative — especially in averting risk or dealing with unexpected consequences. These attributes would have been far more effective in dealing with the risks posed by policies such as the Home Insulation Program (HIP) where, according to the Shergold Review:

DEWHA's development and implementation of the HIP coincided with a significant expansion of the department's responsibilities. It had little experience of delivering programs. It was unprepared for the task. Post-implementation reviews of the HIP identified problems with the department's governance structures, program design capability, corporate administration, risk management behaviours, audit and compliance mechanisms, and effective monitoring. (Shergold 2015, p. 10)

Some governments (including New South Wales, Victoria and the Commonwealth) have sought to formally rebalance guidance in favour of supporting capabilities and better managing risks.

For example, New South Wales' *Government Sector Employment Act 2013* has sought, among other things, to reform the structure and management of its public sector by providing for greater devolution of responsibility and increased flexibility in staff deployment to improve service delivery efficiency and effectiveness. Agencies are still transitioning from practices under the previous legislative framework, so the impacts are not fully apparent (NSW PSC 2016).

At the Commonwealth level, the *Public Governance, Performance and Accountability Act* 2013 (PGPA) has sought to promote high standards of performance and accountability by balancing planning and reporting obligations with greater scope for agencies to manage tasks and risks in a way that suits their operating environments (Belcher 2015). The Act and its associated regulations enshrine a notion of 'earned autonomy', which ostensibly creates an incentive for agency heads to institute better risk practice and culture in their organisations. However, it appears yet to produce significant discernible change. The Shergold Review noted that:

... if the PGPA Act is to achieve its objectives, APS risk culture needs to evolve. Legislation will not change culture: people and their actions do. As recently noted by the Chair of the Australian Prudential Regulation Authority, good risk practice is about behaviour, not structure.' (Shergold 2015, p. 37)

The PGPA Act itself was instituted alongside a range of other procedures, manuals and policies specifying in detail how agencies should conduct their operations, which may have filled a gap but also seems inimical to the purpose of the legislation.

Governments and agency heads have largely accepted the proposals of the review reports we have scrutinised. At least at the Commonwealth level, however, it is hard to discern significant change.

This is not to say that there are not examples of good practice or improvement — inquiry participants have pointed to alternative service delivery models emerging in the social services sector as exemplars of innovative collaboration among stakeholders (some are described in box 10), and several agencies have sought to change their internal cultures by reducing decision approval points and increasing the degree of delegation.

There has been little in the way of public commitments on what will be done in response to the sector-wide and agency-level capability reviews, however, or follow-up to determine their impacts. Recent reports clearly indicate that more needs to be done across the public sector. That said, it is reasonable to assume that progress reflects, at least in part, the risk appetites and operating preferences of Ministers.

Core skills

A major sector-wide review of Australian (Commonwealth) Public Sector (APS) capabilities, the 2010 *Ahead of the Game* Blueprint for the Reform of Australian Government Administration Report, noted that strategic advice requires specific skills, including in quantitative modelling, statistical data analysis and stakeholder engagement, that policy delivery relied on sound program design, risk management and program evaluation skills, and leadership was needed to foster creativity and ideas. Benchmarked against these skill attributes, the report commented that:

- there was a lack of comprehensive evidence about current APS strategic policy capacity and efficiency of public sector agencies
- policy and implementation needed to be better linked through engaging front line staff in policy design
- there was concern about whether the APS was attracting and retaining the best people.

In accordance with recommendations of the *Ahead of the Game* Report, the Australian Government instituted reviews of the capabilities of agencies in areas such as strategy, delivery and organisational operations.

To date, 21 capability reviews have been undertaken. Around half of the reviews conducted to date have noted that departments and agencies struggle with project management skills and program (particularly multiple project) management. In addition, they have found that while some agencies collected vast amounts of transactional and program data on business and individual clients, they failed to use that evidence base either because they lacked the skills or because their dated IT systems were not capable of effectively manipulating or interrogating the available databases.

Other reports suggest gaps or diminution in skills:

- Successive Auditor-General reports at both the Commonwealth and State levels have found evidence of poor program and project management capability, particularly on more complex initiatives. Contract management is a core activity of most agencies, yet often poorly understood and managed (box 7).
- Complaints about the quality of cabinet submissions for new policy proposals were raised by Ministers and Ministerial advisors in the Shergold Review.
- The Shergold Review also noted that 'The APS needs to build a strong cohort of skilled and experienced program and project managers rather than relying on the 'accidental' practitioners who are often selected when no-one with greater ability is available. Some experts already work in the APS, but their experience and qualifications are not sufficiently recognised and their professional status and career development rarely receive the attention they deserve' (Shergold 2015, p. vii)
Box 7 Contract management

A prominent area that has been a challenge for all governments is the management of contracts. This is part of the core business of most agencies, yet an area where reports suggest there are significant, persistent weaknesses. Problems seem most prominent in the management of contracts for major information technology (IT) and construction services.

According to the ex-head of the Australian Government's Digital Transformation Agency, the Australian Public Service has been stripped of its IT skills through decades of reliance on private sector contractors (Towell 2016). In his view, this has been exacerbated by a lack of technical and contract management expertise in government. The ex-head commented that, compared with the United Kingdom, there was a much greater 'disconnect' between policy making and policy delivery, with ideas passed on to junior staff, the States or non-government organisations to deliver without proper evaluation of the cost or effectiveness of the relevant programs.

As one example at the State level, the Queensland Health payroll system and associated information and communications technology projects took over 10 years to complete and was more than four times the original estimated cost. The development of the \$100 million system began in 2002 as part of Queensland's Shared Services Initiative to centralise administrative systems. When the system was implemented in 2010, it was reported to have contained numerous serious flaws.

Risks attaching to IT projects have been heightened by a tendency to create larger IT projects. According to the (OECD 2014), the Australian government had 52 IT projects larger than \$10 USD million in 2014 — the second highest number in a survey of 39 countries (with only 17 respondents to that question). The average duration of Australian projects was 24-30 months, representing high duration risk for successful delivery.

Some other countries have introduced constraints on IT contracts to reduce risk. For example, the Netherlands has capped the value of IT projects at \$10 USD million and their duration to a maximum of 12 months. In other countries, such as Estonia, large projects are sub-divided and sequenced into smaller sub-projects. According to (McKinsey & Company 2017):

Limiting the size of IT projects can also curb the scope and objectives of each project and provide clear boundaries. This limitation helps ensure the project is aligned with government strategy — both at the outset and throughout the project's lifetime. Well-defined objectives can also help avoid shifting requirements during project rollout, and a smaller scoped project can clarify ownership and accountability (McKinsey & Company 2017, p.107)

Of course, IT is only an enabling medium and the repercussions of failure in this area are felt more broadly in less efficient service delivery.

A recent report commissioned by the United Kingdom Business Services Association highlights that contract management problems are not unique to Australia (Sturgess 2017). The report emphasised that the procurement and contract management tools (and capabilities) that are appropriate for purchasing highly commoditised, easily specified goods and services are not appropriate for commissioning complex support services and front-line human services. It noted that the former suits a transactional approach to contracting while the latter requires a more relationship-based approach. The report also differentiated the capability requirements associated with the separate stages of contract commissioning, design, procurement and contract management, and recommended greater attention be given to each through training in applied public service contracting and the operation of public service markets.

In a broader performance context, a comparison of workforce capability and capacity indicators found the APS lagged other public and private sector organisations internationally in most areas in 2013 and 2014 (APSC 2014). In recognition of the need to rebuild public sector capability, the Australian Government has been undertaking so-called modernisation initiatives targeting specific areas of weakness. Examples of the most recent initiatives are described in box 8.

As noted, some effort has been made to address concerns raised in reviews, including through greater devolution of decision-making responsibility. Other areas merit further consideration, and are considered below.

Box 8 APS capability initiatives in the 2017-18 Budget

The Australian Government announced a range of initiatives to improve public sector capabilities in the 2017-18 Budget. The package of measures is estimated to cost around \$480 million over three years, which is to be funded through the continuation of a 2.5 per cent 'efficiency dividend' on the public sector. The following initiatives are a part of the Public Service Modernisation Fund:

- Transformation and innovation the Budget allocates \$350 million to advance the collection and use of government data in the development of evidence-based policy. The measure is also aimed at further developing whole-of-government service delivery platforms, supporting digital capability and systems to improve collaboration across the APS. The stream further provides funding to accelerate the consolidation of shared corporate services arrangements and modernise the administration of business and community grants.
- Agency sustainability \$130 million will be spent over three years to upgrade outdated information and communications technology systems and other assets, and support more modern operating models. Improvements in heritage assets such as the National Maritime Museum, National Film and Sound Archive and Old Parliament House are covered in this stream.

Source: Australian Government (2017b).

Building a capability evidence base

The *Ahead of the Game* Report noted that there was limited accountability for individual agency performance. Unlike countries such as Canada, New Zealand and the United Kingdom there was, at that time, no mechanism that would allow systematic measurement of agency capabilities in areas such as strategy, delivery and organisational operations.

The capability review program was intended to establish a comprehensive evidence base for future agency performance evaluation (Australian Government 2010). The Australian Public Service Commission (APSC) was tasked with managing the reviews, which were to be selected on the basis of risk management principles, led by eminent external reviewers, use a consistent methodology and be conducted at least every five years. According to the APSC (2015a), the strategic objectives of the program were:

- Agency Capability Assessment conducting independent reviews of key agencies to assess their ability to meet the Australian Government's objectives and future challenges
- Agency Capability Improvement working with individual agencies to ensure that the findings of reviews are translated into explicit capability improvements over time
- APS-wide Capability Building developing a view of capability across the APS and using this to realise solutions for systemic challenges.

The reviews were to inform agency-level capability improvement plans (devised by the Department Secretary or Agency Head in consultation with the APSC), with the Secretary or Agency Head accountable for progressing the plan through a performance agreement with the Secretary of the Department of Prime Minister and Cabinet.

The review program commenced in 2011 but review activity slowed significantly after 2014. There have been three reviews completed since that time. To the Commission's knowledge, there have been no follow-up reviews. The apparent stalling of the review program has meant that an evidence base on which to evaluate agency performance is now again lacking.

A mechanism is needed that identifies areas where capability (and other) problems remain unresolved, provides reasons why those problems persist, prompts change, and allows evaluation of progress over time. The Commission understands that the APSC is currently assessing the capability review program with a view to designing a new review framework:

The APSC is currently undertaking an assessment of the capability review program in the light of findings from whole of government reviews. The assessment is now also looking at other public sector review programs such as the New Zealand Performance Improvement Framework. The object is to draw lessons that could inform the design of a subsequent review framework with a strong future focus. (APSC, pers. comm., 18 July 2017)

CONCLUSION 15.1

The Australian Government should re-commit to building a sound evidence base for evaluating, and thence building, public sector capabilities.

Attracting and building skills

The Shergold Review argued that APS recruitment processes should better recognise the strategic links between policy design, delivery and evaluation in order to promote more diverse experience and capabilities among senior executives — but this could apply to staff generally. Staff selection and management criteria could accordingly place more weight on such program leadership and management capabilities.

In response to the *Ahead of the Game* Report (Australian Government 2010), the APSC developed a formal APS Human Capital Framework in 2012 to help agencies adopt strategies to improve workforce capability (knowledge, skills and abilities) and capacity (application of this capability).

Evidence on APS adoption of these strategies is mixed.

- Over 60 per cent of APS employees reported access to effective learning and development programs in 2015-16.
- Just 20 per cent of agencies had developed agency-wide talent management programs targeting high potential employees in that year. ²
- Only 44 per cent of employees considered that senior APS leadership encouraged innovation and creativity in 2015-16.
- Over three quarters of ongoing APS employees had worked with only one agency.
- Turnover rates for the APS are low by private sector standards (less than 7 per cent in 2015-16), implying access to new ideas is limited.
- Most respondents to exit surveys in 2015-16 reported a lack of career opportunities as the main reason for leaving highlighting retention barriers (APSC 2016).

These observations suggest some room to improve.

Mobility of personnel is an important avenue for existing cohorts to gain broader experience, new skills and improved collaboration, and many reviews recommended greater two-way secondment activity.

On structural barriers to greater mobility, there is a relatively low proportion of agencies actively encouraging staff exchange, as indicated by the existence of policies to promote such exchange. In 2016, only 17 per cent of APS agencies reported having a policy in place to promote exchanges with the private sector. The existence of policies promoting exchanges with other public sector (non-APS) agencies was a little higher at 28 per cent, and with other APS agencies the figure was around 40 per cent (APSC 2017). Comparative metrics from equivalent state and territory surveys are not readily accessible.

To promote greater levels of exchange, the APSC recently launched a pilot program (Operation Free Range), which enables interested employees to nominate for inter-APS transfer in areas with critical skills gaps. Other objectives of the program include skill development, retention of APS staff and greater awareness of whole-of-government priorities.

² In 2014-15, 65 per cent of APS agencies indicated they would deploy agency-wide talent management systems over the next three years (APSC 2015b). Fifty per cent of agencies used relationship-based opportunities (such as mentoring, coaching and peer support) to develop talent in 2015-16.

Approaches to achieving better outcomes in skill development could generally be informed by an APSC evaluation of the effectiveness of the APS Human Capital Framework, human capital strategies more generally and barriers to their adoption.

CONCLUSION 15.2

Public sector skill development could be improved through an evaluation by the Australian Public Service Commission of the effectiveness of human capital strategies and barriers to their adoption.

Accountability for change

The PGPA Act aimed to improve governance partly by requiring all public sector entities to report, through annual performance statements, results that would enable assessment of how well agencies are achieving their purpose. While the Department of Finance has issued guidance requiring entities to report on measures arising out of any review or evaluation the entity has committed to undertaking (DoF 2017a), that guidance does not specify whether agencies are obliged to report progress against commitments made at a whole-of-government level or as a result of external review.

A recent review by the Department of Finance (DoF 2017b) on the first annual performance statements produced in 2015-16 found that a significant number of agencies did not report against all performance criteria, they reported against modified criteria to suit actual outcomes, and more generally that the quality of performance information contained in corporate plans and portfolio budget statements was poor.

The DoF review also highlighted that the focus of PGPA requirements is on high-level outcomes. While outcomes are an important focus, many public sector reform recommendations also go to the inputs of policy development and program management including workforce capacity and capability, the effectiveness of stakeholder engagement and quality of risk management processes, which may not show up in annual performance statements.

Ultimately, workforce capabilities and management processes are the responsibility of department and agency heads and, at the sector-wide level, the APSC. There would be merit in more effort being made to ensure there is progress on identified problems, and to prompt and provide support for change where this is needed. To this end:

- the APSC should evaluate what has been done in response to reviews, and the impacts of changes. If progress is found to be poor, an educative process should be put in place, for example, in conjunction with the Australian and New Zealand School of Government, or similar body, to re-authorise and train public servants in better managing programs and supporting innovation
- in agreeing (either in part or whole) to the recommendations of reviews, responsible entities should commit to specific deadlines for delivery.

The Commission understands there may be concerns that the above proposals will add to internal red tape. But a focus on priority reform areas and how progress can be *advanced* (rather than reporting for its own sake) will improve public service accountability for progressing reform without imposing an unnecessary burden on public sector entities.

The above measures could also be complemented by the issuance of charter letters by the Secretary of the Department of Prime Minister and Cabinet to department heads stating expected capabilities, leadership qualities and reform priorities to lift those (for example, to counter risk aversion, and support evidence and stakeholder input-based policy).³

Charter letters to department heads would fulfil a function similar to letters sent by the Prime Minister to portfolio Ministers at the start of every government term, which specify the policies and priorities that Ministers are expected to observe or deliver. Statements of Expectation issued to statutory authorities fulfil this task for statutory/independent authorities. In the latter case, each authority responds with a Statement of Intent that outlines how it proposes to achieve the government's expectations. The same undertakings in reply should be expected of department heads.

The Joint Committee on Public Accounts and Audit (JCPAA) has in the past reported on progress in implementing the recommendations of public sector reform initiatives. The JCPAA could be tasked by parliament to oversee progress on agreed sector-wide reforms on an ongoing basis.

³ The Commission is not aware that any such arrangements are currently in place.

CONCLUSION 15.3

Progress on public sector reforms would be aided by:

- the APSC evaluating what has been done in response to reviews to rectify identified gaps in skills
- entities responsible for implementing public sector reforms committing to and reporting against specific deadlines for delivery
- charter letters from the Secretary of the Prime Minister's Department outlining expected capabilities and public sector reform priorities
- the Joint Committee on Public Accounts and Audit overseeing progress on agreed sector-wide reforms.

Sound policy making

Policy due diligence requirements are only one of the conditions that need to be satisfied for policy development, but a critically important one, with their importance highlighted by the many prominent instances of avoidable failure. Given the complexity of some policy problems and the inherent risks involved in policy change, due diligence requirements do not guarantee success, but do increase the likelihood that policies will work as intended and of smaller costs or harm arising from mistakes. Commenting on the importance of Cabinet processes, the Shergold Review noted, for example:

Cabinet processes support government decision-making. When functioning properly they provide an important safeguard against rushed, uninformed or poorly conceived decisions. Individual ministers have ownership of the proposals that they bring to Cabinet. They need strong support both from their staffers (on the one hand) and their public service departments (on the other). (Shergold 2015, p. v)

The focus should be on making the case for good policy, however, rather than simply adhering to rules. Appraisal processes can have little effect when there are political exigencies. And a common complaint is that Regulatory Impact Statement (RIS) requirements are applied or policed dogmatically, with the policy object lost for the compliance trees.

A clear lesson on the handling of situations under time pressure is that risk management needs to be given even greater importance. An important element of this and a safeguard for governments is consultation with stakeholders on policy ideas and how they could be implemented, which helps better identification and understanding of risks.

More generally, several reviews have highlighted the importance of close collaboration between the public service, service delivery agents and stakeholders in designing and implementing programs. These are tasks that necessarily cannot be wholly undertaken by senior executives, and point to considered devolution of responsibility to lift agency capabilities and ensure that enough effort is being devoted to identifying, monitoring and correcting the potential for things to go wrong.

On risk appetites and management, particularly in dealing with new or intractable problems, experimentation or pilots could help. They are a practical way of informing the better design of policy, but as a sanctioned part of 'good' policy development processes could help:

- better define acceptable levels and avenues of risk (in a systemic sense) for the department or agency given the insights that they can bring into service users' behaviour
- departments and agencies develop better management responses over time to the materialisation of risks (and in doing so providing some predictability on how issues will be managed when they arise, and by whom)
- by encouraging and providing an avenue for innovation in policy and program design

 and recognising that good ideas can come from any person help to change attitudes of risk aversion and over-caution in the public service
- ensure that policy risks, when they do not pay off, do not result in considered experimenters being punished.

And, as discussed in chapter 6, lessons from trials can be taken from elsewhere.

The Commission considers that there should be an explicit guarding against the creation of 'sacred cow' policy areas that are exempted from the normal consideration of likely costs and benefits, alternatives and trade-offs. In this context, participants have raised concerns that policy settings in areas such as national security and climate change mitigation do not receive the same level of scrutiny as some other areas. This, to an extent understandably, reflects a desire to mitigate or control risks. As the now Governor of the Reserve Bank of Australia has observed, however:

... it is appropriate occasionally to ask whether we have got the balance right. Reducing risks is not always cost free – resources need to be devoted to the task and this means that these resources cannot be used for other tasks. And perhaps even more importantly, it might also be the case that a more risk-averse society is naturally less inclined to support and finance innovation, to implement new processes and to apply new technologies. If this is indeed the case, it has implications for future productivity growth. (Lowe 2014)

A reality is that following good regulatory practice is challenging, and takes specific kinds of analytical skills. A common challenge is measuring the scale and hence cost of a problem, and the costs and benefits of possible interventions. Some practical advice in light of experience is set out in box 9.

Box 9 Some practical advice on decision-making

- It is crucial that there be clear justification for policy goals. Would the public be willing to pay for investments (and other costs) required to achieve these objectives, or might investments be better made elsewhere?
- There should be clear articulation of targets. What will progress toward achieving objectives and success look like? How will progress and success be measured?
- In relation to means of achieving goals, governments should seek evidence and input on what works, risks (in implementation and the external environment), and options.
 - Evidence is critical, as is its proper use. 'Expertise is often ... about nuance and 'it depends' rather than absolutes. And for this reason, it is essential to enabling us to make progress on difficult policy problems' (Sullivan 2017).
 - Cost-benefit appraisals are important in judging proposals. While quantification is ideal, many things are hard to quantify with any confidence. Nevertheless, the framework should be used as it can show the hurdle that less tangible costs and/or benefits need to clear for a policy to produce a net benefit.
 - Policy advisors should be open to ideas/contest from 'outside'. Similarly, they should be open to drawing on evidence and/or lessons from policy in other jurisdictions. Policy questions are rarely new.
 - Policy decisions should incorporate a proper understanding of distributional consequences.
 - Trials can be useful where policy problems are amenable, both to increase the evidence base and as a catalyst for change.
 - Public consultation on policy directions and design is critical. It also helps governments to anticipate and better deal with uncertainties that accompany implementation and the consequences of reform.

It should be recognised that policy arguments are rarely simply narrow technical questions. Analysts need to consider competing values, different views on how the world works, non-quantifiable costs and trade-offs, and how these different perspectives would influence the decision. This analysis is needed to prepare for effective advocacy for the reform.

CONCLUSION 15.4

No policy areas should be immune from proper appraisal. But RIS processes should emphasise sound policy-making rather than simply adherence to rules.

Reviews suggest the particular importance of building a sound evidence base on public sector capabilities, and increased collaboration between the public service, service delivery agents and industry stakeholders in designing and implementing programs.

New ways of addressing policy challenges

Concerns about the decline in traditional social services delivery outcomes in Australia have led to alternative service delivery models emerging, though these are on a very small scale compared to the size of government program spending in this area. Some examples are described in box 10. They commonly rely on strategic alliances between business, philanthropy, government and the not-for-profit sector to use evidence as the basis behind testing, implementing and scaling new social services initiatives. They have also influenced the establishment of corporate foundations to grow support for new ways of addressing policy challenges and scholarships for innovation courses aimed at building skills and career paths in not-for profit-activities.

Program evaluation should be standard

Evaluating the efficiency and effectiveness of government programs is critical to evidence-based policy formulation. Done well, evaluation can provide information about program performance to aid decision-making and prioritisation in the annual budget process. It can also strengthen accountability by providing formal evidence of a program manager's oversight and management of program resources and assist those program managers to improve the performance of the programs under their administration.

From a public policy perspective, successful program evaluation strategies share a number of key elements. They rely on the availability of robust program performance information. They require strong analytical and research skill capabilities in the departments (or the contracted or independent reviewers) that conduct the evaluations. They benefit from the involvement of both central agencies and the engagement of line departments managing the programs, and are often most effective when they are formally established by the executive government or through legislative instrument, and link to some process of higher-level scrutiny and decision-making. Last, evaluation results must be made public to enable broader scrutiny and transparency (Mackay 2011).

At the Commonwealth level in the decade to the mid-1990s, all budget funded programs were required (by statute) to be evaluated every 3 to 5 years, with evaluations integrated into the budget process. This period was associated with extensive evaluation activity (530 evaluation reports were published between 1993 and 1997) and there is at least qualitative evidence that evaluation findings made a substantial contribution to Cabinet debate and the development of policy options. For example, surveys conducted by the Department of Finance show that across the 1990-91 and 1994-95 budget years, the proportion of new policy proposals influenced by the findings of an evaluation rose from 23 per cent to 77 per cent (Mackay 2011).

Box 10 Innovation in social policy

There have been a number of recent initiatives addressing specific social policy issues in Australia that have been based on venture philanthropy and involved linking alliances and skill sets to develop new ways of addressing social policy problems. These alliances have involved collaborations between government, private business, individual philanthropists and not-for-profit sectors to build evidence-based approaches to delivering impacts.

Centre for Social Impact

The Centre for Social Impact was established in 2008 as a collaboration between three universities — University of New South Wales, Swinburne University of Technology and the University of Western Australia. The Australian government contributed a \$12.5 million endowment to the Centre matched by four corporate investors — Macquarie Group Foundation, AMP, National Australia Bank and PwC — and supported by individual philanthropic contributions. The Centre aims to improve the delivery of social impacts in Australia through research, teaching, measurement and promoting public debate. This is based on collaboration between business leaders and organisations, government and social purpose sectors to build evidence-based, sustainable and scalable approaches to improving impact.

Social Ventures Australia

Social Ventures Australia (SVA) is a not-for-profit private organisation established in 2002 by The Benevolent Society, The Smith Family, WorkVentures and AMP Foundation. It provides venture philanthropy grant funding, expertise and networks to support organisational transformation and the development of new ways to tackle social change. Its focus is on overcoming disadvantage in Australia, including through education, sustainable employment, stable housing and appropriate health, disability and community services. Initially focusing on funding social entrepreneurs through a venture philanthropy model, SVA subsequently engaged with government to reallocate resources to new and potentially more effective models of service delivery. SVA's range of services are designed to assist business, government and philanthropists to be more effective funders and social purpose organisations to be more effective at delivering services.

SVA pioneered the introduction of social impact bonds in Australia, which are an innovative approach to financing social programs that combine outcome based payments with market disciplines. Social impact bonds are designed to raise private capital for intensive support and preventative programs which address areas of social need. Private investors provide the initial capital to fund the cost of a social service provider and the government pays the private investors a financial return if the agreed social outcome is achieved. They are currently being used or trialled in several Australian jurisdictions including New South Wales, Victoria, Queensland and South Australia.

Goodstart Early Learning

Goodstart Early Learning is a not-for-profit, for-purpose social enterprise that aims to address poor early childhood experiences. It is Australia's largest provider of early childhood education and care, with 13 000 staff caring for 73 000 children across 641 centres. It commenced in 2009 as a consortium of four of Australia's leading charities — The Benevolent Society, the Brotherhood of St Laurence, Mission Australia and Social Ventures Australia. With the support of Australia's financial, legal, business, government, and philanthropic sectors, it made a successful bid for 660 of the child care centres formerly operated by ABC Learning (which had gone into voluntary liquidation in 2008). All profits (surpluses) are re-invested into educational activities and outreach to disadvantaged communities.

There is also evidence that evaluation findings were used by line departments to improve operational and internal management systems. For example, a review conducted by the (ANAO 1997) found a high level of evaluation utilisation by line departments with the most significant impact on operational efficiency and a lesser impact on resource allocation decisions and service quality improvements.

Elements of this model currently operate in all jurisdictions. However, one of the key features — the linking of evaluation processes with explicit decision-making — is not universal. In some cases, the legislative requirement for review of programs has been subsumed by more modern requirements for periodic review of policy settings (such as through sunset clauses in legislation). But the integration of evaluations into formal decision-making processes — most obviously for budget-funded programs in the construction of governments' annual budgets — would be a significant improvement on current practice. Reflecting on the benefits of integrating evaluation into budget processes a previous Commonwealth Auditor-General commented:

... the success of evaluation at the Federal level of government was largely due to its full integration into the budget processes. At least where there was a resource commitment, some form of evaluation was necessary to provide justification for virtually all budget bids (Barrett 2001, p 13).

The evaluation system operating prior to the mid-1990s was dismantled partly because of concerns from line departments about the administrative burden of planning and conducting evaluations and also due to a lack of program evaluation skills. The change also reflected a shift toward greater contestability in policy advice that lessened the demand for systematic use of evaluations in the budget process (Tune 2010).

Taking into consideration the lessons from the past, a more effective program evaluation system would include the following features:

- the greater use of sunset clauses on programs with a fixed deadline for the completion of an evaluation before new funding is committed, an approach similar to that used for assessing the efficacy of regulatory instruments
- similarly, governments should consider making the continuation of program funding conditional on completion of an evaluation and the rectification of significant problems identified, where this would be an effective incentive
- evaluation priorities should be risk-based, with larger programs subject to the earliest scrutiny. This is the approach in performance audits by every jurisdictional audit office.

Who should conduct evaluations?

Evaluations of programs can serve multiple objectives, including assessing their efficiency (are they being delivered at the lowest cost), effectiveness (are they achieving their stated objectives) and outcomes (are community impacts still worth pursuing). Evaluations with different objectives require different methodologies, tools and evaluation skills. They also

rely on adequate management information systems that monitor program inputs and results. The control of those information systems has implications for who should undertake or be involved in evaluating program performance.

As a general principle, it is desirable that judgements on the effectiveness of policies in achieving their objectives be reached independently of agencies that administer them. These would necessarily be informed by the input of, including the data that can be provided by, agencies (the involvement of departmental staff can also overcome resistance to the sharing of performance information with external parties).

Agencies should also ideally have the capabilities to support, and a culture of internal evaluation to enable, ongoing improvement and the meeting of new challenges.

The experience of New South Wales suggests external or arms-length evaluation structures, on their own, do not guarantee success. The NSW Government established a Centre for Program Evaluation in 2013 to conduct rigorous evaluations of large and significant NSW Government programs. It also aimed to build evaluation capability across the NSW public sector, and more closely align the processes of evaluation and program/policy design. Despite the intention, the Centre has not publicly released any reviews or evaluations after more than four years of operation. According to one commentator:

The NSW Centre for Program Evaluation was a product of the NSW Commission of Audit in 2012. Active for three years now, it has not released any publication on any NSW policy initiative. In fact, a review of the NSW liquor and lock-out laws was completed last year, but in a sensitive political climate it has not been released (Gruen 2016).

The Commonwealth's former evaluation system did not prescribe who should conduct evaluations but relied on the responsible entity to either conduct or commission evaluations. This is the current approach in New South Wales, where agencies (or agency clusters) are expected to steer periodic evaluations of new and existing programs in line with guidelines issued by the Department of Premier and Cabinet.

Importantly, New South Wales' guidelines identify the need for Departments and agencies to invest in training and development to improve their own evaluation capability and capacity (NSW Government 2016). Governance arrangements involve agency clusters preparing annual evaluation schedules for approval by the Cabinet Expenditure Review Committee.

Complementing internal evaluation, the Commission envisages that jurisdictional audit offices would continue to conduct systematic reviews of program efficiency and effectiveness for large and high-risk programs.

CONCLUSION 15.5

Evaluations should be standard practice and linked to the decision-making processes of government (including budgets).

3 Overarching budget disciplines

Current fiscal circumstances vary widely across jurisdictions and reflect differences in industry structures and tax bases as well as approaches to budget management.

The Commonwealth's expenditure is almost double that of the States and Territories (\$429 billion in 2015-16, compared to \$237 billion) (Australian Government 2017a, 2017c), thus its fiscal circumstances have a major bearing on overall national outcomes.

The Commonwealth has been running budget deficits since 2008-09 (figure 1). As a result, the ratio of Commonwealth net debt to GDP has gone from -3.3 per cent in 2007-08 to a projected 18.6 per cent in 2016-17.



^a Data for 2016-17, 2017-18 and 2018-19 are estimates. Data for 2019-20 and 2020-21 are projections. *Source*: Australian Government 2017a.

The national net debt position has shifted from -6.8 per cent of GDP in 2007-08 to 21.2 per cent (est.) in 2016-17, 88 per cent of the latter generated by the Commonwealth. At this stage, the Australian Government is seeking to return to a surplus position in 2020-21.

The Commonwealth's surplus target has been revised five times since the 2010-11 budget. In recent years, the worsening in the Commonwealth's fiscal balance has significantly reflected over-optimism embedded into a system that inherently favours a return to past performance after a shock (box 11). A consequence has been that at times both revenue and expenditure forecasts have been astray and persistent borrowing has been required.

The Budget has not been helped by the national tax system, considered to be one of the most complex in the world and increasingly under pressure from structural factors such as technological change; highly mobile investment and multinationals' intra-firm purchasing and lending arrangements; and greater international labour mobility (box 12).

Ultimately, economic forecasts are simply a basis for constructing budgets and one way of assessing the contingencies to which policy might need to respond. As discussed in chapter 6, a key question, given the persistent uncertainty of revenue forecasts, is whether expenditure can be subject to better mechanisms that heighten the likelihood of targets being met and longer-term pressures being prudently managed. The remainder of this section provides background information on fiscal management disciplines discussed in the chapter.

Fiscal strategies

Governments have been making efforts to ensure public finances are on a sustainable track, with States and Territories generally having more success than the Commonwealth.

A distinction between most States and the Commonwealth is that the former have specific fiscal targets (table 1). The types of targets adopted vary from jurisdiction to jurisdiction but typically limit growth in expenses and net debt to specific or calculable levels. Every State except Queensland and Western Australia achieved their fiscal target either at or within the target time frame.

Box 11 Commonwealth budget forecasts

Projections of the federal budget position have been optimistic in recent years (figure 2). In part, this is the result of the economic forecasting methodology. A key assumption of this methodology is that nominal Gross Domestic Product growth converges to its long-term trend within five years after the forecast period (first two years after the Budget year). Where actual GDP falls short of this expectation, there will be lower than forecast government revenues and a worsening budget position. According to the most recent review of the budget forecasting methodology:

Treasury's approach is likely to generate reliable forecasts at times when economic conditions are normal but will be challenged at other times. By construction Treasury's forecasts are weighted toward achieving trend-like, consensus outcomes. This increases the risk of persistent errors being made in Treasury's forecasts. Errors at turning points are almost inevitable. (Tease 2015, p. 5)

The Parliamentary Budget Office has observed that deteriorations in the Commonwealth's budget position have predominantly reflected over-optimism in forecast revenues (PBO 2016). The Federal Treasury has reported that this reflects difficulties in forecasting both the real and nominal economy in the wake of the Global Financial Crisis, and domestic and international changes in the structure of economies (Australian Government 2012).

In response to several reviews since 2005, the Treasury has continued to refine its forecasting models, develop better information sources and staff capabilities, as well as improve reporting on the sensitivity of central forecasts to assumptions and external events. Comparisons of the accuracy of Treasury's forecasting with that of equivalent agencies in other countries and private forecasters indicate that results are, on average, on par with peers (Tease 2015).



Box 12 Australia's tax system – expensive and outdated

There are over 100 different Commonwealth taxes, but the majority of revenue is derived from just a few taxes. In 2013-14, 50 per cent of revenue came from personal income tax, 22 per cent from corporate income tax, 15 per cent from the Goods and Services Tax and remainder from other indirect taxes. Australia's reliance on income tax is projected to increase to close to 80 per cent by 2024-25. States and Territories' main sources of tax revenue are stamp duties and payroll tax. Local government's main own source of revenue is municipal rates.

The 2015 *Re:think* Tax White Paper noted that the tax system is performing poorly on core criteria.

Efficiency. The economic costs of raising revenue are high and rising due to Australia's particular mix of taxes. The most costly taxes are considered to be company tax due to the mobility of capital and the relatively high tax rate (30 per cent) and stamp duties, because they have a narrow base, and discourage investment and exchange of property. Company tax provides around 20 per cent of Commonwealth revenue and is estimated to cost 50 cents in reduced welfare for every \$1 raised (the marginal excess burden). Stamp duties raise around 22 per cent of revenue for the States, and are estimated to cost around 70 cents for every dollar raised. Lower-cost taxes include consumption and land-based taxes because they are less distortionary and more stable sources of revenues, but these make up only a small proportion of revenue.

Efficiency costs also arise from the reliance of States and Territories on the Commonwealth for a large proportion of their revenue (Supporting Paper 14). The Commonwealth raises around 80 per cent of total tax revenue in Australia. Some states have responded to their limited revenue raising options and rising fiscal pressures by proposing taxes that are likely to be highly costly. For example, South Australia recently announced it intends introducing a levy on its share of liabilities held by Australia's five largest banks. The distortionary potential consequences of this proposal highlight structural weaknesses in the tax system, and without a change in this structure, incremental tax decisions simply add to the inefficiencies.

Equity. Fairness is inevitably a value judgment but, on various levels, the system is unsatisfactory. On vertical equity — current rate structures are likely to result in taxpayers facing higher average tax rates over the next decade, largely due to tax thresholds not keeping up with inflation or wages growth (bracket creep). While bracket creep exists because of the progressivity of the personal income tax system, it affects lower and middle income earners proportionally more than higher income earners. For example, an average ordinary full time wage earner in 2013-14 was subject to an average tax rate of 22.7 per cent, and is expected to face an average rate in 2023-24 of 27.4 per cent. In contrast, someone with half that income would have faced an average tax rate of 10.3 per cent in 2013-14, increasing to 17.8 per cent by 2023-24. Bracket creep also erodes the rewards for effort over time and can affect workforce participation, particularly for those with lower levels of income.

(continued next page)

Box 12 (continued)

Simplicity. Australia's tax system is regarded as one of the most complex in the world, partly reflecting the desire to keep up with complex global business models and tax planning, but also reflecting 'new treatments and concessions added in a piecemeal fashion, usually to assist a particular group or otherwise correct for un-intended outcomes'. The costs of complexity are not trivial; Commonwealth tax administration and compliance costs alone are estimated to cost over \$43 billion a year (of which compliance costs are \$40 billion); in addition, the time and resources devoted to tax planning are estimated to be very large.

Australia has a relatively low overall tax burden compared to other countries. However:

- Australia relies more on corporate and personal income tax than other developed countries.
- Corporate and income tax rates are among the highest in the developed world and significantly higher than some key regional competitors.
- Australia has a lower reliance on consumption taxes (a more efficient tax) than most developed countries.

Sources: Australian Government 2015b; Murphy 2016.

At the Commonwealth level, the framework for budget discipline is based on a legislated Charter of Budget Honesty (in place since 1998), which provides principles for the development of fiscal strategies.

The Government's current fiscal strategy seeks the achievement of fiscal surpluses, on average, over the economic cycle, including through reducing the ratio of payments to GDP and stabilising and then reducing net debt over time.

The Commonwealth has relaxed its fiscal strategies over the years (box 13). In part, this may reflect that unforeseen events have prevented commitments being achieved. But it has also softened the discipline that the strategies may once have imposed on aggregate expenditure.

Fiscal targets are not prerequisites for achieving fiscal sustainability. And they are, by nature, crude tools. There is no neutral answer to the question of the optimal size of government, and shocks may occur that prevent achievement of targets. But credit ratings affect the cost of debt, and large debt positions increase vulnerability to shocks, so the size of debt — which need not necessarily correlate to the current size of government, of course — cannot be ignored.

		Compliance reporting	Is target being
Jurisdiction	Fiscal targets	requirement	met
Australian Government	Budget surplus on average over the course of the economic cycle. Reduce payments to GDP ratio over time. Stabilise and reduce net debt over time. Achieve budget surpluses of a least 1 per cent of GDP as soon as possible.	Yes	No
New South Wales	General government expense growth less than average long run general government revenue growth. Eliminating unfunded super liabilities by 2030.	Yes	Yes
Victoria	Sustainable general government sector net debt to Gross State Product ratio over the medium term. Fully fund super liabilities by 2035. Net operating surplus consistent with sustainable general government sector net debt level over the medium term.	Yes	Yes
Queensland	Ongoing reductions in general government sector debt to revenue ratio. Target operating surpluses to fund general government sector capital investment through recurrent revenue. Keep general government sector own-source revenue below 8.5 per cent of nominal Gross State Product. Growth in full-time public employment not to exceed population growth.	Yes	Partial
South Australia	Achieve general government sector net operating surplus every year. General government sector expense growth limited to household income growth. Maximum ratio of general government sector net debt to revenue of 35 per cent.	Yes	Yes
Western Australia	General government sector expenditure growth limited to revenue growth. Cash surplus from general government sector operating activities of at least 50 per cent of infrastructure spend and 5 per cent of receipts for the total non-financial public sector. Total non-financial sector net debt at or below 55 per cent of revenue.	Yes	Mostly No
Tasmania	General government annual expense growth less than average long run revenue growth. Servicing cost of general government debt and superannuation liabilities less than 6 per cent of general government cash receipts.	Yes	Yes
ACT	Achieve an operating balance over the medium term.	Yes	Yes
			(continued next page)

Table 1Jurisdictional fiscal strategies 2017-18a

Table 1	(continued)		
Jurisdiction	Fiscal targets	Compliance reporting requirement	ls target being met
Northern Territory	Achieve general government sector net operating surplus (so general government capital investment funded through revenue rather than borrowing) over the medium term. Maintain general government infrastructure spending consistent with depreciation expense over the medium term. Maintain a competitive tax environment. Net debt as a percentage of revenue returns to long-term average of 40 per cent.	Yes	Mostly No

^a Fiscal strategies relate to 2017-18 budgets except with respect to Western Australia. The latter's strategy is based on its 2016-17 budget.

Source: Jurisdictional Budget Papers.

Budget year		Budget outcome Percentage of GDP	Net debt Percentage of GDP
2007-08	 Fiscal strategy Maintain budget balance, on average, over the course of the economic cycle Maintain budget surpluses over the forward estimates period Not increasing the overall tax burden from 1996-97 levels Improve the Government's net worth over the medium to longer term 	1.7	-3.3
2008-09 2009-10 2010-11	 Fiscal strategy Achieve budget surpluses, on average, over the medium term* Keep taxation as a share of GDP, on average, below the level of 2007-08 Improve the Government's net financial worth over the medium term 	-2.1 -4.2 -3.4	-0.8 3.8 6.5
2012-13 2013-14	 Deficit exit strategy** Hold real growth in spending to 2% a year until the budget returns to surplus 	-1.2 -3.0	10.4 10.5 13.3
2014-15 2015-16	 Fiscal strategy Achieve budget surpluses, on average, over the course of the economic cycle Reduce ratio of payments to GDP Pay down debt by stabilising then reducing Government securities on issue Improve net financial worth over time 	-2.3 -2.4	15.3 18.5
	 Budget repair strategy Deliver budget surpluses building to at least 1% of GDP by 2023-24 Offset new spending measures with spending reductions elsewhere 		
2016-17 2017-18	 Fiscal strategy Achieve budget surpluses, on average, over the course of the economic cycle Reduce ratio of payments to GDP Stabilise then reduce net debt over time Improve net financial worth over time 	-2.1 -1.6	18.6 19.5
	 Budget repair strategy Deliver budget surpluses building to at least 1% of GDP as soon as possible Offset new spending measures with spending reductions elsewhere 		
Source: Au	Note: Budget outcome figure refers to underlying cash balance as per cent of GDP. Net debt figure is per cent of GDP. Data for 2016-17 and 2017-18 are estimates * In 2009-10 the fiscal strategy involved achieving budget surpluses, on average, over the course of the economic cycle. ** There was no deficit exit strategy in 2008-09.		

There are risks on the upside (over-reaching the target) as well as the downside. The Business Council of Australia has noted that the number of countries with fiscal rules (impliedly specific limits, which it advocates) has grown from six in 1985 to 85 in 2014 (BCA 2017). Supported by transparent accounting and monitoring, the adoption of more specific targets could be a useful public policy tool to help alert the parliament to developing imbalances.

Recent changes to fiscal reporting by the Australian Government have sought to improve transparency and align federal budget reporting with approaches in the States and Territories. Specifically, the Treasurer announced that the 2017-18 budget would begin reporting the net operating balance — a measure of revenues less expenditures (including depreciation). Unlike the traditional cash balance measure, the net operating balance does not include net new capital investment, such as infrastructure or defence spending, and provides a better indication of whether the government is meeting its recurrent obligations from its annual revenues. The Treasurer noted that this change would bring the Australian Government into line with the States and Territories and key international counterparts like New Zealand and Canada. (Morrison 2017).

CONCLUSION 15.6

Supported by credible budget parameters and transparent accounting, the adoption of fiscal targets by the Australian Government could help budget management.

Budget parameters

Concerns about optimistic budgets (box 9) have raised concerns about the independence of advice given to the Australian Government on economic forecasts. For example, both the chief executive of the Grattan Institute and a former Reserve Bank Board member have recently suggested that Treasury's forecasting function should be moved to an independent body to improve accuracy and transparency (Potter 2017). The Commission notes, in the first instance, that forecasts underpinning revenue and expenditure projections are determined by the Government on the advice of the Treasury, rather than being independently set. As such, the question is whether there would be merit in removing responsibility for setting budget parameters from the government.

In principle, as budgets inherently reflect the priorities and commitments of the government of the day, removing responsibility for budget forecasting from governments would seem to be unhelpful in holding them to account for outcomes (that is, there is a risk of externally-produced forecasts being blamed for results rather than there being a focus on the fiscal strategies devised by governments in response to these necessarily indicative parameters).

There is little evidence to suggest that economic forecasts would be substantially more reliable if undertaken by another party, assuming current efforts by the Treasury to improve its systems and methods are implemented. And Treasury's role in providing advice on economic conditions to the Treasury Secretary⁴ and Government would presumably require a retention of forecasting capabilities, which would mean that shifting the forecasting function would result in duplication of forecasting systems across Treasury and the new forecasting body.

Better understanding the underlying drivers of budgets

Fiscal pressures are anticipated to increase with demographic change. Chapter 2 discussed the need for a longer horizon (10 years) for the reporting of the projected impacts of selected major programs to better inform decision-making, and the merits of a whole-of-nation intergenerational report (IGR). Further information on the latter is contained in box 14.

Box 14 Intergenerational Report

The Intergenerational Report (IGR) was established under the *Charter of Budget Honesty Act 1998* primarily to raise public awareness about the budgetary challenges associated with an ageing population. The Act stipulates that the IGR is to be produced every five years. The latest report was published in 2015, and followed reports in 2002, 2007, and 2010.

The IGR assess the long-term sustainability of current Government policies and how changes to Australia's population, age profile and other factors may impact on economic growth, the labour force and public finances over the coming 40 years. The report presents projections of a range of economic and fiscal variables based on a set of simplifying assumptions, which include no change to current stated government policy settings. As noted in the most recent report:

All projections are inherently uncertain particularly over long timeframes. ... The projections of the budget position take into account how [government] spending per person is likely to change for different age groups based on current policy, and then uses the expected structure of the population to work out total spending, which in turn can be used to work out the overall budget position over the next 40 years. (Australian Government 2015a, p. xxv)

The Charter of Budget Honesty Act does not specify the content or the format of the Commonwealth report other than indicating that it is to assess the long term sustainability of current government policies.

Several commentators and participants have suggested shifting responsibility for IGRs at the federal level from Treasury to the statutorily independent Parliamentary Budget Office (PBO) for example (Daley 2015; OECD 2012; Pearson 2015; Watt, D and Anderson 2017). This would help to ensure that the IGR is a non-partisan report and help practically in achieving a consolidated view of governments' fiscal sustainability.

⁴ Particularly to support the Secretary in their role as a member of the central bank board.

A shift in responsibility for the IGR to the PBO would require that office to be able to make long-term projections. This could be helped (and duplication avoided) by the sharing of some aspects of budget forecasting systems with Treasury, as occurs in the United Kingdom.

Is there a case for greater independence in monitoring and supervision?

At a broader level, a number of countries have introduced Independent Fiscal Institutions (IFIs) to provide greater transparency in fiscal policy making (Koptis 2011). The functions vary from country to country but can include assessing compliance with fiscal rules or targets, macro-fiscal evaluation, sustainability of public finances, forecasting economic and budget outcomes, costing policy proposals and formulating fiscal policy advice. A comparison of the functions of selected IFIs is presented in table 2. More detail on the operation of three of the institutions is at box 15.

Although they may undertake different functions these institutions share common features. They are all responsible for forward-looking analysis and assessment of budget-related bills or other legislative provisions in the fiscal area (including consistency with fiscal rules or targets, where they exist). They perform real-time costing and forecasting to determine the fiscal consequences of policies. They have no decision-making authority and no power to enforce fiscal rules or targets. Apart from these common attributes, the design, structure and role of IFIs has reflected the particular circumstances and needs of each country. In the words of the OECD:

... in each case there are features [of IFIs] that are specific to each country's needs, legal traditions and initial historical context at the time of establishment. These features, of course, evolve over time, as the institution acquires experience. (Koptis 2011, p. 3)

Table 2Functions of independent fiscal institutions

Selected countries

Country	Institution	Year established	Functions				
			Compliance	Evaluation	Sustainability	Costing	Advisory
United States	Congressional Budget Office	1975		х	Х	х	
Netherlands	Central Planning Bureau	1986	Rules	Х	Х	Х	
Belgium	High Council of Finance	1989	Targets	Х	Х		Х
Korea	National Assembly Budget Office	2003	C	Х		Х	
Sweden	Fiscal Policy Council	2007	Rules	Х	Х		Х
Canada	Parliamentary Budget Officer	2008	Targets	Х		Х	
Hungary	Fiscal Council (former)	2009	Rules	Х	Х	Х	
United Kingdom	Office of Budget Responsibility	2010	Targets	Х	Х	Х	
Australia	Parliamentary Budget Office a	2012	Ū.	Х	Х	Х	

^a Australia's Parliamentary Budget Office may research and report on matters relating to the budget cycle, fiscal policy and financial implications of proposals, but it is not directed to do so under its legislation.

Sources: Koptis 2011, Parliamentary Service Amendment (Parliamentary Budget Officer) Act 2011 (Cth).

There do not appear to be features of other independent fiscal institutions that should clearly be imported to Australia. The legislation establishing Australia's PBO provides considerable flexibility with respect to its functions, including that the PBO can, on its own initiative, research and analysis of fiscal policy settings. We have suggested in the Report that the PBO be explicitly requested to annually monitor the ability of budgets to achieve (more specific) fiscal targets (Recommendation 2.3), and this measure is consistent with its remit.

One notable difference between the PBO and some other IFIs is that it must use the Government's official economic and budget forecasts in the conduct of its functions and is prevented from developing its own forecasts and fiscal parameters (though it may comment on the Government's). This contrasts with the arrangements in the United Kingdom, where the Office of Budget Responsibility produces its own medium-term economic and fiscal forecasts. (As discussed above, the duplication of budget forecasting tasks in Treasury and the PBO seems unlikely to offer significant net benefits).

Recent reviews of the PBO have concluded that it has been a successful institutional development in Australian governance and is a trusted and independent source of budgetary and fiscal policy analysis that has filled a significant gap in Australia's public policy landscape (ANAO 2014; Watt and Anderson 2017). In terms of improvements, the recommendations from these reviews have largely focused on operational issues (in areas such as priority setting and the accuracy of timeliness of policy costings), aside from a recommendation to shift responsibility for the IGR from Treasury to the PBO (see above).

At a jurisdictional level, New South Wales introduced its own parliamentary budget office in 2010 but its role is restricted to providing election policy costings and budget impact statements of all costed policies. The NSW PBO operates in the lead-up to general elections but remains inactive at other times. Victoria recently announced a similar agency, but with a wider remit that covers election and general policy costings and the provision of technical assistance to members of parliament on matters of fiscal and financial policy. Unlike NSW, the Victorian PBO will operate throughout the term of parliament (Pallas 2016).

Box 15 Independent fiscal institutions

Internationally, specialist budget agencies such as Australia's Parliamentary Budget Office are collectively known as Independent Fiscal Institutions (IFIs). Most have a role in preparing or assessing macroeconomic assumptions and analysing long-term fiscal sustainability. Of the 17 IFIs in OECD countries, those in Australia, Canada, Korea, Mexico, the Netherlands and the United States have no mandated role in monitoring compliance with fiscal rules (although Australia's PBO is not prevented from doing so and the United States' Congressional Budget Office reports against the Statutory Debt Limit); two have no role in producing macroeconomic assumptions (Australia and the Slovak Republic); and only two prepare election policy costings (Australia and the Netherlands). A brief description of selected independent fiscal institutions is presented below.

United Kingdom

The United Kingdom Office of Budgetary Responsibility (OBR) was created in 2010 to provide independent analysis of UK public finances. The OBR's main roles involve 5 year economic and fiscal forecasting to accompany the UK Budget, evaluation of the government's performance against its fiscal targets, assessing the long-term sustainability of public finances (a similar function to Australia's Intergenerational Report), analysing the public sector's balance sheet, evaluating fiscal risks and scrutinising the UK Treasury's tax and welfare policy costings at each budget. The OBR has a corporate structure with board oversight. The OBR operates under a Charter for Budget Responsibility, which proscribes the organisation from commenting on or assessing the particular merits of government policy.

United States

In the United States, the Congressional Budget Office was established in 1974 to provide independent analysis, costings and projections of budgetary and economic outcomes over a 10 year time horizon to support the Congressional budget process. These reports compare current with historical projections, compare the official economic forecast with those of other forecasters and show budgetary effects of alternative policies. Longer term forecasts out to 30 years model the effects of demographic trends, economic developments and rising health care costs on federal expenditure, revenue and deficits. The Congressional Budget Office also provides cost estimates of nearly all bills approved by Congressional committees.

Australia

The Parliamentary Budget Office is a statutory, independent government agency established under the *Parliamentary Service Act 1999*. The PBO commenced operations in July 2012. Its role is to provide independent analysis of the budget cycle, fiscal policy and the financial implications of policy proposals. However, under the legislation, the functions of the PBO do not include the preparation of economic forecasts or budget estimates (whether at the whole-of-government, agency or program level). The PBO's legislation explicitly directs it to use the economic forecasts and parameters and fiscal estimates contained in the most recent relevant reports including the Budget Report, Intergenerational Report and Post-election Economic and Fiscal Outlook Report.

Sources: Parliamentary Service Act 1999, ANAO 2014; Frankel 2011.

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Australian Government

Productivity Commission

SHIFTING THE DIAL

LOCAL GOVERNMENT

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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Key points

- Local Governments form an important third tier of government, acting on delegation or authority of the States with respect to regulatory tasks that are deemed to be most effectively and efficiently defined and/or implemented at the local level.
- Like other levels of government, the demands on Local Government are increasing. Common concerns raised by inquiry participants included the ability of councils to meet these demands, and incentives for improvements in performance.
- The amalgamation of councils has been, for some, an effective way of taking advantage of scale in the provision of services, and pooling resources and technical capacities. However, whether amalgamation produces *net* benefits is not always clear cut. There are concerns in some areas that gains from amalgamation may not be sufficient to offset other perceived losses, such as local communities' connectedness to their councils.
 - A simple and preferred step before amalgamations would be for residents and ratepayers to receive a professional assessment of the trade-offs of 'standing alone'
- The ability of Local Governments to undertake their roles is affected to a degree by restrictions on raising revenue.
 - In the short term, there seems little prospect of restrictions such as rate capping being relaxed. They exert, in the presence of relatively weak mechanisms to ensure the prudence and efficiency of expenditure, pressure on councils to make the case for rate increases and justify any proposed variations in the context of their strategic and financial planning.
- A theme of several recent reviews by the Commission was that State Governments have delegated functions to councils without clear policy frameworks or well-designed support. This theme was raised again in this review, including in relation to planning functions (the latter is discussed in chapter 4 and SP 10 of this Report).
- The performance of Local Government would be more effectively gauged and improvements in their performance promoted with clear guidance and matching autonomy on their responsibilities.
- In principle, meaningful information on how well Local Government services match the requirements of their communities and State Governments, and their efficiency over time and against peers, should reduce the need for restrictions on revenue raising (by improving the accountability of Local Government to residents and taxpayers).
- Such information would also help identification of best practice methods in Local Governments for future policy development; and provide sounder incentives for Local Governments to improve their performance.

Local Government

1 Local Government in Australia

In Australia, Local Government forms an important third tier of government, acting on delegation or authority of the States with respect to functions that are deemed to most effectively and efficiently implemented and/or defined at the local level. As the tier of government that is usually closest to the community, it affects all people and businesses and has a unique insight into local and community needs.

'Local government is the government of communities and places. Elected councils are a fundamental element of our democracy, giving expression to people's aspirations for their neighbourhoods, towns and regions.' (NSW Independent Local Government Review Panel 2013)

There are more than 560 Local Governments operating in Australia, variously referred to as councils, boroughs, cities, districts, municipalities, regions, shires, towns, community governments, Aboriginal shires and boards (PC 2012).

This paper looks at the role of Local Government in Australia, how the scope of its activity is determined, the resources available to undertake this role, and available information on performance.

Diversity a feature of local government

Across Australia, there is substantial diversity in the roles and functions of Local Governments both between, and within, jurisdictions. This diversity is partly attributable to differences in the legislative and governance frameworks for Local Government, as well as councils' particular geographical features, the size and density of their populations and financial capacities (box 1).

Typical regulatory responsibilities¹ include authorisation of planning and building developments, administration of food and liquor safety laws, the regulation of companion animals, provision of local roads and administration of certain aspects of health regulation. At the local level, services reflect the specific community's needs and aspirations, which may change as demographic profiles or economic conditions change (for example, as observed now via ageing populations, 'sea' and 'tree' changers, and commodity-related boosts or declines in rural and regional communities).

¹ In the ACT, the roles and responsibilities are undertaken by a directorate of the Territory Government.

Box 1 The big and the small — diversity in Local Government

The Brisbane City Council is Australia's largest Local Government by population and budget. It services about 1.2 million people, has 7550 full-time equivalent employees, brings in over \$2 billion in revenue each year (slightly more than the Tasmanian Government's own source revenue in 2016-17), covers a geographical area of 1338 square kilometres and provides a range of services, from buses and ferries to swimming pools and playgrounds.

By geographical area, the Shire of East Pilbara is Australia's largest council. It covers an area of area of 372 571 square kilometres, which is larger than the state of Victoria. With only 87 staff the Shire provides services to about 20 000 people.

In contrast, the Shire of Peppermint Grove is Australia's smallest council by geographical area. It covers an area of just 1.36 square kilometres across a single Perth suburb on the shores of the Swan River. The Shire employs 24 staff to provide services to its 1524 residents.

In Tasmania, Flinders Council covering the island of the north-east of Tasmania has a resident population of just over 800, in contrast to Launceston Council with a population of over 67 000.

Sources: DIRD (2017); Brisbane City Council (2016); Shire of East Pilbara (nd); Shire of East Pilbara (2016); WALGA (2017); Shire of Peppermint Grove (2016); Flinders Council (2017); Launceston City Council (2016).

Over the past thirty years, the responsibilities of most Local Governments have moved from being simply providers of property-related services — captured in a simple expression of their functions as focused on 'roads, rates and rubbish' — to increased involvement in the provision of social services, such as health awareness and management, recreational facilities and sporting venues and active promotion of local economic development including tourism. The wide range of activities undertaken by Local Governments is highlighted in table 1.

Local Governments are not recognised in the Australian Constitution and are creations of State and Territory Government legislation. As such, the number, population or area coverage and overarching governance (including performance management) arrangements of Local Governments are the responsibility of the States.

Accounts for a small share of total government expenditure, revenue and employment

Compared to the other two tiers of government, Local Government accounts for only a small component of revenue raising, operating expenditure and public sector employment. Local Governments' only tax base, property rates, accounts for approximately 3.5 per cent of Australia's total taxation revenue. Other sources of revenue include user charges and grants from the Australian and State or Territory governments (ABS 2016). At an aggregate level, Local Government is nearly 90 per cent self-funded. However, many rural and regional councils, which do not have the means to collect the same revenues as urban and larger regional councils, are more reliant on external funding sources (ALGA 2017).
The Local Government sector accounted for approximately 5 per cent (\$34 billion) of total public sector spending in 2014-15. This expenditure is dominated by housing and community amenities, followed by transport and communication and then general public services. Local Government employment accounted for about 10 per cent of total public sector employment — just under 187 000 people are employed by Local Government nationally.

Functional area	Roles
Engineering and infrastructure	Public works design; construction and maintenance of roads; bridges, footpaths; drainage; cleaning; waste collection and management.
Property-related	Domestic waste management including solid waste and recycling services, water and sewerage. ^b
Planning and development	Land use and town planning (including heritage); development approvals; building inspection; licensing, certification and enforcement; administration of aerodromes ^C ; quarries; cemeteries, parking stations, and street parking.
Environment and health	Catchment management; parks and gardens; tree removal; pest and weed control; water sampling; food sampling; immunisation; toilets; noise control; meat inspection and animal control.
Community and social	Aged care and child care services; health clinics; youth centres; community housing refuges and facilities; counselling and welfare services.
Recreation, culture and education	Swimming pools; recreation centres; community halls; sports facilities; lifeguards; camping grounds; community festivals; libraries; art galleries; theatres and museums.
Other	Bus services; abattoirs; sale-yards; markets and group purchasing schemes.

Table 1 Local Government activities by functional area^a

^a A majority of these services are not provided by Northern Territory. In the Northern Territory, Local Government responsibilities are limited to traditional property-related services. ^b Water and sewerage are provided by some Local Governments in New South Wales, Queensland and Tasmania only. These services are not provided by Northern Territory Local Governments except in the town of Jabiru in West Arnhem Shire Council. Some Local Governments in South Australia are involved in the operation of effluent drainage schemes. ^c In Victoria, administration of aerodromes (etc.) falls under the functional area 'engineering and infrastructure'.

Source. PC (2012.

How well defined is the role of Local Government?

The specific role of Local Governments is determined by both the requirements of the relevant State and Northern Territory legislation and the expectations of their communities. In principle, the services provided should match those most valued by the community (a critical part of the productivity equation). As for other levels of government, elections provide the opportunity for the local community to express their preferences on options offered by candidates.

Local Government is often described as a government of the 'gaps' given that Local Government will often step in to provide services in direct response to community concerns.

There is no set 'list' as to the type, mix or level of services that all Australians can expect from Local Government. Previous reviews, for example, *Performance Benchmarking of Australian Business Regulation: The Role of Local Government as a Regulator* (PC 2012), have suggested that Local Governments are often caught in a tug-of-war between local preferences and a growing list of responsibilities and requirements delegated to them by their respective State Government.

Participants in this review raised concerns that while the role of Local Governments has expanded, they do not always have the financial capacity or required level of skills to efficiently undertake these roles. They suggested there has not been a significant change in circumstances observed in recent Commission inquiries, where State Governments have increased the responsibilities of Local Governments without increases in resources or sufficient guidance on how roles should be undertaken so as to ensure consistency with, and the efficient meeting of, State goals (PC 2012) (PC 2014). This appears true, at least in the case of planning and land use regulations, in several States. Planning and land use is considered in SP 10.

2 Does Local Government have the capacity to perform its role?

The question of amalgamations

Much of the effort to improve the efficiency and capacities of Local Governments has involved the merging of Local Governments to take advantage of scale in the provision of services, to enhance financial viability and improve administration. More recently, the rationale for consolidation has centred on the potential for larger entities to improve the capacity and viability of smaller governments, rather than on savings (LG NSW 2015).

State Government-initiated council amalgamations have typically occurred in 'waves', with many of Victoria's and South Australia's occurring in the 1990s, Queensland's in the 2007 and 2008 and New South Wales over the past few years, where there has been a focus on councils in the Sydney metropolitan area. In Western Australia, a proposal to reduce the number of councils in Perth by nearly half in 2013 was not pursued by the State Government in 2015 following, reportedly, widespread opposition by local councils and the general community (Barnett and Simpson 2015).²

² Local Government amalgamations have been an ongoing process. Between 1910 and 2014 the number of local councils in Australia (excluding the Northern Territory) declined by nearly half. In Victoria and

In many cases, State Government-driven amalgamations have proved to be a contentious. Opposition to amalgamations in most cases — particularly in New South Wales and Queensland — has involved concerns that the larger Local Government entity will be less responsive to community needs, there will be a loss of the 'grass roots' democracy associated with smaller Local Governments and, particularly in rural and regional areas, a loss of jobs due to the rationalisation of activities.

Some Local Governments have voluntarily merged, such as Geraldton and the Greenough Shire in Western Australia in 2007. However, some have suggested that such voluntary mergers are often undertaken against the backdrop of possible State Government intervention.

As an alternative to amalgamations, Local Governments have turned to collaboration/cooperation to share resources and provide shared services. This has occurred more in non-urban areas. The success or otherwise of such arrangements has often depended on the size, the number and financial strength of the participating Local Governments, as well as the level of commitment and leadership involved (LG NSW 2015).

There are a number of challenges facing non-urban Local Governments supplying water, including low customer density leading to higher costs and difficulty in attracting skilled labour; problems compounded by declining populations and, in some cases, a legacy of under-investment. One of the responses of State Governments has been to pursue amalgamations or greater collaboration between councils. Issues relating to provision and regulation of water services are being examined by the Commission's current inquiry into national water reform.

There is no single answer as to what is the optimal size for a Local Government. This would vary by the area in which the Local Government is located, such as regional or urban, and by its regulatory functions and the mix of services it is providing.

The evidence on whether amalgamations have led to more efficient and effective service delivery is mixed (box 2). Economies of scale do clearly exist; the question is whether they offset other perceived losses, such as local connectedness to councils.

A simple and preferable step before amalgamations would be for residents and ratepayers to receive a professional assessment of the trade-offs of 'standing alone'. Residents and ratepayers should be aware that if a council wants to stay small, there are likely to be inefficiencies and they may need to pay a premium or accept lower quality or level of services. For some taxpayers, 'better' might be about more localised or customised services provided by the smaller area council, rather than less localised but cheaper services provided by larger area councils. Provided the residents and ratepayers are aware

South Australia, the number of local councils declined by just over 60 per cent and in New South Wales and Queensland by just over 50 per cent in the same period (LG NSW 2015).

of the actual costs from 'standing alone' and are willing to meet those costs, decisions on merging or amalgamating should remain with the community.

Box 2 The outcomes of amalgamation

The evidence on the outcomes from Local Government amalgamation is mixed (LG NSW 2015).

A study of the amalgamation of four Clarence Valley Councils in New South Wales in 2004 by Tiley (2013) found that, overall, the benefits outweighed the costs. However, there was disruption, a tendency to increased bureaucracy and the expected financial savings did not materialise, at least in the first few years following amalgamation. The main sources of benefits were increased service delivery capacity, greater purchasing power, the ability to employ more specialised staff, more efficient use of plant and equipment and a more strategic approach to risk management.

A review by the Queensland Treasury Corporation (2009) of the Local Government amalgamations that occurred in Queensland in 2007-08 found overall benefits, with cost savings applied to improvement of services. It also remarked on substantial short-term costs arising from change.

Work by McKinley Douglas (2006) found that Local Government amalgamations in South Australia in the mid-1990s saved only \$19 million, as compared to projected savings of \$150 million per year.

In New South Wales, IPART (2015b) assessed proposals from Local Governments to either stand alone or merge under the *Fit for the Future* Assessments of Local Government in New South Wales in 2015. These proposals were assessed based on their ability to deliver scale and strategic capacity to meet the needs of the community, financial sustainability, the ability to manage infrastructure and services and efficiency in the delivery of services (based on a declining per capita operating expenditure). Of the 139 proposals assessed, 52 were found to be 'fit', under the assessment criteria. Of the 87 that were assessed as 'unfit', 60 did not have sufficient scale and strategic capacity, 18 did not meet the financial sustainability criteria and 9 did not meet either of these criteria (IPART 2015a).

A study by Sinnewe, Kort and Dollery (2016) compared the Brisbane City Council to the Sydney City Council, an average of six other south east Queensland councils and 10 metropolitan New South Wales councils across four financial indicators. These included own-source revenue capacity, management of capital, debt servicing capacity and asset management.

The study found that between 2008 and 2011, the comparison groups outperformed the Brisbane City Council in respect of financial flexibility, liquidity and debt servicing ability. In contrast, Brisbane City Council compared well in regard to investing in new infrastructure, and its rates and fees per household were below the NSW Local Government comparison groups and about average for the other large south east Queensland councils.

The extent of the cost savings resulting from Victorian Local Government amalgamations in the 1990s have been subject to debate. Some suggested that savings were in the order of 8 to 9 per cent whereas others have suggested that there had been little economic gain as Local Government operating costs in Victoria had increased between 1991-92 and 1996-97 (Tiley and Dollery 2010).

Research undertaken by the Centre for Local Government at the University of New England by Dollery has long been sceptical of the benefits of amalgamation, drawing on both international and Australian evidence. There is a trend in a number of OECD countries towards a smaller number of larger local authorities. The evidence has been mixed as to the significance of savings, economies of scale or performance improvements through mergers and amalgamations (Boyle 2016).

Local Government financial capacity

Local Governments have greater overall control over their spending than over their revenue, although, of course, much spending is necessitated by State Governments.

State Governments impose restrictions on the type, and in some cases the amount, of revenue Local Governments can earn and raise through borrowings. Local Governments have three main sources of revenue: property rates, their only source of tax revenue; fees and charges on the goods and services they provide; and grants received from other levels of government or the private sector.

In 2014-15, Local Government, inn aggregate, raised almost 90 per cent of their own revenue, with grants and subsidies making up the remaining 10 per cent (DIRD 2017). However, there is considerable variation, in per person terms, in both own-source revenue raised and grants received by Local Governments in Australia, with Local Governments in urban areas predominantly funded from their own sources of revenue, particularly rates, fees and charges. For most rural and remote councils, grants are a substantial source of revenue (PC 2012).

The Commission's study into transitioning regional economies noted that where populations have declined in Local Government areas, related declines in revenue are hampering efforts to maintain infrastructure designed to service (and be funded) by larger populations (PC 2017).

Restrictions on revenue raising

State Government restrictions on Local Government revenue raising are largely imposed through requirements to offer concessions to particular groups or the capping of Local Government rates.

Rate capping is currently used in New South Wales and Victoria and has been used in other jurisdictions, to control increases in Local Government rates (box 3). In South Australia and Tasmania, the relevant Local Government Act sets out principles for Local Governments to take into account when devising their rates policies.

For a State Government, rate capping can protect ratepayers from excessive rate rises by Local Government. Given Local Governments are a creation of the States, they have an interest in containing overall tax burdens and ensuring that Local Governments determine rates responsibly. However, for Local Governments rate capping means they must either find another revenue source (for example increasing local fees and charges or higher grants from other levels of government) or reduce their expenditure, which could mean more efficient delivery, but could also inhibit a Local Government's ability to respond to its community.

To get around the inflexibility of the rate cap, New South Wales allows councils to vary categories of rates as long as their general income remains within that allowed by the maximum increase. The Government also allows councils to apply for higher general

revenue via a special rate variation, whereupon the Independent Pricing and Regulatory Tribunal vets the reasonableness of proposed expenditure. These provisions, while relatively administratively burdensome, are aimed at providing continuing assurance of state oversight of Local Government revenue raising, while allowing genuine local needs to be met.

Box 3 Rate capping

New South Wales

Rate pegging, as it is referred to in New South Wales, has been applied since the 1970s. Since 2011-12, the Independent Pricing and Regulatory Tribunal (IPART) has set the maximum annual increase in each council's general income. It determines the rate increase with reference to changes in the average costs faced by councils and desired improvements in productivity.

For 2017-18, the rate peg is 1.5 per cent (1.8 per cent the previous year). Provided a council's general income remains within the set maximum increase, it may increase categories of rates by higher or lower than the rate peg. Councils requiring additional general revenue may apply to IPART for a special variation. Charges for waste management, water, sewerage and stormwater are not subject to rate pegging.

Victoria

Victoria introduced rate capping in the 2016-17 financial year following an election commitment by the Government to maintain rate increases below the CPI — the 'Fair Go Rates System'. The Minister for Local Government sets the maximum increase in councils' rates and charges based on recommendations from the Essential Services Commission (ESC). The ESC bases its recommendations on the forecast change in the consumer price index over the financial year to which the rate cap relates, plus or minus any adjustment for factors such as wage pressures or efficiency dividends. The Minister can choose to apply the cap to all councils (as has been done to date), a group of councils or a single council. Councils can apply to the ESC for a higher cap.

In 2017-18, the rate cap is 2 per cent (2.5 per cent the previous year) and applies only to general rates and municipal charges. It does not apply to certain charges, such as for garbage collection. However, the Minister has powers to extend the application of the rate cap to other rates or charges in the future.

Other states and territories

Rate capping has also applied temporarily in some States, for example in South Australia in 1997-98 and 1998-99, and in the Northern Territory between 2007 and 2010.

Sources: IPART (2017); ESC (2016); VDELPW (2017); South Australian Economic and Finance Committee (2016); NSW Local Government Independent Review Committee (2013); Battersby (2015).

Despite the flexibility afforded by such mechanisms, there continues to be criticism of rate capping. An independent review of local governments in New South Wales found that it was unlikely that Local Governments would subject their ratepayers to large increases in rates if rate pegging was relaxed. It found:

... no evidence from experience in other states, or from the pattern and content of submissions for Special Rate Variations, to suggest that councils would subject their ratepayers to grossly

excessive or unreasonable imposts if rate-pegging were relaxed. (NSW Independent Local Government Review Panel, 2013)

The use of rate capping also limits the accountability of Local Government to their ratepayers, a point noted by the Henry Tax Review.

If local governments are to be accountable to ratepayers for their expenditures, it follows that they should have full (or at least greater) autonomy over the setting of the tax rate applied to properties in their jurisdictions. (Henry et al. 2009)

However, the use of independent regulators in New South Wales and Victoria to determine or recommend rate increases has 'de-politicised' the process, and required Local Governments to both be more efficient and justify proposed expenditure in the context of their financial and strategic plans.

There is no clear evidence about the impact of rate capping on the performance of Local Governments. Victoria will be reviewing its rate capping system by the end of 2021. This would provide an opportunity to also look at the companion issue of the effectiveness of its new performance reporting regime in promoting the quality and efficiency of council services (further discussed below). In principle, strengthened accountability through this mechanism should lessen or obviate the need for stringent rate controls.

In addition to capping rates, States can impose statutory limits on some fees and charges for Local Government services. In New South Wales, the Local Government Act requires councils to provide concessions on rates to pensioners and sets the amount by which the rates are required to be reduced. In its submission to the Commission's study (PC 2017) into transitioning regional economics, the Western Australian Local Government Association submitted that restrictions on charges for services can have a significant impact:

These restrictions limit the efficiency of the [local government] sector and the ability to appropriately raise own-sourced revenue or manage assets in the best interests of their communities. These constraints also restrict the sectors' ability to invest in productivity enhancing infrastructure, and provide important services for the community — which will be critical to ensuring the successful transition in the local economy. (WALGA, sub. 22, p. 18)

Previous reviews have found that these limits can be at levels below the full costs of providing the services (NSW Independent Local Government Review Panel 2013; PC 2008), although this is contrary to governments' competitive neutrality obligations. Where concessions are required as community service obligations, these requirements should be clearly identified, costed and paid for by State Governments (Harper et al. 2015).

The Financial Assistance Grants program and minimum grants

The Financial Assistance Grant program provides funding from the Australian Government to Local Governments across Australia via State Governments on the advice of the State's grants commission. Every Local Government receives a minimum grant equivalent to a per capita distribution of 30 per cent of the general purpose funding pool in accordance with the National Principle requirements of the *Local Government (Financial Assistance) Act 1995* (Cth). In addition, funds are provided on a horizontal fiscal equalisation basis so that all Local Governments in a State have the ability to provide a similar range and quality of services.

Local Governments only receiving the minimum grant entitlement are typically located in capital cities or urban areas. In 2014-15, just over 44 per cent of the population was in 'minimum grant' councils (DIRD 2017). Across jurisdictions, the proportion of the population covered by Local Governments on the minimum grant varies widely, ranging from 28 per cent in New South Wales to just over 75 per cent in Western Australia in 2014 (DIRD 2017).

There have been a number of calls for removal of the minimum grant principle to support a higher level of horizontal equalisation and enable greater levels of redistribution to the relatively less well-off councils.

The NSW Independent Review of Local Government noted that the current arrangements resulted in large amounts of assistance being provided to relatively well-off Local Governments and said:

The Panel believes that in a climate of fiscal restraint, consideration needs to be given to the option of redistributing more funds to the most needy councils and communities. (NSW Independent Local Government Review Panel 2013)

Similarly, the Henry Tax Review commented:

There seems little reason that local governments with large fiscal capacities should receive a guaranteed minimum grant (which allows them to tax their residents less than they otherwise would) at the expense of local governments with relatively small fiscal capacities (which result in them taxing their residents more than they otherwise would). The current requirement that each council receives 30 per cent of its per capita share of untied financial assistance grants may prevent State grants commissions from redistributing to councils that require greater assistance. (Henry et al. 2009)

The Commission's 2008 study into the fiscal capacity of Local Governments also found that, given the differences in the scope to raise additional revenue across different classes of councils, there was a case to review the provision of Australian Government general purpose grants to Local Governments (PC 2008).

More recently, the Australian Government asked the Commonwealth Grants Commission (CGC) in 2012 to identify measures for improving the impact of the Local Government Financial Assistance Grants (FAGs) on the effectiveness of Local Governments and their ability to provide services to their residents within the current funding envelope. The CGC reported by December 2013, but at this stage the report has not been publicly released. The Commission is of the view that there should be a holistic recognition of different councils' capacities to raise revenue.

Skills and leadership

Available evidence suggests there is considerable variation in the workforce capacities of Local Governments.

Generally, rural and remote Local Governments have the smallest workforces, but have more workers per resident than urban Local Governments. However, smaller rural and regional governments often face difficulties in being able to provide and maintain the range of technical and professional skills — for example, engineering, IT and health related roles — required to undertake their role. Also, recruitment and retention of staff can be a challenge for Local Governments in remote and some regional and rural locations.

Local Governments, where possible, have responded by sharing professional and technical staff between councils. For example, the Local Governments in north-western Tasmania and in the Riverina region of New South Wales have arrangements in place to share staff. Nevertheless, State Governments also need to be cognisant of the resources available to Local Governments, both in terms of finances and workforce capacity, before devolving additional responsibilities to them.

Also, secondments and staff movements between levels of government and the private sector provide an opportunity to broaden the skills and experience of staff, and develop capability, both at an individual level, and across the workforce more broadly (PC 2012).

Recent work by the Commission on transitioning regional economies (PC 2017) noted that regional development initiatives had the strongest chance of success when communities themselves took leadership in identifying strategies for facilitating development. The more successful regions have seen Local Governments preparing strategic plans to identify and analyse regional strengths, opportunities, potential risks and priorities for action.

3 How well is Local Government performing?

There are a number of mechanisms through which the performance of Local Government can be assessed and be held accountable for its performance. The local community assesses the performance of Local Government through elections, there is the public scrutiny of Local Government processes and finances, State Government audit processes and, in some jurisdictions, regular reporting on agreed performance indicators.

The Commission notes that voting in Local Government elections is not compulsory in South Australia, Western Australia and Tasmania. This potentially creates a risk that Local Governments with relatively small populations will be represented by sectional (engaged) interests, so providing services or making other decisions that may not be those most valued by the community as a whole.

Assessing and reporting on the performance of Local Governments and providing this information in a transparent manner that is accessible to both governments and the wider

community is an important mechanism for incentivising improvements. However, at present these mechanisms are not used as widely or as effectively as they could.

The importance of transparency

Information about processes, decisions and rules can highlight gaps in governance. Information on what is being delivered, the standards to which they are being delivered and how performance compares are particularly important to inform areas for improvement, prompt change and hold Local Governments to account.

There is a role for both absolute and relative performance indicators. Absolute indicators, such as in regard to finances, provide information as to whether or not Local Governments are performing to a generic standard and how they are performing over time. Comparative indicators can provide additional useful information, particularly in identifying causes of differences between similar councils and identifying best-practice methods in councils for future policy development.

Reliable information on performance can also help answer questions about the impact of State Government interventions, such as rate capping systems and amalgamations on Local Government capability and service quality.

A lack of effective Local Government performance measures is a longstanding issue that has been identified by multiple reviews (IC 1997; NSW Independent Local Government Review Panel 2013; VAG 2008).

A former Western Australian councillor and mayor noted some of the consequences of poor, or inadequate, reporting on performance:

I suggest the by far most major issue is the almost complete lack of business transparency in local government. ... Apart from the annual list of rate increases in the mainstream media there is virtually no reporting of individual or relative performance by local government. For, I believe, one simple reason, no attempt is made to measure any type of performance, apart for individual project completion, or performance against budget. (sub. 23, p. 1)

It was also suggested that as the status of Local Governments and remuneration of Local Government executives was determined by budget size and workforce, there was an incentive for executives to increase both, to the detriment of council efficiency:

As the only metrics that are measured and compared are size of budget and workforce reporting these have to be the primary determinants of remuneration. Hence together with maintaining relative pecking orders this ensures there is constant and unending pressure to increase both of these. So fundamentally, the more money they spend the more they are paid. So logically if follows, the more money they waste the more they are paid, the more inefficient they are the more they are paid because both inflate their expenditure. (sub. 23, p. 1)

Local Governments should provide *meaningful, accessible* performance indicators

At present, there are multiple aspects of Local Government performance that Local Governments around the country are required to report on, including financial performance, service delivery and governance (box 4).

Box 4 Examples of existing reporting frameworks

Reporting of Local Government performance indicators varies across jurisdictions. Examples of performance reporting in New South Wales, Western Australia, Queensland and Tasmania are summarised below.

Your Council (New South Wales)

The Your Council report summarises local council performance under several themes, including financial performance, service delivery and community asset management. The performance data are also available in spreadsheet form to the public, but is not provided in a format that allows easy comparisons across councils. The NSW Independent Local Government review suggested a worthwhile objective might be to establish a website giving the public easy access to a range of comparative data. (NSW Independent Local Government Review Panel 2013).

My Council (Western Australia).

The Western Australian 'My Council' website provides financial health indicators and some council profile information (for example, area, population, rates and compliance audit information). Users can compare financial health indicators across similar councils on the website or download the whole dataset. At this stage, the comparative information does not extend beyond financial indicators.

Local Government Comparative Reports (Queensland)

The Queensland Department of Infrastructure, Local Government and Planning provides comparative reports on its website, including spreadsheets with information on different areas of Local Government, in particular financial, personnel, roads, water and sewerage services, waste management, libraries and parks and gardens. These reports are designed for use by councils rather than the general public.

A secondary system is the 'Better Councils, Better Communities' initiative. This is a council-driven project aimed at supporting Queensland councils to achieve better productivity and financial performance. The 'Better Councils' website canvasses examples of council innovations and success stories for other councils to learn from.

Local Government Sustainability Objectives and Indicators Project (Tasmania)

Tasmania published a Local Government Performance Report each year summarising the performance of Tasmania's councils against 10 sustainability objectives and indicators until 2013-14. The indicators used a range of data sources to measure performance across financial management, asset management, planning and development. Other data sources are being considered for performance information. The Auditor General currently reports on the financial sustainability of Local Government and on some efficiency indicators.

Sources: Western Australian, Department of Local Government, Sport and Cultural Institutions (2017) NSWOLG (2015); LGAQ (2017); QDILGP (2017).

While much work has already gone into collecting this information, the focus should be on improving the *usefulness* of information for council administrators and the community. That is, to inform judgements on the scope, efficiency and quality of services, and provide guidance on areas and incentives for improvement. Requiring local governments to collect information and report on activities that have little relevance to their performance will only create an additional red tape burden on local government.

To be effective, relevant information on the performance of Local Government would ideally be available in a central location and in a format to ensure it is accessible to a variety of users, including other levels of government to whom Local Government is accountable, as well their own taxpayers and local community.

In some jurisdictions, information is provided in a format that makes it difficult to compare the performance of similar councils, in others the information has been limited to financial performance or provided in a format for use by other councils rather than the wider public (box 4).

Victoria recently introduced a Local Government Performance Reporting Framework (LGPRF) following recommendations by the Victorian Auditor General to improve the transparency of performance reporting by Local Government. This reporting framework is viewed by several jurisdictions as being a relative exemplar, and being drawn on by Western Australia. It requires Local Governments to report on a broad range of indicators, releases data publicly and allows easy comparison of similar Local Governments across Victoria (box 5).

There would be merit in other States drawing on Victoria's system to improve their own.

Box 5 Performance reporting of Local Government in Victoria

Following reports by the Victorian Auditor General's Office (VAGO) in 2010 and 2012, which recommended more transparent performance reporting, the Victorian Government introduced the Local Government Performance Reporting Framework (LGPRF) in 2015. Under the LGPRF, Victorian councils report indicators across four categories: service performance, financial performance, sustainable capacity, and governance and management.

The indicators are provided on the 'Know Your Council' website, which allows the public to see detailed profiles of individual councils, including geographic and population information for the council, finances, performance results for the four categories and an opportunity for the council to explain or comment on their results.

The public can also compare the performance of similar councils. Victorian councils are divided into five categories: metropolitan, interface, regional city, large shire and small shire. Given the large disparity between councils between these categories the website only allows comparison of like councils within these groups.

Development

The LGPRF was established to ensure Victorian councils are measuring and reporting on their performance in a consistent way. Two years were spent developing the LGPRF, which included a one year pilot program before the 'Know Your Council' website was launched to the public. It has now been operating for two years and all Victorian councils participate.

Challenges

Some of the key challenges for the LGPRF included ensuring the reporting framework did not create a large burden on councils, meeting the needs of different stakeholders (councils, public, state government) and finding a balance between simple and meaningful data, including like-for-like and not overly simplistic comparisons.

These challenges are being addressed in part through extensive consultation with stakeholders. For example, to reduce the burden on councils, the Department of Environment, Land, Water and Planning has sought to ensure that the Essential Services Commission (which is responsible for setting rate caps) uses data from the same reporting framework for its rate setting functions.

Outcomes

A recent review of the LGPRF highlighted positive outcomes, including a high level of satisfaction with the framework among councils. Responses suggested that councils are gaining increasing value themselves from using the Know Your Council website.

Source: Local Government Victoria (2017).

CONCLUSION 16.1

The more effective use of comparative indicators to measure the performance of Local Governments would:

- improve the accountability of Local Governments to residents and taxpayers
- identify best practice methods in Local Governments for future policy development
- provide an incentive for Local Governments to improve their performance by highlighting differences in performance between similar Local Governments.

The performance of Local Governments would be more effectively gauged and improvements in their performance promoted with clearer guidance and matching autonomy on delegated roles and responsibilities.

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