



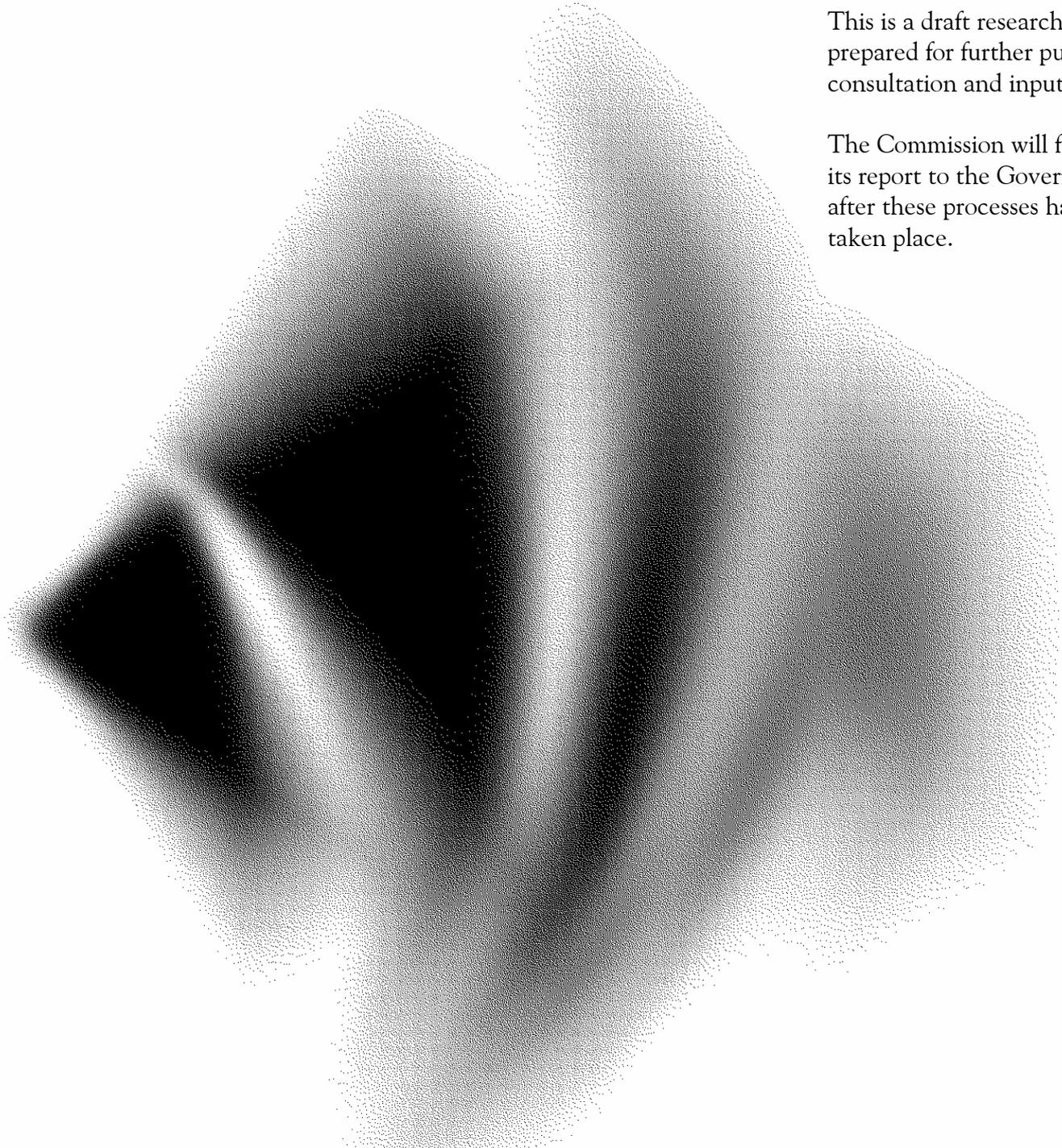
Australian Government
Productivity Commission

Economic Implications of an Ageing Australia

Productivity
Commission
Draft Research
Report

This is a draft research report prepared for further public consultation and input.

The Commission will finalise its report to the Government after these processes have taken place.



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The Productivity Commission

The Productivity Commission, an independent agency, is the Australian Government's principal review and advisory body on microeconomic policy and regulation. It conducts public inquiries and research into a broad range of economic and social issues affecting the welfare of Australians.

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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Foreword

Australia, like most developed countries, has an ageing population. The proportion of people aged 65 and over is expected to more than double over the next few decades, raising questions about how this will affect Australia's long term economic prospects.

The 2002 Intergenerational Report examined the fiscal effects of an ageing population from an Australian Government perspective. Following a request from the Council of Australian Governments, the Government asked the Productivity Commission to undertake a research study examining the productivity, labour supply and fiscal implications of likely demographic trends over the next 40 years for all levels of government.

In preparing this draft report, the Commission has drawn on information from submissions, consultations with government, other relevant organisations and research groups, as well as a wide array of studies of the impacts of ageing. The Commission wishes to thank the many people who have contributed so far, particularly officials from State and Territory governments, for their co-operation and detailed analytical input.

The Commission welcomes feedback on this draft report. The final report will be presented to the Treasurer in late March 2005 and to the Council of Australian Governments.

Gary Banks
Chairman
November 2004

Terms of reference

IMPLICATIONS OF THE FUTURE AGEING OF AUSTRALIA'S POPULATION

PRODUCTIVITY COMMISSION ACT 1998

The Productivity Commission is requested to undertake a research study examining the productivity, labour supply and fiscal implications of likely demographic trends over the next 40 years, to further improve understanding of the challenges and opportunities resulting from an ageing Australia.

The context for this research study is the projected ageing of the Australian population, the associated impacts on growth in the labour force, overall economic growth and the fiscal positions of all levels of government.

In undertaking the study, the Commission is to consult broadly with governments and other key interested groups; and take into consideration any recent work relevant to the study.

The Commission is to report on the following:

1. The likely impact of an ageing population on Australia's overall productivity and economic growth.
2. The potential economic implications of future demographic trends for labour supply and retirement age, and the implications for unpaid work such as caring and volunteering.
3. The potential fiscal impact of the above factors on Commonwealth, State and Territory and, to the extent practicable, local governments.

The Commission is required to provide a report within 9 months of receipt of this reference. The report will be provided to the Council of Australian Governments.

It is anticipated that the analysis and projections in the report would provide useful background information for future planning and policy development by Australian governments.

PETER COSTELLO

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OVERVIEW

Key points

- Australia faces a pronounced ageing of its population over the next forty years. One-quarter of Australians will be aged 65 years or more by 2044-45, roughly double the present proportion.
 - In itself, population ageing should not be seen as a problem, as it reflects the beneficial effects of improved life expectancy and voluntary control over fertility. However, it will give rise to economic and fiscal impacts that pose significant policy challenges.
- Labour force participation rates are significantly lower for people aged over 55 years. As more people shift into older age groups, overall participation rates are projected to drop from around 63.5 per cent in 2003-04 to 55.4 per cent by 2044-45.
- Falling participation and average hours worked will curtail Australia's labour supply growth, notwithstanding a projected decline in unemployment rates.
 - In the next two years, the number of workers is projected to grow by around 320 000, but by 2024-25 it will take almost 20 years to achieve the same growth.
- Assuming the average labour productivity performance of the past 30 years, GDP growth per capita will slump to 1.25 per cent per year by the mid 2020s, roughly half its present level. This could improve if Australia were to achieve a sustained lift in its productivity performance.
- As the population ages, education and some social welfare payments are projected to fall relative to GDP, whereas aged pensions and health and aged care costs are projected to rise relatively.
 - Following earlier reforms, pensions will not exert as much pressure on Government budgets, as they will in many other developed countries.
 - The major source of budgetary pressure is health care costs, which are projected to rise by about 5 percentage points of GDP by 2044-45.
- In the absence of policy responses, the fiscal gaps opened by ageing will sum to around 7 percentage points of GDP by 2044-45, with an accumulated value over the forty years of around \$2200 billion.
 - While most of this can be expected to fall on the Australian Government, there are significant burdens on State and Territory Governments.
- Policy measures will be needed to reduce the fiscal pressure and/or to finance the fiscal gap.
 - Actions to improve productivity and achieve more cost-effective services provision, especially in health care, are of central importance.

Overview

Population ageing has been called the quiet transformation, because it is gradual, but also unremitting and ultimately pervasive. Population ageing will accelerate over the next few decades in Australia, with far-reaching economic implications. It will contract Australia's workforce and economic growth, at the same time that burgeoning demands are placed on Australia's health and aged care systems. A gap will open between Government revenue and spending that will need to be closed. Every jurisdiction in Australia is affected in different ways, depending on their specific responsibilities and capacity for raising revenue. Population ageing will require new policy approaches at all levels of government.

This study has been requested by the Australian Treasurer on behalf of the Council of Australian Governments. The terms of reference essentially require the Commission to assess the implications of Australia's ageing population for productivity, labour force and fiscal outcomes across the three tiers of government. The study is complementary to, but updates and builds on, the Australian Treasury's *Intergenerational Report* (2002). A key distinguishing feature is that it includes detailed projections for the States and Territories. It has benefited from submissions and other input from all governments.

The Commission's assessment of the impacts of ageing are based on projections, not forecasts. The projections are intended to be a guide to what will happen under existing Government policies and if people's behaviour continues in much the same way as it has recently. But they are not forecasts in the sense that they are expected to occur. Indeed, the projections could be accurate only if governments chose to do nothing.

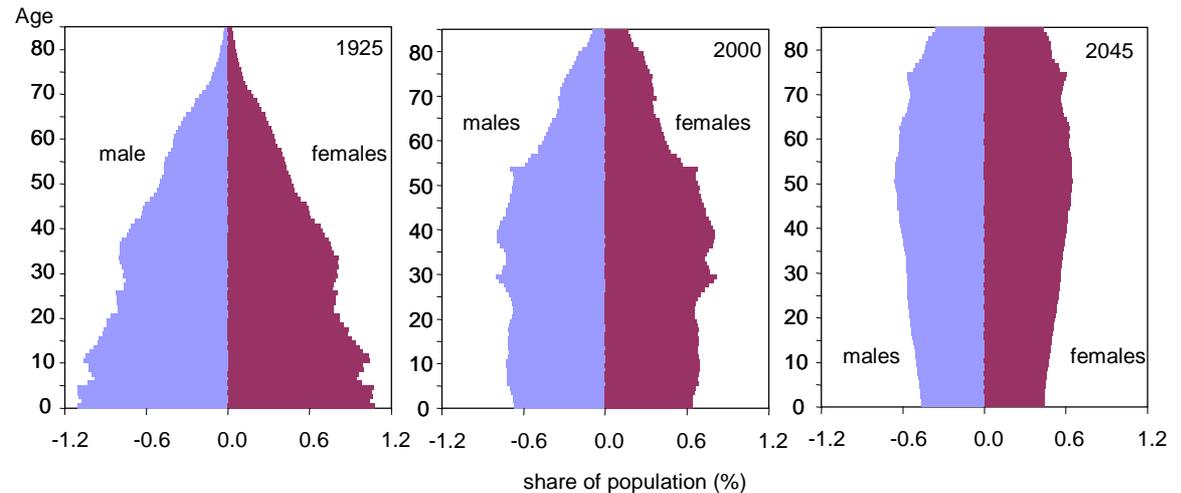
From pyramid to coffin: the demographic transition

The ageing of our population has been occurring ever since people started to acquire influence over fertility and mortality. As the average number of births per women and the incidence of death in all age groups have declined, the age structure has shifted profoundly. At Federation, the old were scarce. Less than one in 25 of the population were aged 65 years or more. Now, they comprise one in every eight

Australians. By 2044-45, more than one in four will be aged 65 years and over. They will comprise around 7 million Australians, up from the present 2.5 million.

The age distribution is being squeezed into a different shape by these demographic pressures. It has already shifted from a pyramid to its present beehive shape. Given current trends, the population age structure will continue its inversion and begin to resemble a coffin (figure 1).

Figure 1 From pyramid to coffin
 Changing age structure of the Australian population, 1925-2045



Ageing is occurring across Australia, with no jurisdiction escaping a significant shift in its age structure (figure 2). South Australia and Tasmania are conspicuous as the States that will have the greatest concentrations of the old by 2044-45. This reflects their present above-average representation of the old and the tendency for migration patterns to disproportionately remove the young. The Northern Territory remains, by contrast, a relatively ‘young’ jurisdiction, as a consequence of its large Indigenous population and the fact that older Territorians often retire to other States.

While population ageing is not a new phenomenon, it will begin to gather pace over the next two decades (figure 3). In every year between 2012 and 2028, the aged share of the Australian population is projected to increase by more than 0.4 percentage points — an increase 4 times the long-term average.

Figure 2 Ageing affects all Australian States and Territories
Change from 2002-03 to 2044-45

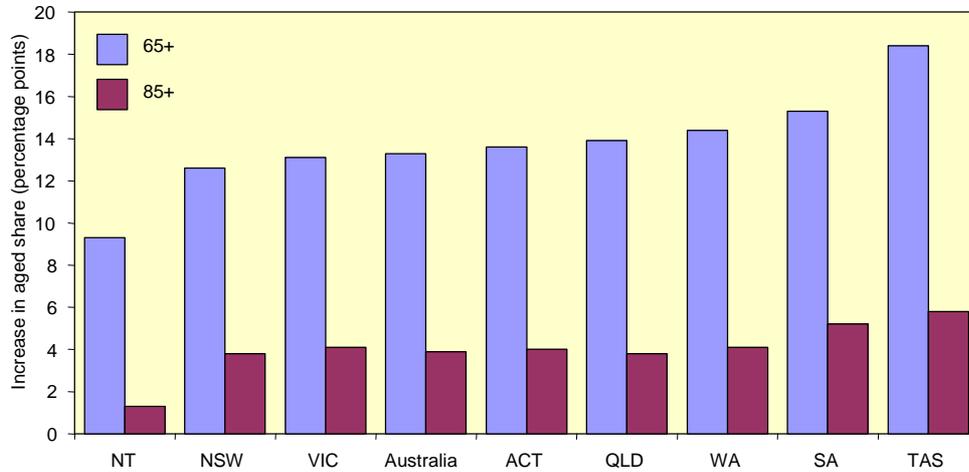
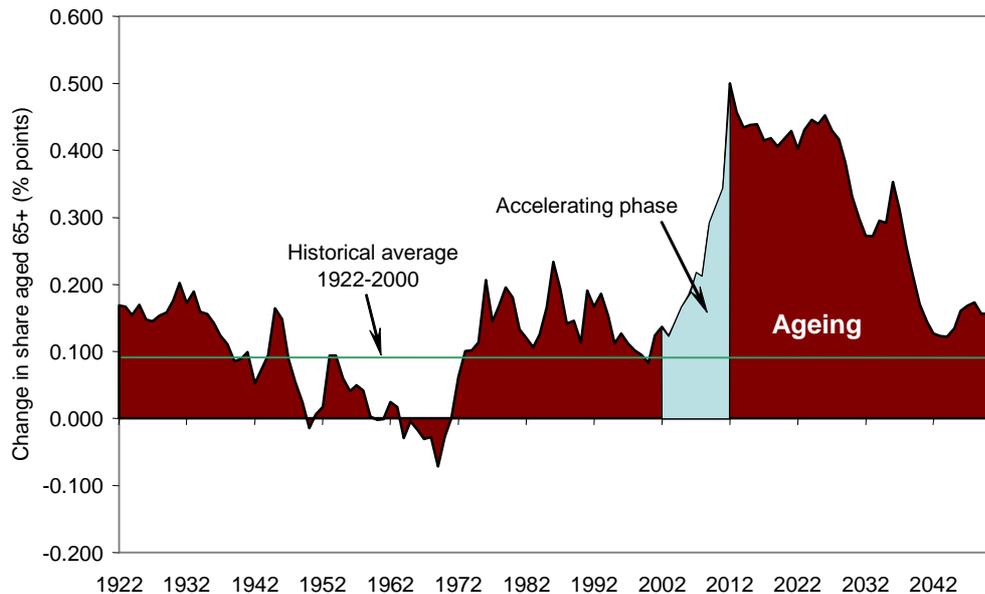


Figure 3 Ageing is set to accelerate
Annual change in the share of people aged 65+ in the population: 1922-2051



The generation that will turn 65 years old between 2011 and 2031 is called the ‘baby boomers’ — born in an era of heightened fertility after World War II. The demographic transition faced by Australia is sometimes seen as a baby boomer ‘problem’. However, it is a mistake to see population ageing as just about the number of old people. It is really about the age structure of the population — the ratio of the old to other ages. Any given number of old people’s needs can be met as long as there are sufficient numbers of younger people to drive the economy and provide the needed services. Much of the projected change in the age structure reflects slow growth in the population of younger ages in the coming decades. This

is not a symptom of the baby boom, but its opposite, the long-run decline of fertility in Australia since the 1960s.

The Commission examined the contribution of the baby boomers to ageing trends by simulating what would have happened had there been no baby boom. Assuming a slow continuous decline in fertility rates since the Second World War, population ageing would have been brought forward in time and would have generated a greater age dependency rate than with the baby boom until the mid 2030s (and little difference over the period to 2051). Thus, the main effects of the baby boom have been to *defer* population ageing in Australia and make its onset more pronounced. The real drivers of population ageing are the long-term declines in fertility and increased longevity.

Projections and assumptions

Of course, perspectives on the future age structure involve assumptions about future fertility, mortality and net migration patterns. These may not be realised. The Commission has used the official Australian Bureau of Statistics population projections (the ‘mid’ or B series) in the base case. These assume a continued fall in the total fertility rate, improved longevity and net migration that stabilises at 100 000 people per year.

However, even were there no further improvement in life expectancy (a very pessimistic outlook) and no further falls in fertility, then population ageing would still continue. The aged dependency ratio — the ratio of those aged 65 to those aged 15-64 years — would still rise by nearly 15 percentage points from 2001-02 to 2044-45. This compares with the 25 percentage points rise in the aged dependency ratio under the base case.

In fact, there are credible arguments that population ageing may turn out to be more profound than the base case projections used throughout this study. Different assumptions particularly affect the population share of the oldest old (people aged 85 years or more) — the group for whom health and aged care costs are the highest. For example, under quite feasible alternative assumptions about future fertility and longevity, the share of the oldest old increases from 1.4 per cent of the population in 2001-02 to 9 per cent by 2044-45. In raw numbers, this would be an increase from 277 000 to 2.3 million.

Increased migration wouldn't help much

There is a common view that ageing could be avoided, or at least substantially moderated, by a larger (net) migration intake. But the numbers reveal little practical scope for this.

- To avoid (or rather to delay) any increase in the aged dependency ratio by just 40 years would require a net migrant inflow to population ratio of 3.35 per cent — about six times the present ratio. This would result in an Australian population of around 114 million by 2044–45 (compared to the base case projection of 26.2 million), with an annual migrant intake at that time of 3.7 million a year.
- Even quite big differences in annual intakes of migrants are not likely to change the story much. For example, were migration to stay fixed at 125 000 for the next forty years (25 000 a year more than the ABS use in their ‘middle’ scenario), then the share of people aged 65 years or more would be 25.6 per cent rather than the projected 26.1 per cent.

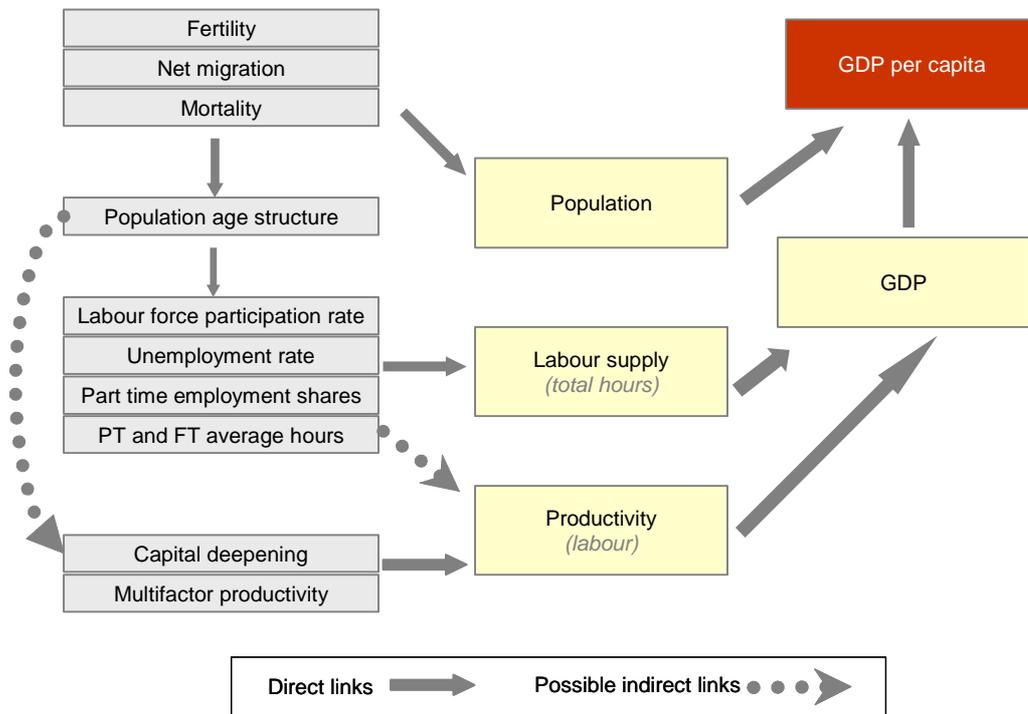
Impacts on labour supply and economic growth

Population ageing will reduce labour supply growth — diminishing Australia's future (per capita) growth prospects (figure 4). There are several factors at work here, but the most important is the impact of ageing on the labour force participation rate. This is the share of the population who are in the labour force (either in a job or actively looking for one).

Labour participation currently falls significantly for those over 55 years and is negligible after the age of 70 years. As more people shift into these older groups, outflows from the labour force are likely to quicken and the overall labour participation rate to fall. This ageing effect is only partly offset by new young workers, since lower past fertility rates have reduced their numbers. It is also partly offset by a continuing trend for higher female participation at most ages — but this trend must abate at some point.

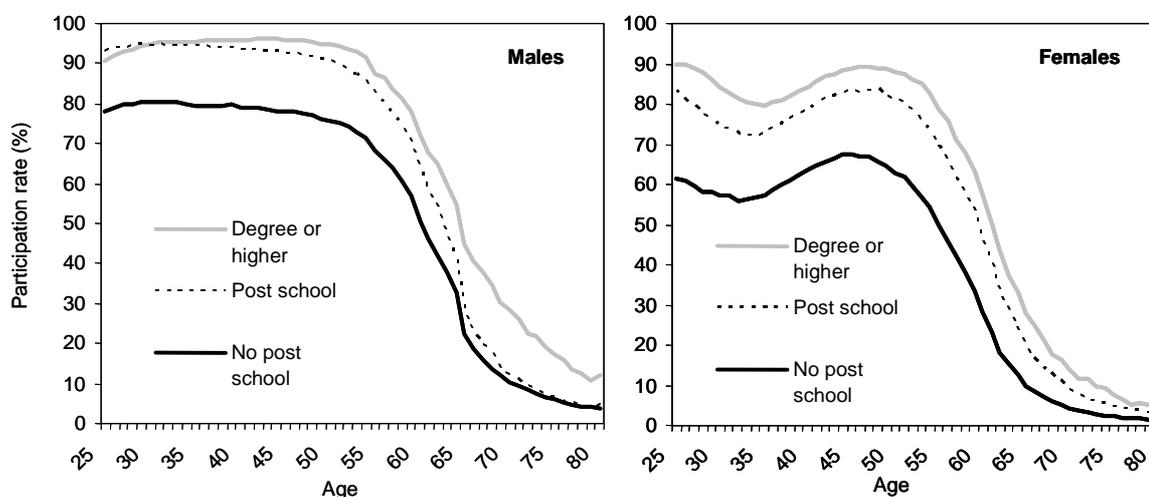
To develop an overall picture of these counteracting flows, the Commission estimated age-specific participation rates and combined these with projections of the changing age shares of the workforce. Rather than just look at age-specific participation rates and how they might evolve, the Commission modelled the labour participation rates of *cohorts* of people — groups of people born in distinct periods. It is important to do this because the labour market behaviour of different cohorts can be quite different, reflecting varying social attitudes, access to education and other influences.

Figure 4 **The 3 Ps — population, participation and productivity — of economic growth**



It is clear, for example, that currently younger people are on average much better educated than older ones, and that better educated people generally have higher participation rates (figure 5). It is projected that education levels will continue to rise. This will stimulate labour participation rates. However, the returns to education may fall with its extension to a greater share of any generation, so that the effect is unlikely to be as strong as figure 5 would imply.

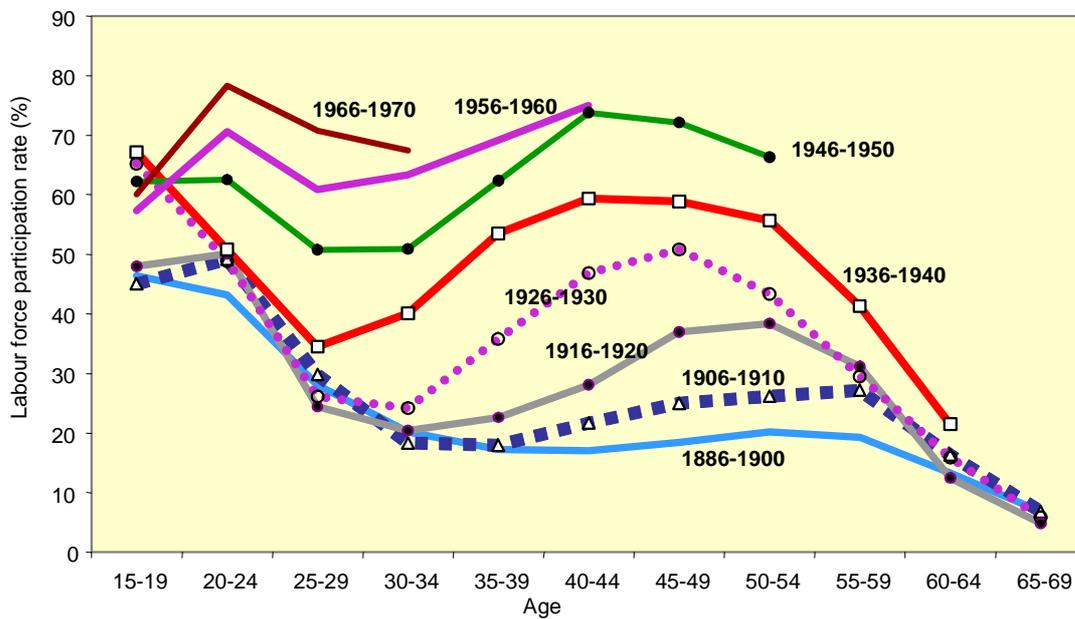
Figure 5 **Labour force participation differs by age and highest educational attainment, 2001**



Cohort effects on participation rates are particularly strong for women (figure 6). Lifetime female participation in the labour force has increased dramatically and its time profile has also altered.

- A woman born around Federation typically participated in the formal labour market while very young (aged 15 to 19 years), and withdrew with marriage and child bearing. After having (several) children, she generally never returned to a paid job.
- A woman born just before the second world war also had her peak participation rate when young, but her withdrawal from the labour market with the advent of childbearing was temporary.
- Later female cohorts have significantly lower participation rates when young than pre-1920 females, reflecting greater involvement in years 11 and 12 of secondary schooling and tertiary education. But against this, the dip in participation associated with childbearing is smaller and less protracted. Women have become better educated, and have fewer children and greater access to part-time jobs and childcare. The peak involvement of women in the labour force is now around 40-44 years — in stark contrast to their great-grandmothers.

Figure 6 Recent female cohorts participate much more^a



^a The years shown are the birth years of the various cohorts.

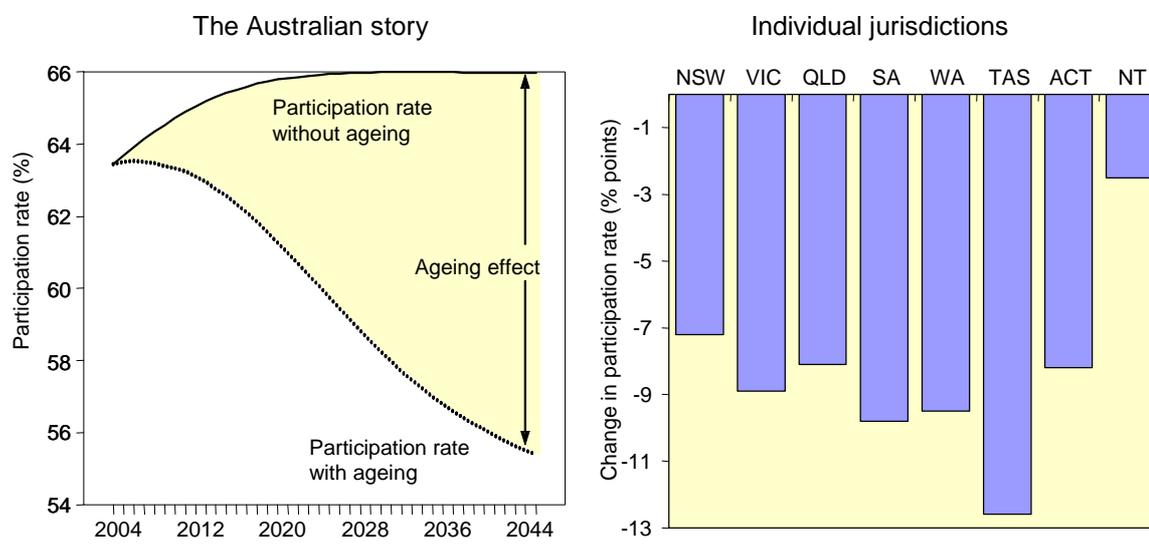
Cohort effects are much less pronounced for males than females, and their long run impact has been to *reduce* rather than increase labour force participation. At least part of the underlying reason for this is an increasing incidence of disability pension uptake among older males in unskilled occupations.

Taking account of these changing cohort patterns, the Commission has projected future participation rates for different age groups by gender. The projections show a continuing tendency for greater female participation for all ages over 25 years and a (slowly abating) trend for lower participation rates for males aged from 25 to 54 years. Ultimately, female and male participation rates are expected to converge for most age groups.

The aggregate participation rate will fall with ageing

Applying these age-specific trends to Australia's ageing population, aggregate labour force participation rates are projected to fall by around 8 percentage points, from their current level of 63.5 per cent to 55.4 per cent by 2044-45 (figure 7). Had there been no change in the age structure of the population, participation rates would have *risen* by around 2.5 percentage points, reflecting the continued importance of increasing female participation. Accordingly, by 2044-45, the difference in participation rates attributable to ageing amounts to nearly 11 percentage points — a margin that would have large effects on Australia's growth prospects.

Figure 7 Aggregate participation rates fall with ageing
2003-04 to 2044-45



The most important determinant of this overall reduction in the labour force participation rate is the shift in the age structure of the population towards older, less participating groups. Plausible increases or decreases in age-specific participation rates do not change much the picture that emerges.

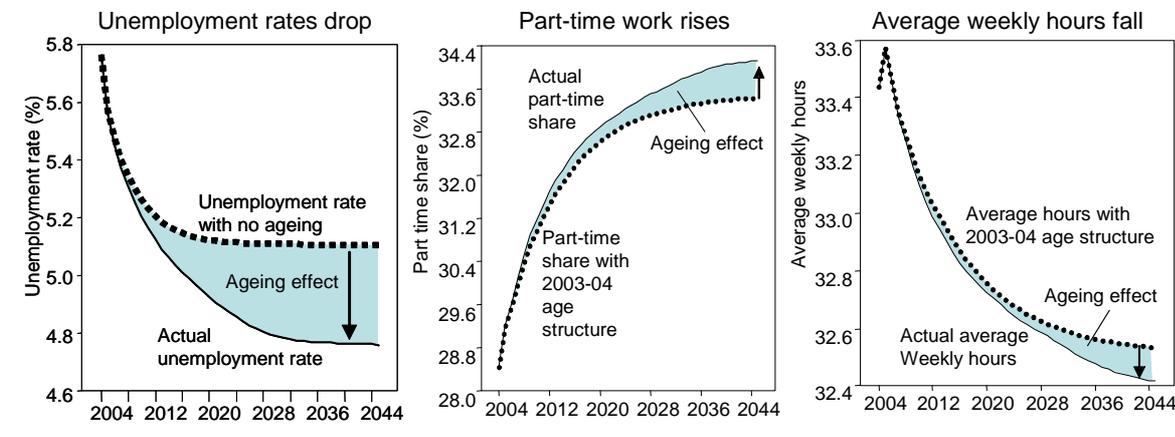
Most States and Territories are similar to the national pattern, but two exhibit more extreme results (figure 7). There are large declines in participation rates in the most ‘greying’ jurisdiction — Tasmania. In contrast, participation rates fall by a much smaller amount in the Northern Territory, a reflection of its unique demography.

Unemployment will fall, but so will hours worked

Participation is only part of the labour supply story. The other two important elements are unemployment and hours worked.

Ageing is likely to have a positive twist for *unemployment*. This is because the highest unemployment rates are experienced by young people, who are in transition from education to work, and the lowest by older people, who have the alternative of retirement. Consequently, the shift in the age structure of the workforce is likely to reduce measured unemployment rates, although the effect is quite small. This effect is reinforced by a generally falling trend in unemployment rates and implies that, for a *given* participation rate, the *effective* labour supply will be higher than otherwise (figure 8).

Figure 8 Effects of ageing on unemployment, part-time employment rates and average hours worked
2002-3 to 2044-45



The story for average hours worked is different again. Average hours worked are generally projected to increase modestly for part-time workers of most ages, while being stable for full-time workers generally. However, the *incidence* of part-time work will continue to rise for Australians of most ages (particularly for males). That, and the fact that older workers have a higher tendency to work part-time, mean that average weekly hours per employee are projected to fall.

So ageing has a doubly depressive effect on labour supply — reducing participation rates and cutting average hours worked. These greatly outweigh the positive influences via lowered unemployment.

Labour supply growth slows

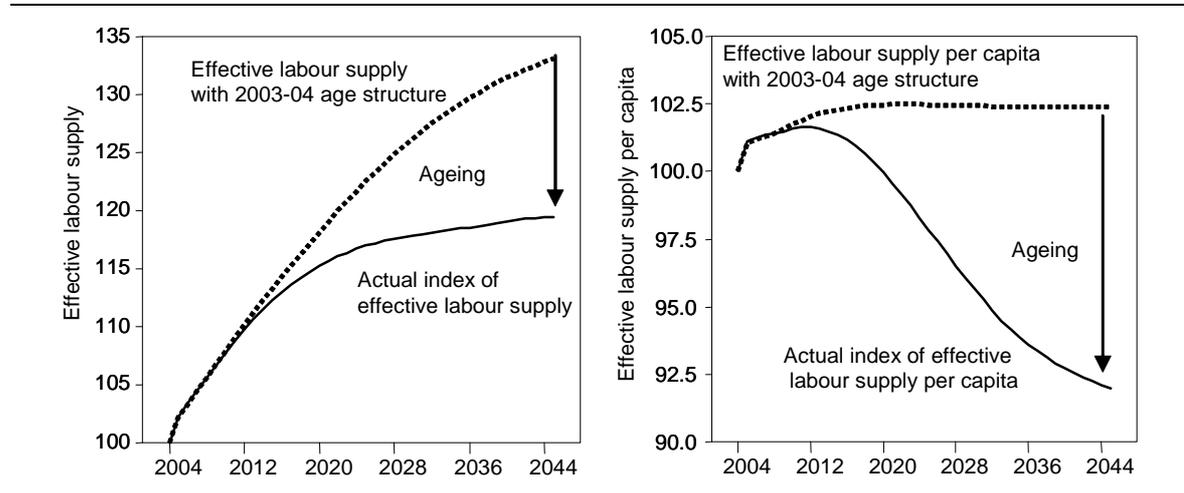
These components of labour supply — participation, part-time and full-time work, average hours and unemployment — can be brought together to provide two perspectives on labour supply:

- the number of people in employment; and
- the total number of hours actually worked per year (the ‘effective’ labour supply).

Both are projected to grow sluggishly as a result of ageing (figure 9). For example, the number of workers is projected to grow by around 320 000 in just the two years from 2003-04 to 2005-06. This is about the same growth in the labour supply that occurs over the entire twenty years from 2024-25 to 2044-45. Indeed, in the next forty years, the pace of effective labour supply growth is slower than population

growth (unlike in the past), so that hours worked per capita is projected to decline by around 10 per cent.

Figure 9 **Ageing and effective labour supply**
Australia 2003-04 to 2044-45



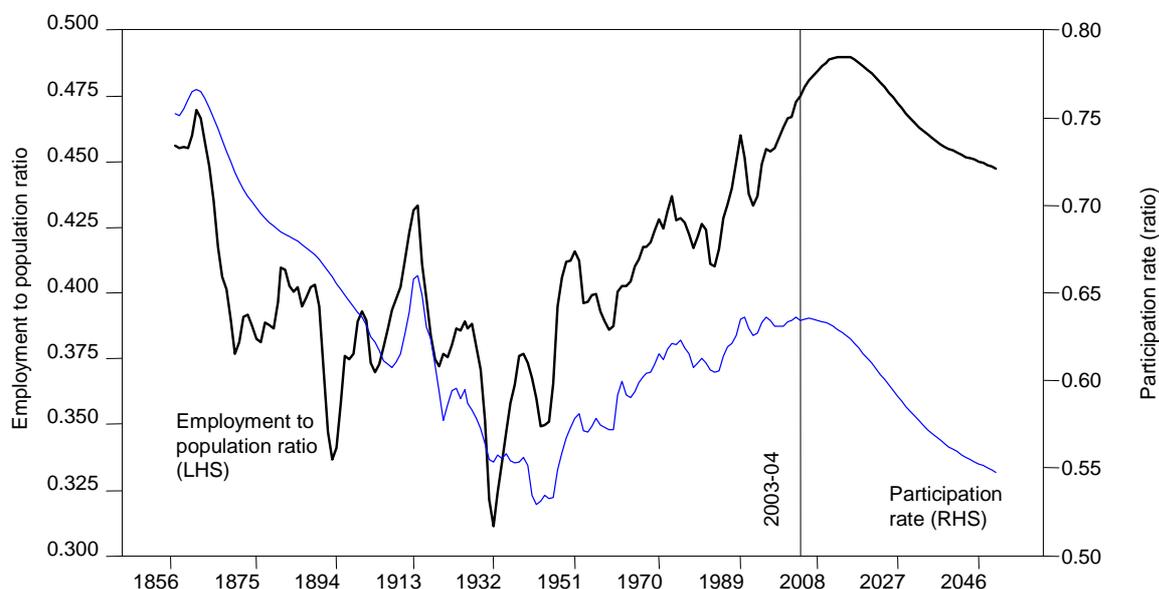
The labour supply ‘problem’ in historical perspective

Adopting an historical perspective reveals a more positive story than told by the projected outcomes for the next forty years alone (figure 10). The employment to population ratio over the next forty years is not historically low. Even with the projected decline in participation, the ratio of employees to population will still be higher in 2050 than at almost any time in the last century. (This reflects the importance of the young population in this ratio.)

It is misplaced to *blame* ageing for any economic pains, since the flip side of ageing is an earlier era of economic gains.

- A significant source of ageing (and the accompanying projected decline in the employment to population ratio over the next 40 years) was the general decline in fertility after the baby boom.
- But the presence of the baby boomers and the relative absence of their progeny was a major factor behind the *rise* in employment to population ratios after the Second World War and its current apex. The baby boomer phenomenon produced a big economic growth bulge, which will inevitably vanish as the boomers age.

Figure 10 Taking a long view: 200 years of Australian labour supply



What effect on labour productivity?

The effects of ageing on labour productivity are less clear-cut than its impacts on labour supply. This is because there is a variety of, sometimes offsetting, ways in which ageing could affect productivity.

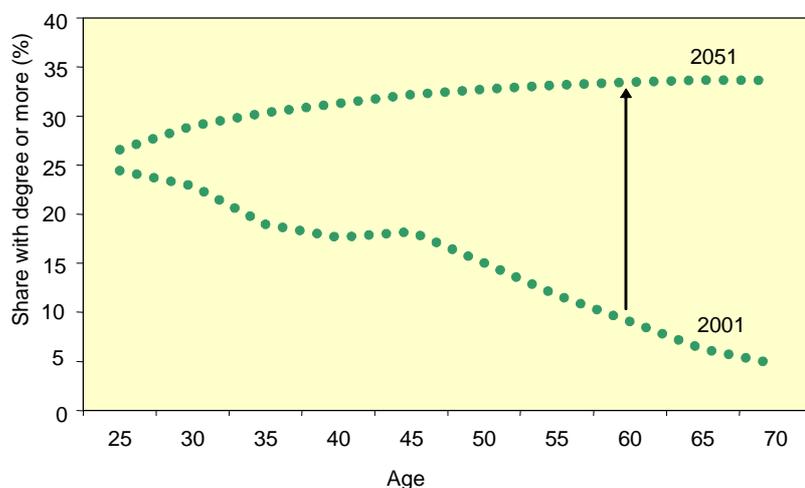
Information on wage rates and empirical estimates of productivity by age groups suggest that, on average, a person's productivity levels initially increase with age before declining after middle age — with productivity following an inverted u-shape.

However, the old of tomorrow will be different from those of today. Very few older Australians currently have post-secondary educational qualifications. That is set to change as today's more highly educated younger cohorts get older (figure 11). Together with the potential for a healthier older workforce (as new health technologies are developed and employment moves away from more hazardous occupations), this suggests that the productivity disparity between middle-aged and older workers will diminish somewhat over time.

Overall, the impact on productivity of the shift to older workforces depends on two things:

- the shape of the productivity profile across different ages (and how this changes over time); and
- the relative shares of the workforce in a given age range.

Figure 11 **The old of the future will be more educated than younger cohorts**



The net effect on productivity depends on whether the gains from a reduced share of inexperienced (and less productive) younger workers are outweighed by the falls in productivity associated with a growing share of the oldest workers. Overall, the Commission estimates that the net effect is negative, but negligible in magnitude.

Productivity has an international dimension too. Population ageing is a global phenomenon, which may affect international capital markets as hundreds of millions of old people deplete their retirement assets and as demands for new investment change with slowing labour supply growth in developed economies. These global forces are important because they may affect capital to labour ratios in Australia — historically, an important determinant of labour productivity growth. However, this is a complex area with competing views from different models about likely outcomes. Moreover, growth in capital deepening in Australia has been remarkably stable over the last 40 years, against a backdrop of significantly changing global investment and demographic conditions.

There are also complex links between demographic change and innovation, entrepreneurship and incentives for technical progress. But there is little persuasive evidence that these will undermine labour productivity growth.

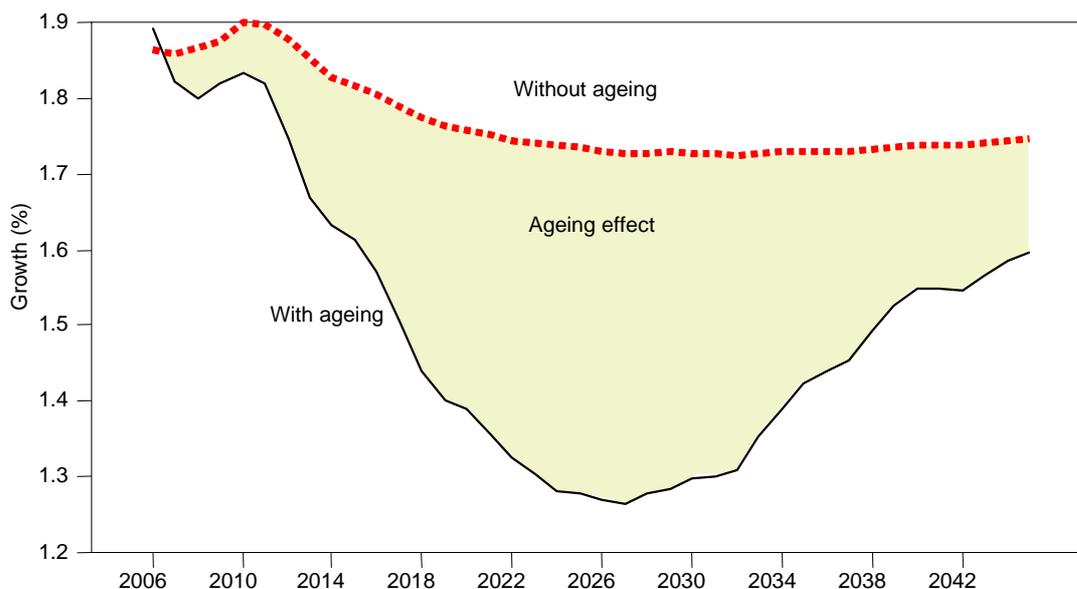
Overall, there is insufficient evidence to suggest that ageing per se will either enhance or erode Australia's labour productivity prospects.

Future economic growth — an age of diminished expectations?

For a given labour productivity growth rate, the effect of population ageing on labour supply is to slow Australia's economic growth over the coming decades.

GDP per capita growth rates are projected to fall steadily over the period to around 2025, with a partial recovery thereafter (figure 12). For example, GDP per capita growth is projected to slump to around 1.25 per cent a year by the mid 2020s — roughly half its present rate.

Figure 12 **Economic growth in Australia — a 40 year projection**
Per capita GDP, 2004-05 to 2044-45



However, these impacts should not be dramatised. Real per capita incomes will still be much higher than today — indeed by 2044-45 they will be nearly double those of 2003-04. In addition, the measures of output used in the above analysis tend, if anything, to understate the true increase in living standards. This is because — following standard National Accounts conventions — the calculations pre-suppose zero productivity gains in sectors such as education where output is hard to measure.

Moreover, in the modelling behind the above results, nothing adverse is happening to the incomes of individuals from a lifecycle perspective (in fact, every new generation has substantially growing lifetime earnings). The slowdown in *aggregate* growth merely reflects the fact that there are more people in retirement or the part-time working years of their lives. It should also be recalled that people value the leisure received in retirement and often choose to retire voluntarily.

The results also reveal that, in the likely absence of any major resurgence in the workforce, Australia's economic growth over the next four to five decades will overwhelmingly depend on productivity growth.

To illustrate its significance, suppose that Australia was able to sustain the so-called ‘miracle’ productivity performance of the 1990s. With an annual productivity growth rate of 2.05 per cent, Australians would be better off in cumulative GDP terms by around \$3 900 *billion* by 2044-45 relative to the assumed base-case growth rate of 1.75 per cent. (The picture looks correspondingly worse, of course, if productivity rates fall.) So, while economic growth prospects look weak from an historical perspective, productivity — and the policies that encourage it — remain the critical swing factor.

What happens to spending?

Many aspects of an ageing Australia will be accommodated automatically by markets. Private consumption and production patterns will shift over time towards goods and services that best meet the preferences and needs of an ageing population.

But some critical age-related goods and services are funded and regulated by governments rather than markets, reflecting problems in their provision in purely private markets — such as access and equity concerns. The demographic transition may place pressure on government finances because GDP — the pie from which services are ultimately funded — is projected to grow more slowly than spending demands.

Of course, not all government spending areas will be increased by ageing:

- education costs will fall as a share of GDP, as younger cohorts diminish in relative importance;
- a range of social welfare payments — particularly family assistance, parenting payments and unemployment benefits — will also decline in importance;
- other expenditure areas, such as transport, housing, and law and order — while all having an ageing dimension — are not likely to be much affected by ageing; and
- many government expenditure functions — such as defence — are not obviously linked to demography at all.

In one area where ageing *is* likely to increase government costs relative to GDP — aged pensions — Australia is relatively well placed compared to most developed countries. This reflects past reforms to superannuation and retirement saving policy.

The most important sources of potential stress on Government spending are health and aged care.

Health care expenditure will escalate

The incidence of sickness and disability rises with age. Accordingly, on average, older people use significantly more health services per person than other Australians. For example:

- Costs per person in the Pharmaceutical Benefits Scheme are strongly age-related — average costs for a male aged 65-74 are more than 18 times those for a male aged 15-24 (figure 13).
- Hospital costs follow a similarly steep age-profile, while Medicare costs also rise with age, though less steeply.

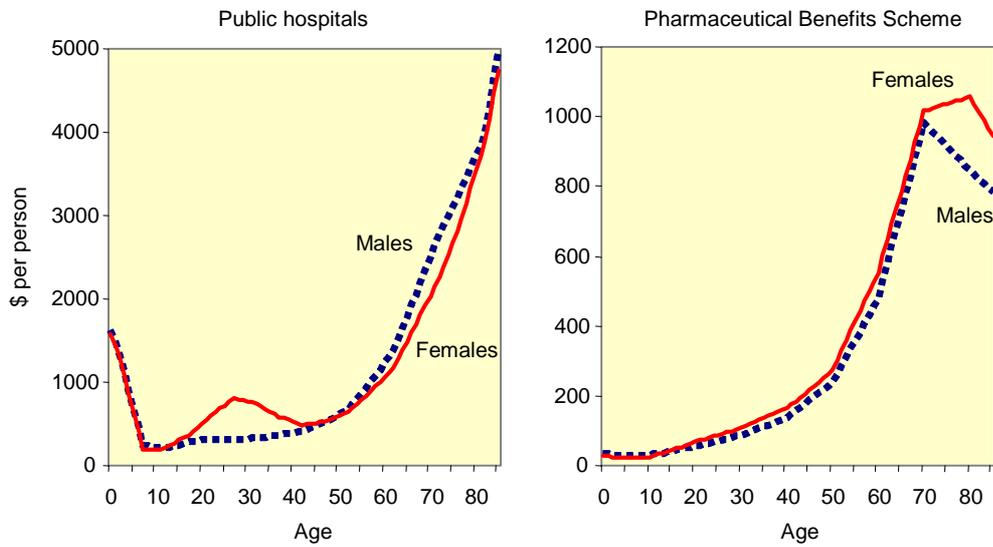
Across health services as a whole, expenditure on the over 65s amounts to around 4 times more per person than that on those under 65, and rises to between 6 to 9 times more for the oldest groups. Similarly pronounced age-based relationships are observable across time and in all developed countries. With rapidly increasing numbers of the old, the upward-sloping age profile of health expenditure suggests that ageing will increase health spending significantly.

The importance of demand and technology

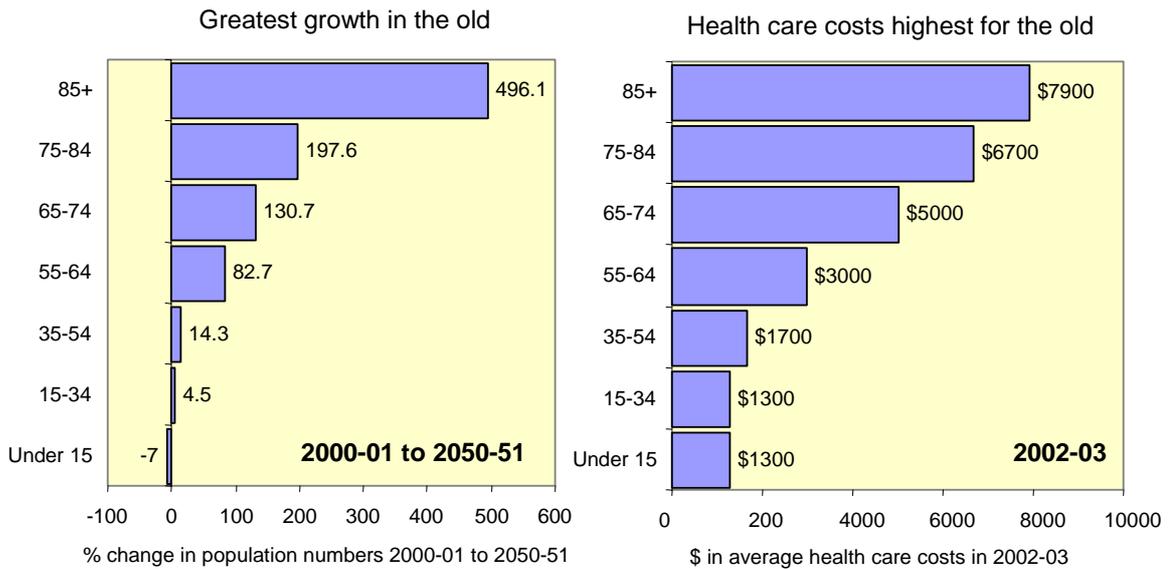
In itself, ageing has been historically a relatively minor driver of rising health costs. Non-demographic factors, particularly increasing utilisation at any given age and the use of new (and expensive) technologies, have been the main source of rising health expenditure over the last 20 years. Real per capita spending has been increasing for all major components of Government health expenditure. Real average growth rates range from a high 7.5 per cent for pharmaceuticals to a more modest 2.3 per cent for hospital expenditure.

These trends arise because increasing incomes simultaneously provide the capacity for increased government funding of health care, create expectations of better and more extensive treatments and prompt investments in new health technologies. While some of these technologies lower the cost of care (for example, cataract operations), overall the expansion of treatment is generally considered to have outweighed any unit cost reductions. This may be a negative in expenditure terms, but to a large extent it reflects the success of modern medicine in improving and prolonging peoples' lives. For example, one study found that over 70 per cent of the reduction in mortality for coronary heart disease between 1980 and 1990 has been traced to improvements in medical technology (and the rest to prevention strategies).

Figure 13 **Costs of hospitals and drugs rise with age**



... so relative costs and growth of ageing form a powerful cocktail



These demand and technology developments are sometimes seen as being 'ageing-neutral', because rising trends in expenditure per person occur for all ages. However, this ignores the fact that older people use more health services, so that the aggregate expenditure impact of any given increase in costs arising from technology is amplified the greater the aged share of the population.

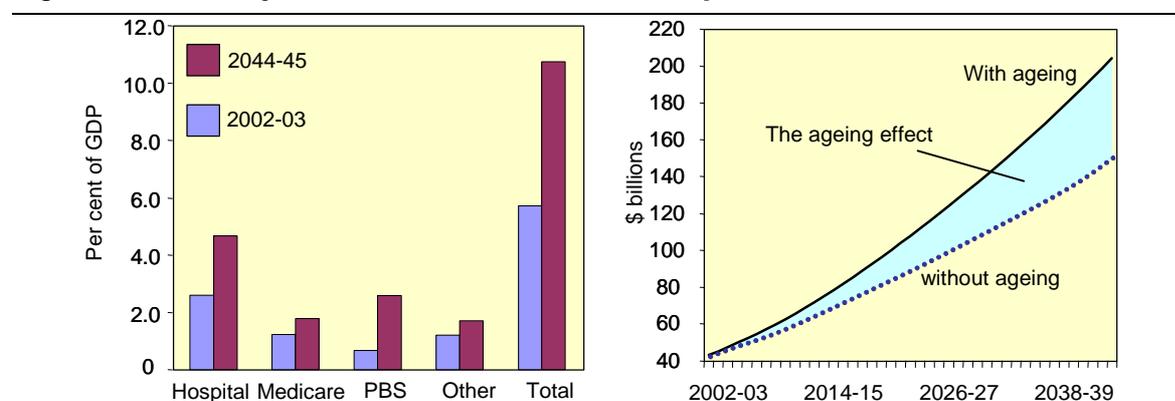
A critical question for the future is whether demand and technological factors will serve to steepen or flatten the age-cost profiles of health care (such as those in figure 13). Were health costs to rise more slowly for the aged than for the young, then the fiscal consequences of ageing would be much reduced. However, across all

government-funded health expenditure areas in Australia, historical evidence suggests that demand and technology are acting to maintain (and even slightly increase) the age profile of expenditure across different components of health care.

Pressures on health care spending

Under the assumption of a fixed age-cost profile, and using historical non-demographic growth rates for health spending per capita, total Government health expenditure is projected to increase from 6 per cent to around 10.8 per cent of GDP in 2044–45. All components of health expenditure are projected to rise (figure 14).

Figure 14 **Projected Government health expenditure**



Hospital expenditure remains the largest component of expenditure, although its share is projected to fall slightly. Pharmaceutical expenditure is projected to increase by the greatest relative amount, with Medicare and other expenditure maintaining broadly stable shares of expenditure.

But aren't the old getting healthier?

It is sometimes argued that ageing will not have as large an impact on health costs because older people will be significantly healthier in the future. An apparent decline in age-specific disability rates is adduced as evidence for this.

The story is complex and, as yet, not fully resolved, but the weight of evidence does not support the view that better health in the elderly will reduce health expenditure.

- For one thing, the findings on disability rate trends remain controversial, and depend on the definitions and contexts in which judgements are made.
- There is evidence of a rise in chronic conditions among the old, even in those populations recording lower disability rates. The connection may be that medical

interventions have lowered disability or trauma associated with morbidity, but the condition remains present.

- Even where populations have higher health status, this may reflect the use of effective (but costly) treatments. That is, the causality runs from additional treatment to better health, rather than from better health to lower treatment costs. For example, hip replacements can provide greater mobility and relief of pain, but are relatively expensive operations.
- Finally, there are several emerging public health risks that may *raise* morbidity levels. In particular, the sharp rise in obesity rates in advanced countries — including Australia — is associated with a rapid increase in the incidence of diabetes II, with its direct treatment costs and long-run risks for cardiovascular disease, blindness and kidney disease.

What if most costs were associated with the end of life?

A related claim is that ageing may not affect health costs significantly because most of a person's lifetime health costs are concentrated in the period before death, regardless of how long he or she lives. However, this argument is flawed on two counts.

First, most of the evidence suggests that while health costs are important in the year or two preceding death, they do not comprise the bulk of a person's lifetime costs. Ongoing health costs for people who are not about to die still appear to account for most spending.

Second, population ageing is not just due to increases in longevity, but also to changes in the historical patterns of fertility and migration inflows. The continuous decline in fertility after the baby boom is particularly important in an Australian context. This created a bulge in the age distribution, which means that ageing will involve a dramatic increase in the incidence of deaths in the population. The number of deaths per 1000 people is expected to rise by 62 per cent between now and 2044-45. So even if costs incurred at the end of life *did* explain most of the upward slope of the age profile of health expenditure, an ageing population would still lead to a major increase in health expenditure in Australia.

The Commission has estimated the fiscal effects of a 'proximity to death' health expenditure model and found that such a phenomenon somewhat defers the costs of ageing, but makes only modest differences in the end to the pressures felt by the entire health system. Given Australia's demographic patterns, the proportion of costs associated with death does not substantially alter the link between ageing and aggregate health expenditure.

The risks are more likely to go the other way

The propositions about ‘older but healthier’ or ‘only death costs matter’, if true, would tend to flatten the age-cost profile over time. There are greater risks, however, that the profile may steepen. In other words, growth rates in health care spending could be greater for older than younger people, implying bigger pressures on the health system than the Commission has projected. Several forces could bring this about.

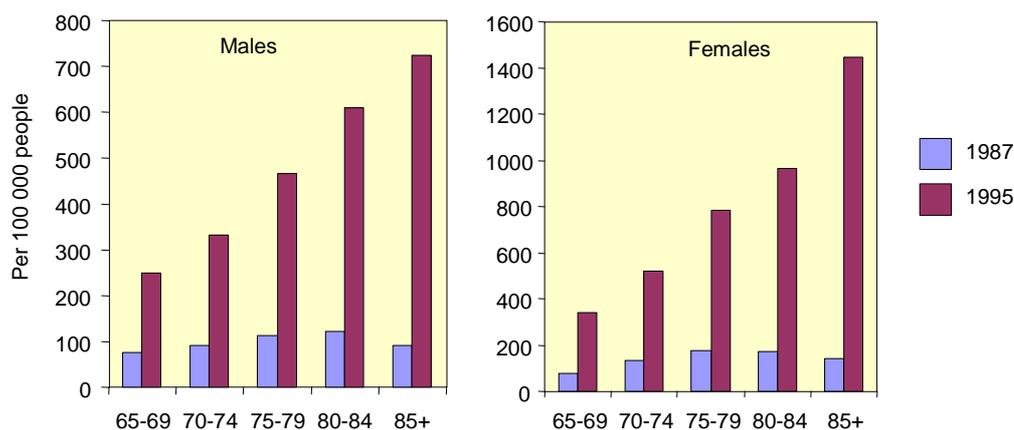
- One is that more medical procedures can be performed safely. US data show that the incidence of hip replacements in the old has increased most rapidly among the oldest old (figure 15). This reflects less traumatic surgical techniques and better anaesthesia that have improved prognoses for such operations among the oldest old. Increases in interventions among the old are less pronounced using Australian data, but already average annual growth in hospital treatment (separations per person) have grown much more for the old than the young.

- Social perceptions about the value of older people have been changing. As one nurse put it:

When I was in an intensive care unit 20 years ago, somebody over 75 would have a tough time getting in. They are now 85 and they are having complicated and major surgery.

- Research and technological developments will tend to focus on where the disease burden is greatest — illnesses associated with ageing.

Figure 15 Hip replacement trends among America’s aged



Aged care needs will increase

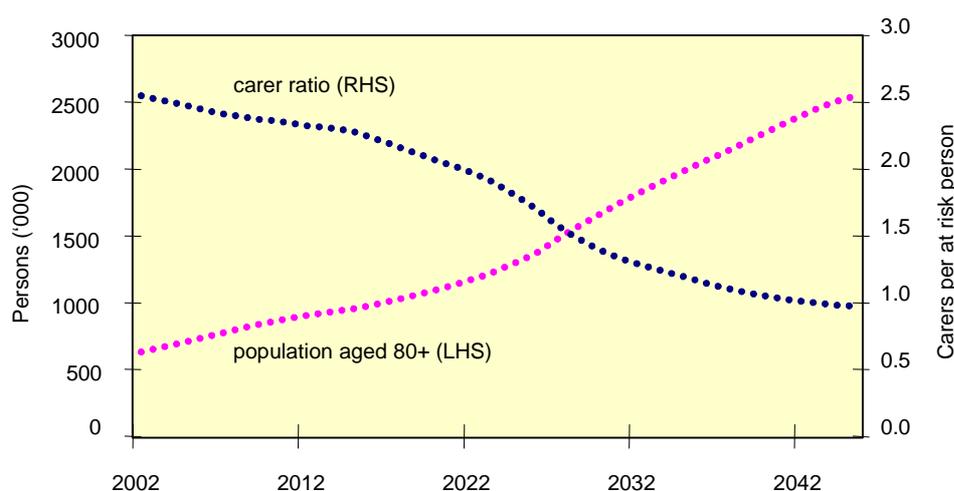
The incidence of formal aged care increases rapidly after 80 years of age. The proportion of 80 year olds is expected to almost treble, from 3.3 per cent of the population in 2002-03 to 9.7 per cent in 2044-45, suggesting that ageing will exert substantial pressure on aged care expenditure.

This trend may partly be offset by lower profound and severe age-specific disability rates — though the evidence is not clear cut. As in the Hogan report, the Commission has incorporated a modest reduction in the disability rates that are relevant for institutionalisation. Were these reductions not to be realised, the number of residents and associated costs would rise by significantly more.

- With modest reductions in disability rates, the number of low and high care residents is projected to increase by around 180 per cent between now and 2044-45.
- If there were no reductions in disability, the comparable rise would be around 250 per cent.

Changes in the care mix — between residential and community care — will continue, but do not offer a panacea for cost pressures. Per person costs are similar, and in any case, the capacity for a significant re-balancing of care to the community is likely to be constrained over the longer run by the availability of carers (figure 16).

Figure 16 The number of carers will not match the growth in the aged



Ultimately, the costs of aged care are expected to increase by around 2.5 times more than the growth of GDP over the next forty years. The overall cost share of GDP will rise from around 0.85 per cent in 2002-03 to around 2.1 per cent in 2044-45.

‘Fiscal pressure’ will build

Fiscal pressure is the extent to which increases in government spending outpace revenue growth. In this study, the focus is only on those revenue and spending areas that are age-related.

The incidence of fiscal pressure is complicated by the financial dependence of the States and Territories (‘States’) on the Australian Government. Changes in the payments made by the Australian Government to the States as a result of ageing pressures can shift budget pressures between the different tiers of government. The implication of this is that *aggregate* fiscal pressure borne by governments collectively is the best single measure of the fiscal consequences of ageing, because it is not sensitive to assumptions that affect incidence. In other words, fiscal pressure is like water in a maze of tunnels: pumping it from one tunnel to another does not diminish the amount, but merely re-distributes it.

Ageing has modest effects on the tax revenue shares of GDP. For governments as a group, tax revenue is projected to fall by around 0.2 percentage points of GDP from 2002-03 to 2044-45. The more striking ageing story is on the expenditure side. Here, across all levels of Government, spending is projected to rise by around 6.8 percentage points of GDP over the same period, of which most is for health and aged care. Social safety net payments — which includes aged pensions — rise relatively modestly. This is because the increase in payments associated with the aged pension are partially offset by the decline in payments that favour younger age groups, such as family payments and unemployment benefits.

Table 1 **How much fiscal pressure nationally will there be?**
Age-related government spending to GDP ratios

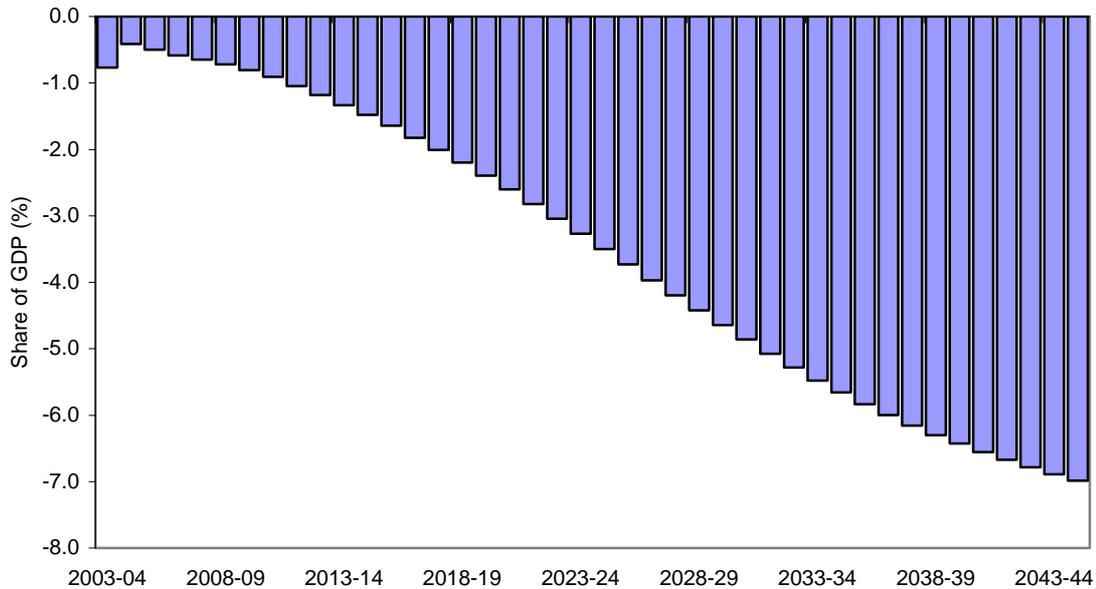
	2002-03	2044-45	Difference
	Percentage points	Percentage points	Percentage points
All Government summary			
Health	5.7	10.7	5.0
Aged care & carers	1.0	2.3	1.3
Education	4.8	3.7	-1.1
Social safety net	6.5	8.1	1.6
Total	18.1	24.9	6.8

Fiscal pressure rises smoothly over time for combined governments (figure 17), reflecting the fact that population ageing is a gradual and continuous process.

Overall, by 2044-45, governments are projected to have a combined ageing-related fiscal gap of nearly 7 per cent of GDP. Cumulatively, the value in 2002-03 dollars

of the fiscal gaps projected from 2002-03 to 2044-45 is around \$2.2 trillion (\$2200 billion).

Figure 17 The pressure builds gradually
Net fiscal position relative to 2002-03



^a See chapter 13 of the report to see the derivation of these data.

Which jurisdictions bear most pressure?

The fiscal pressures on the Australian Government are projected to be higher than for State Governments, and indeed somewhat higher than found by the Intergenerational Report.

The lower pressures on the States in the Commission’s ‘base’ projections reflect two influences:

- Given their rationale, it is assumed that special purpose payments (SPPs) from the Australian Government to the States rise with service needs, rather than say being fixed in real per capita terms. Were the demand for government services — such as health care — to outpace SPP funding, then clearly more of the fiscal pressure would be felt by the States. It could add as much as around 1.7 percentage points to the combined States’ fiscal pressure (with a commensurate reduction for the Australian Government) by 2044-45.
- The States are fiscally advantaged by their significant role in education funding. Two forces are at work here. First, population ageing results in a lower share of Australians of school age (the area of education for which the States have the

greatest responsibility). Second, the Australian Government is a major funder of private schools, which are growing relatively rapidly, displacing students from State-funded public schools.

The Commission has also estimated the ‘apparent’ fiscal pressure measure for each jurisdiction, excluding the impact of GST grants. The pressure is more apparent than real, because the future size of the GST grants made to the States recognise their relative spending and revenue-raising disadvantages. For example, Tasmania ages relatively more than other States and so faces steeper health and age care costs. It can, accordingly, expect to receive a greater share of GST revenue than currently to ‘equalise’ its position relative to other States.

There are fiscal pressures for local governments too, reflecting their involvement in aged care, community transport and a range of other human services. However, the effects on local governments are highly variable, reflecting differential involvement in the provision of age-related services and the wide variation in demographic change at the regional level. Coastal areas, in particular, have higher concentrations of older people and are expected to ‘age’ rapidly.

Some key implications

Population ageing is *not* a crisis

Notwithstanding the projected magnitude of the fiscal gap, the predominant view in policy discussion is that these potential impacts do not constitute a crisis, at least not yet. There are several reasons for supporting this view:

- An ageing population is predominantly a reflection of beneficial trends — improved life expectancy and voluntary reductions in fertility. Had many more children been born in Australia in the 1970s and 1980s, our current and impending population structure would have been younger, but our workforce would have included far fewer, and less educated, women. Given that education also promotes productivity, two of the ‘Ps’ necessary for economic growth — participation and productivity — would have been significantly lower.
- Unfunded pension liabilities, while significant, will not exert as much pressure on Government budgets as they will in many other OECD countries.
- Health care expenditure, while burgeoning, will promote community wellbeing and may reduce the need for other age-related outlays, such as residential nursing home care.

-
- Australia will also be a richer country when these impacts are felt, providing a greater capacity to absorb the additional costs of its ageing population. As noted, average per capita incomes in 2044-45 will be around 90 per cent greater than today.
 - People contribute more to a society than just through their marketplace labour. Older Australians play a significant role as volunteers, carers and community members. The Commission estimates that the value of volunteering will rise from 1.8 to 2.2 per cent of GDP. In any case, the extra leisure that older people are enjoying has value like other activities; it just does not get picked up in GDP estimates.
 - Finally, the ageing of the population is a gradual phenomenon and its economic and fiscal impacts will also gradually build up over time. Events with long lead times cannot be considered crises as long as there is scope for anticipatory countermeasures.

The policy challenges

Ageing still raises major policy challenges, predominantly because the fiscal pressure is substantial and any fiscal gap must be financed. A range of policy areas are relevant, but some approaches are likely to yield greater dividends than others.

Population policies are not likely to reduce the effects of ageing. Only very large (and increasing) migration flows could make a difference. Even existing migration targets may be frustrated, with other ageing countries competing with Australia for skilled migrants. Fertility is less amenable to policy action, and in any case, any reversal of declining fertility would initially increase the aggregate dependency rate.

Higher economy-wide productivity and participation rates will boost economic growth and household incomes. They are worthwhile in their own right, as well as increasing society's capacity to meet the costs of ageing. But their effect on fiscal pressure is muted to the extent that service demands continue to rise with income, while labour costs in the relevant service areas rise with general economy-wide productivity gains. However, the story is altered if fiscal pressures need to be at least partly financed through income taxes. In that case, higher productivity raises real household incomes and, at given real marginal tax rates, increases average tax revenues, alleviating fiscal pressures.

While economy-wide productivity gains are critical to future living standards generally, improvements in the cost effectiveness and productivity of Australia's health system would play a direct role in reducing the costs associated with the demographic transition. There is considerable scope for such gains, including

through better coordination across services and jurisdictions, a more flexible healthcare labour market, and better preventative health care.

A need for early action

Fortunately, population ageing is a slow process, and the impacts on budgets are also gradual. For all tiers of government, the policy imperatives from population ageing are to provide appropriate services, especially health and aged care, and to fund and manage these efficiently and equitably. Early intervention would avoid the need for inefficient or inequitable ‘big bang’ interventions, such as excessive tax increases or service rationing, which would also face considerable public resistance. There are credible risks that the demographic or cost pressures might raise the fiscal stakes of ageing higher than those projected by the Commission. Early action would also help mitigate such risks. Population ageing can only be conceived as a crisis if we let it become one.

1 Introduction

As one participant in this national study put it: ‘ageing is us’. By 2044-45 one in four Australians will be ‘old’ (65 years or more) — double the present share. At that time, the old will comprise around 7 million Australians, up from the present 2.5 million. This demographic transformation is a result of our success in improving longevity and controlling fertility. But it also poses some challenges for public policy.

This study — commissioned by the Council of Australian Governments — is about the economic implications of such a large proportion of the population ageing together. It continues a stream of other Productivity Commission research into ageing.¹

1.1 Scope of the study

The terms of reference (p. iv) set out the broad scope of this study.

The imperative for implementing any policy measure depends on where, when and by how much ageing affects the economy. This report is intended to inform such policies by examining the origins of population ageing and quantifying its effects on:

- the *supply-side* of the economy — labour supply, productivity and economic growth to 2044-45 (including informal labour through volunteering and caring for people);
- *spending* — the funding of age-related government services, such as health and aged care, education and social security payments; and
- *taxation revenue* — such as GST receipts and payroll taxes.

The study is complementary to, but updates and builds on, the Australian Treasury’s *Intergenerational Report*. A major distinguishing feature of this study is that

¹ The Commission has undertaken studies into nursing home subsidies (PC 1999b); the general policy implications of ageing (PC and Melbourne Institute 1999); some of the potential productivity links to an ageing workforce (Barnes et al. 1999); aged care projections (Madge 2000) and pricing in residential aged care (PC 2003).

detailed projections are made for the States and Territories, as well as the Australian Government. State and Territory Governments also have substantial budget exposure to ageing and have their own policy challenges associated with the impacts of ageing. Ageing has a local dimension too, taking place in disparate communities. So the challenges for government at this level — local government — are also considered in this report.

The report has a strong methodological vein. It explores new methods for making and interpreting projections that may be useful for policymakers. It uses more recent data than were available for the Intergenerational Report and new underlying population projections — which are the major reasons for some of the (relatively small) differences with that report.

What is the nature of the projections in this study?

The terms ‘projections’ and ‘forecasts’ are often distinguished in exercises that look into the future. A projection is a ‘what if’ experiment. It indicates what will happen *if* a certain set of conditions are met. Often, different projections are made, showing the results of different sets of assumptions. For example, the Australian Bureau of Statistics produces three major scenarios for Australia’s future population (and offers many other tailor-made choices to users) — users then choose the series they believe is most appropriate for their purpose. In contrast, a forecast is an assessment of the most likely outcome.

The Commission’s assessment of the impacts of ageing are based on projections. The horizon for most projections is 2044-45. The projections are intended to be a sensible guide to what will happen under existing Government policies and if people’s behaviour continues in much the same way as it has recently. But they are not forecasts in the sense that they are expected to occur. Indeed, it should be anticipated that they will be wrong because they will elicit policy and behavioural responses that deal with the adverse consequences they reveal. For example, governments will almost certainly avoid large fiscal deficits through a mix of strategies, such as increasing taxes, reducing services, improving the cost-effectiveness of services or changing their funding sources. The projections could be right only if governments chose to do nothing.

It is appropriate in the context of this study to exclude from our projections the specific government reactions to the challenges posed by ageing. An analogy for the approach is the situation in which someone spies a large boulder on a train track. Their *projection* is that there will be a rail disaster and many deaths if the boulder is not moved or the train not stopped. Their *forecast* is that someone will move the boulder, averting the accident. The projection — the conditional forecast — is much

more useful for policy (and was generally endorsed at a roundtable meeting of senior officials from all governments).

The Commission's projections also do not take account of any new Government policy that has been announced, but not yet implemented. For example, the Australian Government has announced policy changes that would tighten eligibility for the disability support pension, but so far the measures have not been passed by the Senate. Similarly, the Australian Government has also announced that it will provide new funding for vocational education and training outside the existing State-based arrangements, but these have not been implemented yet. It is sensible to exclude such policy changes from the projections because their final form is not yet known. However, our judgment is that such changes — if implemented — would not make a large difference to the Commission's overall conclusions about the impacts of ageing.

That said, apart from ignoring the likely reactions of government, the projections are the Commission's best judgements about what Australia will be like as it ages over the next 40 years. Those judgments are, of course, accompanied by some uncertainty. There are many things affecting the future that are unguessable or very hard to predict. For instance, cost-effective treatments for dementia could emerge which would free many from residential nursing homes. On the other hand, the rising trend of obesity levels may create a future epidemic of diabetes II. Fertility rates may not drop as much as forecast. Or more people may work on into later ages in the future than anticipated. It is certain that new technologies will be developed, but in the past, people have been poor at guessing what these will be, let alone their significance over long time frames.

In the face of such uncertainty, the appropriate stance is to model a variety of possible futures so that policymakers can determine the best overall responses. Consequently, sensitivity analysis is used throughout this study.

1.2 Participation in the study

The Commission has consulted with a wide range of people, institutions and governments about the implications of ageing (appendix K). Consultation took place with the Australian Government, all State and Territory Governments, and representatives of local government. Submissions were sought from interested parties — and 41 were received by 17 November 2004.

A further round of consultation will take place after release of this draft, and further submissions are invited on its findings.

1.3 Structure of the report

This report is structured in three parts.

Part A outlines the dimensions of expected demographic change in Australia over the next 50 years (chapter 2) and examines the impact of this change on the supply side of the economy —the availability of labour (chapter 3), productivity (chapter 4), and economic growth (chapter 5).

Part B presents a series of chapters on the Commission’s projections of the impacts of the ageing population on governments’ expenditure and revenue. The key spending areas associated with ageing are health (chapter 6) and aged care (chapter 7). The picture for personal benefits (chapter 8) is more complex, because some payments are made to predominantly young people (such as parenting payments), while others are for the old (the aged pension). For education spending, demographic change is a source of potential fiscal relief (chapter 9). There are also a range of other expenditure areas in which ageing may be important (chapter 10), but where quantitative estimates of its effects are difficult (for example, transport and housing). Ageing also has effects on Government’s tax revenue prospects (chapter 11). While the focus of the quantitative estimates of the impact of ageing are on Australian, State and Territory Governments, ageing will have local effects too. These impacts are explored in chapter 12.

Part C examines the projected net fiscal burden under current government policies and raises some broad policy implications of ageing (chapter 13).

Appendices provide further detail about the Commission’s projections or methodologies.

2 Ageing of the Australian population

Key points

- Australia's population is rapidly ageing. The share of the population aged over 65 years is projected to rise from 12.8 to 26.1 per cent from 2002-00 to 2044-45. An even bigger relative change is anticipated in the importance of the oldest old — those over 85 years or more. Their share increases from 1.5 to 5.4 per cent over this period.
- Currently, there are 5.3 people in the potential workforce for every person aged 65 or more years (an aged dependency ratio of 19 percent). By 2044-45, this will have fallen by more than a half, to less than 2.3 (an aged dependency ratio of 44 percent).
- The youth dependency rate will fall, partly offsetting this rise in aged dependency, but not by very much. In any case, the fiscal costs associated with the young are less than those associated with the old.
- Some Australian jurisdictions will age more than others. Tasmania and South Australia stand out as those in which the share of the aged will be greatest 40 years from now, while the Northern Territory will have the least — a consequence of its unique demography.
- The main factors underlying population ageing in Australia have been, and will be, increases in life expectancy and reduced fertility rates. The post-war baby-boom, often credited as a major source of ageing, has actually delayed ageing in Australia, although making its onset more pronounced.
- There is limited scope to moderate population ageing through demographic policies.
 - Much of ageing is testimony to successful attempts to prolong life through technology and public health initiatives — a process people would not like to see reversed.
 - Feasible fertility increases can slow ageing but not by much.
 - Despite popular thinking to the contrary, immigration policy is also not a feasible counter measure. For example, stabilisation of the existing age structure would require annual migration rates of 3.4 per cent of the population (or nearly 700 000 migrants in 2004-05), resulting in an Australian population of 114 million by 2044-45 and annual net migrant intake at that time of 3.7 million.
- While policy cannot alter Australia's demographic future by much, other circumstances might. Different outcomes for mortality rates and to a lesser extent, fertility, could make a big difference to Australia's ageing future. For example, it is conceivable that by 2044-45, the aged dependency ratio could be as low as 37.2 per cent or as high as 61 per cent. This suggests the importance of long-term policy approaches that are flexible enough to deal with quite different population ageing outcomes.

2.1 Introduction

Australia, like all other advanced economies, is experiencing a major demographic transition towards an ageing population. This transition should not be seen as ‘bad’. It is testimony to the historically unprecedented conjunction of several positive demographic and economic factors — including longer life expectancy and control over reproduction rates. But the transition is nevertheless a profound one, with potentially large implications for Australians and for governments’ policies.

This chapter provides the starting point for the analysis in this report by considering the extent of the demographic transition, why it is occurring, and whether policies popularly advocated for abating it would be likely to have much effect.

2.2 The extent of the demographic transition

How can we know the future?

Gauging Australia’s future population size and structure depends on knowing what will happen to births, deaths and net migration. Forecasts are difficult because, based on past experiences, the phenomena that affect fertility, mortality and migration have a tendency to change in unexpected ways. For example, enhanced family planning methods (particularly the introduction of the contraceptive pill) played an important part in the fertility declines of the 1960s and 1970s, but were not predicted at the time.

In the future, unforeseen epidemics and wars, changes in lifestyle choices and the development of new health technologies may affect mortality rates in unanticipated ways. Changing social attitudes to children (and their care), variations in biological fertility and policy measures that affect costs associated with having children may reverse or accentuate the downward trend in the overall fertility rate. Unexpected changes to geopolitical and economic circumstances and to immigration policy, combined with shifting global patterns of competition for skilled migrants, limit the capacity for accurate migration forecasts.

Nevertheless, barring large departures from historical demographic trends, useful projections of Australia’s population and (particularly) age structure can be produced.

For most of this report, the Commission relies on ABS population projections. The various ABS projections are founded on extensive consultation and expert judgements about how the demographic determinants of population could plausibly

evolve. The projections, although based on what the ABS regards as sensible assumptions, are conditional predictions, not forecasts per se. They show what will happen if the assumptions are valid. The ABS urges users to assess the validity of the underlying fertility, mortality and migration assumptions for themselves and use the scenario(s) that best accord with their assessment. In this report, the Commission has generally used the ABS's 'middle' (series B) projection. This is premised on:

- a medium fall in total fertility rates from the current level (just over 1.7) to 1.6 babies per woman of fertile age by 2011 (and then staying constant over time);
- a medium level of net overseas migration to Australia falling slowly from present levels of 125 000 to 100 000 by 2005-06, and then remaining at that level to 2050-51; and
- a medium gain in life expectancy of 7.2 years for men and 5.3 years for women from 1999-2000 to 2050-51.

However, the Commission has also developed its own demographic projection models to explore the consequences of different scenarios, to simulate the past and to understand and project the unique demographics of one jurisdiction: the Northern Territory. These have drawn on advice and estimates of the ABS, the Northern Territory Government and several demographers (appendix K). To avoid confusion, this report uses the ABS series B projections, unless otherwise flagged.

The sensitivity of the projections to different assumptions is discussed separately for each of the major demographic drivers of population ageing (below). But it is important to emphasise from the start that all credible models of Australia's future population show significant population ageing.

Population ageing in Australia

Population ageing — an increasing proportion of the population accounted for by older age groups — is gathering pace in Australia (table 2.1, figures 2.1 and 2.2). Over the next forty years, the number of children will fall in absolute terms, even though the total population is projected to increase by around 30 per cent. In contrast, the number of the old will rise strongly. And the significance of the very old is projected to grow even more. At the moment, there are around 300 000 people aged 85 or more in Australia — roughly the size of a small city like Canberra. By 2044-45, the metropolis of the very old will have grown to 1.4 million. By 2050-51, just six years later — their number would have swelled by a further 170 000. The number of centenarians, now a rarity, will grow sixteen fold

from 2002 to 2045, and by 2051, when there will be around 70 000 Australians of this advanced age.

Table 2.1 Ageing of the Australian population
2001-02 to 2044-45

Age	Population change	
	Number of people ('000)	%
0 to 14	-248.4	-6.2
15 to 64	2 386.7	36.8
65 plus	4 339.9	174.3
65 to 74	1 641.6	123.2
75 to 89	2 168.7	203.8
90 to 99	482.8	536.7
100 plus	46.7	1514.8
All ages	6 478.2	32.9

Source: ABS 2003a.

As a consequence, the *share* of the population that is old will rise significantly. Indeed, by 2016 the share of the population aged 65 years or more will exceed those aged less than 15 years. And by 2043, even the share of the population aged 75 or more years will exceed the share aged less than 15 years.

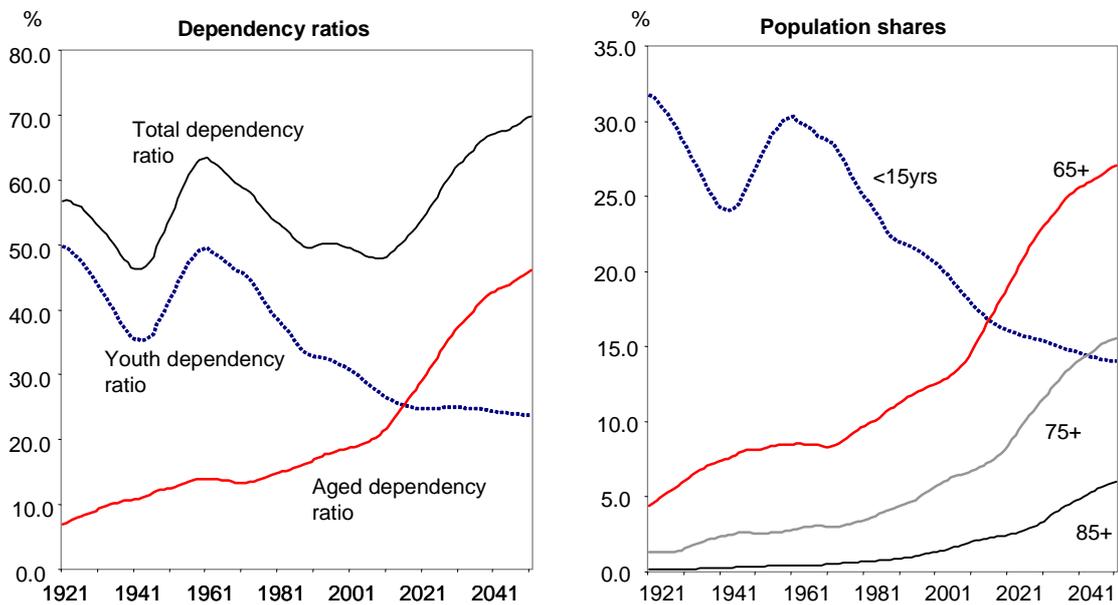
While population ageing occurs in each year of the next four decades, the extent of ageing accelerates from now to 2015 (figure 2.2).

This shift in Australia's age structure means that, over the next forty years, the 'aged dependency ratio' — the number of people aged 65 years and over relative to the population aged 15-64 — will rise significantly (figure 2.1). Currently, there are about 5.3 people in the potential workforce for every person aged 65 or more years. By 2044-45, this will have fallen by more than a half, to less than 2.3.

Such dependency ratios — while commonly used in demographic descriptions — have to be interpreted carefully.

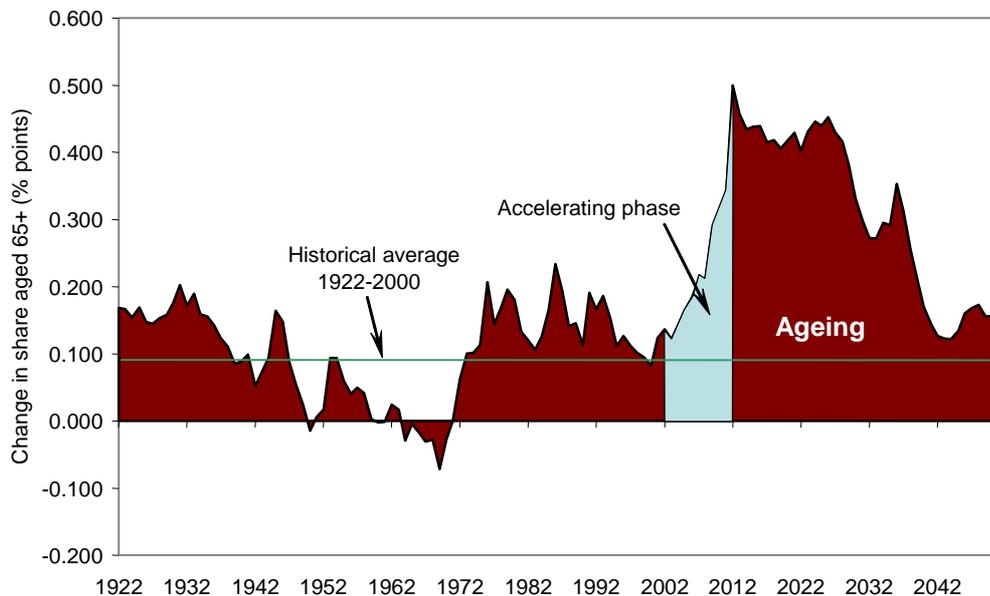
- First, they only reveal broad trends in the availability of people available for work, and ignore the fact that people over 65 years can still participate in the workforce or make valuable social and economic contributions in other ways. The term 'dependency' need not imply financial or economic dependency by the old.
- Second, it is often noted that growing aged dependency is counteracted by a decrease in the dependent young. The ratio of those aged under 15 years to the 15-64 year age group will fall over the next half-century.

Figure 2.1 The demographic transition, 1921 to 2051



Data sources: Commonwealth Bureau of Census and Statistics, *Australian Demographic Bulletins*, 1921-1970 and ABS, *Australian Historical Population Statistics*, (Cat. No. 3105.0.65.001) table 19, 1971-2003, and ABS B series projections 2004 onwards. All data are end June.

Figure 2.2 Ageing, 1922 to 2051^a
 Yearly change in the share of the aged



^a All years in which the change is positive represent an ageing population (shaded). Where the change is growing, ageing is accelerating.

Data sources: Based on yearly change in the population share of 65+ year olds based on data from Commonwealth Bureau of Census and Statistics, *Australian Demographic Bulletins*, 1921-1970 and ABS, *Australian Historical Population Statistics*, (Cat. No. 3105.0.65.001), table 19, 1971-2003, and ABS B series projections 2004 onwards. All data are end June.

However, these counteracting effects are not as important for the economy and the Government's fiscal positions as might be thought:

- The fall in the youth dependency rate is only sufficiently big to counteract the effects of the rise in the aged dependency rate to 2008 (where the *total* dependency rate reaches the lowest level since 1946). But from 2008, the total dependency rate rises steeply to reach a new historical height;
- Young dependents attract less Government-funded spending than older Australians, so a fall in their share has less fiscal impact than an equivalent rise in the aged dependency share.
- The young are the main source of future labour force growth. So falling youth dependency presages low labour force growth and, other things being equal, relatively weaker future economic growth.

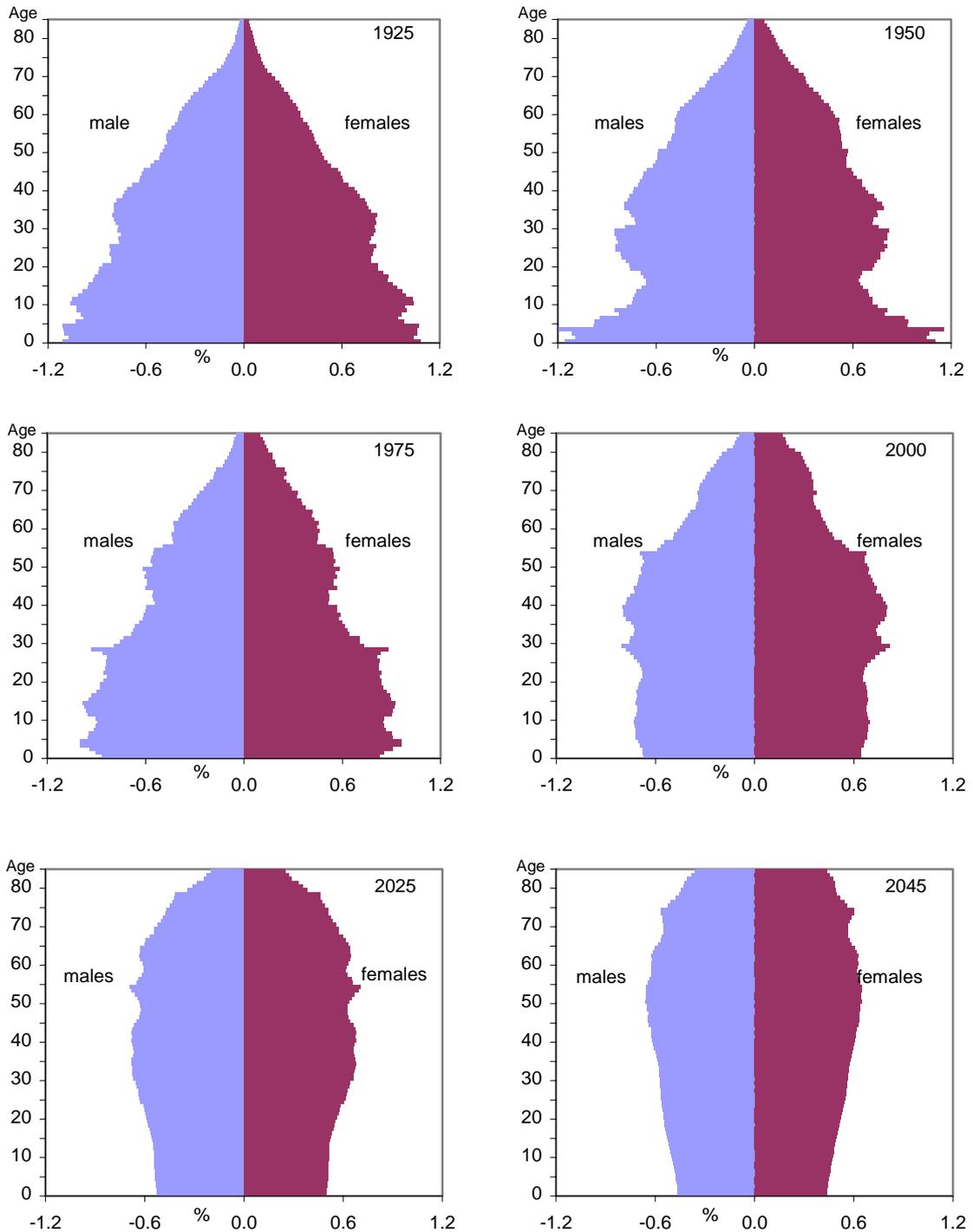
It is clear from figures 2.1 and 2.2 that population ageing is not a new phenomenon for Australia. Indeed, the demographic transition has been occurring for more than a century. In 1870, 42 per cent of the Australian population were aged less than 15 years and only 2 per cent were aged 65 years and over (McDonald and Kippen 1999a, p. 3). The proportion of people aged less than 15 years declined strongly in the 20th century — with the notable exception of the baby boom years — to reach about 20 per cent in 2001. By contrast, the proportion of people aged 65 and more has risen over all years to reach just below 13 per cent by 2002.

The so-called 'population pyramid', which depicts the relative size of population segments by single year of age, provides another way to visualise the ageing of the Australian population (figure 2.3). As the average number of births per women and the incidence of death in all age groups continued to decline, the Australian population pyramid early in the 21st century has, in line with those of other developed economies, increasingly begun to resemble a beehive. Given current trends, the population pyramid will continue its inversion and begin to resemble a coffin (McDonald and Kippen 2000).

Demographic change in Australian States and Territories

With the exception of the Northern Territory (see below), the ageing pattern is much the same for most Australian jurisdictions, though more accentuated in some than others (table 2.2).

Figure 2.3 Percentage of population by single year of age
1925 to 2045



Data source: Data are end June. Data are for single years of age up to 84 years, with truncation of 85+ year old data to avoid a spike at that age interval. Data are from: Commonwealth Bureau of Census and Statistics *Australian Demographic Bulletins* for 1925 and 1950; ABS, *Australian Historical Population Statistics*, (Cat. No. 3105.0.65.001), table 19 for 1975 and 2000; and ABS B series for 2025 and 2045.

South Australia and Tasmania stand out as the States that will have the greatest concentrations of the old by 2044-45. This reflects their present above-average representation of the old and the tendency for migration patterns to disproportionately extract the young. In Tasmania, for example, there will be 6 people aged 65 years or more for every 10 people aged 15 to 64 years in 2044-45.

Table 2.2 Ageing varies across jurisdictions
2002-03 to 2044-45

	<i>Share of age groups in the population</i>									
	NSW	VIC	QLD	SA	WA	TAS	NT (ABS)	NT (PC)	ACT	Total
	%	%	%	%	%	%	%	%	%	%
2002-03										
65+	13.3	13.2	11.9	14.9	11.4	14.2	4.0	4.1	9.0	12.8
75+	6.3	6.2	5.5	7.4	5.1	6.7	1.3	1.3	4.0	6.0
85+	1.5	1.5	1.3	1.8	1.3	1.6	0.3	0.3	0.9	1.5
90+	0.5	0.5	0.4	0.6	0.4	0.5	0.1	0.1	0.3	0.5
ADR	19.9	19.6	17.6	22.5	16.7	21.8	5.7	5.8	12.7	19.0
2044-45										
65+	25.9	26.3	25.8	30.2	25.8	32.6	11.5	13.4	22.6	26.1
75+	14.5	15.0	14.3	18.1	14.6	19.6	4.7	5.6	12.9	14.7
85+	5.3	5.6	5.1	7.0	5.4	7.4	1.3	1.6	4.9	5.4
90+	2.3	2.5	2.2	3.2	2.4	3.2	0.5	0.7	2.2	2.4
ADR	43.5	44.0	43.2	53.3	43.2	60.6	16.9	19.6	35.9	43.8
Change	points	points	points	points	points	points	points	points	points	points
65+	12.6	13.1	13.9	15.3	14.4	18.4	7.5	9.3	13.6	13.3

^a ADR is the aged dependency rate (calculated as the number of people aged 65 years and over as a percentage share of the population aged 15-64 years old).

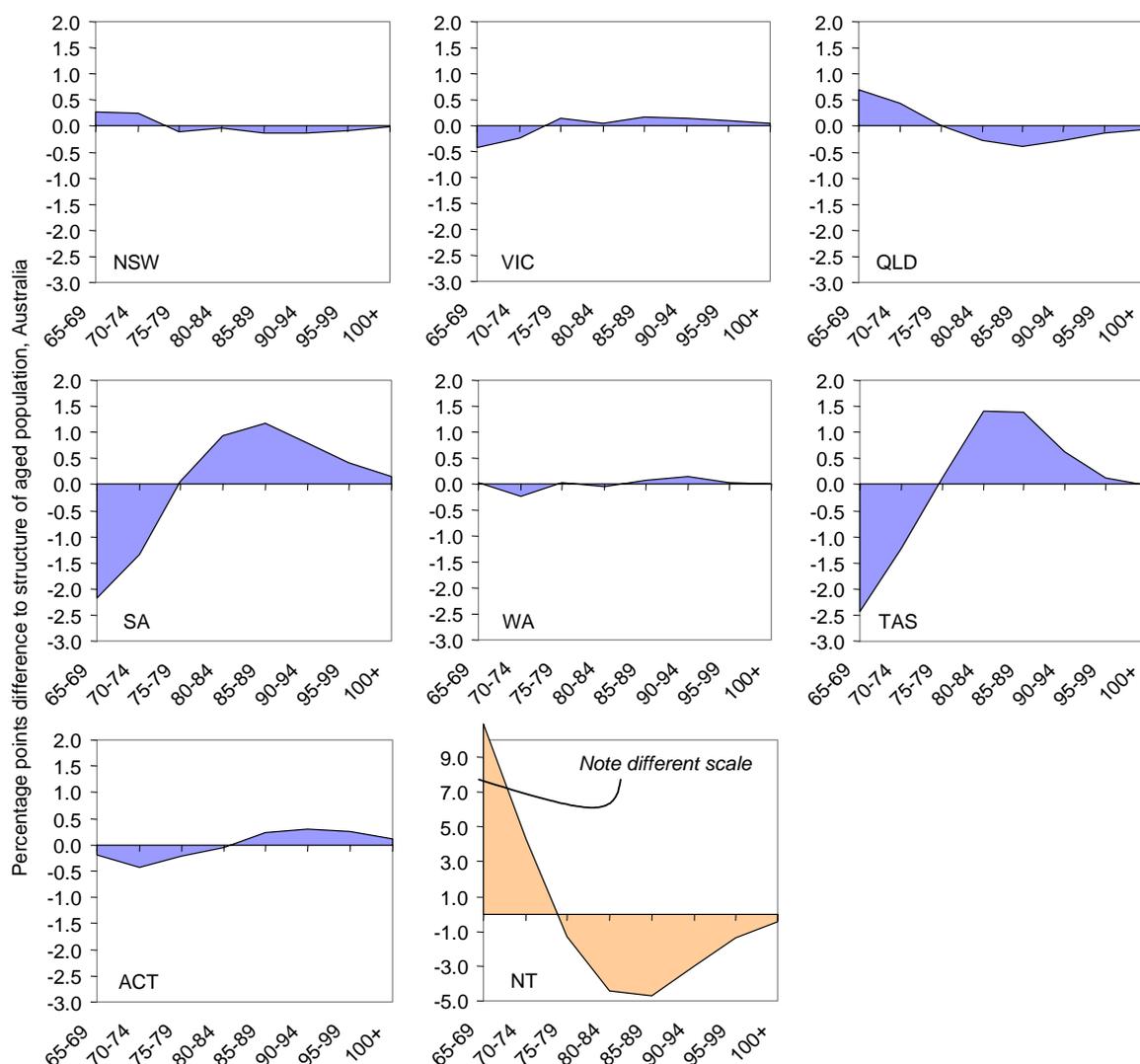
Data source: ABS demographic projections, Series B (unpublished data by single years of age to 100+) and PC projections for alternative Northern Territory shares. The PC projections for the Northern Territory combine separate projections for the non-Indigenous and Indigenous populations and rely on different mortality, fertility and net interstate migration assumptions than the ABS B series and are discussed later in the chapter. The PC projections are much closer to the ABS series C projections for this jurisdiction.

However, the relevant factor for ageing pressures on the States is the *change* in the proportion of the aged, rather than the actual proportion of the population that is old by 2044-45. This is still the highest for Tasmania and South Australia, but it is also significantly higher for Western Australia than others (table 2.2).

While it is conventional to represent people aged 65 or more as ‘old’, many of the costs and challenges associated with ageing occur with the *oldest* old — those aged 85 years or more. For example, the probability of entry to high level residential nursing homes increases substantially at the oldest ages. In that sense, it is important to consider the age structure of the old as well as just the total share of people aged over 65 years. This differs substantially between jurisdictions too.

- The Northern Territory (and Queensland to a lesser extent) has a greater representation of the younger old among their aged by 2044-45 (figure 2.4).
- In contrast, Tasmania and (at the oldest ages, even to a greater extent) South Australia have a greater share of the oldest old among their aged.

Figure 2.4 The age structure of the aged
Differences between jurisdictions, 2044-45^a



^a The graphs were calculated as follows, using the ABS B series for 2044-45. First, for each jurisdiction, the numbers of people in the quinquennial age groups, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99 and 100+ were expressed as a share of those aged over 65 years old. Then the equivalent shares for Australia as a whole were subtracted to derive the difference in percentage points. Thus, a positive value represents an over-representation of an age group in the aged in a jurisdiction compared with Australia as a whole.

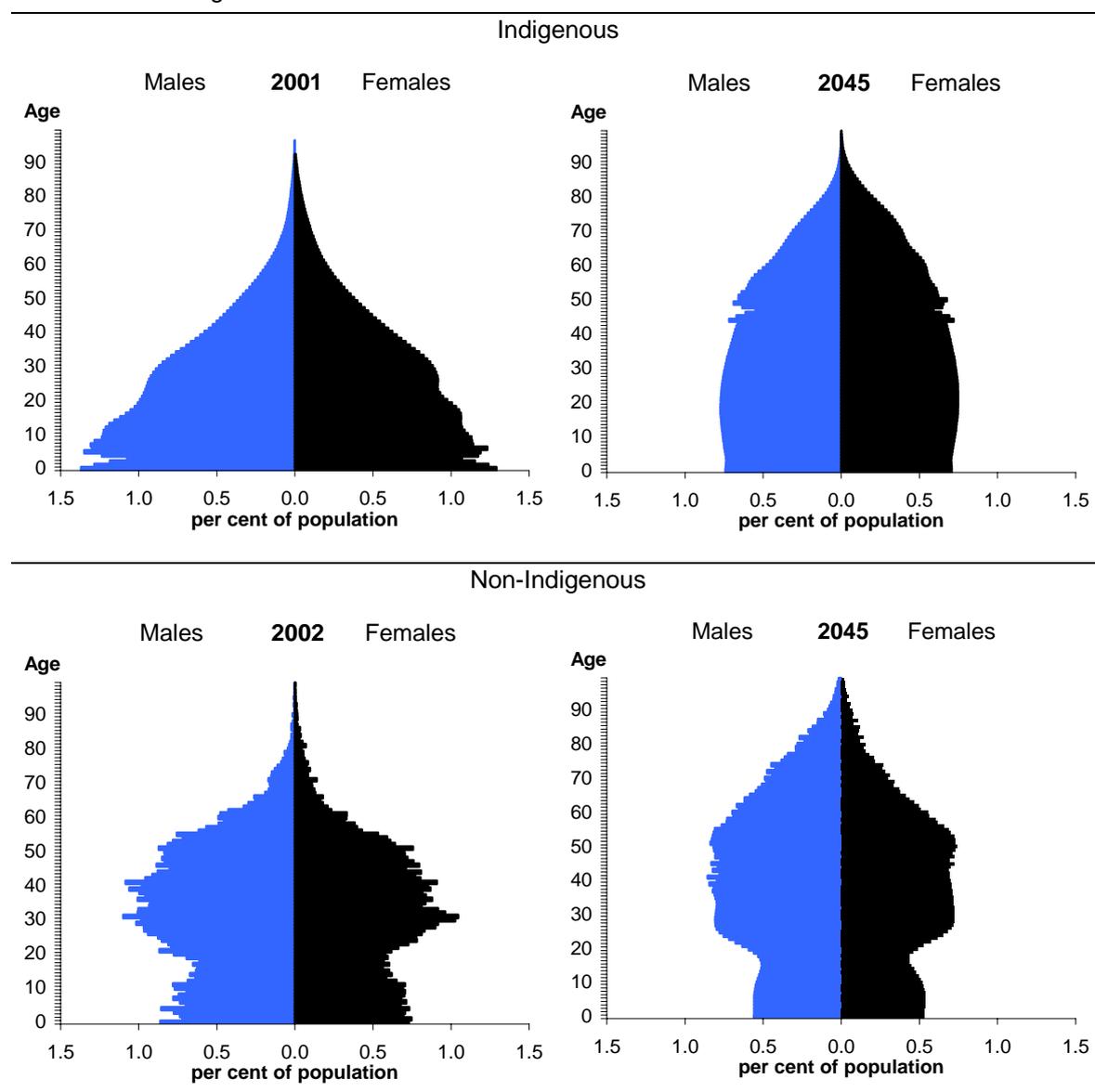
Data source: Data are end June 2044-45 from ABS series B projections.

The special case of the Northern Territory

The Northern Territory has two other features that sharply distinguish it from other jurisdictions. First, roughly 30 per cent of the population is Indigenous. This sub-population has an age structure weighted far more to the young, reflecting high fertility rates and relatively low life expectancy (figure 2.5). Second, many non-Indigenous Territorians do not stay in the Northern Territory at older ages. As a result, the conventional measure of ageing — the change in the share of those aged 65 years or more — is less in this jurisdiction.

Figure 2.5 **The special case of the Northern Territory**

Age structures in 2001 and 2045



Data source: Data are end June. Data are for single years of age up to 99 years, with truncation of 100+ year old data to avoid a spike at that age interval. The data are based on PC projections.

Nevertheless, significant changes occur in the age structures of the two sub-populations. Interstate migration and falling fertility rates hollow out the young and the very old in the non-Indigenous population, resulting in a unique ‘arrowhead’ age structure by 2044-45 (figure 2.5).

In the Indigenous case, (assuming significant reductions in fertility and mortality rates) the population structure shifts from a third-world pyramid with a wide base represented by the young, to a more first-world age structure. While there is only a modest shift in the share of the aged, the *proportional* change in the share of the aged is high by Australian standards. In the Northern Territory the share increases by 3.3 times, whereas on average the share doubles in Australia as a whole.

It should also be emphasised that the age threshold used to define ‘oldness’ depends on the social and economic effects of ageing. Indigenous people in the Northern Territory currently have a life expectancy roughly 20 years less than their non-Indigenous counterparts and experience older people’s diseases at much younger ages (for example, cardiovascular disease and diabetes II). Accordingly, many Indigenous people aged in their 40s and 50s have disability and morbidity characteristics that are more akin to those of older Australians. In that sense, the younger apparent age structure of the Northern Territory, now and (and to a lesser extent) in forty years time, belies a significant burden of disease present at younger ages. This has implications for health budget forecasts (chapter 6).

Global patterns of ageing

The shift towards older populations is a worldwide trend — reflecting general reductions in fertility rates and reduced mortality risks. Only six of 193 countries reveal a decrease in the projected age dependency rate from 2000 to 2050.¹ In fact, the *rate of change* to older populations is fastest in less developed economies, such as Thailand, Brazil, Mexico, China, Vietnam and most Middle Eastern countries.

In absolute terms, however, it is the developed economies that will have the most aged populations by 2050 — particularly Japan and European countries, like Italy, Greece and Switzerland (table 2.3). When measured by the aged dependency ratio, Australia will experience relatively moderate ageing compared with many other developed countries. It is ranked 53rd of 193 countries in terms of the (highest) aged dependency ratio by 2050.

¹ These are six of the poorest third world countries: Lesotho, Guinea-Bissau, Malawi, Angola, Zambia, Zimbabwe and Swaziland (see the source from table 2.3).

Table 2.3 Global patterns of ageing^a

<i>Country</i>	<i>2000</i>		<i>2050</i>	
	<i>Share 60+</i>	<i>ADR</i>	<i>Share 60+</i>	<i>ADR</i>
	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>
Japan	23.3	37.5	42.4	95.1
Spain	21.2	33.0	40.9	89.3
Italy	24.1	39.1	40.6	87.5
Greece	23.4	38.0	39.6	84.8
Czech Republic	18.3	28.1	39.5	83.9
Belarus	19.3	31.1	37.6	78.0
Ukraine	20.6	33.4	37.7	77.6
Switzerland	21.3	34.4	37.5	76.7
Austria	20.7	33.0	37.2	75.6
Singapore	10.5	15.5	37.4	74.8
Republic of Korea	11.0	16.2	36.9	74.7
Poland	16.6	25.9	36.2	73.4
Russian Federation	18.5	29.1	36.0	72.9
China, Hong Kong	14.4	20.9	36.0	72.7
Portugal	20.8	33.3	35.6	71.3
Germany	23.2	37.9	34.5	68.6
Puerto Rico	15.4	25.3	34.1	67.0
Sweden	22.3	37.6	33.6	65.6
Belgium	22.1	36.6	33.3	64.7
Finland	19.9	32.1	32.6	62.8
France	20.5	33.8	32.3	62.4
Canada	16.7	26.0	32.2	61.5
Norway	19.5	32.2	32.2	61.2
Netherlands	18.2	28.8	30.7	57.3
Ireland	15.2	24.0	30.2	56.9
Denmark	20.0	32.4	30.6	56.8
Iceland	15.1	24.5	30.4	56.6
China	10.1	15.5	30.0	55.7
Australia	16.4	26.0	29.9	55.6
United Kingdom	20.7	34.4	29.6	54.5
New Zealand	15.7	25.6	29.0	53.0
Luxembourg	18.4	29.4	27.4	48.9
Mexico	6.9	11.7	26.2	46.1
United States of America	16.1	25.9	25.5	45.1

^a ADR denotes the aged dependency ratio. In this table only this is measured as the share of people aged 60+ to those aged 15-59 years (the basis on which the United Nations provides population age data).

Source: United Nations, *2003 World Population Prospects, the 2002 Revision*, United Nations Population Division (available from <http://www.un.org/esa/population/unpop.htm>).

What is the cause of the demographic transition?

The age structure of the population at any point in time is determined by the historical experience in fertility, mortality and net migration. Looking at past patterns in these demographic drivers has two benefits. First, it explains why we are where we are now. Second, analysis of these trends underpins the assumptions used to derive long run projections of the population age structure of the kind shown in section 2.2. These trends are considered in the following three sections, with a summary of their overall effects in section 2.7.

2.3 Mortality rates have been falling

Average mortality rates have been declining strongly over the last century (figure 2.6). For example, the number of deaths per 1000 population (the crude death rate) almost halved last century from 12.2 in 1901 to 6.6 in 2001.² This occurred despite a rising concentration of older people, who are more likely to die. If adjustments are made for the effect of an older age structure by using the standardised death rate (SDR),³ the fall in mortality is even more pronounced. The SDR almost halved in the past 30 years alone, falling from 10.5 deaths per 1000 population in 1971 to 5.4 in 2001.

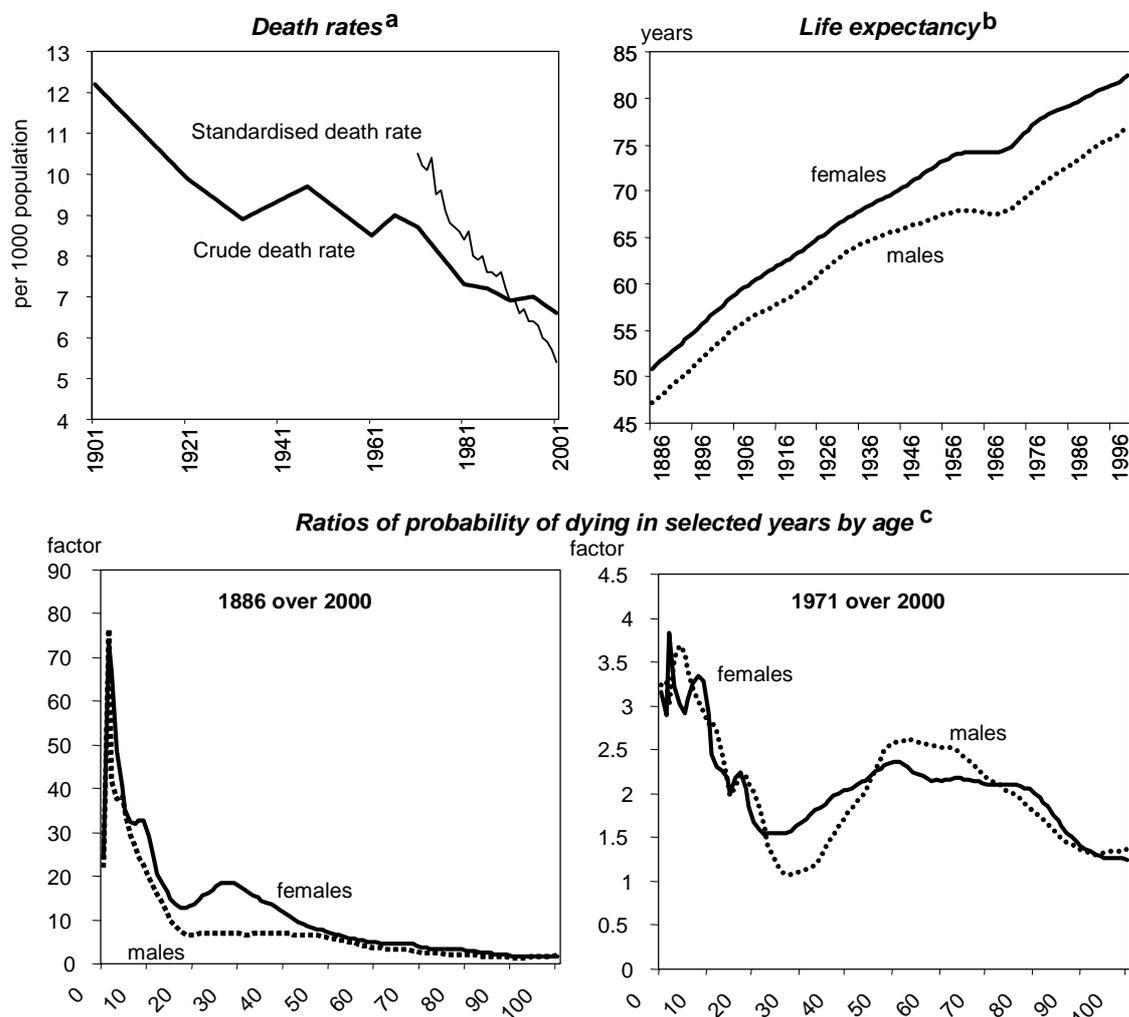
Much of this improvement stems from a decline in infant mortality. For example, a one year old child was close to 80 times more likely to die in 1886 than a child of the same age in 2000 (figure 2.6). Although this is the peak reduction in mortality by single year of age, it is apparent from the figure that the likelihood of dying at a specific age has fallen substantially for all but the oldest age groups. Moreover, there have been substantial reductions in the likelihood of death at most ages even in recent times. For example, over the 30 year period from 1971 to 2000, there has been at least a 50 per cent reduction in the probability of death for middle aged people. As a consequence of falling mortality rates, life expectancy has increased by around 30 years since the 1880s (figure 2.6).⁴

² ABS, *Australian Demographic Statistics*, Cat. No. 3101.0.

³ The *standardised death rate* (SDR) enables the comparison of death rates between populations with different age structures by relating them to a standard population. Unless the age-specific death rates are unreliable (for example, for small populations), the standardised death rate gives the overall death rate that would have prevailed in the standard population if it had experienced the death rates of the population under study.

⁴ It should be noted that life expectancy is just a synthetic measure of the impact of cumulative age-specific mortality rates recorded at a given time. It records the average life expectancy of a person at birth, were that person to experience the age-specific mortality rates observed in the *current* population for future years of their life. In fact, mortality rates are declining over time.

Figure 2.6 What has happened to mortality in Australia?



a The SDR is standardised to the 1991 population structure. The crude death rate was linearly interpolated for some years. **b** Life expectancy was interpolated for some years using a cubic spline. Data run from 1886 to 2000. **c** These graphs show how probabilities of death (termed q_x in life tables) have changed over time for different ages. The years shown are averages over a span of years. For example, 1886 is the average for 1881 to 1991 and 2000 is the average for 1999 to 2001.

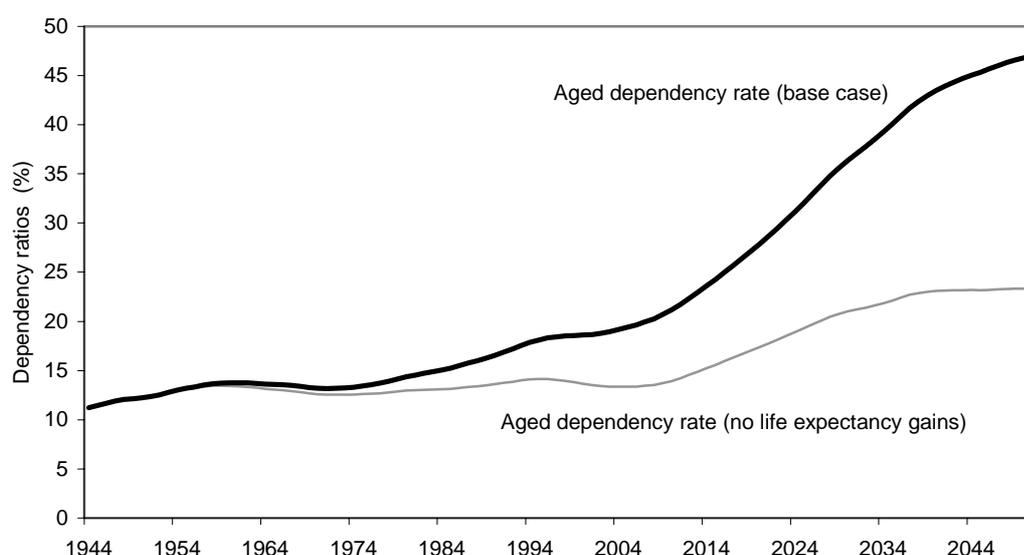
Data source: The CDR is from ABS, *Year Book Australia 2001* (Cat. No. 1301.0) for 1901 to 1991, and from ABS, *Deaths, Australia* (Cat. No. 3302.0) for data to 2001. Life expectancy, the SDR and death probabilities are from ABS, *Australian Historical Population Statistics* (Cat. No. 3105.0.65.001).

The effects of reductions in mortality rates on population ageing can be visualised by imagining an Australia in which no such gains had been made since the Second World War (figure 2.7). In that adverse case, Australia would have a much younger

Accordingly, a person born at a time where mortality rates are still falling will live on average for more than the recorded life expectancy at that time. For example, so-called cohort life tables, which take into account future changes in mortality rates, suggest that a male born in 1997 will live for more than six years longer than the recorded life expectancy for 1997 (ABS 2002).

age structure than otherwise — both now and in forty years time.⁵ Even so, some ageing would still occur, with the age dependency ratio doubling from 2001-02 to 2044-45 (reflecting the fact that ageing is still partly shaped by migration and fertility patterns). This thought-experiment reveals that population ageing is the inevitable consequence of the beneficial transition from high mortality societies to low ones. Ageing does raise policy challenges, but most people would not want to reverse the demographic factors that have underpinned the transition.

Figure 2.7 What a difference increased life expectancy makes.



^a The base case is calculated as a simulation in which historical trends in fertility, mortality, net overseas migration are used to project the population from the 1944 base year to 2002. ABS B series projection scenarios for these demographic variables are used to continue the simulation until 2051 (although some of the 2002 starting values for these variables are updated to reflect new information – for example, on fertility rates). The base case closely matches the actual dependency ratio recorded for historical data and the ABS’s published B series to 2051, indicating that the simulation methodology is appropriate. The counterfactual case is then simulated in the same way, but with no changes in central death rates from 1944 (and therefore no gains in life expectancy).

Data source: PC calculations.

What is the future for mortality?

Most demographers expect further gains in life expectancy in the future. However, gauging the extent of the likely long run gains is difficult.

⁵ But while the aged dependency ratio falls, the ratio of young people to those aged 15-64 hardly changes.

It is hard to forecast the factors that may reduce mortality rates. The history of mortality reduction reveals that major gains stemmed from quite disparate sources, with different patterns in different periods (box 2.1). It is possible that there will be far more effective treatments for the major causes of death (such as cancer, strokes and cardiovascular disease). It is also possible that further preventative public health strategies might reduce mortality from some sources. However, the past patterns of mortality reductions reveal that people surviving one condition go on to be exposed to others. In any case, quite apart from the uncertainties associated with the development of new medical and health technologies, there are potential new disease risks (such as SARS and antibiotic-resistant bacteria) and lifestyle factors that may raise mortality (such as those associated with the rising incidence of obesity and diabetes II).

Box 2.1 Why have mortality rates fallen?

Improvements to sanitation are credited with reductions in infectious diseases causing many of the infant and young children deaths early in the 20th century (Cumpston 1989). Better nutrition, improved access to clean water, better education and smaller family sizes are also likely to have contributed to better infant health and increased resistance to infection.⁶ The introduction of antibiotics in the 1940s further reduced death rates from infectious diseases and helped maintain the declining mortality trend for younger age groups, as well as having broad benefits for all other age groups.

Australia, as many other developed countries, experienced a 'health transition' from infectious to chronic diseases. During this transition, some falls in the incidence of infectious diseases, especially for older age groups, were offset by the rising incidence of chronic diseases. For example, coronary heart disease, stroke and cancer death rates increased from the 1920s and 1930s (AIHW 2000).

The increasing incidence of some chronic diseases was arrested and subsequently reversed in the second half of the 20th century. Aside from lifestyle factors and nutrition, improvements in medical knowledge, procedures and technology contributed to this reversal (AIHW 2000), especially in regard to circulatory diseases from the 1970s. This explains the more recent reductions in mortality experienced by older age groups.

Many demographers doubt that past gains in life expectancy can be maintained because of biological limits to life. In that case, extrapolations of past trends may tend to overstate future reductions in mortality rates. Reflecting this, the ABS B series projections are based on the assumption of a slowing in life expectancy gains slow over time (with the Intergenerational report adopting a similar approach). However, it is not certain that the limits to longevity will constrain life expectancy growth in the next 40 years. The ABS's past projections have

⁶ Gandevia 1978, quoted in AIHW 2000.

systematically been below actual life expectancy gains because the trends failed to slow as predicted (Booth and Tickle 2003, 2004).

Uncertainty about future longevity suggests the need to test the sensitivity of ageing projections about a range of mortality scenarios (especially since it is evident from figure 2.7 that mortality patterns have a large impact on the extent of ageing).

The Commission compared three alternative scenarios with the projections based on the ABS B series. The alternative scenarios are based on high, medium and low estimated mortality rates estimated by Heather Booth of the Australian National University (box 2.2).

The results (table 2.4) suggest that relatively modest changes in life expectancy trends over the next forty years can make a significant difference to the age structure of the population, particularly for the oldest old. For example, under the high scenario, people aged 85 years or more account for 8.3 per cent of the population in 2044-45, more than 50 per cent higher than the share suggested by the ABS B projections. In raw number terms, under the high life expectancy scenario, there would be around 2.3 million people aged 85 years or more and 1.3 million people aged 90 years or more in 2044-45 (compared with about 1.4 million and 0.6 million under the series B projections respectively).

These scenarios indicate that demographic transition over the next 40 years, while already remarkable, could be even greater. If realised, this would have even larger fiscal implications than those projected by the Commission under the ABS B series.

Table 2.4 Effects of varying assumptions about mortality on ageing in Australia^a

<i>Ageing measures</i>	<i>ABS B series</i>		<i>Alternative scenarios</i>		
	2001-02	2044-45	Low life expectancy	Medium life expectancy	High life expectancy
			2044-45	2044-45	2044-45
	%	%	%	%	%
Share aged 65+ years	12.7	26.1	24.5	27.2	29.6
Share aged 85+ years	1.4	5.4	4.5	6.4	8.3
Share aged <15 years	20.3	14.3	14.7	14.1	13.6
Aged dependency rate	18.9	44.4	40.2	46.4	52.0
Total dependency rate	49.1	67.8	64.2	70.4	76.0

^a The alternative scenarios are based on the point estimates of mortality rates obtained by Booth (box 2.2), and the high and low values associated with the 95 per cent confidence interval. The ageing measures for the alternative scenarios are based on a simulation using cohort-component projection methods and ABS B series projection assumptions for fertility and net migration (although some of the 2002 starting values for these variables are updated to reflect new information – for example, on fertility rates).

Source: PC calculations.

Box 2.2 Alternative estimates of future life expectancy gains

Booth and Tickle (2003) forecast Australian age-specific death rates⁷ to 2031 using an adaptation of the Lee Carter method.⁸ This method has several advantages:

- it avoids the problems associated with projecting on the basis of cross-sectional measures, such as life expectancy, since it uses age-specific measures of mortality;
- it is a replicable and less subjective technique than making judgments about future life expectancy; and
- as it is statistically estimated, it provides statistical confidence intervals around the point estimates of mortality rates. Against this, any misspecification invalidates such confidence intervals.

Booth updated these forecasts and extended them to 2050. On that basis, forecast life expectancy reaches 92.2 years for females and 88.0 years for males by 2050, compared with ABS medium projections of 87.7 and 84.2 years in 2050. However, the ABS's medium assumption still lies within Booth's lower 95 per cent confidence interval for 2050 of 86.5 and 83.3 years. The ABS's high assumption projects a life expectancy at birth of 95.0 years for females and 92.2 years for males by 2050, which is close to Booth and Tickle's higher 95 per cent confidence level of 97.8 and 92.5 (figure 15, ABS 2003a).

The Intergenerational Report, like the ABS's medium assumption, also assumes a stronger decline in LE gains than Booth's forecasts, with LE projected to be 87.5 and 82.5 for females and males respectively by 2042 (compared with Booth's point estimate for 2042 of 90.8 and 86.5).

Booth's estimates have a larger gap between male and female life expectancy than the ABS and the Intergenerational Report. This is because they use a longer time horizon from which to project (using mortality data from 1968) and the gap between male and female life expectancy has been narrowing particularly fast in the latest decade.

The Commission analysed the impacts of using Booth's point estimates and the 95 per cent confidence intervals as the three mortality scenarios.

⁷ The *age-specific death rate* (ASDR) gives the number of deaths at a specified age per 1,000 of the population of the same age (or age group).

⁸ 'The model due to Lee and Carter (1992), which is a special case of principal components, is used by the U.S. Census Bureau as a benchmark for their population forecasts, and its use has been recommended by the two most recent U.S. Social Security Technical Advisory Panels. It also appears to be the dominant method in the academic literature and is used widely by scholars forecasting all-cause and cause-specific mortality around the world' (Giroso and King, 2003, p 36). See Booth and Tickle 2003 for more detail and background on these mortality projections. For a more general discussion of the Lee Carter method and its benefits, see Tuljapurkar, Li and Boe, 2000; Preston, 1991; Wilmoth, 1996; Haberland and Bergmann, 1995; Lee, Carter and Tuljapurkar, 1995; Lee and Rofman, 1994; Tuljapurkar and Boe, 1998; NIPSSR, 2002).

2.4 Fertility has been falling

The Australian fertility experience has fluctuated widely over the long term (figure 2.8). After World-War I, the total fertility rate⁹ declined from about 3.1 in 1921 to reach a trough of 2.1 when the great depression was at its worst, before building up again in the post-World-War II years to reach a peak of 3.6 in 1961. There were sharp falls in fertility rates from the early 1960s to the late 1970s. This reduction in fertility rates reflected many influences¹⁰, such as:

- increased access to family planning methods;
- advances in medical technology and changes to the interpretation of abortion law made it safer and easier to terminate unintended pregnancies; and
- increases in labour force (and education) participation by women in the late 1960s and 1970s and other socioeconomic changes that motivated smaller family size.

Since the late 1970s, total fertility rates have continued to fall, but at a gradual rate — reaching a TFR of around 1.7 in the 2000s. This is roughly half that of the peak in 1961. This prolonged reduction in fertility rates reduces the number of children who otherwise would have been born over the last forty years, but it obviously has no impact on the number of people aged over 40 years. Accordingly, lower fertility rates alter the ratio between the young and older aged groups, raising the share of the old in the population.

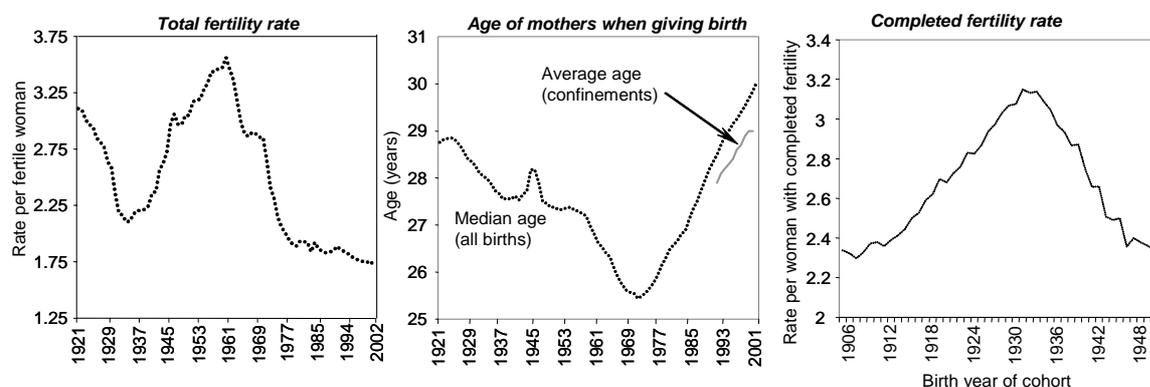
As in the case of mortality, it is possible to gauge the effects of past fertility trends on population ageing by considering various ‘what if’ scenarios (figure 2.9). Had fertility stabilised at its 1944 level in 1973, instead of rapidly declining (avoiding the baby ‘bust’), then the aged dependency ratio (ADR1) would rise by much less than currently projected (ADR0). On the other hand, there would be many more young children, with the implication that the young dependency ratio would remain relatively stable over time. This has the implication that the *total* dependency ratio would be higher from the mid 1970s to around 2030 than under the base case. So while higher fertility in the past would have assuaged present and future ageing, it

⁹ The *total fertility rate* (TFR) is the unweighted sum of the age-specific fertility rates (ASFR) of all women in a given calendar year: $TFR_t = \sum_a ASFR_{a,t} / 1000$, where $ASFR_{a,t}$ is the number of live births per 1000 women of age a in calendar year t . The division by 1000 is performed because total fertility rates are reported per woman, whereas the age-specific fertility rates are expressed per 1000 women. The TFR represents the number of children a group of women would bear, on average, during their lifetime, if they experienced the age-specific fertility rates that apply in a given year at each age of their reproductive lives.

¹⁰ de Vaus 2002; PRB 1999; Carmichael 1998; ABS 1998; McDonald 2000.

does not avoid the potential difficulties of a relatively small workforce that may need to finance the needs of the young and the old.

Figure 2.8 Patterns of fertility in Australia^a



^a The AIHW statistics on average age are for confinements and so include still births, whereas the ABS figures on median age only include live births.

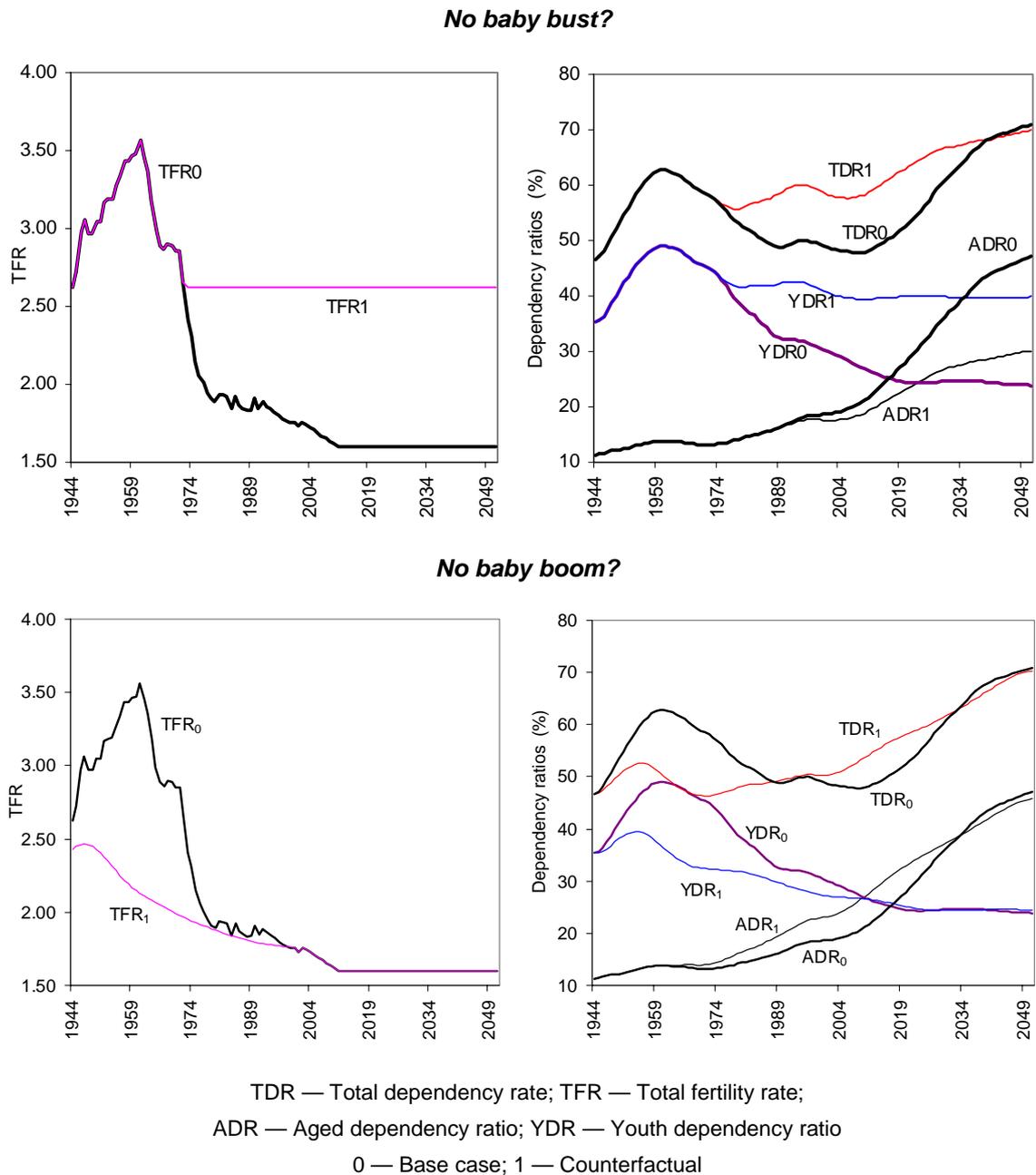
Data source: Total fertility rates from 1921 to 2002 are from *Births, Australia* (ABS Cat. No. 3301.0). Data on the median age of mothers are from ABS, *Australian Historical Population Statistics* (Cat. No. 3105.0.65.001, table 37). Data on average age of mothers at birth are from AIHW 2000, *Australia's Mothers and Babies 2000*, National Perinatal Statistics Unit report. Completed fertility rates were calculated from unpublished ABS data (age-specific fertility rates by single year of age, 1921 to 2002). The data stop at the cohort born in 1952 because they are the last cohort for whom the full set of fertility data are available (ie up to age 49 years by 2001).

It is sometimes argued that the imminent retirement of baby-boomers is largely responsible for population ageing. However, population ageing is not just about the number of the aged, but their relative number compared with those of younger ages. The long-term reduction in fertility rates after the baby boom means that there will be relatively fewer younger people in the coming decades. It is this, more than the baby boom itself, that has shaped Australia's future age structure. Simulations reveal the true effects of the baby boom (figure 2.9).¹¹ In its absence, population ageing would have been brought forward in time and would generate a greater age dependency rate than with the baby boom until the mid 2030s (and then with little difference to 2051). The baby boom deferred population ageing in Australia and has not accentuated it.¹² However, as apparent from figure 2.9, it has made the onset of population ageing more rapid.

¹¹ In this scenario, the fertility rates were made to rise slowly from a TFR of 2.37 in 1942 to a peak of 2.47 in 1947 and then gradually decline to reach the reported TFR of 1.76 in 2002 levels. This compares with the actual historic peak of 3.56 in 1961.

¹² The flip side is that the youth dependency ratio would have been lower without the baby boom to around 2010, and, as a consequence, the overall dependency rate would have been lower until around 1990.

Figure 2.9 What would happen if fertility had been different?



^a See note to figure 2.7 for a description of the base case (*with* the baby boom). The counterfactual case assumes that the TFR rose slowly from 1942 to a peak in 1947 and then gradually declined to the TFR level of 2002 (and following ABS series B assumptions thereafter).

Data source: PC calculations.

Uncertainty over future fertility rates

As with mortality, the general view among demographers is that total fertility rates will continue to decline — and this is the basis for the base case assumption

underpinning the estimates of population ageing presented in section 2.1. However, the total fertility rate conceals complex fertility developments for women of different ages. The recent period of gradual decline masks strong declines in fertility among younger women (especially up to the age of 27) and rises in fertility at later ages (particularly those in the 33 to 38 age bracket). These changes reflect a continuing trend in the postponement of childbearing over the past three decades, with the median age of mothers at confinement rising steadily from a trough of 25 years in 1971 to reach 30 years in 2001 (figure 2.8, ABS all births).

Postponements of births pose difficulties (the ‘tempo’ effect — box 2.3) for interpreting past trends in the TFR and using these to project future fertility rates for demographic projections. For example, were women to have as many children as older generations over their lifetime (the *completed fertility rate*¹³), but have them later in their lives, the TFR would initially fall as babies were delayed and then rise back to its previous level as women had babies at older ages. This is an unrealistic hypothetical, because postponement has also been associated with a reduction in the completed fertility rate of women (figure 2.6). It appears that *two* forces are at work. Women are:

- delaying having children¹⁴; and
- having fewer children over their lifetimes. This reflects the fact that fewer women are going on to have family sizes above two children in their lifetimes (Carmichael and McDonald 2003), and that more women are never having children (McDonald 1998 and de Vaus 2002). It appears from parenting intention surveys that women aged 18 to 24 years today are *planning* to have around 2 children in their lifetime. This is already less than that achieved by their parents and realised fertility rates are expected to be less than planned rates.¹⁵

On the basis of these fertility trends the ABS ‘medium’ scenario projects a continued decline in the TFR to 1.6 babies per woman in 2011 and staying fixed

¹³ The completed fertility rate is the number of children ever born to a woman whose fertility is completed (assumed to occur at age 49 years). Unlike the total fertility rate, which measures the number of children that a hypothetical women would have if she were to conform to the age-specific fertility rates of a given year, the completed fertility rate captures the average number of children actually born to any given cohort of women aged 49 years and over.

¹⁴ There is substantial evidence that delays in entering parenthood is a continuing phenomenon (Kohler and Ortega 2002; Kohler, Billari and Ortega 2002). However, in some countries, including Denmark and the United States, the relevance of this effect has been weakened over time (Morgan and Ridnfuss 1999).

¹⁵ Melbourne Institute of Applied Economic and Social Research 2002.

thereafter.¹⁶ Given that the TFR is already at this level in Victoria, and even lower in the ACT (at 1.5), this projection may seem to be excessively sanguine about Australia's fertility outlook. However, this ignores the tempo effects described above. For that reason, the long run estimates should be contextualised by noting that in a stable long run population, the TFR must equal the completed fertility rate. A value for the long run TFR of 1.6 represents a substantial drop in the *completed* fertility rate from its present value (which was around 2.3 for the cohort of women born in 1953).¹⁷

Box 2.3 The tempo effect

The effect of delay on the total fertility rate is called the *tempo* effect by demographers. Examining its importance requires information on age-specific and parity specific fertility rates (ie the extent to which women have different *given* number of children, such as none, 1, 2 and so on). While these data are often incomplete or unavailable, some studies have been undertaken. Research has revealed strong distorting effects of postponement in the Czech Republic, Sweden, Italy and the Netherlands (Sobotka 2003). For example, the TFR fell to below 1.5 in the Netherlands in 1983 and 1984 before resuming a gradual rise to 1.72 by 2000. In contrast, the CFR was 1.87 for the 1952 cohort, which has gone through their most fertile years during the TFR trough.

Reflecting the problems in interpreting the TFR, it has been argued that the concern over below-replacement fertility in the United States over the previous 25 years had been largely misplaced because, after adjusting for the rising age at childbearing, the underlying level of (completed) fertility was essentially constant at very close to two children per woman throughout this period (Bongaarts and Feeney 1998, p. 2).

In an Australian context, Kippen (2003) has undertaken simulations that demonstrate that the distortions to the TFR from tempo effects can be pronounced. However, while arguing that tempo effects can result in the TFR re-bounding from its current level, Kippen considers that it is more likely that the TFR will continue to fall because of an overall reduction in completed fertility rates.

Disentangling trend declines in completed fertility rates from the tempo effects associated with women merely shifting childbirth to older ages makes it particularly difficult to forecast the future of fertility.

¹⁶ Their high (low) scenario is 1.8 (1.4) by 2011.

¹⁷ It also represents a significant reduction compared with short-term projected completed fertility rate of 2.1 for the 1963 cohort (that is, the lifetime fertility achieved by women aged 49 years in 2012). This estimate assumes a continuation of modest rises in the age-specific fertility rates of older women. The estimate is likely to be reasonably accurate even were there errors in this assumption, since such women have already gone through the most fertile part of their lives by 2002.

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- It is quite possible that long run total fertility rates will be higher than 1.6 per woman. For example, if *age-specific* fertility rates were to continue to decline for younger ages for some time, and then stabilise, while fertility rates for older ages continued to increase associated with the tempo effect, then a TFR as high as 2.05 is possible by the mid 21st century. (This would still be associated with a long run reduction in the completed fertility rate.) It is also notable that around one quarter of women (and their partners) who have currently completed their fertility say that they have had fewer children than they would have wanted (survey evidence cited by de Vaus, 2002).¹⁸ This suggests that there is an unmet demand for greater fertility. Were the social and economic circumstances that generated this gap to change, then women might have more children.
 - On the other hand, it is also possible that total fertility rates could drop below 1.6 babies per woman. This has already occurred in many European countries (where rates are often around 1.4). Kippen (2004) has modelled several possibilities for Australia over the next decade, with the lowest scenario leading to a TFR of 1.5 by 2015. In comparison, the ABS's lowest scenario is a TFR of 1.4 by 2011 (ABS 2003a).

The Commission simulated the consequences for population ageing of divergent views about fertility trends over the next 40 years and compared these with the ABS B series (table 2.5).¹⁹ It is evident that *plausible* increases in the TFR above the baseline case decrease the aged dependency ratio by 2044-45, but not by very much.²⁰ The reason for this is that fertility changes generally occur slowly and so do not make a sufficient difference to the working age population to offset the large numbers of future older Australians. Indeed, the biggest short and medium-run effect of increased fertility is to raise the number of the young, so increasing the young dependency ratio. This raises the overall dependency rate by 2044-45. There may be good reasons for increasing fertility rates — such as better meeting people's aspirations for having children — but it is unlikely that any feasible changes in fertility patterns can do much to affect population ageing over the next forty years.

¹⁸ A much smaller share say they have had too many children.

¹⁹ The low scenario represents the rough average of the low TFR scenarios given by Kippen and the ABS.

²⁰ Even very large fertility increases, say a gradual return to a TFR of around 3 by 2050, make a relatively small difference to ageing, stabilising the aged dependency rate at just under 40 per cent by 2044-45.

Table 2.5 **Effects of varying assumptions about fertility on ageing in Australia**

Ageing measures	ABS B series		Alternative scenarios		
			Low fertility	Medium fertility	High fertility
	TFR _{LR} = 1.6		TFR _{LR} = 1.45	TFR _{LR} = 1.75	TFR _{LR} = 2.05
	2001-02	2044-45	2044-45	2044-45	2044-45
	%	%	%	%	%
Share aged 65+ years	12.7	26.1	26.9	25.5	24.1
Share aged 85+ years	1.4	5.4	5.6	5.3	5.1
Share aged <15 years	20.3	14.3	13.4	15.5	17.5
Aged dependency rate	18.9	44.4	45.1	43.2	41.3
Total dependency rate	49.1	67.8	67.5	69.4	71.4

^a The ageing measures for the alternative scenarios are based on a simulation using cohort-component projection methods and ABS B series projection assumptions for mortality and net migration (although some of the 2002 starting values for these variables are updated to reflect new information – for example, new mortality rates).

Source: PC calculations.

2.5 The role of migration in population ageing

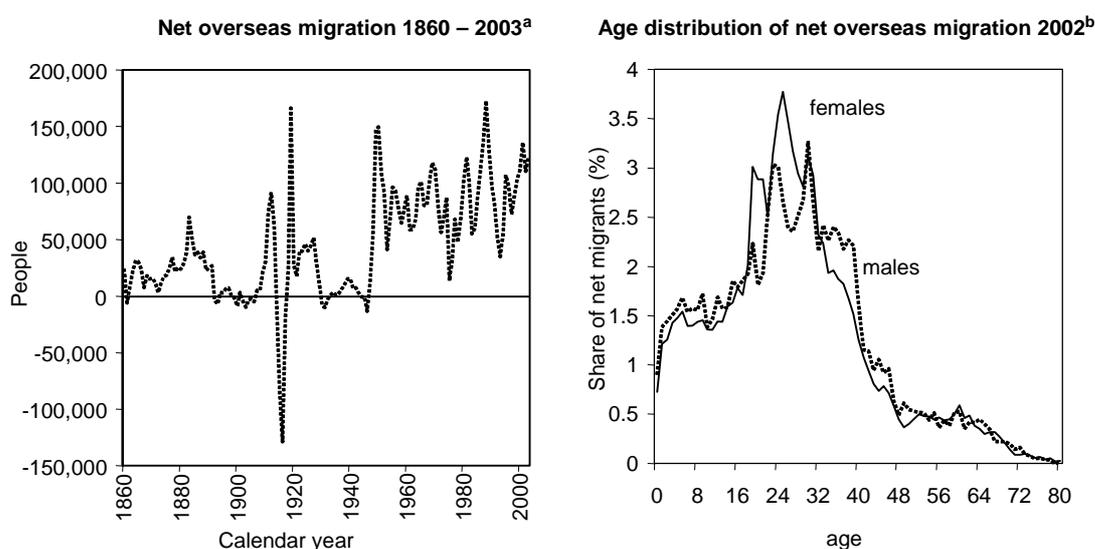
Overseas migration

It is clear that net inflows of migrants²¹ have strongly influenced population *numbers* in Australia (figure 2.10). Almost one quarter of the current Australian population was born overseas and net migration into Australia totalled over five million over the past century.

But how does and can migration affect the *age structure* of the population? Net migration largely adds to the working age population of Australia, with relatively small shares of people aged over 50 years (figure 2.10). Accordingly, in any given year, inflows of migrants reduce the aged dependency ratios in that year. However, the long run effects need not be large because migrants themselves age. The degree to which the ageing of past migrants can be offset, and thus the ageing of the population delayed, also depends on the rate of growth of net migration over time.

²¹ Net overseas migration, as currently defined in the ABS statistics, consists of: (1) net permanent migration — new permanent settler arrivals in Australia, minus permanent departures of Australian permanent residents; (2) net long-term migration — arrivals minus departures of Australian permanent residents who were absent for more than one year plus arrivals minus departures of visitors staying in Australia for one year or more; and (3) category jumping — changes to travel intentions from short term to permanent or long-term and vice versa.

Figure 2.10 Patterns of net overseas migration into Australia



a Until 1925 net overseas migration was measured simply by subtracting total overseas departures from total overseas arrivals. From July 1925, only long-term and permanent arrivals and departures were counted and from 1976 an adjustment was made for the fact that changes to travel intentions from short term to permanent or long-term and vice versa occur (category jumping). Due to problems identified in the processing of information on traveller intentions, adjustments for category jumping were dropped by the ABS in September 1997 pending a review of the methodology, but was re-introduced several years later. The data therefore reflect somewhat different measures of net overseas migration over this long period. **b** This is the age distribution of net overseas migration into Australia in 2002 (from unpublished ABS statistics).

Data source: ABS, *Australian Historical Population Statistics*, Cat. No. 3105.0.65.001 and ABS, *Australian Demographic Statistics*, Cat. No. 3101.0 for latest years.

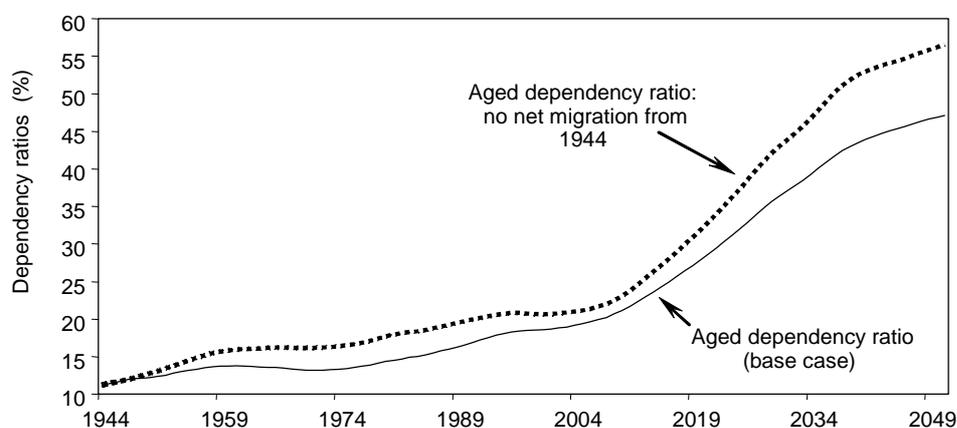
Net migration has been significant and has generally grown over the last 50 years. While this has had large impacts on population numbers, its impact on Australia’s age structure has been much smaller. Had there been no net migration to Australia from 1944 to 2051:

- Australia’s population would have been only 12.6 million in 2044-45 and (with lower fertility) only 12.2 million by 2050-51 —roughly half of that projected in the base case.
- the aged dependency rates in 2002 would be only several percentage points higher than that which actually prevailed (figure 2.11). The impact of zero net migration is bigger in the longer term, resulting in an aged dependency ratio around 9 percentage points higher than the base case by 2044-45.²² But significant population ageing still occurs in both instances. Accordingly, the aged dependency rate is projected to increase by around 2.4 times from 2001-02

²² This is based on observed historical net migration levels and a steady state 100 000 net migrants per year to 2051.

to 2044-45 under the base case, but would rise by only a little more (2.6 times) had there been no net migration after 1944.

Figure 2.11 The aged dependency ratio with zero net migration



^a See figure 2.7 for a description of the base case. The counterfactual case is then simulated in the same way as the base case, but with zero net migration from 1944.

Data source: PC calculations.

The implication is that while past (large) net migration inflows *have* moderated the rise in aged dependency rates, it has not prevented (and, at present levels, will not prevent) significant ageing of the population.

The question then arises about the *future* prospects for net migration and the extent to which it could affect population ageing over the next 40 years. At least in the near term, the Australian Government can largely determine the size of net migration inflows by altering quotas. Accordingly, of all the factors affecting population ageing, net migration rates might be seen as the most policy malleable (political economy considerations aside). Some analysts — most notably, Withers (2002) — claim that changes in immigration policy could make a significant difference to future policy ageing, while others have questioned this (Young 1990, 1994, McDonald and Kippen, 1999b).

The perspectives on this issue depend on two broad factors. First, they are based on judgments about what constitutes a ‘significant’ effect.

Second, they reflect different views about appropriate underlying demographic assumptions; namely:

- what assumptions should be made about the fertility of new immigrants? If they are higher (lower) than the host country then this will further dampen (accelerate) future ageing. The ABS projections assume no difference in fertility (or mortality) rates;

-
- what assumptions should be made about the age distribution of net migrants? If the age structure shifts more to the young, then there is greater potential for net migration to affect the age structure. The ABS projections assume a continuation of the existing age distribution (which is already weighted towards younger people); and
 - should future net migration flows be modelled as fixed population flows or as a fixed share of the population, in which case, net inflows would increase over time? In each case, what assumption about the fixed level or rate is appropriate?

At present, immigrant fertility is close to that of resident Australians (McDonald and Kippen 1999b). As noted by McDonald and Kippen, and acknowledged by Withers (2002), it is hard for the Government to select immigrants with higher fertility rates. One mechanism — choosing more people from non-English speaking backgrounds (who tend to have higher fertility rates) — would be contrary to Australia’s non-discriminatory entry policies (and possibly conflict with other entry criteria, eg skill levels). In any case, simulations undertaken by McDonald and Kippen suggest that large differences in total fertility rates of immigrant compared with existing resident women would be required to make even a 1 percentage point difference in the share of those aged 65 years or more by 2048.

Alvarado and Creedy (1998) examined the impacts on ageing were there to be a shift in the age structure of net migrant inflows from 60 per cent being aged under 30 years to 80 per cent being aged under 30 years. In their particular experiment, this reduces the share of the population aged over 65 years by around 1.6 percentage points by 2050. However, Alvarado and Creedy’s alternative assumption represents a de-facto ‘orphans preferred’ immigration policy because it produces an age distribution with unrealistically large numbers of children relative to adults.²³ More credible shifts to a younger age structure of migrants reduce the population share of people aged 65 years or more by only 0.6 percentage points by 2048 (McDonald and Kippen). In any case, there are difficulties with targeting young families as migrants, because it would tend to increase youth dependency ratios and reduce the average skill levels of migrants.

The ABS projections used in this report are based on an assumption that net migration is fixed at 100 000 per year from 2006. The alternative scenarios explored by the ABS also assume fixed (higher or lower) net migration levels. If the population is growing, this has the implication that net migration rates are falling over time, and the capacity for them to influence the age structure must also fall.

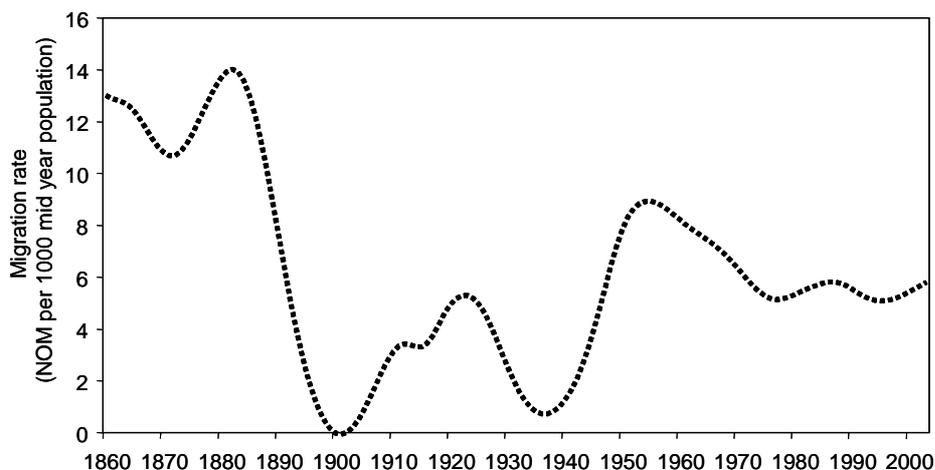
²³ Around 2.4 people aged 0-9 years per person aged 30-39, as against an actual historical experience of 0.7 (McDonald and Kippen 1999b).

Withers (2002) considers that a fixed rate assumption may be more appropriate, given that the ability of a population to absorb a larger number of migrants rises as the population itself grows.

The past evidence for either approach is mixed:

- Calculations of trends in either rates or levels are complicated by some difficulties in categorising immigration (box 2.4).
- The historical evidence suggests that very different migration *rates* have applied at different periods in Australia's past (figure 2.12). That said, the observation by McDonald and Kippen (1999b) that the migration rate has had a sharp negative trend over the past half century appears to be influenced by the strong migration levels just after WWII, and does not apply consistently for the full period. For example, the rate appears to have been roughly stable at under 0.6 net migrants per 1000 residents since the early 1970s.

Figure 2.12 **Net migration rates over the long run^a**
Australia, 1860 to 2003



^a Based on the NOM data shown in figure 2.10, normalised by the mid year population, and then smoothed using a Hodrick-Prescott filter.

Data source: As in figure 2.10.

- Similarly, trends in *levels* appear to shift over time (figure 2.10). The linear trend line for the number of net migrants is positive in the last half-century. For example, from 1947 to 2003, the average rise is around 400 a year (translating to around 20 000 extra migrants every 50 years).²⁴ But the results are often not

²⁴ The long run implied growth in migrants over a 50 year period depends on the exact starting date. Varying the starting date for calculating the trend from between 1945 and 1955 leads to growth in annual net migration of between 11 000 and 33 000 net migrants over a 50 year horizon. However, at conventional significance levels, the trend growth rates are only statistically significant for 6 out of the 11 starting dates.

statistically significant — so that it is still possible that the best statistical description of net migration levels is that they are fixed at a given value, but subject to large random swings on a year to year basis.

There are other factors that tend to support projections based on roughly fixed migration levels:

- it may not be the size of the resident population that is relevant for absorption of new migrants, but the size of the resident population of a similar age profile to migrants (McDonald and Kippen 2002). If there were a fixed ratio of migrants to this re-defined Australian population base, the actual numbers of migrants would not change much over time, because the Australian population aged between 15 and 40 years (the dominant migrant age range) does not grow very much;
- Australia is experiencing a rising number of emigrants. This leads to a need to absorb a larger number of immigrants, just to maintain the number of net migrants at a specific level; and
- increasing competition for skilled migrants around the world, fuelled by the low fertility rates and ageing experienced in many OECD countries, means that it will progressively become more difficult to attract skilled migrants. These make up a growing proportion of migrants sought in the Australian migration program. This also has the potential to further increase skilled emigration from Australia.

Nevertheless, the Commission considered the impact of a fixed migrant rate, as well as various other fixed level scenarios, on population ageing (table 2.6). The Commission used the upper and lower net overseas migration ranges suggested by the ABS as the most credible range for migration levels. An increase to the upper range of 125 000 net migrants a year makes only a slight difference to the pace of population ageing. A decrease to 70 000 may be a more likely scenario given increased global competition for skilled migrants and population stagnation in younger age groups in developed countries (still the major source for Australia's migrants). This accentuates ageing by more than the shift to a higher level retards it, but the effects are still relatively modest.²⁵

²⁵ This asymmetry reflects two factors. First, the lower range is 30 000 less than the base case, while the upper range is 25 000 more. Second, as discussed in the text, the marginal reductions in aged dependency falls with additional migration.

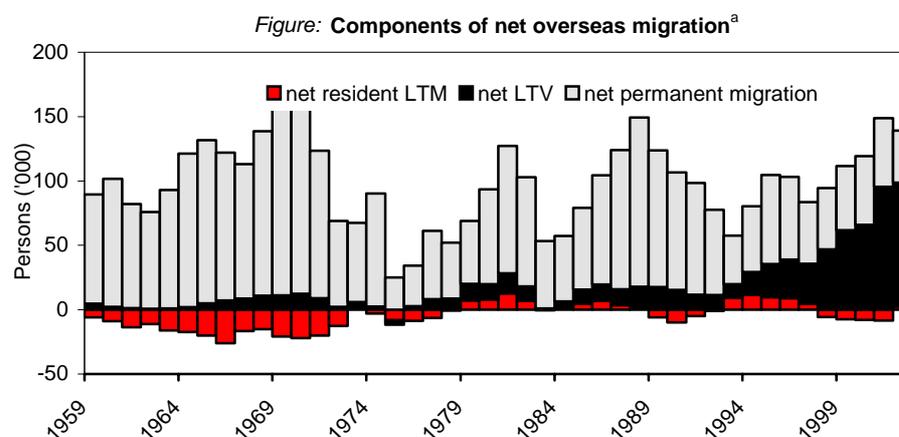
Box 2.4 Difficulties in measuring net overseas migration

Measurement of net overseas migration is controversial, with different 'adjustment' methodologies employed at various times. The ABS suspended adjustments to net overseas migration from September 1997, but has re-introduced them recently. Apart from the adjustment for differences between intended and actual duration of stay, the new ABS net overseas migration adjustment also includes an element of adjustment for people being added to or taken out of the estimated resident population (ERP) many times in the same quarter. The revised net overseas migration estimate is approximately 110,000 for 2001-02, down from the previously published net overseas migration of 134,000.

Some of Australia's leading demographers consider that even the large downward adjustment made by the ABS for 2001-02 may be too small (McDonald, Khoo and Kippen 2003). An alternative approach — the 'stock' method²⁶ — yields an estimate of net overseas migration of 96 000 for 2001-02, about 14 000 below the ABS's revised estimate and about 38 000 below the previously published ABS figure. While the stock method also has limitations, these results highlight some of the difficulties in measuring present levels of net overseas migration. The ABS acknowledges the need to continue developing new approaches (ABS 2004).

It is also worth noting that recent net overseas migration numbers increasingly reflect the growth in net long-term visitors (ABS 2003b). However, this growth cannot be sustained, even if the number of long-term arrivals and departures reaches equilibrium at high levels. All things being equal, net overseas migration numbers can be expected to fall.

These measurement problems complicate inferences about future migration numbers from recent trends.



^a Excludes category jumping.

Data source: ABS Cat. No. 3105.0.65.001 *Australian Historical Population Statistics* (table 57).

²⁶ The stock method defines Net Overseas Migration as follows: $NOM = (\text{net permanent and long-term movement of Australia residents}) + (\text{the change in the stock of persons on long-term temporary visas}) + (\text{conversions on-shore to permanent residence}) + (\text{newly issued temporary protection visas}) + (\text{the change in stock of New Zealanders staying in Australia on a long-term basis})$.

Table 2.6 What impact would different immigration policies have on population ageing in Australia by 2044-45?

<i>Migration scenarios</i>	<i>Share aged 65+ years</i>	<i>Share aged 85+ years</i>	<i>Share aged <15 years</i>	<i>Aged dependency rate</i>	<i>Total dependency rate</i>
	%	%	%	%	%
Fixed migration levels					
<i>ABS ranges</i>					
70 000	27.3	5.8	14.0	46.6	70.4
100 000	26.1	5.4	14.3	44.3	67.8
125 000	25.6	5.3	14.5	42.8	67.0
<i>Other ranges</i>					
0	30.1	6.6	13.1	53.1	76.3
30 000	28.8	6.2	13.5	50.0	73.5
60 000	27.7	5.9	13.9	47.3	71.1
90 000	26.7	5.6	14.2	45.1	69.0
120 000	25.8	5.3	14.4	43.1	67.2
150 000	25.0	5.1	14.7	41.4	65.7
300 000	22.0	4.2	15.6	35.2	60.1
330 000	21.5	4.1	15.7	34.3	59.3
Fixed migration rates					
0.65%	24.5	5.0	14.9	40.4	65.0
3.35%	12.7	1.8	19.0	18.6	46.4

^a The ageing measures for the alternative scenarios are based on a simulation using cohort-component projection methods and ABS B series projection assumptions for mortality and fertility, and various alternative net migration assumptions. The results of the PC's projection model varies slightly from the published ABS result when using the B series assumptions because some of the 2002 starting values used in the model have been updated to reflect new information – for example, new mortality rates. For all scenarios involving fixed migration levels, it is assumed that there is a linear trend from the observed net overseas migration in 2002 to the new level in 2010, and thereafter staying at the 2010 level. Fixed migration rates apply for all years from 2003 to 2051.

Source: PC calculations.

It is apparent that moderate levels of net migration of around 90 000 people per year — roughly Australia's present level — make a significant difference to population ageing compared with an extreme (and unrealistic) counterfactual of zero future migration. For example, the aged dependency rate is about 8 percentage points less than under the zero migration scenario. However, as noted by McDonald and Kippen (1999b), the marginal reductions in aged dependency from extra migration fall the higher the base level of migration.²⁷

²⁷ For example, the fall in the aged dependency ratio associated with an extra 30 000 people is 0.9 percentage points if the migration level is 300 000 a year, whereas the fall in the aged dependency ratio associated with an extra 30 000 people is 3.1 percentage points if the annual net migration intake is zero.

There are larger effects on the age structure associated with fixed migration *rates*. But even at 0.65 per cent — a rate significantly higher than recent years — it still remains the case that the share of people aged 65 years and over roughly doubles from 2001-02 to 2044-45.

In order for the aged dependency rate in 2044-45 to be as low as its 2002-03 level, the migration rate would have to be raised to 3.35 per cent. This is about six times its present rate. However, that scenario is associated with an Australian population of around 114 million by 2044-45 (compared with the base projection of 26.2 million), with annual migrant intakes at that time of 3.7 million a year.

The lesson from these ‘what if’ scenarios is that net overseas migration cannot realistically be engineered to avoid or even substantially moderate Australia’s demographic transition to an older population.

Interstate migration

It is very difficult to forecast interstate migration flows, because, unlike overseas migration, there are few barriers to the free movement of people. The flows will be affected by changes in the economic circumstances of different jurisdictions, competing policies for attracting and retaining people, diverging regulations affecting employment and schooling, and the respective population sizes and age structures of the donor and recipient jurisdictions. Jurisdictions sometimes have aspirations for net migration inflows that are inconsistent with other jurisdictions. Clearly, any forecasts of interstate migration must ensure that the gross inflows and outflows of different jurisdictions match.

Differences in the methodologies employed to forecast future interstate migration flows can have large effects on annual net flows for all jurisdictions and on population numbers and population structure for some. For example, Wilson and Bell (2002, p. 40) show that, depending on the approach used to estimate net flows, by 2050-51:

- Tasmania could have net internal migration flows of between -1 500 a year and +2 500 a year;²⁸
- Queensland could have net internal migration flows of between 41 000 a year and 6 200 a year; and
- South Australia could have net internal migration flows of between -2 500 a year and 4 700 a year.

²⁸ The Tasmanian Government (sub. 40) used the assumption of zero net migration for most of its modelling.

Generally, for the more populated jurisdictions, differences in assumptions about net interstate migration do not make large differences to the projected age structure. This is not true, however, for some of the smaller jurisdictions, particularly the Northern Territory, South Australia and Tasmania. Accordingly, by 2050-51, Wilson and Bell (2002, p. 41) show that the aged dependency rate could be:

- as high as 70.5 per cent and as low as 57.7 per cent in Tasmania (a discrepancy of 14 percentage points);
- as high as 29.5 per cent and as low as 16.3 per cent in the Northern Territory (a discrepancy of 13.2 percentage points); and
- as high as 60.6 per cent and as low as 54.3 per cent in South Australia ((a discrepancy of 6.3 percentage points).

The discrepancies arising from different assumptions are much smaller for other jurisdictions (for example, only 1 percentage point for Victoria and never more than 3.7 percentage points, as in the case of the ACT).

The sensitivity of population ageing in individual jurisdictions to net interstate migration assumptions is much greater than the sensitivity of Australia's overall population structure to net overseas migration. However, the broad economic implications of this sensitivity are not as substantial as the actual discrepancies in aged dependency rates. This is because:

- what matters most in terms of economic growth and fiscal impacts is the aggregate age structure of the national population, not where in Australia the young and the old are located; and
- the Grants Commission's funding processes recognise the fiscal burdens of ageing (among other things), and take these into account when recommending the distribution of funds. Accordingly, there is limited scope for a jurisdiction to avoid the fiscal pressures associated with ageing through interstate population rivalry with other jurisdictions. Were a jurisdiction to attract the young and repel the old, the funding formulas would adapt to restore a roughly equitable share of the aggregate fiscal burden associated with ageing.

2.6 Putting the jigsaw of effects together

Barring catastrophes, much of the population structure and numbers apparent at a given time are the legacy of demographic factors that have been at work for many years. For example, the baby boom in post-war Australia and the subsequent protracted reduction in fertility rates created bulges and gaps in population shares that progressed through age groups over lengthy periods of time. In contrast,

demographic changes over the past few years have had a limited impact on the present population structure.

This inertia has the implication that a significant part of the future ageing of Australia's population reflects the influence of demographic patterns that have already been set — principally the effects of historically falling fertility rates and longer life expectancy.

Even were fertility rates, net migration levels and mortality rates to stay fixed at their current values, population ageing would still continue apace (table 2.7). For example, the aged dependency ratio would still rise by nearly 15 percentage points from 2001-02 to 2044-45. This compares with the 25 percentage points rise in the aged dependency ratio if fertility and mortality rates continue to decline and net migration stabilises at 100 000 per year (in line with ABS B series population projections).

Table 2.7 Stuck in 2002 — a demographic thought-experiment

Scenarios	Aged dependency rate ^a		Youth dependency rate ^b		Total dependency rate ^c	
	2001-02	2044-45	2001-02	2044-45	2001-02	2044-45
	%	%	%	%	%	%
Base case ^d	18.9	44.4	30.3	24.0	49.2	68.4
All demographic drivers fixed at 2002 values ^e	18.9	33.7	30.3	26.4	49.2	60.2

^a The aged dependency rate is the ratio of the population aged 65 or more years to the population aged between 15 and 64 years. ^b The youth dependency rate is the ratio of the population aged less than 15 years to the population aged between 15 and 64 years. ^c The total dependency rate is the sum of the two. ^d The results are based on a simulation model of Australia's future population. It uses the published estimated resident population for 2001-02. Broadly, ABS B series projection scenarios for mortality rates, fertility rates and net overseas migration are used to calculate populations by age and sex to 2050-51 using the cohort component method (although some of the 2002 starting values for these variables are updated to reflect new information – for example, on fertility rates). The base case closely matches the actual dependency ratios recorded for the ABS's published B series, indicating that the simulation methodology is appropriate. ^e The alternative scenario is then simulated with fertility rates, mortality rates and net overseas migration levels set at their 2001-02 values.

Source: PC calculations.

Notwithstanding the importance of the past in shaping Australia's future demographic structure, it is also clear from this thought-experiment that 10 percentage points of the 25 percentage point projected change in the aged dependency rate *is* due to future changes in mortality, fertility and net migration patterns — predominantly the former two.

While this chapter has shown that policy cannot realistically alter Australia's demographic futures by much, other circumstances might. Different outcomes for

the key demographic drivers of ageing can make a difference to the age structure.²⁹ But within credible ranges, only changes to life expectancy appear to make a large difference. That said, each of the experiments conducted in previous sections held two of the three determinants of the population age structure fixed. To get an impression of the *overall* range of uncertainty, the Commission also simulated (table 2.8) the outcomes for the age structure when simultaneously:

- *Scenario P1* — the total fertility rate falls to 1.45, life expectancy increases to 92.4 and 97.7 years for males and females respectively by 2050-51³⁰ (the upper range from Booth's mortality estimates) and net migration levels drops to 70 000 per year. Among the range of plausible scenarios, this produces the most aged population structure; and
- *Scenario P2* — the total fertility rate rises to 2.05, life expectancy only increases to 83.3 and 86.4 years for males and females respectively (the lower range from Booth's mortality estimates) and net migration levels increases to 125 000 per year (which will give the least aged population structure).

Table 2.8 A range of possible futures

Measures of ageing in 2050-51

Ageing measures	ABS alternatives			PC Alternative scenarios	
	A series	B series and Base case	C series	P1	P2
	%	%	%	%	%
Share aged 65+ years	28.3	27.1	29.7	33.4	22.2
Share aged 85+ years	8.6	6.0	6.7	10.9	4.3
Share aged <15 years	15.2	14.0	12.0	11.8	18.2
Aged dependency rate	50.0	46.0	50.8	61.0	37.2
Total dependency rate	76.9	69.8	71.4	82.6	67.8

^a While the Commission has generally used 2044-45 as the end year for projections, the various ABS measures of ageing for the three different series published in Cat. 3222.0 do not report data for that year. The A series assumes a long-term TFR of 1.8, net overseas migration of 125 000 and life expectancy at birth from 2050-51 of 92.2 and 95 years for males and females respectively. The B series is described at the start of this chapter. The C series assumes a long-term TFR of 1.4, net overseas migration of 70 000 and life expectancy at birth from 2050-51 of 84.2 and 87.7 years for males and females respectively. The Commission's P1 and P2 series are discussed in the text.

Source: ABS data are from ABS 2003a. Others are from the PC's demographic model.

These scenarios reveal how different Australia's demographic futures could plausibly be: it is quite conceivable that the aged dependency rate could be as high 61 per cent or as low as 37 per cent by 2050-51. The share of the population that are

²⁹ For example, the Tasmanian Government (sub. 40, p. 10) identified considerable demographic uncertainty for that State, using a wide range of demographic scenarios in their modelling.

³⁰ Data for 2050-51 are used to match published ABS data on its alternative scenarios.

very old — those aged 85+ — could be as big as 11 per cent or as small as 4 per cent. A recent assessment of Australia’s population futures using probabilistic population models has also found a relatively wide range in possible aged dependency ratios, but a similar median result to that of the ABS B series (Wilson and Bell 2004).

The ABS A and C series do not provide such dramatically divergent views of Australia’s possible future age structures. For example, the aged dependency rate lies between 46 and 50.8 per cent by 2050-51. This reflects the fact that the alternative ABS scenarios are intended to provide high and low estimates of population *numbers* — rather than high and low perspectives on the extent of ageing.³¹

These uncertainties about the future extent of ageing suggest continued monitoring of population trends and the development of long-term policy approaches that are flexible enough to deal with quite different population ageing outcomes.

³¹ In addition, the ABS scenarios only have a medium and a high life expectancy assumption.

3 Ageing and labour markets

Key points

- Labour participation rates — the proportion of people who are looking for, or in, a job — decline at older ages. By increasing the proportion of older people, population ageing will depress aggregate participation rates.
- Over the next 40 years, aggregate labour force participation rates in Australia are projected to fall by around 8 percentage points from their current level of 63.5 per cent to 55.4 per cent by 2044-45.
- Average weekly hours worked per employee are projected to fall. This reflects the rising incidence of part-time work generally and the increasing labour market share of older workers, who have a greater tendency to work part-time than others.
- Ageing has a positive twist for unemployment. This reflects the fact that unemployment rates tend to be highest for young people, being in transition from education to work, and lowest for older people, who have the alternative of retirement. In the absence of ageing, the unemployment rate would be around 0.4 percentage points higher than the projected 5.2 per cent in 2044-45.
- The negative effects of ageing on participation and average hours worked outweigh the positive influences via lowered unemployment.
- Overall, labour supply grows much more sluggishly as a result of ageing.
- In just the two years from 2003-04 to 2005-06, the number of workers is projected to grow by around 320 000, while it would take nearly the full 20 years from 2024-25 to 2044-45 for the same growth to occur.
- In the next 40 years, the pace of effective labour supply growth will be slower than population growth (unlike in the past), so that hours worked per capita decline by around 10 per cent.
- Relatively small increases in the average age of employees are anticipated over the next 40 years — roughly two and a half years for males and three years for females.
- Even with the projected decline in participation, the ratio of employees to the total population will be higher in 2050 than at almost any time in the last century.
- Volunteering rates are likely to increase modestly in the next 40 years. This is mostly attributable to the decline in the population share of young people, who tend to have relatively low volunteering rates.

3.1 Why ageing matter for the labour market?

At the turn of the 20th century, many older Australian males worked until near death, enjoying a relatively brief retirement. Consequently, in that era, workforce ageing did not have much effect on the total male labour supply.

In the ensuing century, Australians gained around 20 years of extra life expectancy and earned nearly five times more income per capita — fundamentally altering the nature of their expectations about leisure and work. Today, many males are anticipated to participate in the formal labour force for less than half of their roughly 80 year life expectancies.¹ Labour force participation for *both* sexes is now concentrated in the ages from 20 to 55 years.² People have lower participation rates at earlier ages (when acquiring education) and at higher ages (when many have voluntarily or involuntarily retired, or have cut back their involvement in work).

If this pattern persists, then the shift in the age structure of the population over the next half century will imply that many more Australians will be in age groups that have lower labour market involvement. Other things being equal, this can be expected to slow labour supply and, in turn, economic growth. Since governments fund services through taxes on current income, a fall in economic growth will affect the future ability of Australian governments to generate revenue to meet health, aged, education and other obligations.

Ageing may also have other labour market consequences. Today's generation of older workers have different characteristics to middle-aged and younger workers. For example:

- they are more experienced, but on average less educated and receive less training;
- they appear to be more productive than younger workers, but slightly less so than middle-aged workers;
- they are less likely to become unemployed than other age groups, but once unemployed take longer to find a new job;
- in any given year, they tend to change jobs less often and are less willing or able to move jobs to another location; and
- they tend to have greater incidence of disability and ill health, and suffer some general physical and cognitive decline.

¹ The labour force includes those *with* jobs and those *looking* for work.

² Box 3.1 gives the usual definition of participation and other standard definitions of labour supply.

Box 3.1 Definitions of terms used in labour supply

There are several measures of labour markets and their links to the population. These are useful building blocks for describing the past and in modelling future scenarios.

- The *prime workforce* is the population aged between 15 and 64 years inclusive, covering those years when formal employment is most likely. This is more commonly referred to as the *potential workforce*, but this label can be misunderstood since it inaccurately implies that labour force participation rates are zero at ages after 64 years.
- The *feasible workforce* is the number of people who could feasibly be in the labour force and is measured as the civilian population aged 15 years and over. It is the base used to determine the labour force participation ratio.
- The *aged dependency rate* is the ratio of the ‘old’ (those aged 65 years and over) to the prime workforce.
- The *youth dependency rate* is the ratio of the ‘young’ (those aged below 15 years) to the prime workforce.
- The *labour force* includes all civilians aged 15 years and over who are in work (the *employed*) or actively looking for work (the *unemployed*).
- The *civilian population* is the Australian resident population, less defence personnel.
- The *participation rate* is the share of the labour force in the civilian population aged 15 years and over (that is, as a share of the feasible workforce).
- The *unemployment rate* is the share of the labour force who are unemployed.
- An overall summary of the extent to which a country’s population is actively employed is given by the *employment to population ratio* — the share of the population who are employed.

To the extent that these differences persist, they suggest that an ageing population may reduce unemployment, but also decrease labour market flexibility. The variations in worker productivity over different ages, combined with possible macroeconomic effects of ageing on capital accumulation and innovation, suggest that ageing may affect worker productivity too (chapter 4).

Of course, the old of tomorrow are likely to be different from the old of today, and this may also affect labour market outcomes. For instance, at given ages they may be healthier and more highly educated. This may mean higher labour market participation rates and productivity than would be anticipated from the characteristics observed among the current old.

It should be emphasised that the labour force does not count non-market activities as ‘employment’. It excludes unpaid work, such as home activities like cooking,

cleaning and childcare, and volunteering generally. Ageing may affect the amount of these economically and socially valuable activities. For example, per capita unpaid contributions outside the home made by people aged over 65 years are greater than those made by the young, but less than those made by middle aged groups (de Vaus et al. 2003). While they may not be counted as part of GDP and the labour force, some account needs to be taken of age-related trends in these activities in reaching a view about how well off Australians will be in generations to come.

In sum, ageing matters for labour markets and prosperity in numerous ways. This chapter is one of three that pieces together the jigsaw of effects that ageing may have for labour markets, aggregate labour supply and economic growth over the next half century. This chapter:

- indicates the relevant definitions of labour supply that are useful for modelling;
- sets out the framework for estimating future labour supply and economic growth;
- examines past trends in key labour supply measures;
- explores the mechanisms that will shape the impact of population ageing on labour markets, using the past as a guide to what may be important in the future; and
- provides projections of labour supply.

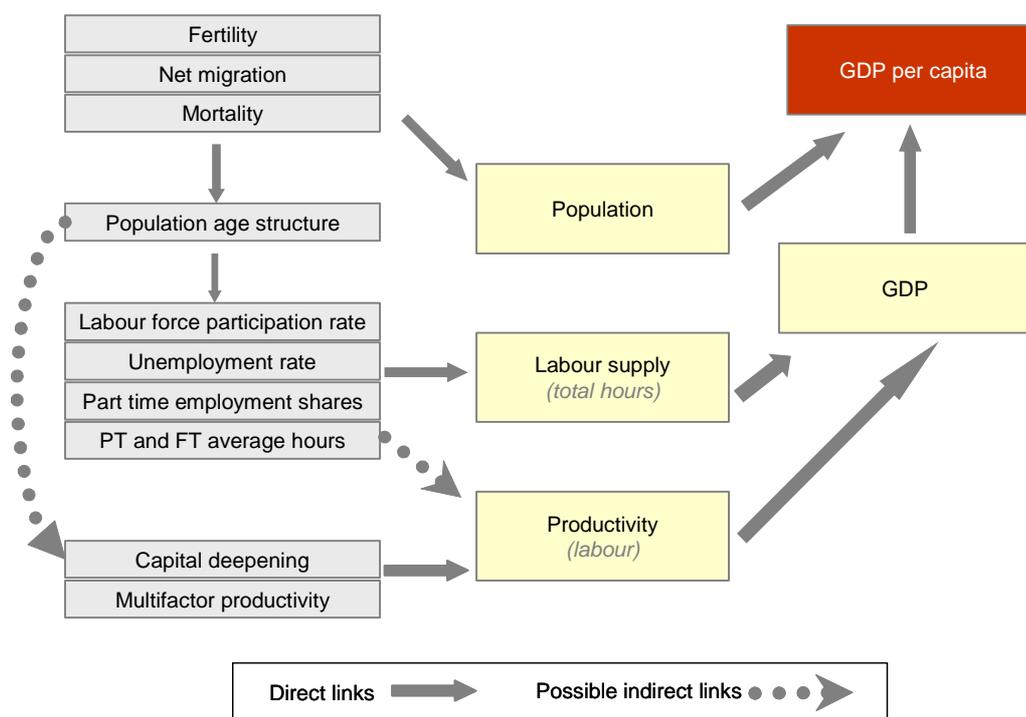
Chapter 4 provides evidence on the possible labour productivity effects of an ageing population. Finally, chapter 5 brings these elements together into projections of economic growth (and the contributing role of ageing) for Australia and its individual States and Territories.

3.2 Methodology

The sum of a nation's (recorded) economic output per capita depends broadly on three things, now popularly referred to as the three 'Ps' (figure 3.1):

- *population* — the total number of people (*and* the associated number of people of working age);
- *participation* — the amount of work measured as the number of hours of work undertaken in any given year; and
- *productivity* — labour productivity or output per hour.

Figure 3.1 The 3 Ps of national economic output



^a The figure expands upon the conceptual framework outlined by Henry (2003).

The first has been discussed and projected in chapter 2. This chapter and the next are devoted to projecting the latter two variables.

Estimating future economic growth is like peeling an onion. Projections of each of the key labour market components involve, in turn, projections of their constituent parts. GDP per capita (the standard measure of economic output) can be represented as the multiple of a chain of other labour market and economic variables (box 3.2).³ The percentage increase in GDP per capita in any given year is approximately equal to:

- the percentage increase in the labour participation rate;
- minus the change in the unemployment rate;
- plus the percentage change in average hours worked per employee;
- plus the percentage increase in the ratio of the feasible workforce to the population (those aged 15 years and over to the total population); and
- plus the percentage change in labour productivity.

³ A similar approach was adopted by Bacon (1999) and the Intergenerational Report. The actual variant of this identity used by Bacon is based on the civilian population aged 15 and over only.

Box 3.2 The algebra of economic growth

In formal terms, growth can be broken into its various constituent parts as follows:

$$\frac{GDP_t}{POP_t} \equiv \frac{LF_t}{POP_{15_t}} \times \frac{EMP_t}{LF_t} \times \frac{Hours_t}{EMP_t} \times \frac{POP_{15_t}}{POP_t} \times \frac{GDP_t}{Hours_t} = \frac{LF_t}{POP_{15_t}} \times (1 - UR_t) \times \frac{Hours_t}{EMP_t} \times \frac{POP_{15_t}}{POP_t} \times \frac{GDP_t}{Hours_t}$$

where POP is the population, POP15 is the civilian population aged 15 years and over, EMP is employment, LF is the labour force, GDP is (real) gross domestic product, Hours are total hours worked and UR is the unemployment rate.

In turn, this identity can be reformulated in growth terms, so that:

$$\Delta \log \left(\frac{GDP}{POP} \right)_t \equiv \Delta \log \left(\frac{LF}{POP_{15}} \right)_t + \Delta \log (1 - UR)_t + \Delta \log \left(\frac{Hours}{EMP} \right)_t + \Delta \log \left(\frac{POP_{15}}{POP} \right)_t + \Delta \log \left(\frac{GDP}{Hours} \right)_t$$

noting that for small changes, $\Delta \log x$ is close to the percentage change in x .

This simple formulation provides a basis for a modular approach to projecting GDP per capita — projections for each component can be made separately and simply added together. This report uses many methods for deriving the components, such as cohort analysis, econometric models of trends and educated assumptions.

Generally, each of the layers is examined at the ‘age-gender-state-time’ specific level and, in some cases, at even more disaggregated levels. For example, in the case of average hours worked per week, the total is derived by separately projecting average hours by sex, age group, State and Territory location, and part-time or full-time status from 2003-04 to 2044-45. When weighted by employment shares, these sub-components give an estimate of aggregate average hours worked.

By considering how any given labour market characteristic varies by age, it is possible, by keeping age shares fixed, to conjecture what would have happened had population ageing not occurred. However, it should be emphasised that the validity of such ‘thought experiments’ depends on whether other variables do not also change as the age structure changes (box 3.3).

Box 3.3 **Accounting for feedbacks**

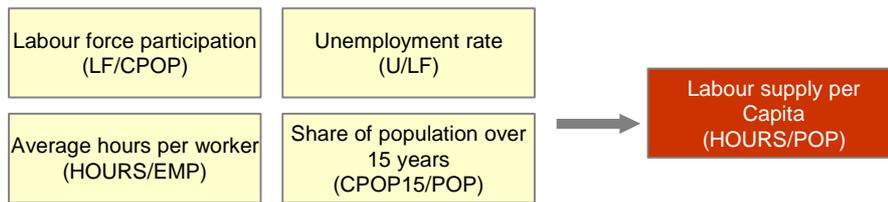
While each component of labour supply can be considered separately, there may be feedbacks from one component to another.

- As well as affecting population growth, changes in fertility rates may influence the propensity of women to participate in the labour force (and vice versa).
- Productivity shocks may be associated with changes in labour participation, since they affect wage rates and the attractiveness of working (while aggregate productivity rates may reflect compositional effects associated with shifts in the age structure of the workforce).
- The biggest effects on average hours worked arise from shifts in the composition of labour participation from full-time to part-time work, from males to females, and from younger to older workers, rather than a change in average hours worked for full-time or part-time jobs per se.
- Several interacting processes affect the labour force over the business cycle — creating relationships between unemployment rates and participation rates. During downturns, some people lose jobs, but are retained in the labour force, leaving the participation rate unchanged. But other job losers or new potential entrants to the labour force are discouraged by poor job prospects and leave (or do not enter) the labour force — so-called ‘discouraged’ workers — thus depressing the participation rate. Conversely, in upturns, discouraged workers are drawn back into the labour force, increasing the labour force participation rate — the ‘encouraged’ worker effect. It may be important when undertaking trend analysis of participation and unemployment rates to *control* for these business cycle impacts, so as to better estimate any trend components for projections. But such cyclical interactions between unemployment and participation rates matter little for the long-run projection of participation rates because, by definition, a long-run model has to assume a stable level of unemployment.
- There may be links between increases in participation rates and part-time work for some older age groups, as people marginally attached to the labour force are more likely to secure part-time jobs than full-time jobs.

3.3 Labour supply trends: the view backwards

This section briefly considers each of the major components used to derive effective labour supply (figure 3.2) and their links with ageing as suggested by past patterns.

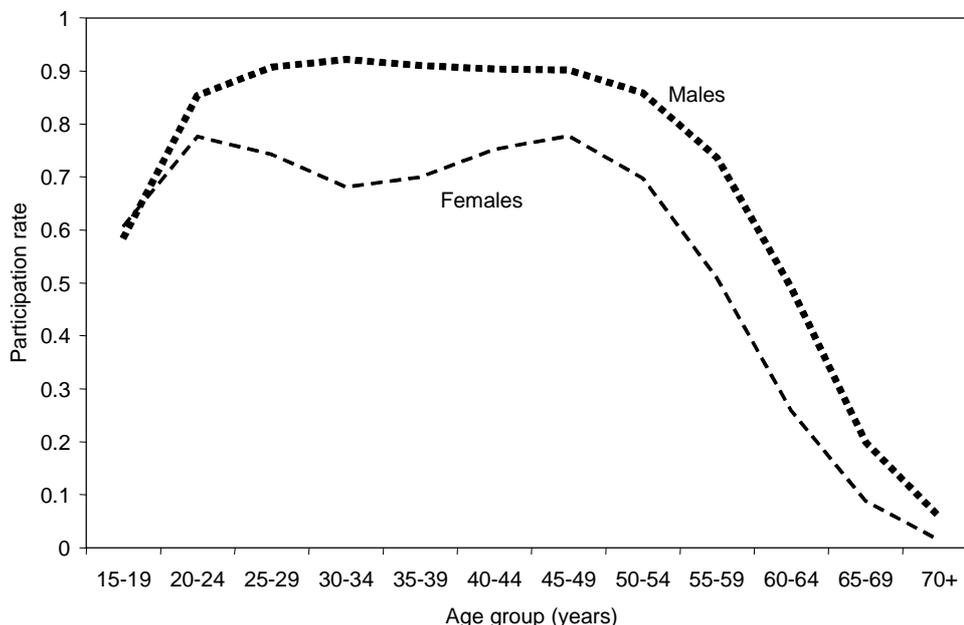
Figure 3.2 Deriving total hours worked (labour supply) per capita



Labour participation rates

A major feature of labour participation is that different age groups have persistently different likelihoods of participating in the labour market, with lower participation rates for the very young (reflecting involvement in education) and for older Australians (mainly reflecting retirement preferences and disability). This age profile of participation rates underlies the likely importance of the changing age structure of the workforce in shaping aggregate participation rates (figure 3.3).

Figure 3.3 Participation rates are higher for males than females
2002-03

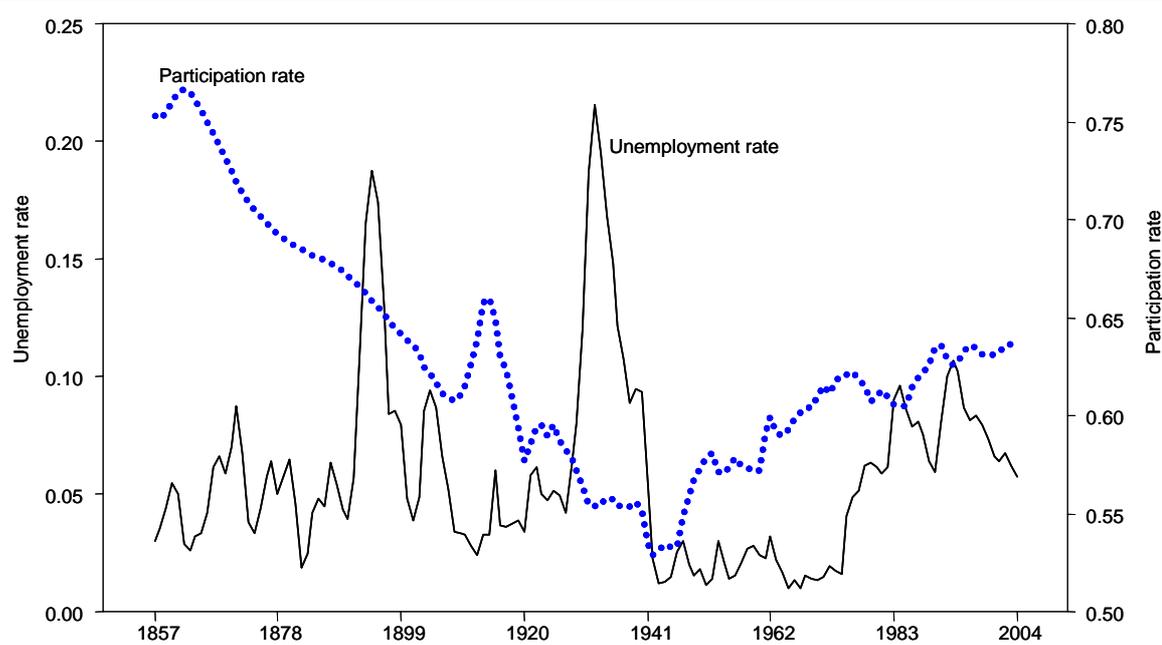


Data source: ABS, *Labour Force, Australia* (Cat. No. 6203.0).

There have been large shifts in participation rates over time. After a long gradual slide in the participation rate from the mid 1850s, Australia’s participation rate climbed by around 10 percentage points from the Second World War to the new millennium. At around 63 per cent, it is currently at an historical peak for the post-

war period (figure 3.4). This upward trend has been interrupted by periods of sluggish or falling participation associated with economic downturns (the so-called ‘discouraged worker’ effect). However, such instances do not appear to be important in shaping long term trends — as suggested by the absence of a long-run relationship between unemployment and participation rates (figure 3.4).

Figure 3.4 Labour participation and unemployment rates
1856-57 to 2003-04



^a Data from 1856 to 1947 are derived from population, unemployment and workforce data, adjusted for estimates of the proportion of the population aged 15 years and over (sourced from ABS, *Australian Historical Population Statistics*, Cat. No. 3105.0.65.001; Withers et al. 1985, p. 89, pp. 96-97, pp. 133-135 pp. 203ff and Vamplew 1987, p. 30-35, p. 44). Data for series from 1948 to 1963 were estimated by splicing ABS, Labour Force data from Butlin (1977, p. 91) onto the more recent estimates. Data for series from 1964 to 1977 were estimated by splicing ABS Labour Force data from Foster and Stewart (1991, p. 151) onto the more recent ABS estimates. Data for the series from August 1977-78 to 2003-04 are from the ABS, *The Labour Force, Australia* (Cat. No. 6203.0). A possible puzzle in the above data is the high aggregate participation rate in the 19th century, given that available evidence on female participation (at least at the end of the 19th century) suggested low female participation rates. One explanation is the higher male to population ratio in 19th century Australia, in part, prompted by immigration resulting from the gold rush in the 1850s (McLean 2004).

Data sources: ABS (Cat. No. 6203.0 and Cat. No. 3105.0.65.001), Foster and Stewart 1991, Butlin 1977, Vamplew 1987 and Withers et al. 1985.

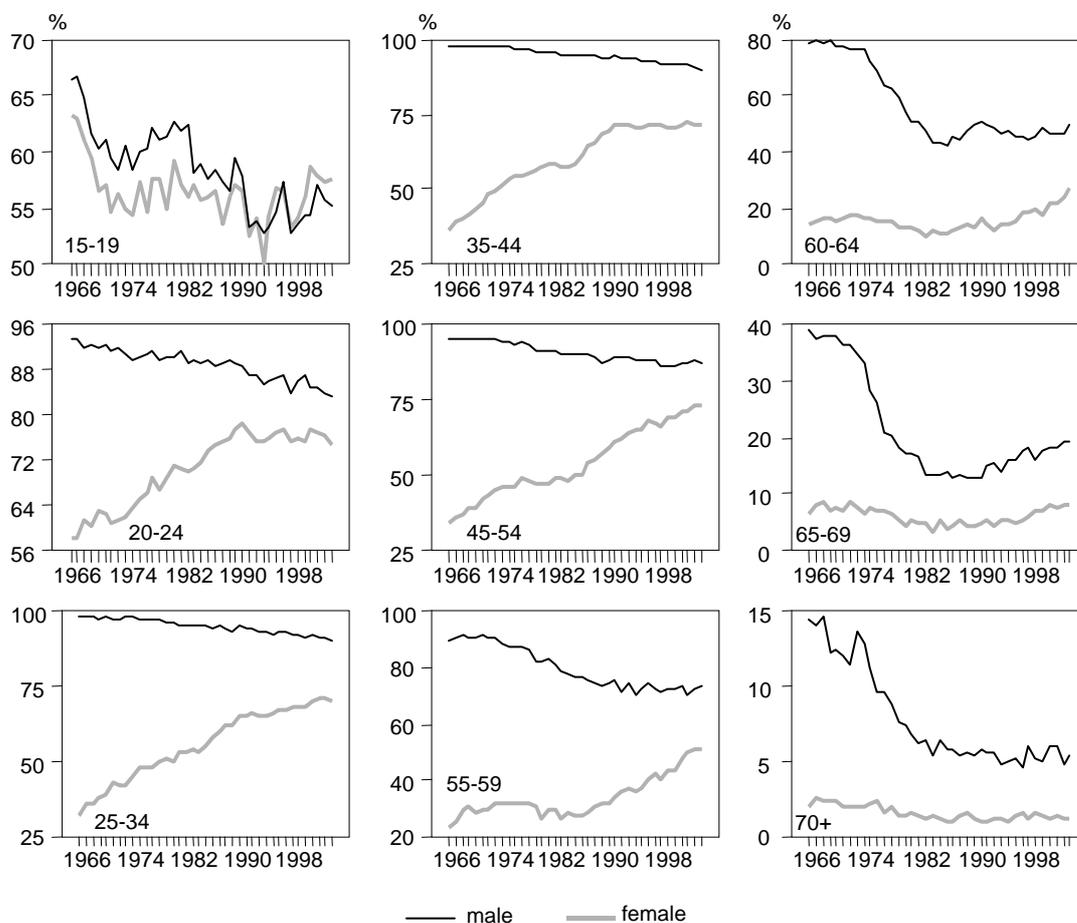
The aggregate story hides many of the underlying demographic and social currents that have affected labour force participation. Understanding these forces may be important for realistic projections. Data on historical participation rates reveal large, sometimes countervailing, changes in participation rates for *given* age-gender groups (figure 3.5). In particular:

- female participation rates have risen for all but the youngest and oldest groups;

- male participation rates have generally declined. In percentage terms, this decline has been greatest for older males; and
- over the longer run, the increasing duration of education among younger people has delayed their entry to the workforce. However, youth participation rates have risen in the last decade despite rising educational attendance — a trend associated with the increased availability of casual and part-time jobs.

Figure 3.5 Participation rates by age groups, male and female

August 1965 to August 2003

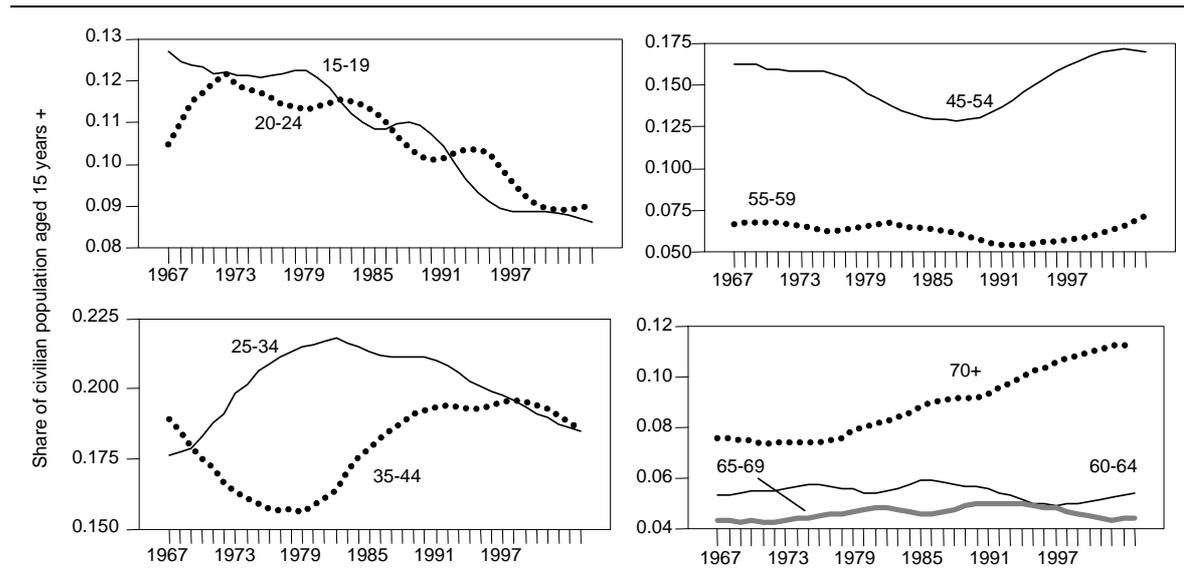


Data sources: Data for 1965 are from Foster and Stewart (1991) (with data for 55-59, 60-64, 65-69 and 70+ age groups estimated from data on 55-64 and 65+ age groups). Data for 1966 to 1977 are from ABS, *The Labour Force, Australia, Historical Summary 1966 to 1984*, Cat. 6204.0, while data for 1978 to 2003 are from ABS, *The Labour Force, Australia*, Cat. 6203.0 for 1978 to 2003 (including unpublished data for the 65-69 and 70+ age groups and estimation of August 2003 data for these two age groups from July 2003 data).

There have been significant shifts in the age structure of the civilian population potentially available for work (those aged 15 years and over) over the past 25 years (figure 3.6). But with the exception of the growing importance of people over 70 years old, the direction of the demographic shifts has not, so far, particularly favoured high or low participation age groups. This is because people aged 20-54

years have similar (high) labour participation rates. So the adverse effect on aggregate participation rates of the reduced population share of the young since the 1980s has been largely offset by the favourable effect of the increased population share of mature workers aged 35-54 years.

Figure 3.6 Trends in population shares by working age groups
Shares of civilian population over four decades



Data source: ABS, *The Labour Force, Australia*, Cat. 6203.0 and ABS, *The Labour Force, Australia, Historical Summary 1966 to 1984*, Cat. 6204.0.

This is confirmed by more formal analysis that breaks down changes in the aggregate participation rate into those that can be attributed to shifts between age groups with differing participation rates — the ageing effect — and those that can be attributed to trends in participation rates within age groups. Over the four decades from August 1966 to August 2003, the trend effects have been the main source of change in the aggregate participation rate. Of the 3.1 percentage points change in the participation rate over this period, 5.3 percentage points can be attributed to trends in participation rates within age-groups and -2.2 percentage points to ageing effects. Over this period, population ageing has had modest negative effects on Australia's overall labour participation rate and has been more than offset by trend rises in participation rates within age groups.⁴

⁴ Over the *very* long run, workforce ageing seems to have played a more significant role. But even this assessment changes on closer scrutiny. Over the period from 1911 to 2003, trend increases in age-specific participation rates accounted for a 7.6 percentage points increase in the aggregate rate. In contrast, compositional shifts in the age structure of people aged 15 years and over accounted for a 6.6 percentage points fall in the aggregate rate. But this assessment ignores the historical role played by 10 to 14 year olds in Australia's labour force. For example, in 1911, 16 per cent of boys and 5.3 per cent of girls aged 10 to 14 years participated in the labour market.

Overall, the greater general tendency for increased female participation has been the driving factor behind the increasing aggregate labour participation rate in the last 25 years. Had no other changes occurred, the labour participation rate would have increased by 6.2 percentage points from 1978-79 to 2002-03. The fact that the observed increase was actually only 2.95 percentage points largely reflects the offsetting influences of declining male participation trends and workforce ageing.

Cohort effects

The labour market behaviour of people born in different periods — cohorts — can be quite different. Analysis of cohort participation rates, rather than trends in age-specific participation rates, can produce a better understanding of past and likely future trends. The generational differences that underpin cohort analysis reflect:

- different social attitudes (for example, attitudes to the role of women in the workforce after marriage or childbirth);
- varying aptitudes (due to different levels of education and different lifetime exposures to technology and opportunities for learning by doing); and
- the enduring effects of historical events (such as higher disability rates among combatants in the world wars or the ‘scarring’ effects of mass unemployment).

It is clear, for example, that younger people are on average much better educated than their older brethren, and that better educated people generally have higher participation rates, an issue that is re-visited in section 3.4.

The generation into which a person is born makes a big difference to his or her lifetime labour force participation patterns.⁵ This is particularly so for women. Lifetime female participation in the labour force has increased dramatically since Federation and its time profile has also altered (figure 3.7).⁶

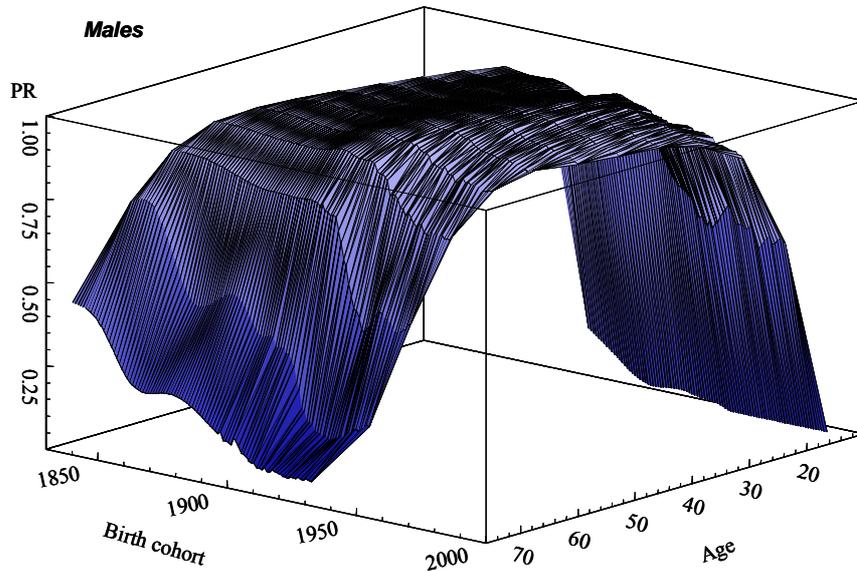
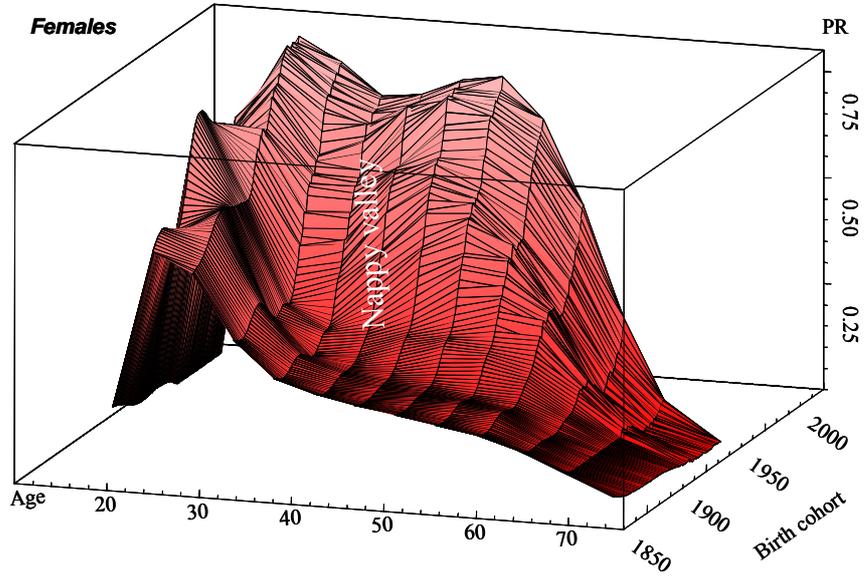
(By 2003, this group had no labour market role.) This suggests that over this long time span, participation rates should be calculated using the population aged 10 years and more — in line with the labour market involvement of this group in earlier years. In this case, shifts in age-specific participation rates increase the aggregate participation rate by 5.7 percentage points while population ageing reduces the aggregate rate by around 3.2 percentage points.

⁵ This is confirmed by statistical analysis undertaken by the Commission and by the ABS (Ravindiran et al. 2002).

⁶ Separate participation rates by gender are not available on a systematic basis for earlier periods. The high aggregate participation rates shown in figure 3.4 for the 19th century are not inconsistent with the co-existence of relatively low female participation rates, because the male population was significantly higher than the female one (reflecting the 1850s gold rush).

Figure 3.7 **Lifetime patterns of work for different cohorts: participation rates by age and birth year of cohort**

All birth years from 1834-38 to 1988-92



^a Note that the orientation of the graphs is different so as to reveal particularly salient features of changes in participation rates for different cohorts. Data on ages and birth cohorts are the midpoints of 5 year spans.

Data sources: Various labour force series from the ABS and Withers et al. (1985).

A woman born around Federation would typically participated in the formal labour market while very young (aged 10 to 19 years), and withdrew with marriage and child bearing. After having (several) children, she generally never returned to a paid job. The section of figure 3.7 depicting participation rates in the childbirth years — ‘nappy valley’ — is wide and deep for such early cohorts.

A woman born just before the Second World War also had her peak participation rate when young, but her withdrawal from the labour market with the advent of childbearing was temporary.

Later female cohorts have significantly lower participation rates than pre-1920 cohorts when young, reflecting greater involvement in secondary schooling and tertiary education. But against this, the dip in participation associated with childbearing is smaller and less protracted — ‘nappy valley’ is now shallow and much narrower. This is because women have become better educated, with fewer children and greater access to part-time jobs and childcare. The peak involvement of women in the labour force is now around 40-44 years — in stark contrast to their great-grandmothers.

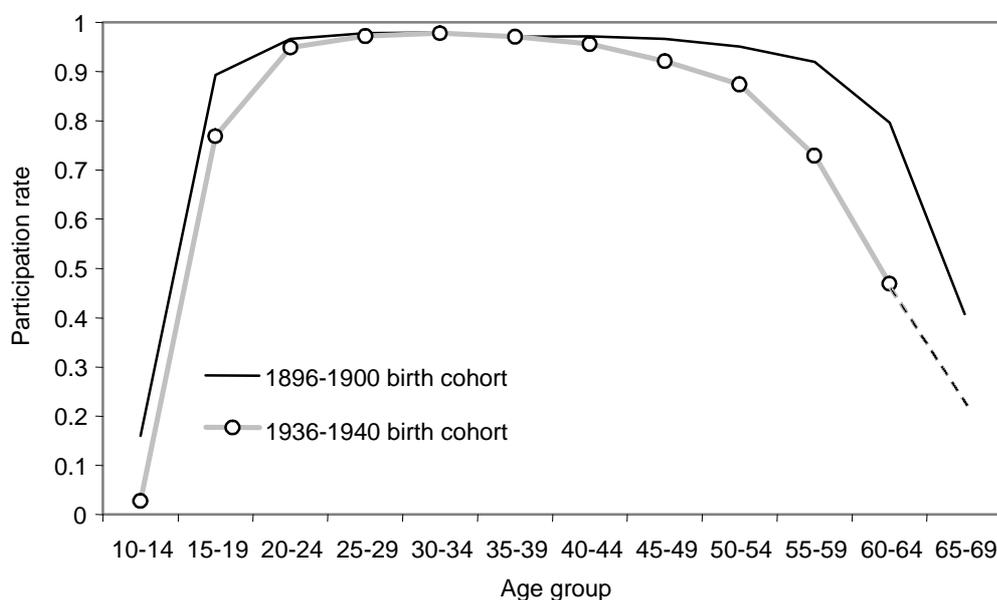
Several factors suggest that more recent birth cohorts will, when aged, participate to a greater extent than the group of women currently aged 55 and over. First, cohort effects are strong, and their effects on older age groups have yet to be fully played out. For example, cohorts born before 1950 have participation rates that are around 10 percentage points higher than the 1936-40 birth cohort. This greater lifetime propensity to be in the labour market can be expected to affect their participation when aged over 55 years. The phased deferral of access to the Age Pension from age 60 to 65 is likely to further increase female participation rates for later birth cohorts.

Cohort effects are much less pronounced for males than females, and their long-run impact has been to *reduce* rather than increase labour force participation.

- At Federation, the lifetime participation profile of males hardly varied between ages 15 and 60 years, with steeply decreasing rates before and after this age range — like a building with a flat roof and steep sides.
- For later cohorts, the ‘roof’ started to collapse with older ages (more easily seen in a sample of the data — figure 3.8). For example, the participation rate of males aged 60-64 years was around 80 per cent for the 1896-1900 birth cohort, but some 30 percentage points less for the 1936-40 birth cohort.

Later in this chapter the Commission uses techniques that capitalise on these cohort differences to project labour participation rates.

Figure 3.8 **Comparing male participation rates by age for two cohorts**
Those born 1986-1900 and those born 1936-1940



Data source: As above.

Unemployment

Participation rates measure whether people are available for work — but not whether they are actually in a job. Accordingly, it is necessary to subtract the unemployed when projecting the effective labour supply.

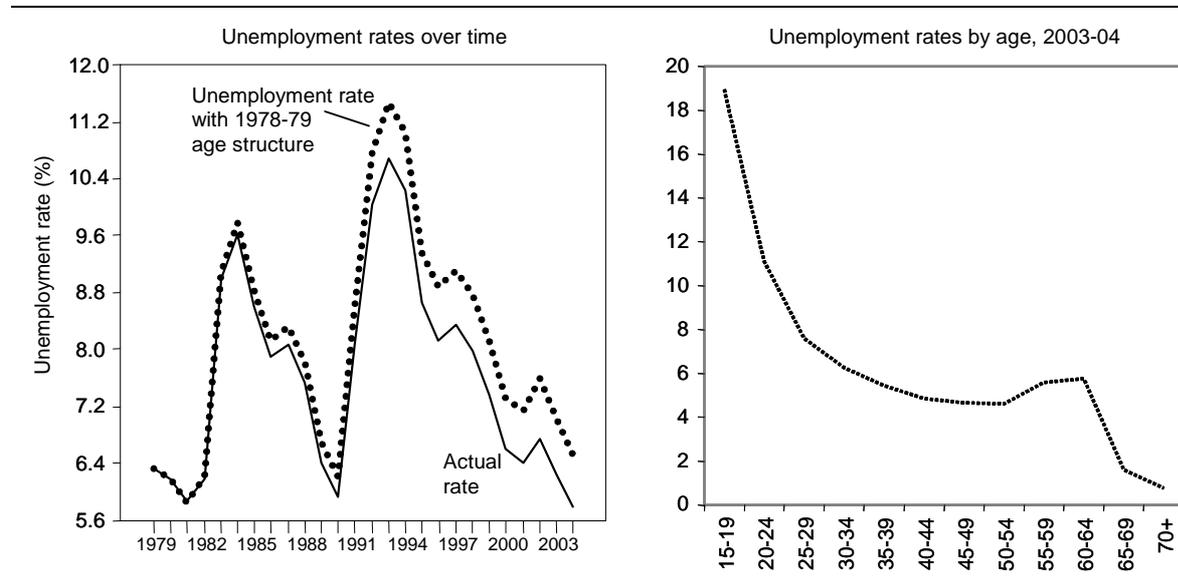
Unemployment rates vary by age group (figure 3.9). Young people have higher average unemployment rates, reflecting the matching and search costs associated with a first job. The oldest workers have low unemployment rates, largely because they can retire if jobs are hard to find. This suggests that the age structure of the feasible workforce may have an impact on aggregate unemployment rates. However, the size of the effect — at least in the past — has been relatively small (figure 3.9).

Hours worked

While the overall participation rate has continued to rise from the 1980s, the most vigorous job growth has been in part-time jobs, while male full-time jobs have decreased at a rapid rate. This implies that the changing mix of part-time and full-time jobs will have had a significant impact on total hours worked (and accordingly effective labour supply and economic growth) — a trend that is expected to persist.

This points to the importance of projecting full and part-time participation rates and average hours worked, rather than just participation rates per se.

Figure 3.9 Unemployment rates and ageing
1978-79 to 2003-04



a The age-adjusted measure of the unemployment rate is calculated by aggregating age-specific unemployment rates over time using the 1978-79 labour force shares by age. This then gives an idea of what unemployment would have been with no labour force ageing.

Data source: ABS, *The Labour Force, Australia*, Cat. 6203.0.

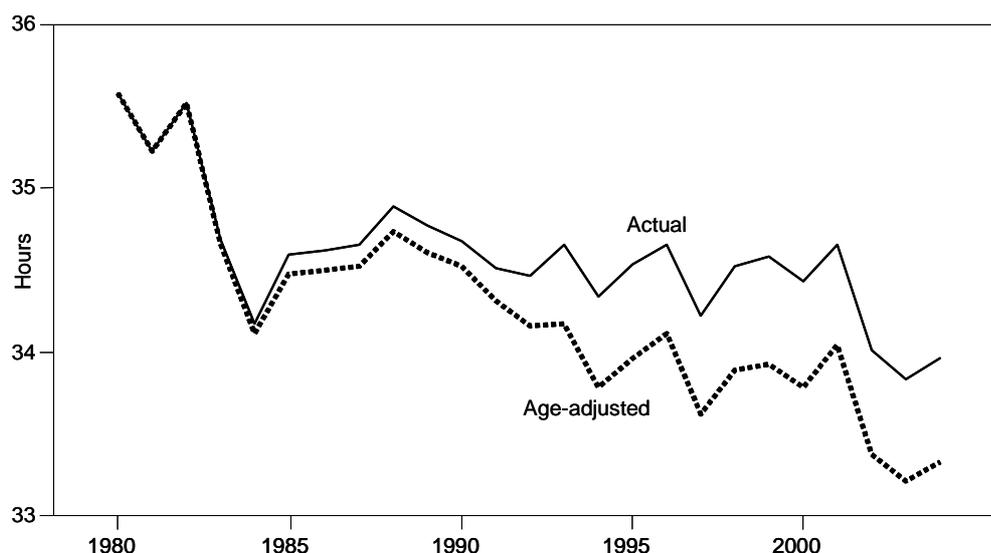
Over the past two decades, average weekly hours worked by full-time employees have risen for both genders and all age groups excepting those aged 65 years and over. Part-time hours worked have followed a more complex pattern:

- for males, average part-time hours fell significantly for most age groups from the early 1980s to the early 1990s — and have since risen generally, though in most cases not recovering to their 1980s levels; and
- average part-time hours increased throughout the two decades for some female age groups (for example, for females aged 25-34, 35-44 and 45-54 years), but showed the same pattern as for males for other age groups (for example, females aged 15-19 and 20-24 years).

Overall, average part-time weekly hours and full-time weekly hours have each increased by around 5 per cent from 1978-79 to 2002-03. But changes in the mix of employment between gender, age and full-time versus part-time status has meant that in aggregate, average weekly hours worked have *fallen* by 4.5 per cent over the last two decades (figure 3.10). This reflects several important structural changes in employment that may also be relevant for future projections of total hours worked:

- part-time work has increased significantly (from 5.1 per cent to 14.8 per cent of employment for males, 34.1 to 45.7 per cent for females and 15.5 per cent to 28.5 per cent overall);
- female participation rates have increased (as noted above). Females have a higher inherent likelihood of working part-time, and within their choice of full-time or part-time work, work less hours on average than males;⁷ and
- changes in the age distribution have (over this period) shifted employment to age groups that work longer hours. Had the age distribution of employment stayed at its 1978-79 levels, average hours worked would have fallen by 2.25 hours per week (or a 6.3 per cent reduction). As it was, shifts in the age distribution meant that hours worked only fell by 1.6 hours or a fall of 4.5 per cent.

Figure 3.10 **Average hours worked per week**
1978-79 to 2002-03^a



^a The age-adjusted hours worked were calculated as:

$$AgeH_t = \sum_{j=15-19}^{65+} \frac{EMP_{j,1979}}{EMP_{1979}} \times AVHRS_{j,t}$$

The difference between AgeH and the unadjusted series reflects shifts in the age distribution of the population.

Data source: ABS, *The Labour Force, Australia*, Cat. 6203.0.

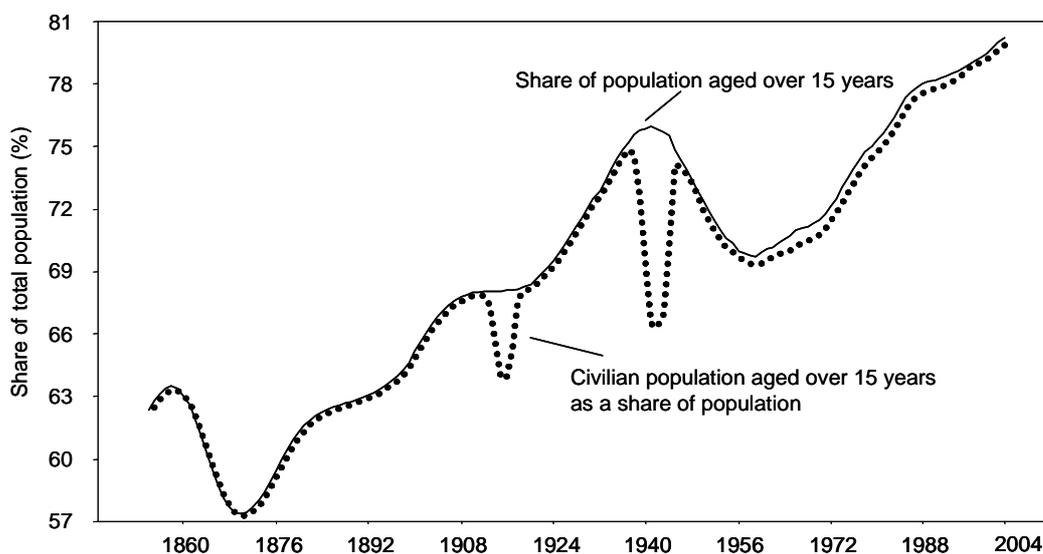
⁷ With the exception of part-time working hours for young people aged under 24 years, where male and female patterns of hours worked are indistinguishable.

The feasible workforce

The negative effect of population ageing on labour participation rates provides an exaggerated picture of the effects of ageing on output per *capita* because it does not take account of the reduced number of young people (those under age 15 years) who have to be supported. With population ageing, the aggregate labour force participation rate inevitably falls as more people shift into the retirement age bracket where the labour force participation rates are very low. But a typical corollary of ageing is that the proportion of the population aged below 15 years also falls. Accordingly, the effects of ageing on per capita income (as opposed to income per person aged 15 years and over) are moderated.

Historically, like most other developed economies, the relative size of the population aged 15 years and over, which is the maximum size of the workforce, has been generally growing over time (figure 3.11). For example, this demographic feature has meant that, from 1961-62 to 2003-04, real GDP per person aged 15 years and over grew by 122 per cent, while real GDP per capita grew by around 156 per cent, or more than 30 percentage points more. This demographic feature will be a significant restraining influence on the adverse effects of ageing on per capita income growth in the future.

Figure 3.11 **Relative size of the feasible workforce**
1855-56 to 2003-04^a



^a Two measures are shown. The first (the strict definition) excludes defence personnel from the feasible workforce so as to be consistent with the basis on which participation rates are measured (This is: CPOP15/POP, the ratio of the civilian population aged 15 years and over to the total population). The second includes such defence personnel and so is simply the share of people aged 15 years and over in the population (POP15+/POP).

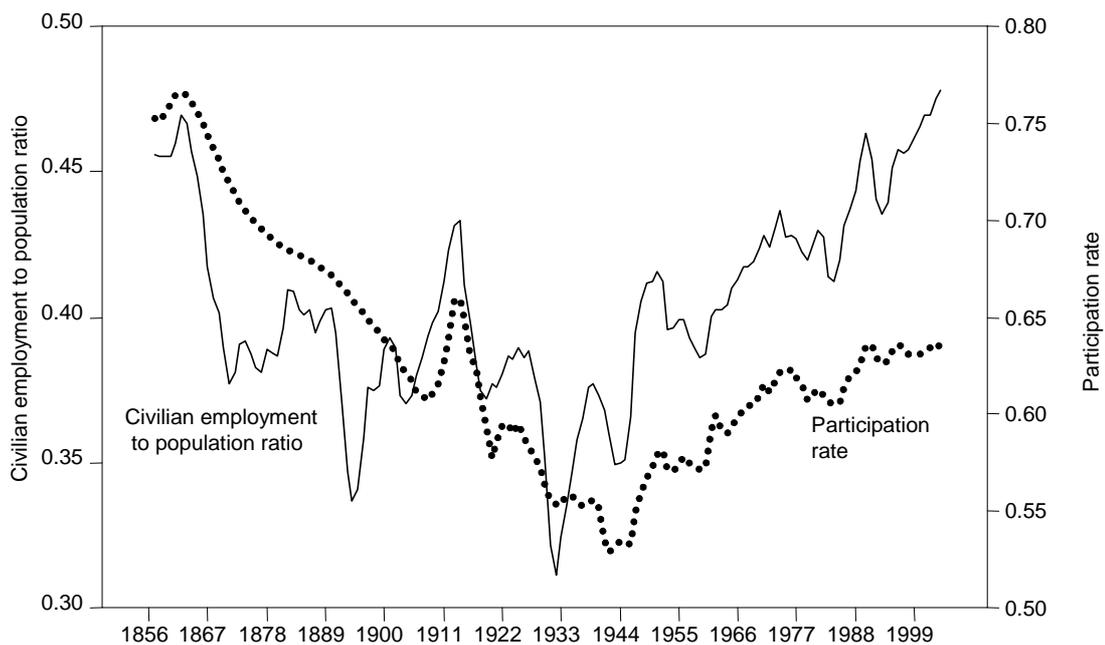
Data sources: Vamplew 1987 p. 30-35, p. 44 and ABS, *Australian Historical Population Statistics*, Cat. 3105.0.65.001 and ABS, *The Labour Force, Australia*, Cat. 6203.0.

Another way of identifying the importance of this factor, as well as any long-run shifts in unemployment rates, is to note that GDP per capita can be written as the following identity:

$$\begin{aligned} \text{GDP/POP} &\equiv \text{Productivity} \times (1 - \text{Unemployment rate}) \times \text{Participation rate} \\ &\quad \times \text{Share of population aged 15 years and over} \\ &\equiv \text{Productivity} \times \text{Employment to population ratio} \end{aligned}$$

The employment-to-population ratio picks up the effects of reducing youth dependency, as well as changes in unemployment and participation rates — and is probably the best summary measure of labour supply trends in the economy (figure 3.12). Testimony to the effects of declining youth dependency, the employment ratio grew by 24 per cent from its post-war low in 1958-59 to 2003-04 in comparison with the 11 per cent growth in the participation rate over the same period.⁸

Figure 3.12 Employment to population changes and participation rates
1855-56 to 2003-04^a



^a Data prior to 1900-01 have been interpolated on ten year data using a cubic spline. The data on participation rates and employment were obtained from the sources described in figure 3.4, while those on the population are described in figure 3.6.

Data sources: ABS (Cat. 6203.0 and Cat. 3105.0.65.001), Foster and Stewart 1991, Butlin 1977, Vamplew 1987 and Withers et al. 1985.

⁸ These growth rates are the percentage changes in the relevant rates, not the percentage points difference in rates. For example, the change in the participation rate is calculated as $100 * (PR_{2004} - PR_{1959}) / PR_{1959}$ per cent.

Remarkably (and unlike the participation rate), the present employment-to-population ratio is the highest it has been since useable economic records have been kept for Australia. Ageing will shift the ratio down from this historical peak, but (as shown later) not to levels that are very low by past standards.

What are the lessons from the historical trends?

Quite apart from the fact that projections are partly extrapolated on previous trends, the historical experiences are useful in other ways. They reveal:

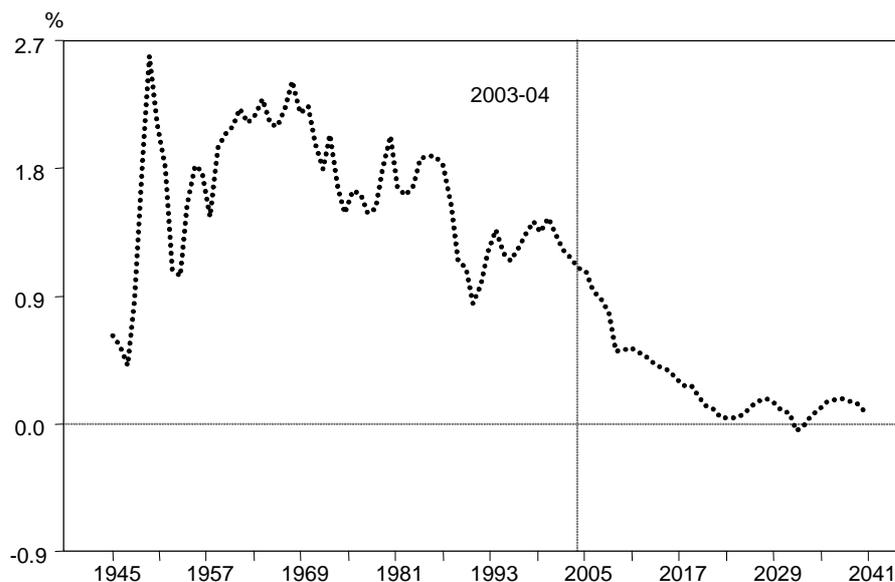
- Even though significant ageing occurred over the 20th century, ageing has so far played second fiddle to other social forces affecting labour market participation.
- Cyclical downturns are relatively unimportant influences over the very long term. This is significant because there may be cyclical downturns over the next forty years. However, their timing and likelihood is conjectural. Since such downturns matter over the short and medium terms only, it is appropriate to use long term average trends in economic variables in projections, rather than to try to forecast any particular cyclical shocks.
- Participation rates can change markedly in a short period — for example, participation rates for males aged 65 and over halved from the mid 1970s to the early 1980s.
- There are significant switches in trends in participation rates. For example, 65-69 year old male participation rates fell by a trend rate of 1.6 per cent per year from August 1965 to August 1984, but increased by a trend rate of above 0.4 per cent per year from August 1990 to August 2003. It is doubtful that the resurgence in participation rates from 1990 could have been readily predicted beforehand. This underlines the difficulties in projecting participation rates on the basis of past trends.
- The effect of population ageing on the aggregate participation rate was more than offset by within age-group effects — such as increased female participation — over the past 25 years. In the future, these effects will continue, but are unlikely to be as strong. Accordingly, population ageing effects are likely to be bigger. The future will not look like the past — simple extrapolations on the basis of the *aggregate* labour participation rate would be highly misleading because they fail to take account of compositional effects.

3.4 Projections of Australia's labour supply

What will affect future labour supply?

The labour force is like a leaky tub being filled by a hose. Retirement and other moves out of the labour force deplete it, while it is replenished mainly by new younger recruits and women re-entering the workforce after childbirth. The ageing of the population has big effects on these flows by increasing outflows due to retirement, while stemming inflows of new young workers. Much of the future labour supply story is purely demographic — a reasonable approximation to future labour supply growth is the change in the population aged 15 to 64 years (figure 3.13).

Figure 3.13 **Growth in worker numbers is set to decline to record lows**
Yearly percentage change in the number of people aged 15-64, 1944-45 to 2044-45



Data source: ABS Population projections (B series) and ABS, *Labour Force, Australia* (Cat. 6203.0) for earlier years.

To get a more precise grasp on labour supply involves ‘peeling the onion’ of its contributing components. To do this requires assumptions about future labour market trends. There are a myriad of factors, other than the purely demographic, that are likely to influence future labour supply growth. Some of the more important are:

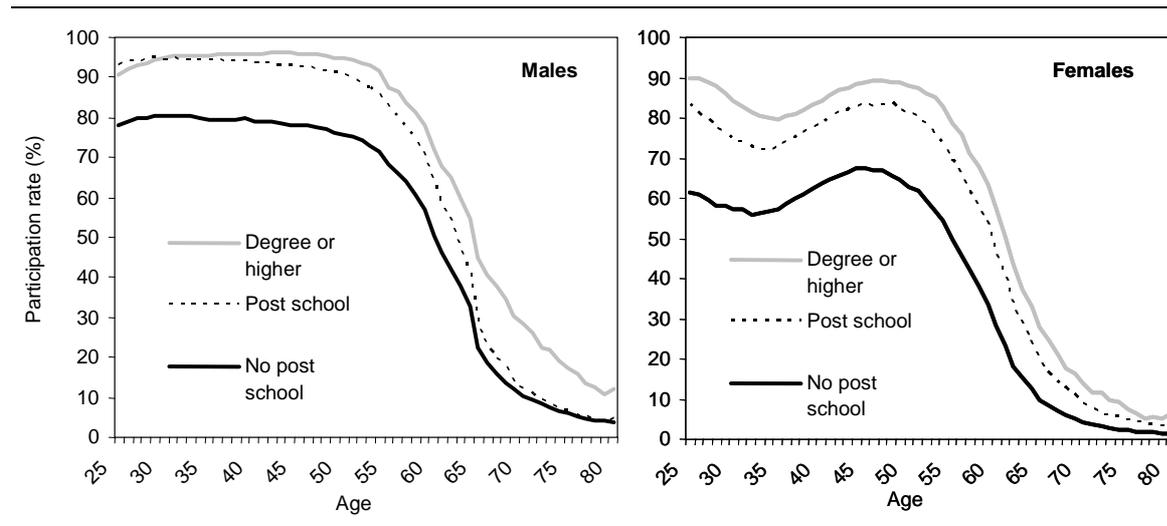
- trends in future education;
- pension policy;

- trends in disability rates; and
- slow moving social trends — such as improved access to paid work for women.

Trends in future education

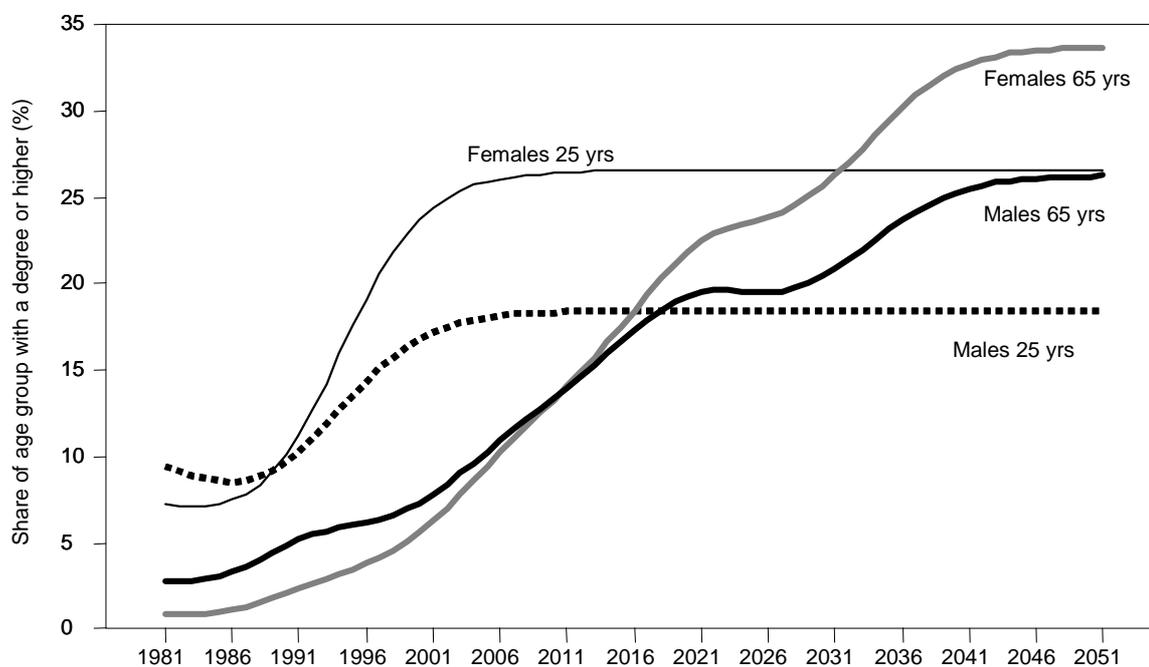
Educational attainment is strongly linked to labour participation rate outcomes (figure 3.14). Older people currently have low levels of post-school education, but cohort analysis of educational attainment rates suggest that in several decades, older workers will have higher average rates of educational attainment than younger workers (figure 3.15). This occurs for two reasons. First, the current generation of young have relatively high educational attainment rates — and by the middle of this century, they will be the next generation of the old. Second, people continue to acquire education as they age. This striking change in the age distribution of educational attainment can be expected to stimulate labour force participation rates for older workers to some degree — a point emphasised by recent analysis by Treasury economists (Gruen and Garbutt 2003, Kennedy and Hedley 2003). However, there is evidence that as educational attainment rates increase, their impact on labour participation rates diminishes. So it is unlikely that the association depicted in figure 3.14 will be as strong for older workers later this century. Nevertheless, rising educational attainment rates are still likely to exert a positive influence on participation rates.

Figure 3.14 Labour force participation by age and highest educational attainment
Percentage rates, 2001



Data source: ABS 2001 Population Census data provided by the Australian Government Department of the Treasury.

Figure 3.15 Relative educational attainment (holding a degree or more) by sex and age
1981 to 2051



Data source: Commission calculations.

Pension policy

The most important recent policy change is the progressive deferral of access to the Age Pension for females aged below 65 years. This will slowly increase participation rates among females aged 60-64.

Trends in disability rates

While measuring trends in the age-specific prevalence of disability remains a contested field, there is little doubt that the impact of a given level of disability on labour force participation has been accentuated over the last few decades. The number of people — particularly men — accessing the Disability Support Pension (DSP) has increased rapidly for most age groups. For example, from 1978-79 to 2002-03 there was a quadrupling in the number of males aged 40-49 years claiming the disability pension. This trend reflects the relative attractiveness of the DSP compared with unemployment benefits for people with a disability facing labour market difficulties.

People on DSP are classed as outside the labour force — and indeed the uptake of this benefit appears to be a major contributor to the historical decline in the labour force participation rates of older males. For instance, had those males aged 60-64 years on a disability pension stayed in the labour force, then labour participation rates for this age group would have dropped a mere 0.4 percentage points from 1978-79 to 2002-03 instead of 8.2 percentage points. In other words, these simulation results suggest that 95 per cent of the decline in the participation rate of males aged 60-64 years could be attributed to the increased use of the DSP.

However, DSP rates are already dropping for males aged 50-64 years and are anticipated to stabilise for younger males and all females over the longer run. Accordingly, one of the major drivers of falling participation rates for men (and one of the significant frictions that prevented older female participation rates from rising even further) is set to play a more marginal role in the future.

Other trends and cohort analysis

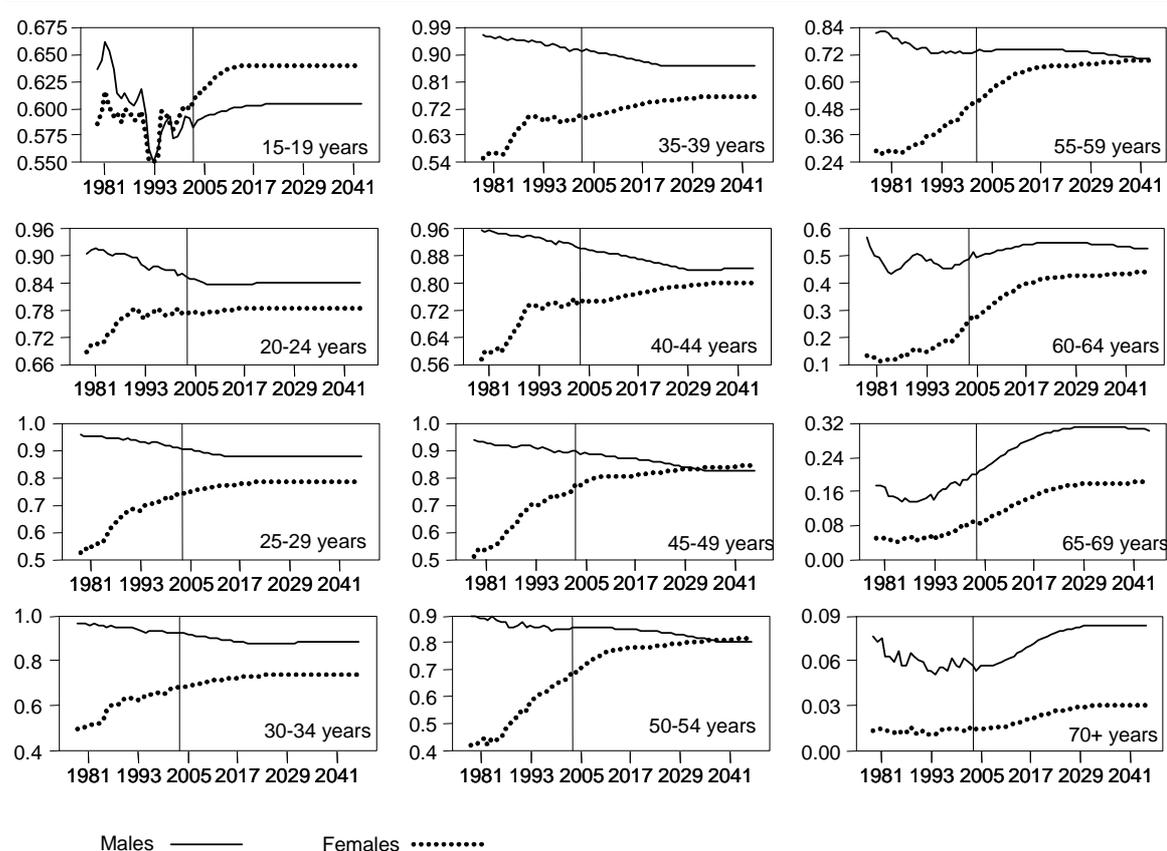
Many of the factors that have led to changes in labour participation rates — including those above — reflect broad technological, social and commercial trends. For example, expansion of flexible casual and part-time job opportunities in the service sector have allowed people, particularly women, to combine childcare and work responsibilities. Falling fertility rates and rising divorce rates have also increased female participation rates, as have increasing educational attainment rates. Collectively, these trends have been major influences on aggregate labour participation rates — and many are likely to continue.

But how can such trends be adequately captured in projections, given that each factor is hard to model separately? The Commission's projection approach recognises that many of these trends operate at the cohort level. For example, educational attainment and cultural attitudes to work are factors that depend on a person's cohort. It is also apparent that occupational and industry choices are often made early in life and so are partly dependent on a person's cohort. This suggests that adopting a broad cohort modelling approach to participation rates will collectively pick up many of these broad trends. Cohort methods can also pick up recent shifts in trends too — such as the fall in age-specific DSP rates for older males. The method — which extends an approach derived by the OECD (Burniaux et al. 2003) — relies on estimating the probability that a person of a given age exits or enters the labour market over the next period. Trends in exit and entry rates are modelled over the past, so they can pick up likely future shifts in cohort behaviour.

Labour participation rate projections

Taking account of these changing cohort patterns, the Commission generated projections of participation rates for different age groups by gender for Australia as a whole (and for all States and Territories).⁹ The projections (figure 3.16) show a continuing tendency for greater female participation for all ages over 25 years. For the core years of work from 25 to 59 years, female patterns of workforce involvement increasingly resemble that of males. There is a (slowly abating) trend for lower participation rates by males aged from 25 to 59 years. However, participation rates for males aged 60 years and over are expected to rise in the next 40 years, albeit still remaining low relative to other ages. The greater involvement by older males reflects the trend towards lower exit rates from the labour force for this age group. The source of this trend is unclear.

Figure 3.16 Projected participation rates by age and sex
Australia, 1978-79 to 2044-45

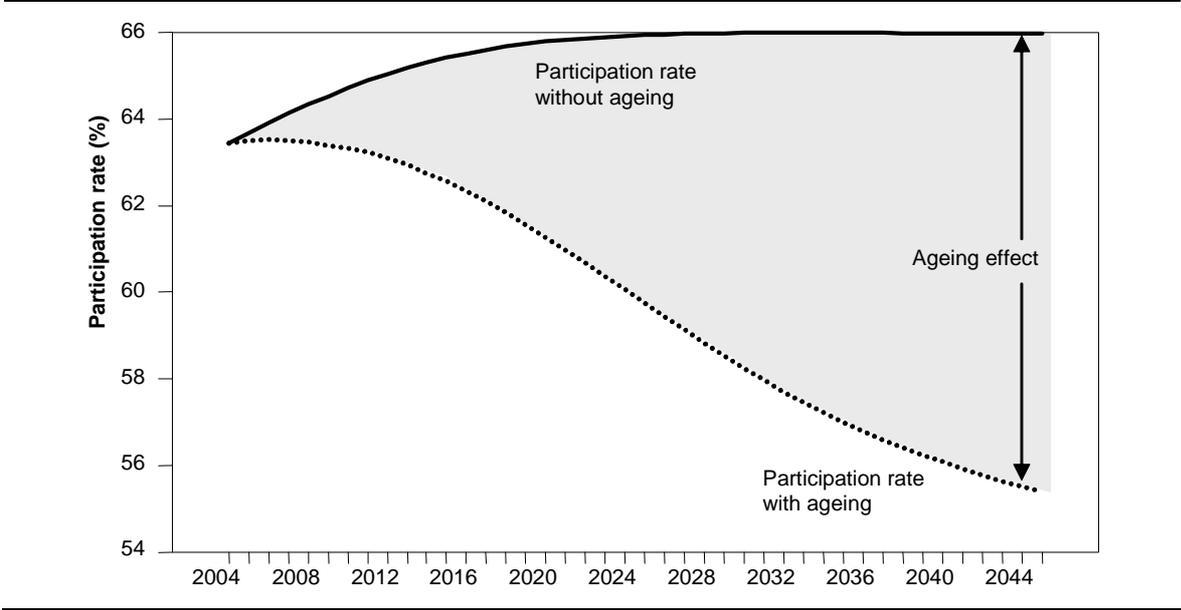


Data source: Commission calculations from 2004-05 using a dynamic cohort approach. Otherwise rates are derived from the ABS Labour Force Survey (Supertable LM8).

⁹ Detailed estimates are available for each State and Territory on request.

The aggregate labour force participation rate for Australia is calculated by weighting the age-specific rates by the relevant age population shares. Over the next forty years, aggregate labour force participation rates in Australia are projected to fall by around 8 percentage points from their current level of 63.5 per cent to 55.4 per cent. (figure 3.17). Had there been no change in the age structure of the population, participation rates would have *risen* by around 2.5 percentage points, reflecting the continued importance of rising female participation. Accordingly, by 2044-45, the difference in participation rates attributable to ageing amounts to nearly 11 percentage points — a margin that would have large effects on Australia’s growth prospects.

Figure 3.17 Aggregate participation rates fall with ageing
2003-04 to 2044-45



Data source: Commission calculations.

These projections corroborate the findings in the Intergenerational Report, based on older ABS population projections and labour force data, and different methods for forecasting age-specific participation rates. The Intergenerational Report found an aggregate participation rate of around 56 per cent in 2041-42, which is close to the Commission’s estimate for the same year.

The effect of the demographic transition on Australia’s labour force in the next four decades is much greater than has occurred in the last 30 years. And in contrast to the earlier experience, these ageing effects are not offset by trend rises in age-specific participation rates. Past ageing gives a very poor guide to the dramatic effects of future ageing on Australia’s labour force.

But a question remains as to whether the age-specific trends underlying this aggregate projection are likely to be realised. The results for females pass a basic credibility test. It is highly likely that female participation will continue to rise, because the factors that have been driving rising participation are still at work (such as increased education and better matching of female job preferences). But there can be less confidence in the forecasts of continuing declines in participation trends for males aged 20-59 years, because it is unclear that the historical forces that lowered participation thus far will continue.

This suggests a need for sensitivity analysis. Such analysis reveals that the aggregate participation results are remarkably robust to different assumptions about trends in age-specific participation rates. Indeed, had age-specific rates stayed fixed at their initial levels (2003-04 in this case) — a common assumption in labour force projections — the aggregate participation rate by 2044-45 would be 52.4 per cent. This is only three percentage points below the participation rate projected by the Commission. This underlines the point that the most important determinant of the future aggregate participation rate is the shift in the age structure of the population. Even large increases in age-specific participation rates have relatively modest impacts on the aggregate participation rate (box 3.4).

As noted in the Intergenerational Report (p. 28), the relative insensitivity of the aggregate participation rate to changes in age-specific trends has some policy implications. The thought-experiments show that major increases in participation rates for all age-sex groups (of the kind described by Gruen and Garbutt 2003) are required to significantly abate the effects of ageing on labour force growth. Substantial increases in participation rates for older Australians alone do not make a large difference to overall participation rates — and policies that elicit such increases cannot, by themselves, realistically be a panacea for the sluggish labour supply arising from ageing. However, to the extent that policy overcomes barriers to participation that confront older Australians and results in outcomes that they desire, then such increases are worthwhile in their own right (and may also be part of a suite of policies aimed at better growth prospects).

State results

The cohort method was also applied to individual States and Territories to generate labour force and participation rate projections (table 3.1). Most jurisdictions follow a similar pattern. The change in participation rates in Victoria, Queensland, and the Australian Capital Territory are roughly the same, with South Australia, Western Australia and New South Wales flanking these trends.

Box 3.4 Exploring participation scenarios

Big increases in participation rates: if age-gender-specific participation rates are fixed at their maximum value for the period from 1978-79 to 2044-45,¹⁰ then the aggregate participation rate in 2044-45 is 58.5 per cent — still around 5 percentage points below the current level and 7.5 points below the rate in 2044-45 had no changes occurred in the age structure of the population. This scenario is a relatively extreme one. For example, it returns male participation rates to peaks of over 96 per cent for males aged 25-39 years old (which is up to 10 percentage points above the level projected by the Commission for 2044-45 for these age groups), while still allowing female participation rates to grow at strong levels over the next forty years.

Increasing participation rates by older male workers: if male participation rates for older workers (those aged 55 years or more) were 10 percentage points greater than the base case for 2044-45, then the aggregate participation rate would be 57.5 per cent — still only around 2 percentage points more than the base case (close to the results found by the Intergenerational Report in running a similar experiment, p. 28). This is an extreme assumption for the oldest males, implying that participation rates for males 70 years and over and 65-69 year olds in 2044-45 are around 2.4 and 2.3 times greater (respectively) than the maximum recorded from 1978-79 to 2003-04.¹¹

Less disability support: it may be conjectured that if policies aimed at reconnecting at least a proportion of disability pensioners with the labour market are successful, then rates of DSP uptake might decline relative to that projected by the Commission in its baseline assumptions. This might halt the downward trend in male participation rates. If it is assumed that male participation rates for those aged 20-59 years¹² no longer fell after 2002-03 (and stayed at 2003-04 rates), the effect on future aggregate labour force participation rates would be very small. Under this assumption, by 2044-45 the aggregate participation rate would be 56.6 per cent instead of the projected 55.4 per cent. In any case, it is a moot point whether changes in male participation rates stemming from re-connecting DSP beneficiaries to the labour force would substantially alter the trends in *employment* rates by age group (which, as shown below, are what matters for economic growth). This is because many of those on disability payments would have (and have had) great difficulty obtaining jobs.

Becoming Scandinavian: Gruen and Garbutt (2003) conduct another ‘what if’ experiment, based on the outcomes were Australia to gradually reach the 80th percentile of a selected group of 2001 OECD male and female participation rates — making us have aggregate rates more like Scandinavian countries. This experiment somewhat resembles the first of those above, with male participation rates that are close to (and sometimes exceeding) the historical maximum over the past 25 years and female rates that are roughly in line with those projected by the Commission. Using their assumptions with the new ABS series B demographic series results in an aggregate participation rate of around 60 per cent by 2044-45, mitigating the participation effects of ageing by around 50 per cent.

¹⁰ With rates for 2004-05 to 2044-45 as projected by the Commission.

Two other jurisdictions exhibit more extreme results. There are large declines in participation rates in the most ‘greying’ jurisdiction — Tasmania. The Tasmanian Government, for instance, projected that participation rates would fall by between 10.9 and 13.5 percentage points by 2042 (sub. 40, pp. 12-14). In contrast, using ABS data that do not differentiate indigenous from non-indigenous sub-populations in the Northern Territory, suggest that participation rates there will hardly decline at all. This is because ABS demographic projections for the Northern Territory population show much less ageing than other populations.

Table 3.1 Changes in labour participation rates in Australian States and Territories
2003-04 to 2044-45

<i>Jurisdiction</i>	<i>Aggregate participation rates</i>			
	2003-04	2024-25	2044-45	Change 2003-04 to 2044-45
	%	%	%	%
NSW	62.5	59.6	55.3	-7.1
VIC	63.1	59.0	54.2	-8.9
QLD	64.7	60.8	56.6	-8.2
SA	61.5	56.1	51.7	-9.8
WA	65.8	61.3	56.3	-9.5
TAS	58.8	51.4	46.2	-12.6
ACT	71.8	67.4	63.6	-8.2
NT	71.2	72.2	70.3	-0.8
NT alternative ^a	66.3	64.5	63.8	-2.5

^a Based on combining separate projections for the indigenous and non-indigenous populations. The difference between the estimates for the starting year (2003-04) reflects the use of extrapolated ABS Population Census data (2001-02) in the alternative estimates, rather than the use of Labour Force Survey estimates.

Source: Commission estimates.

However, the Northern Territory result is partly a statistical anomaly, reflecting the very different characteristics of its two underlying populations. For example, population growth is much more rapid among the Indigenous population, which will have the effect of increasing the indigenous share of the Northern Territory population and weighting aggregate labour market outcomes more towards the (usually poorer) labour market outcomes of this group.

On advice from the Northern Territory Government, the Commission re-calculated participation rate projections for this jurisdiction by generating separate

¹¹ If the experiment is re-run but with the 10 percentage points increase only occurring for males aged 55-64 years then the effect on aggregate participation rates is negligible (at around 0.7 percentage points).

¹² With rates for other age groups increasing, in line with the baseline projections.

demographic projections and participation rate models for the two sub-populations.¹³ This resulted in a somewhat bigger decrease in participation rates, but one that was still much less significant than that facing other jurisdictions. However, it should be emphasised that labour force participation is not the same as labour supply. The labour force includes people who are unemployed or on labour assistance programs, such as CDEP. Accordingly, projections of labour force participation for the Northern Territory, even when adapted for the two-sub-populations, will significantly overstate effective labour supply.

While some of the differences between jurisdictions reflect different underlying trend growth rates in age-specific participation rates, the major contributing factor to their different experiences is demographic (table 3.2).

Table 3.2 Ageing effects on participation rates by jurisdiction
2044-45 relative to 2003-04

<i>Jurisdiction</i>	<i>Participation rates</i>			
	2003-04	2044-45 with no ageing	2044-45 with ageing	Ageing effect
	%	%	%	%
NSW	62.5	65.2	55.3	9.9
VIC	63.1	64.5	54.2	10.3
QLD	64.7	68.1	56.6	11.5
SA	61.5	64.2	51.7	12.5
WA	65.8	67.3	56.3	11.0
TAS	58.8	60.3	46.2	14.1
ACT	71.8	75.6	63.6	12.0
NT	71.2	75.5	70.3	5.2
NT alternative ^a	66.3	73.9	63.8	10.1

^a These estimates are based on combining separate projections for the indigenous and non-indigenous populations. See the note for table 3.1.

Source: Commission calculations.

Unemployment and hours worked

Participation is only part of the labour supply story. The other two important elements are unemployment and hours worked.

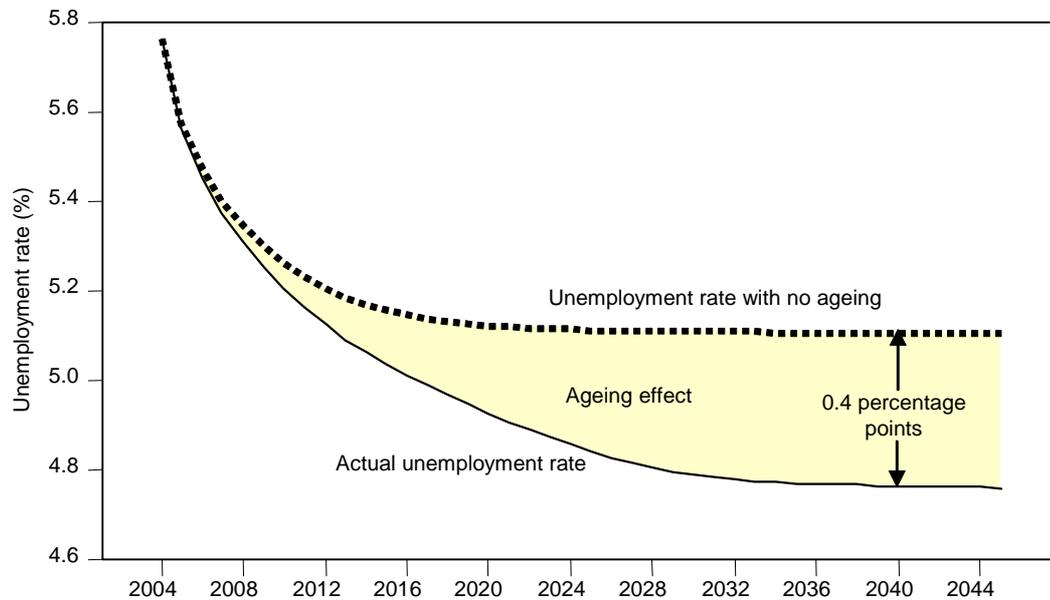
The dual drivers of the aggregate future unemployment rate is the long-run unemployment rate associated with a stable inflation rate (the so-called ‘non-accelerating inflation rate of unemployment’ or NAIRU) and demographics which

¹³ These projections were not undertaken using cohort methods because of data limitations. It was assumed that there would be some ‘catch-up’ with non-Indigenous Territorians by the Indigenous population. The details are available on request.

weight individual age-sex unemployment rates. The NAIRU is projected to be just above 5.1 per cent in 2044-45 were the age structure to be fixed at 2003-04.

The actual long-run unemployment rate is a little less than this because ageing is likely to have a positive twist for unemployment. This reflects the fact that the highest unemployment rates are experienced by young people, in the transition from education to work, and the lowest by older people, who have the alternative of retirement. Consequently, the shift in the age structure of the workforce is likely to lower measured unemployment rates, although the effect is quite small at around 0.4 percentage points (figure 3.18). The result implies that for a *given* participation rate the *effective* labour supply will be higher than otherwise.

Figure 3.18 Ageing and aggregate unemployment rates
2003-04 to 2044-45



^a The measure of unemployment rate with no ageing is calculated by weighting age-sex specific unemployment rates by labour force shares that would occur without ageing.

Data source: Commission calculations.

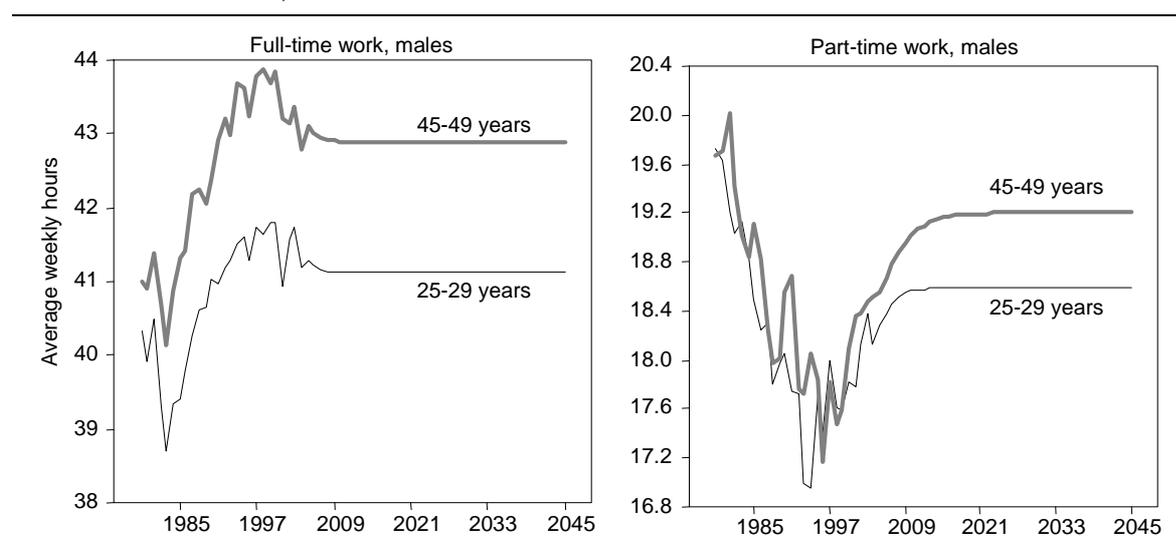
Of course, unemployment is not only determined by matching and search costs, but by broader imbalances in the demand for and supply of labour. Given there will be relatively fewer young people in the labour force, it would be expected that unemployment associated with insufficient demand would more commonly occur among older people, pushing up their unemployment rates. Nevertheless, Australia is currently experiencing a period of stable macroeconomic performance, and this is the basis on which projections in this and other chapters are made. In that context, it is appropriate to project age-specific unemployment rates and then to use

demographics and labour force participation rates to derive an aggregate unemployment rate.

The story for average hours worked is different again. Average hours worked are generally projected to increase modestly for part-time workers of most ages, while being stable for full-time workers generally (figure 3.19). However, the *incidence* of part-time work will continue to rise for Australians of most ages (particularly for males). Contributing factors include the preferences of many people for part-time jobs and the ascendancy of the service sector. That, and the fact that older workers have a much higher tendency to work part-time anyway, mean that average weekly hours per employee are projected to fall (figure 3.20).

So ageing has a ‘double whammy’ depressive effect on labour supply — reducing participation rates and cutting average hours worked. These greatly outweigh the positive influences via lowered unemployment.

Figure 3.19 Selected projections of average hours worked per week
Males, 1978-79 to 2044-45



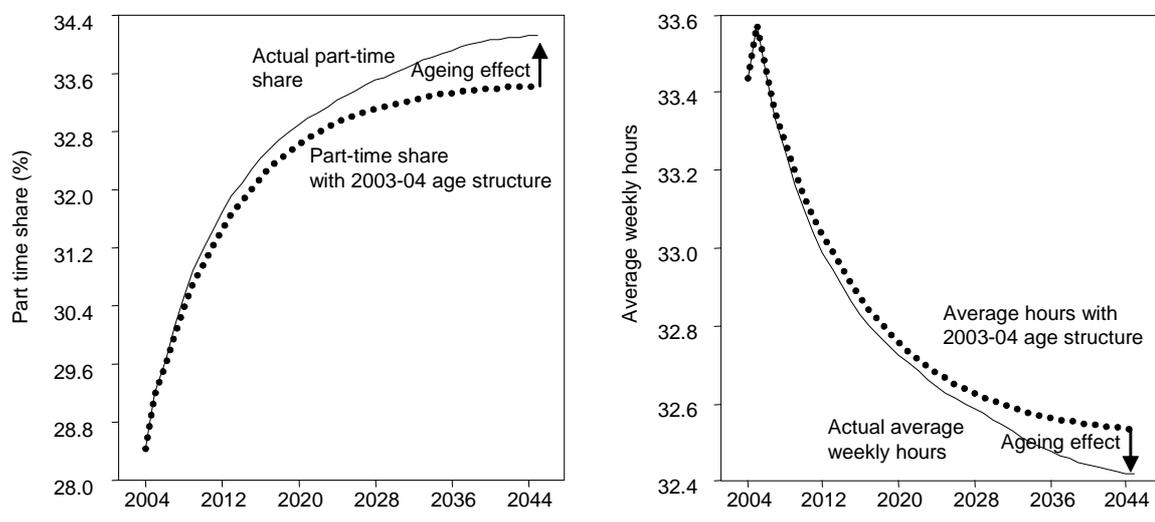
Data source: Commission estimates and ABS Labour Force Survey data.

Labour supply

These components of labour supply — participation, part-time and full-time work, average hours and unemployment — can be assembled into two perspectives on labour supply:

- employment; and
- the total number of hours actually worked per year (the ‘effective’ labour supply).

Figure 3.20 Effects of ageing on part-time employment rates and average hours worked
2003-04 to 2044-45



Both grow sluggishly as a result of ageing (table 3.3 and figure 3.21). For example, the number of workers is projected to grow by around 320 000 in just the two years from 2003-04 to 2005-06. This is about the same growth in the labour supply that occurs over the entire twenty years from 2024-25 to 2044-45. Annual trend growth rates in the two decades to the 21st century are more than three times greater than the annual trend growth rate in the next four decades. Indeed, in the next forty years, the pace of effective labour supply growth is slower than population growth (unlike in the past), so that hours worked per capita decline by around 10 per cent. Had the population structure not changed, hours worked per capita would have risen by 10 per cent.

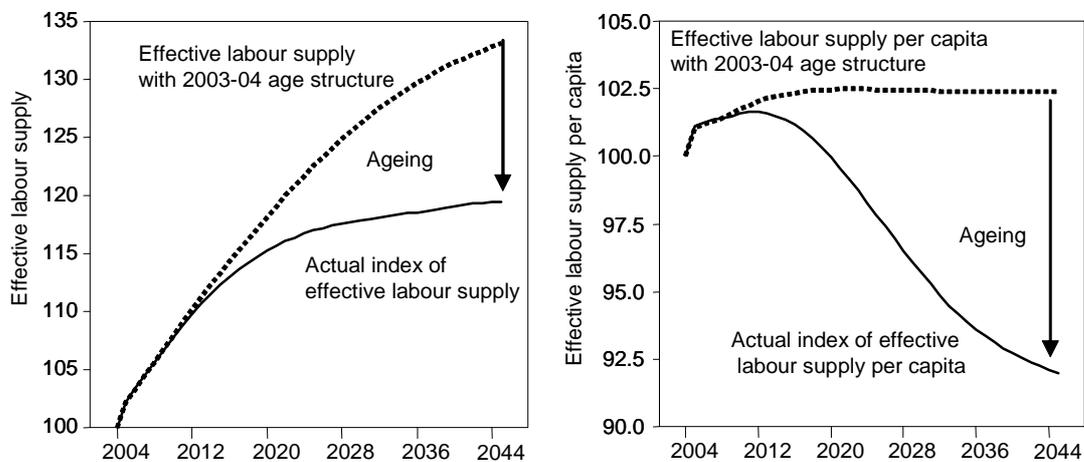
Table 3.3 Labour supply growth slows with ageing^a

Period	Trend growth rate	
	Number of workers	Total hours worked
	%	%
1979-80 to 1999-00	1.84	1.74
1999-00 to 2009-10	1.60	1.23
2009-10 to 2019-20	0.78	0.67
2019-20 to 2029-30	0.27	0.22
2029-30 to 2039-40	0.14	0.10
2039-40 to 2044-45	0.09	0.08
1999-00 to 2044-45	0.54	0.44

^a Growth rates are based on regressing the logged value of the labour supply measure against a time trend.

Source: Commission calculations.

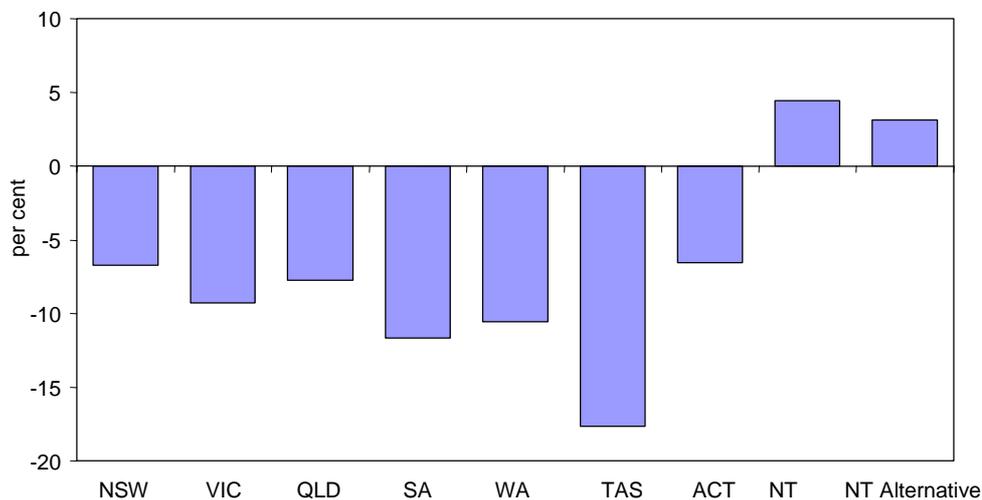
Figure 3.21 Ageing and effective labour supply
Australia 2003-04 to 2044-45



Data source: Commission estimates.

Given divergent patterns of ageing and labour market prospects there are significant differences between jurisdictions in trends in hours worked per capita (figure 3.22).

Figure 3.22 Changes in effective labour supply per capita vary by jurisdiction
Percentage change in total hours worked per capita, 2003-04 to 2044-45^a



^a The increase in total hours per capita in the Northern Territory case reflects the combination of a relatively younger population and assumptions about the increasing engagement of Indigenous Territorians in the Northern Territory labour market.

Data source: Commission estimates.

This measure is probably the single best indicator of dependency since it takes account of actual employment and hours worked, rather than just the changing age

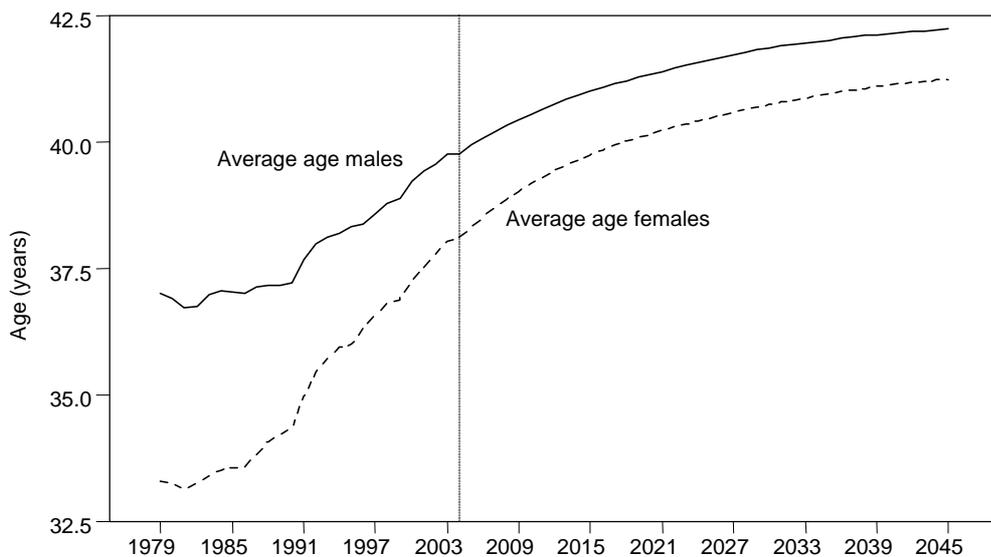
structure of the population in each State and Territory. Tasmania stands out particularly as a jurisdiction in which the available hours per capita fall precipitously as a result of ageing.

Average labour supply age

The labour supply projections allow the estimation of the average age of employees over the next forty years — which provides a simple measure of labour supply ageing (figure 3.23). In fact, relatively small changes in average age are anticipated — roughly two and half years for males and three years for females.¹⁴ Indeed, in the case of females, there was much more ageing of the labour supply between 1978-79 and 2003-04 (around 4.8 years) than is projected for the next forty years.

Figure 3.23 Average age of employees

Australia, 1978-79 to 2044-45^a



^a Average age is calculated by taking the midpoint of the 5 year age spans as the representative age for each age-sex group and weighting these ages by shares of hours worked.

Data source: Commission calculations.

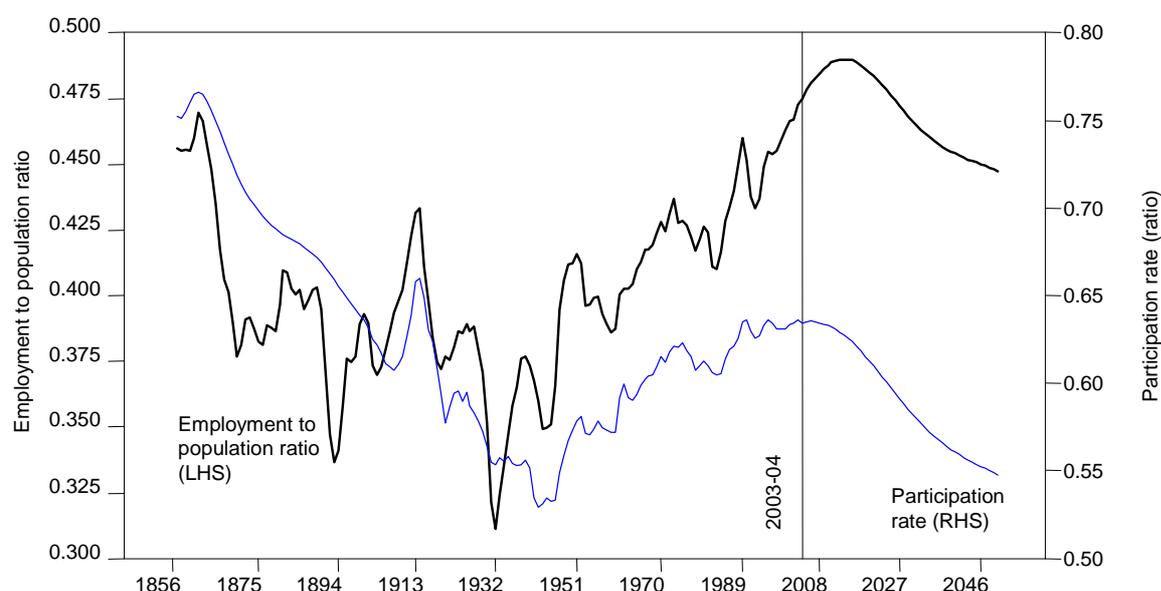
The labour 'problem' in historical perspective

Adding the Commission's projections to figure 3.12 provides a two hundred year perspective of the Australian labour market (figure 3.24). Adopting this perspective

¹⁴ This reflects the fact that, while the labour supply shares of the old increase dramatically (for example, the labour supply share of 70 year olds and over increases fourfold), they still account for a very small share of the total labour supply. Accordingly, they provide little weight to older ages in computing average ages.

reveals a more positive story than told by the projected outcomes for the next forty years alone. For one thing, it becomes clear that the employment to population ratio over the next forty years is not historically low. Even with the projected decline in participation, the ratio of employees to population will still be higher in 2050 than at almost any time in the last century. (This reflects the importance of the young population in this ratio.)

Figure 3.24 Taking a long view: 200 years of Australian labour supply
1856-57 to 2050-51^a



^a These data were constructed from many historical data series — with interpolation based on econometric estimates and cubic splines for some earlier data.

Data source: Commission estimates based on ABS labour force data, Vamplew (1987), Withers et al. (1985), and Foster and Stewart (1991).

It is misplaced to *blame* ageing for any economic pains, since the flip side of ageing is an earlier era of economic gains.

- A significant source of ageing (and the accompanying projected decline in the employment to population ratio over the next 40 years) was the general decline in fertility after the baby boom.
- But the presence of the baby boomers and the relative absence of their progeny was a major factor behind the *rise* in employment to population ratios after the Second World War and its current apex. The baby boomer phenomenon produced a big economic growth bulge, which will inevitably vanish as the boomers age.

3.5 Volunteering

This chapter has thus far focused on conventional measures of the labour force. While falling outside standard measures of GDP and the labour force, it is also important to consider the contribution made by unpaid labour. This section briefly examines the implications of an ageing population on volunteering.

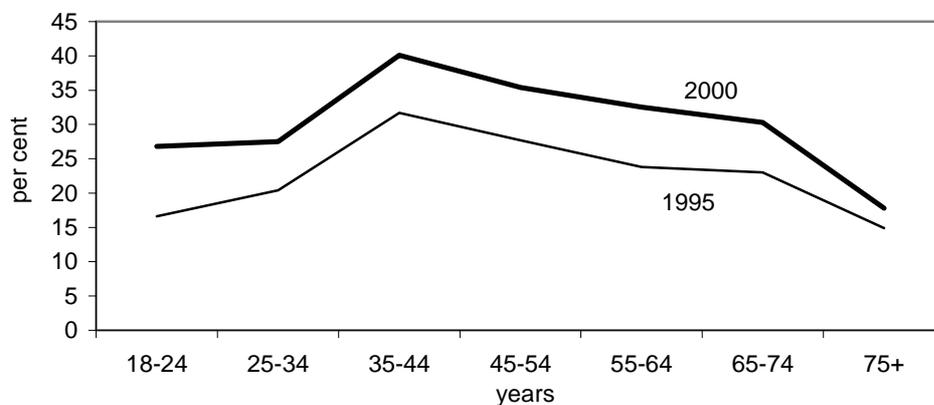
Volunteering and age

In 2000, nearly one third of Australians aged 18 years and over was engaged in voluntary work through an organisation, contributing over 700 million hours of unpaid work (ABS 2000, Cat. 4441.0).

Participation rates for volunteering in organisations increase up to 35 to 44 years and then progressively decrease with age (figure 3.25). However, actual time spent volunteering tends to increase with age, whether the definition of volunteering includes only that undertaken through organisations or includes informal volunteering (such as caring for a sick neighbour).

Figure 3.25 **Voluntary work through an organisation**

Participation rates by age group, 1995 and 2000



Data source: Data source: ABS 2000, Voluntary Work, Cat. 4441.0.

Age also influences the type of voluntary work undertaken. People aged over 55 years volunteer predominantly in the areas of community, welfare and religion, 35 to 44 year olds volunteer mainly in education, training and youth development and younger volunteers participate principally in sport and recreation.

Projections

Data on participation rates in volunteering were applied to demographic projections to estimate the number of volunteers by age and gender over the next 40 years. Given data limitations, only volunteering through organisations was modelled. It is likely that this will understate the effect of demographic change on volunteering because older people are particularly important providers of caring services to other adults.

The Commission projects that the number of volunteers over time will increase from 4.7 million in 2002-03 to almost 6.5 million in 2044-45, an increase of 36 per cent. In the absence of population ageing, the number of volunteers would be lower, growing to about 6.2 million in 2044-45. Accordingly, changes in the age structure of the population increase volunteer numbers by around 5 per cent. The principal reason for the growth in volunteering is the decreasing population share of the young, who have low volunteering participation rates.

The likely growth of volunteers was seen as a positive feature of ageing by several participants in this study. For example, Australians for an Ecologically Sustainable Population (sub. 7) noted that this aspect of ageing tended to be overlooked in some negative portrayals of ageing. The Victorian Government (sub. 29, p. 51) and the Australasian Centre on Ageing (sub. 9) considered that, as well as strengthening communities, volunteers significantly contributed to the economy. Several participants recognised the role of volunteers in informal care (for example, the Tasmanian Government, sub. 40, p. 30). (Carers are further examined in chapter 7.)

While ageing generally increases volunteering, some participants are concerned that shortfalls in volunteering may occur in some areas, such as emergency services (Victorian Government sub. 29, p. 99) and sport and recreation, education, training and youth development (Volunteering Australia sub. 28, p. 6).¹⁵

This is consistent with the Commission's projections, which suggest that there will be shifts in the relative importance of different types of volunteering activity. The growth in the number of volunteers is expected to be higher in community and welfare areas, but significantly lower in sport, recreation and education.

¹⁵ The Securities Institute (sub. 22) noted another risk. It considered that moves to increase the labour force engagement of older people, while increasing formal labour supply, might come at the expense of a smaller pool of volunteers and unpaid workers.

4 Productivity and ageing

Key points

- Population ageing can affect aggregate productivity because average productivity levels change with age.
 - Both cross-sectional wage data and empirical estimates suggest that average productivity levels initially increase with age before declining after middle age. Consequently, changes in the age composition of the labour force may affect aggregate productivity.
 - Experimental estimates suggest a mostly negative, but negligible, effect over the 40 year projection period. This small effect arises because the bulk of workers remain in the most productive age range. Moreover, the beneficial productivity effects of a smaller proportion of young workers largely offsets the effects of a greater proportion of older workers.
- Demographic change is potentially linked to investment and technical progress — two of the major sources of labour productivity gain. Such effects are expected to be small:
 - Global ageing will change global demand for and supply of savings and thereby affect interest rates and capital flows. Specific effects on growth in capital deepening in Australia are not clear from existing empirical studies. Moreover, growth in capital deepening in Australia has been remarkably stable over the last 40 years, against a backdrop of significantly changing global investment and demographic conditions.
 - Innovation, entrepreneurship and incentives for technical progress may be linked to demographic change, but there is little persuasive evidence that there will be notable effects in Australia.
- Annual labour productivity growth has averaged about 1.75 per cent over the last 30 years. To the extent that population ageing, itself, is likely to have little effect on aggregate productivity growth, this rate provides a useful starting point for modelling the long term effects of population aging. The Commission has also simulated the effects of average growth rates of 1.45 and 2.05 per cent.

4.1 Introduction

Rising labour productivity has been the main factor behind aggregate economic growth over the past fifty years. As the labour supply will contract relative to Australia's population over the next half century, the significance of labour productivity growth will be further accentuated.

As explained in chapter 3, modelling the budgetary and economic growth impacts of an ageing population requires an estimate of future labour productivity growth.¹ This chapter explains the assumptions used by the Commission.

Labour productivity growth is the result of a complex interaction of many factors. While the historical pattern of year-on-year productivity growth can be quite volatile, long run projections need only pick up the anticipated trend. Consequently, the Commission's baseline approach (like that of the Intergenerational Report and the Access Economics' model of State and Territory budgets) assumes a constant average annual labour productivity growth rate over the projection period, rather than elaborate, but potentially spuriously detailed, annual projections. Given some uncertainty about the long term trend, the Commission has also considered a range of averages more or less favourable than the baseline assumption.

A particular focus for this study is whether labour productivity growth may be impeded or enhanced by population ageing. This issue warrants serious consideration because some research suggests significant effects of ageing on productivity. For example, Lindh and Malmberg (1999) estimate that age effects alone may have reduced average productivity growth rates from 1990 to 1995 by an average of 0.2 percentage points per year, for a sample of 23 OECD countries.²

There are several mechanisms by which population ageing could affect labour productivity. At some age, the physical and mental effects of ageing are likely to offset the benefits of experience, so that productivity levels of older people may be less than that of middle aged people. Depending on when such an effect manifests itself, this implies that the changes in the age structure of the workforce could affect aggregate productivity growth. On average, shifts towards very young or very old workforce age structures would be associated with reduced productivity growth. Of

¹ Growth in labour productivity (real output per worker hour) can be decomposed into the growth in the capital-labour ratio (capital deepening) and growth in multi-factor productivity (which is the 'residual' growth in value added not directly attributable to the measured growth in the quantity and quality of labour and capital inputs).

² Similar studies of the role of the age structure in productivity or economic growth include Malmberg (1994), Sarel (1995), Persson (1999), Nahuis et al. (2000), Feyrer (2002), Andersson (2001), and Navaneetham (2002).

course, the relative productivity of different age groups may not be stable over time, because the characteristics of the groups may change (such as better education for older cohorts).

Population ageing may also affect productivity growth rates through macroeconomic effects on savings, investment and innovation. For example, to the extent that older people draw down savings to fund their retirement, there would be reduced scope for investment and capital deepening — one of the major sources of labour productivity growth.

Another important consideration for this study — which examines the implications of ageing for all Australian jurisdictions — is whether there may be long term convergence or divergence in State and Territory labour productivity growth rates.

The chapter is organised as follows:

- Section 4.2 summarises the labour productivity assumptions used in some recent Australian studies of the economic effects of demographic change;
- Section 4.3 examines past productivity growth rates and what the future may hold;
- Section 4.4 considers whether there may be differences in the level of productivity of workers across age cohorts;
- Section 4.5 examines the implications of demographic change for growth in capital deepening and technical progress; and
- Section 4.6 considers whether there may be convergence or divergence in productivity growth between the State and Territories; and

4.2 Labour productivity assumptions used in previous studies

When comparing studies of the estimated long term impact of demographic change on economic growth and government budgets, it is important to be aware that small differences in assumptions about future productivity growth rates, compounded over many years, can greatly alter projected outcomes. These differences in assumed growth rates can arise from two sources:

- different views about the effects of ageing on productivity; and
- different views about economy-wide productivity changes that are not linked to ageing.

Different views about ageing and productivity

In fact, most Australian studies have not included explicit links between ageing and productivity at all. The most common base case assumption is that all workers have the same productivity level (value added per hour worked), which grows at the same average annual rate. This is the same as assuming a fixed rate of productivity growth for the economy as a whole. This approach was used in the Intergenerational Report, the Access Economics model used by State Governments, the base cases of Day and Dowrick (2004) and a recent Australian Government Treasury paper (Gruen and Garbutt 2003). It is also used as the base case in the Commission's projections in this study.

An alternative approach is to assume that average productivity levels differ across demographic groups, so that a change in the age composition of the workforce affects overall productivity. This approach was used, for example, in one scenario by Gruen and Garbutt (2003). They assumed that, in the future, the average level of productivity of workers of different age and gender would be proportional to recent average hourly wages paid to workers in these groups. Workforce ageing produced a slight difference in overall productivity compared with their baseline scenario.

This approach can be further extended by taking into account any cohort effects. For example, average education levels will rise in the old as the current, well-educated young begin to age. In one of their modelling scenarios, Day and Dowrick (2004) explored these cohort effects. They estimated that by 2041 the average years of education across age groups will have risen by 1.2 years (from 13.0 presently) and this would raise annual labour productivity growth by an *additional* 0.22 percentage points.³

Different views about general economy-wide productivity trends

The long run productivity assumptions used in other studies diverge, not because of different views about the possible effects of ageing, but rather due to different judgements about the relevance of past growth rates and future key drivers.

The IGR assumed future labour productivity growth (real output per hour worked) of 1.75 per cent per year on the basis of the past 30 year average for the economy as a whole. It also considered a high growth scenario of 2.0 per cent per year (about the average for the 1990s) and a low growth scenario of 1.2 per cent per year (about the average for the 1980s).

³ This consists of a positive effect of 0.9 percentage points, due to the higher *level* of education, less 0.68 percentage points, because the *rate* of increase in education levels will be slower than in the past.

Day and Dowrick (2004) assumed a labour productivity growth rate of 2.0 per cent per year for their baseline scenario. This corresponded to the average for the market sector (not the economy as a whole) since 1978-79. They argue that this is a conservative assumption, because education levels are forecast to increase and this is expected to increase the rate of labour productivity growth; their optimistic scenario assumes a rate of 2.2 per cent per year. They also considered a pessimistic scenario of 1.5 per cent per year growth in labour productivity, which they say may arise if, for example, institutional or policy settings discouraged investment, or because slower labour force growth resulted in less benefit (than the past) from scale economies, or because an ageing workforce may be less dynamic.

Gruen and Garbutt (2003) assumed a long run average annual growth rate of 1.75 per cent, in line with the Intergenerational Report. However, they gave three reasons why growth might be faster. First, the world's technological frontier may expand faster than in the past because of increasing applications of information and communications technology (ICT), with spillover benefits for Australia. Second, they cited empirical evidence that finds a strong and stable statistical correlation between slower labour force growth and faster labour productivity growth. Third, like Day and Dowrick, they argued that the expected rise in the average level of educational attainment should increase labour productivity growth, though they did not posit an estimate. Notwithstanding the possible contributions of these factors to stronger productivity growth, Gruen and Garbutt noted that it may be a big step to assume, for now, sustained long term growth higher than 1.75 per cent without a continuing policy focus on economic reform.⁴

In submissions to this study, State and Territory governments adopted the following assumptions in their analyses:

- The Victorian government (sub. 29, p.80) used a base case of 1.75 per cent and an alternative assumption of 2.0 per cent.
- The Queensland government (sub. 17, p.32) used an annual labour productivity growth rate of 2 per cent for the 'medium' scenario — in line with Queensland's recent experience — and 1.75 per cent and 2.5 per cent for the 'low' and 'high' scenarios, respectively.
- The South Australian government (sub. 23, p.17) used a rate of 1.75 per cent.
- The ACT government (sub. 21, p.18) used a rate of 2 per cent per year, but noted that it was reasonable to assume that the productivity gains of the past

⁴ The WA government (sub. 39, p.29) commented that as there was some risk that recent strong productivity growth may not continue, policy settings in Australia must be supportive of continued growth.

decade will not be maintained over the next 40 years, and so a rate more in keeping with historical levels (1.6 per cent) was also examined.

- The Tasmanian government (sub. 40) started with a rate of 1.75 per cent and compared it with a ‘low’ rate of 1.25 per cent.
- The WA government (sub. 39) used a base rate of 1.75 per cent and 1.25 and 2.25 for sensitivity tests.

4.3 Past and future productivity growth

As these studies recognize, Australia’s past productivity record obviously provides some guide to the future.

A methodological caveat

One obstacle to interpreting the past record is that the output of non-marketed services (such as certain public health) is measured by the value of labour inputs. This imposes a zero productivity growth rate on these sectors, and is therefore likely to underestimate overall productivity growth in the economy.⁵ Accordingly, Day and Dowrick (2004) argue that labour productivity for the market sector is a more reliable measure than for the whole economy, and use past trends in market sector productivity in their projections. However, when forecasting the economic growth effects of ageing, Day and Dowrick assume that the market sector productivity growth rate applies to the whole economy. This raises several issues:

- It assumes that the unmeasured productivity growth in the non-market sector is the same as that of the market sector. This is unlikely to be true, although it is probably better than assuming zero growth (as is implicit in the orthodox approach).
- A more problematic issue is one of consistency. Projecting the implications of ageing on tax revenues and government spending often relies on assuming the continuation of past trends, expressed as a ratio to the existing National Accounts definition of GDP. Such historical ratios could not be used if future GDP was measured by taking into account non-zero productivity in the non-market sector. For example, such an approach would produce upwardly biased tax revenue projections.

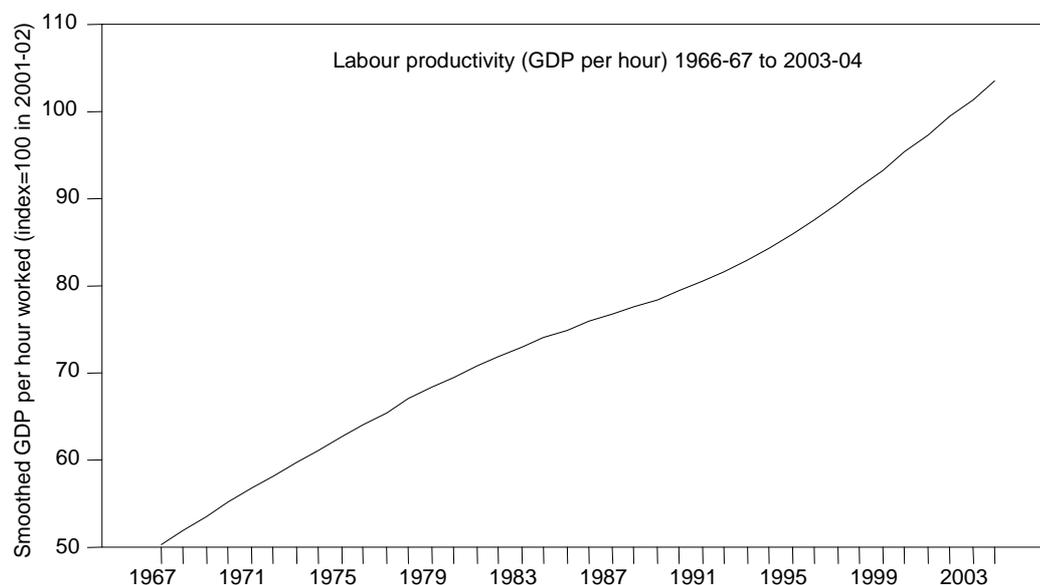
To avoid these consistency problems, this report has used the existing national accounts approach to the measurement of GDP — with its underlying assumptions — but also looked at the implications of different productivity growth projections.

⁵ The National Accounts measure of labour productivity for the whole economy for the last 25 years averaged about 0.5 per cent per year less than for the market sector.

What does history tell us?

The last forty year span of labour productivity (based on GDP) reveals several shifts in long run trends (figure 4.1), with a slowdown evident in the 1980s and an acceleration during the 1990s (hence the ‘miracle’ decade). Based on cyclically adjusted data (table 4.1), the long-term growth rate from 1966-67 to 2003-04 is 1.76 per cent per annum — very close to the Treasury long-run value of 1.75 per cent used in the IGR. This rate is 0.3 percentage points below the vigorous productivity growth apparent over the period from 1992-93 to 2003-04, but nearly 0.5 percentage points above the sluggish performance from 1985-86 to 1992-93, when growth was 1.26 per cent per year.⁶

Figure 4.1 Labour productivity accelerated in the 1990s
GDP per employee hour worked, 1966-67 to 2003-04^a



^a The labour productivity series has been smoothed by a Hodrick-Prescott filter, so that growth rates can be calculated for any period without being affected by cyclical variations.

Data source: Commission calculations, ABS National Accounts (Cat. No. 5204.0).

⁶ These results are for economy-wide output per hour worked, and should not be confused with figures for the market sector (which comprises about two-thirds of total output).

Table 4.1 Labour productivity growth rates, 1966-67 to 2003-04
Market and non-market sector, Australia^a

<i>Period</i>	<i>Compound growth rate (unsmoothed series)</i>	<i>Trend growth rate (unsmoothed series)</i>	<i>Trend growth rate (smoothed series)</i>
	%	%	%
<i>Peak to peak</i>			
1969-70 to 1978-79	2.23	2.32	2.38
1978-79 to 1985-86	1.62	1.66	1.49
1985-86 to 1992-93	1.09	1.02	1.26
1992-93 to 1998-99	2.20	2.16	1.97
1998-99 to 2003-04	1.89	1.90	2.07
1992-93 to 2003-04	2.06	2.11	2.04
1969-70 to 1992-93	1.70	1.67	1.70
1969-70 to 2003-04	1.81	1.68	1.69
<i>Entire time period (non-peaks)</i>			
1966-67 to 2003-04	..	..	1.76

^a In order to avoid biases associated with the influences of the business cycle, peaks in GDP per hour worked were identified by smoothing the data using a Hodrick-Prescott (HP) filter and forming the ratio of the smoothed to the unsmoothed data. However, it should be emphasised that it is too early to determine whether the end year (2003-04) will be the peak in the latest cycle. It should also be noted that these peaks are not the same as those identified by the ABS using market sector data (and a slightly different smoothing technique). Growth rates were then calculated on the unsmoothed data across the identified peaks (the first two columns). The third column represents trend growth rates calculated across various periods using the smoothed data. This method can also — with caution — be applied to non-peak to non-peak periods, since the influence of the business cycle is significantly reduced. This enables an assessment of an even longer run productivity growth rate — as shown in the last row of the table. The trend growth rates for both columns 2 and 3 were calculated by regressing the natural log of the relevant productivity measure against a time trend using OLS.

Source: ABS National Accounts (Cat. No. 5204.0 and 5206.0).

In deciding on a range of likely future outcomes, the past acts as a check. For example, it would be difficult to justify averages for the next 40 years lower or higher than the extremes of the last 40 years. The Commission has assumed a range of 1.45 to 2.05 per cent as being useful for this study. The upper bound matches the strong productivity growth of the 1990s, while the lower bound provides approximate symmetry around the long term average of around 1.75 per cent.⁷ Box 4.1 sets out some of the circumstances that may be associated with higher or lower productivity outcomes.

The baseline productivity assumption should be viewed as a useful starting point for this exercise, matching that of the IGR and consistent with the long run historical trend. It should not be seen as the Commission's *forecast* of Australia's future productivity growth.

⁷ A complementary approach is to work backwards and calculate the 'minimum' productivity growth rate in order that the *level* of real output per capita is maintained, despite the impacts of ageing. For example, in the case of New Zealand, Guest et al. (2003) estimate a labour productivity growth rate of 0.27 per cent would suffice.

Box 4.1 The scope for sustaining recent productivity growth

The strong, sustained Australian productivity performance since the early 1990s has prompted examination of the factors that lay behind it and the scope for maintaining it. Four aspects are often highlighted. First, there are likely to be further gains from the diffusion of information and communication technologies (ICTs). ICTs are a source of significant capital deepening effects. For example, the innovative use of ICTs played a key role in the uplift in productivity in the wholesale trade sector, which was a major contributor to Australia's productivity surge. As a general purpose technology, there should be further scope for ongoing user adaptation. In addition, ICTs may enhance the ability for older workers to remain in the workforce via a reduction in physical demands and enhancement of flexibility in job change).

Second, Australia appears to be below the levels of productivity achieved in some other OECD countries. For example, in terms of GDP per hour worked, in 2002 Australia was at 83 per cent of the US level, up from 76 per cent in 1990, but only slightly above the 1950 relativity. Notwithstanding qualifications about international productivity measurement and the feasibility of a relatively small economy to achieve US benchmarks, this suggests the scope for productivity catch-up.

Third, forecast increases in education levels (human capital) are expected to be beneficial to productivity growth. Increases in education levels should directly increase the level of productivity of workers. There may also be implications for the rate of capital accumulation, technology absorption and technology advancement, labour supply participation and fertility. However, at some point, the returns to education may begin to diminish.

Fourth, as identified in the recent review of National Competition Policy (PC 2004b), Australian Governments have scope to implement further reforms that could stimulate productivity.

While the above factors may strengthen productivity growth, there may be some challenges facing Australia that could undermine productivity growth. For example, salinity, further droughts and climate change could dampen agricultural performance, with sizeable effects on other sectors. Externally, global ageing is expected to slow growth in output in many advanced economies, and may have damaging impacts on global entrepreneurship and innovation. This could reduce demand for Australian goods and services (with possible scale effects) and slow the growth in the value of foreign technological spillovers that have been an important source of past productivity growth.

4.4 Relative productivity of current workers

A common view is that an individual's productivity rises until some middle age peak, after which it begins to decline. The basis for this view is largely two-fold.

First, the physical and cognitive effects of ageing mean that the average 70 year old is less capable at certain tasks than when they were 35 years old. Second, human capital theory predicts that productivity increases with experience, at least, in the early years, while education and training rates diminish after some middle age peak, such that skills depreciate.

A counter view is that there is no decline in productivity in later years, nor are older workers any less productive than younger contemporaries (box 4.1). The claim is that any decrements in physical and cognitive capacities are relatively small during working years and, even when they do occur, do not materially undermine performance in most tasks. In addition, it is sometimes claimed that certain attributes of older workers, such as greater experience, less absenteeism and lower job turnover, make older workers of comparable (or greater) value to employers than younger workers.

Box 4.2 The positive view — age does not affect productivity

The research ... indicates that there is strong support for a finding that an ageing workforce is not necessarily linked to lower productivity. Improving health and higher levels of educational attainment for older workers are associated with the maintenance or improvement of productivity. Certainly there is no overwhelming support for suggesting workers' productivity declines with age. (DEWR 2003, p.5)

'The overall finding from more than 100 research investigations is that there is no significant difference between the job performance of older and younger workers.' (Warr 1994 p.309)

'There are only small declines in reaction time and physical strength and almost all research into the productivity of older workers has shown it to compare quite favourably with that of other workers from other age groups ... precisely because of seniority.' (HREOC 1999, p.16)

'The bulk of the evidence (Reid (1989), McNaught & Henderson (1990), Encel (1992), Salthouse (1994) and Waldman and Avalio (1986) suggest productivity declines little with age, and that in many applications (notably work involving intellectual skills) productivity may rise with age.' (Access Economics 2001)

'... all the research evidence suggests older workers are just as productive, trustworthy, stable and conscientious and as adaptable to change as younger workers.' (NSW Anti-discrimination Board 2004)

'A number of factors have contributed to the decline in labour market participation by those aged 55 and over. They include ... discriminatory attitudes towards older workers, based largely on myths about their supposed inability to be efficient and productive workers.' (South Australian government, sub. 23, Background Paper on Employment and Older people, p.4)

In light of these divergent views, it is important to obtain an objective assessment of ageing impacts on productivity. Measuring the relative productivity of current workers of different age is challenging. Three broad approaches have been tried:

- examining the age profile of worker characteristics that may be related to productivity — for example, education, training, job turnover and absenteeism;
- using the economy-wide cross sectional pattern of earnings across age groups as a guide to relative productivity; and
- econometrically estimating the relationship between age of workers and their productivity, using large samples of diverse workers — in one case, covering almost three million concurrent workers.

Worker characteristics and age

A popular approach to assessing the relationship between productivity and age is to examine, one at a time, the age pattern of certain worker characteristics that may be expected to have a bearing on individuals' productivity. The Commission has examined several characteristics in some detail.

The gerontological evidence reveals some decline in capabilities

Disciplines such as industrial gerontology and applied psychology have intensively examined changes with age in physical and cognitive capacities (including traits such as reasoning speed, numerical and verbal capabilities, problem solving and memory recall). The general picture that emerges is that some capacities decline from some stage in adulthood (Skirbeck 2003).

It is less clear what effect this has on work performance:

- It is likely that the effects depend upon the nature of the task and the role of experience in compensating for, what in practice, are slow and subtle changes in capacities. Warr (1994), for example, concludes that experience can compensate in some tasks, but not others.
- The impact on economy-wide productivity of biological ageing may also be muted if workers, when confronted with decline in certain biological capacities, leave the workforce or change to jobs in which those capacities are not important.⁸

⁸ Both the Queensland government (sub. 17, p. 27) and Victorian government (sub. 29, p.42) also come to the view that the effects of biological ageing and experience tend to work in opposite directions.

-
- There is also some evidence suggesting that targeted training programs may soften or halt age-related decline (Skirbeck 2003, p.5).

Older workers tend to be less educated and less trained

Historically, the average education attainment level of older workers has been much lower than for younger contemporaries. Educational differences play a key role in job and wage differences between older and younger workers and would be expected to at least partly explain statistical differences in average worker productivity across age groups.

The incidence of training is significantly lower among older workers (Wooden et al. 2001). This could reflect the benefits and costs to employers of training older workers. For example, the period over which an employer can obtain a return from training is lower for workers close to retirement. However, some commentators question whether employers misperceive the benefits and costs of training older workers.

Two skills which may be important for productivity in a modern society, literacy and computer skills, are lower among older workers, even after accounting for education differences between age groups (Miller and Mulvey 1997; OECD 1998).

Staying and moving around – patterns of worker mobility

Long service with an organisation (tenure) — commonly seen as an indicator of certain worker qualities — is much more prevalent among older workers. However, this is partly an artefact because, clearly, younger workers under, say 40 years of age, have had less scope for 20 years of service. Nonetheless, longer experience with a firm increases the likelihood of better performance, *if* the job entails firm-specific skills and knowledge.⁹ However, some empirical evidence suggests that, on average, earnings and productivity increase little, if at all, beyond about 10 years tenure.

Job turnover is much lower among older workers. From an employer's perspective, low turnover should reduce hiring and training costs. On the other hand, from an economy-wide perspective, low turnover may impede the diffusion of knowledge and the efficient matching of employers and employees (Jovanovic 1979).

⁹ The South Australian government (sub. 23, Background paper on Employment and Older People, p.5) expressed concern about a huge potential loss of corporate memory in the public sector over the next 10 years — about 18 per cent of the current workforce is expected to retire by 2011.

Ilmukannus et al. (1999) find empirical support for a positive relationship between firm productivity and turnover in Finland manufacturing.

Older workers are probably less healthy

The probability of poorer health and disability clearly increases with age among the *population*. There is less comprehensive evidence on the prevalence of poorer health and disability among different age groups in the *workforce*, but most of what is available suggests ill-health rises with age.

That said, it is likely that differences in health status by age in the workforce are less marked than differences between age groups in the population generally, because people with particularly poor health are more likely to be unemployed or to exit the labour force.

Somewhat paradoxically, surveys reveal lower than average sick leave *incidence* rates for the oldest workers. To some extent, this reflects greater use of sick leave for family reasons by younger workers. In any case, sick leave incidence is only one part of the health productivity story, as it does not capture the impacts of chronic conditions on performance while at work. Nor does it consider the duration of sick leave, which may also vary by age. The total duration of leave on workers' compensation, as a proportion of total hours worked by age cohorts, was highest for workers over 50 years.¹⁰

But overall absences from work are lower for the old

Surveys find that the incidence rate for all forms of absences (approved and unapproved leave) is slightly lower among older workers. However, the pattern, duration and forewarning of absences, and the nature of the work (such as team-based versus individual work), are probably also important in determining whether such absences have significant productivity effects. The age dimension of these aspects is unknown.

Ageing will add to team diversity

Increasingly, the view is put that a more age-diverse workforce enhances business performance (and productivity). For instance:

- age diversity is said to yield greater team problem-solving abilities; and

¹⁰ New cases accepted in 2000-01 involving at least one weeks absence.

-
- businesses with older workers are predicted to more likely attract, and be better able to, service older customers, who will become increasingly representative in an ageing society.¹¹

However, the effects on firm performance of age-diverse teams are still unclear. Gibbons and Waldman (1999) discuss the large sociology literature on this issue. Moreover, two empirical economic studies did not find a benefit from customer age matching or age diverse teams.¹²

The characteristics of the old are changing

Some of the characteristics of older workers change in a way that may affects their average productivity and overall productivity growth rates:

- future cohorts of the old will have educational levels much closer to those of younger cohorts, reducing productivity disparities by age;
- the health profile of older workers may improve due to less exposure to, or better treatment of, illnesses (reflecting changes in the occupational mix of jobs, new health technologies and improved OH&S practices), also raising average productivity levels; and
- average labour participation rates at older ages are likely to rise (chapter 3). While there may well be large advantages in such increases, such old workers are likely to have lower skills and poorer health status than old workers already in employment — depressing average labour productivity levels.¹³ Of course, there is still a gain to output from their involvement, but it should not be

¹¹ Access Economics (2001, p.9) states ‘the productivity of employees can be turbo-charged by the advantages of matching [the age of] an organisations customer base’. It identifies examples such as hardware and music shops where customer demographics are matched by staffing.

¹² Leonard and Levine (2003) used a sample from 800 retail stores employing over 70 000 individuals. They found that race and gender diversity did not predict sales or sales growth, but that age diversity predicted low sales. There was little benefit to employers from ‘matching’ except when the customers do not speak English. Hamilton et al. (2004) studied the productivity of workers in a garment plant that had shifted from individual piece rate payments to team piece rate payment. They found that teams with greater diversity in age were less productive, while teams with greater diversity in worker abilities were more productive, as were teams composed of one ethnicity (Hispanic in this case).

¹³ Bryant et al. (2004) assume differences in the productivity of ‘new’ and existing workers, in estimating the GDP effect of higher participation rates in New Zealand, on the basis that survey evidence shows that people who are not currently employed differ systematically from people who are currently employed in ways that affect hours and productivity — for example, those currently not employed are more likely to have young children, and lower education. They use estimates of average wages for people not in employment (by age and sex) which are about 65 to 75 per cent of the average for those currently employed.

assumed to be as great as other older workers more strongly attached to the labour market.

On the whole, it is likely that the gains from the first two effects will dominate that of the third. Consequently, average disparities in productivity of older and middle aged workers may decline over time.

Summing up

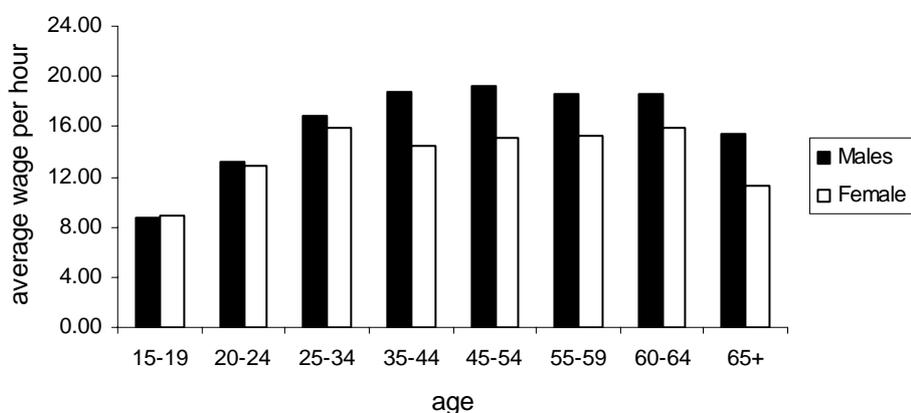
The productivity of *individual* workers is determined by a host of characteristics — for example, education and skills, experience, motivation, inherent intellectual and physical capabilities, their team work and personality. Some of the worker characteristics most important for productivity performance — such as cognitive and physical functioning — decline after some age. That age varies enormously by the individual, and, in many cases, will occur largely after retirement. There are offsetting advantages with age too, and compensation strategies that are likely to ameliorate ageing effects. Nevertheless, the evidence on changes in worker characteristics and age is consistent with *some* decline in *average* labour productivity levels after middle age. (As shown below, this finding is reinforced by data on productivity and wages.) The disparity between older and middle age workers may reduce in the future.

The emphases on ‘some’ and ‘average’ are important. First, it is far from clear whether the productivity effects are large (as discussed below). Second, while averages matter for an assessment of the effect of ageing on economy-wide productivity, they are irrelevant to judgments about the suitability of older people for jobs. Age is a very poor predictor of ability or productivity. Many older people will have superior performance to younger people.

Cross sectional earnings as a proxy for workers’ relative productivity

As noted above, Gruen and Garbutt (2003) used the recent economy-wide, cross sectional age pattern of wages per hour as an estimate of the relative productivity across age and gender cohorts (figure 4.2). Several submissions also suggested this as a possible approach (including Queensland Government, sub. 17, p. 28 and Nigel Fitzpatrick, sub. 31).

Figure 4.2 Average wages by age and gender, 1999-2000



Data source: Gruen and Garbutt (2003), figure 7.

It is important to dispel any possible misunderstandings about the productivity interpretations of this wage pattern. It does not measure a typical individual's lifetime pattern of earnings: indeed, longitudinal data typically shows that individual's (hourly) earnings largely rise with age. Rather it reveals that among current workers, the youngest and oldest are on average in lower paid jobs, whatever the reasons.

It could reasonably be expected that payments to labour broadly reflect the scarcity value to society of employing labour in those activities — and so figure 4.2 may provide an adequate proxy for present day relative productivity differences for the current age structure (with their given other worker characteristics). The use of the wages profile as a proxy for productivity differences between age groups also has the attraction of providing evidence encompassing the entire paid employment sector.

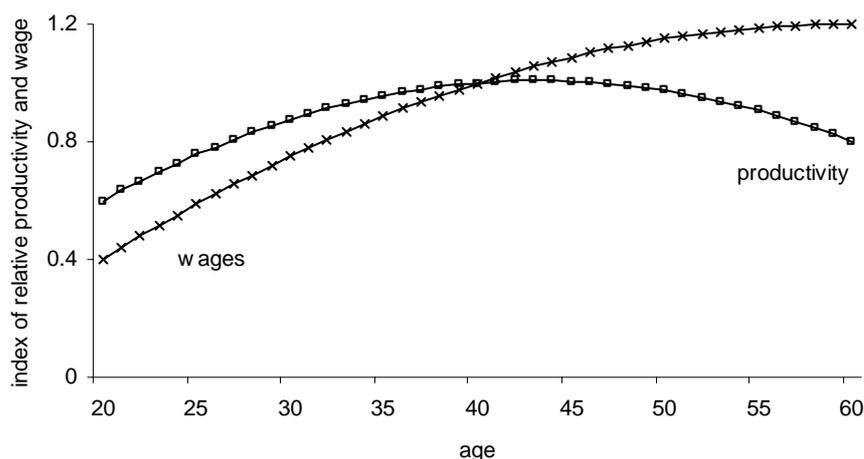
However, actual productivity in the future may not exactly match this wage profile for two reasons:

- relative wages of older workers may be higher in the future, reflecting changes in education profiles;¹⁴ and
- there is evidence (using large sample studies) that, on average, younger workers tend to be paid less than their marginal productivity and older workers more.¹⁵

¹⁴ Though, against this, Borland and Wilkins (1996) found that the hump shaped age-earnings profile for full time male employees (in their main job) changed very little between 1975 and 1994, despite changes over the period in educational attainment rates across age groups. But changes in other factors may make it hard to identify an education effect.

Accordingly, the wages profile above may underestimate the productivity decline associated with age and overestimate the productivity gain made as young people gain experience (figure 4.3).

Figure 4.3 Illustration of empirical cross section productivity-wage patterns



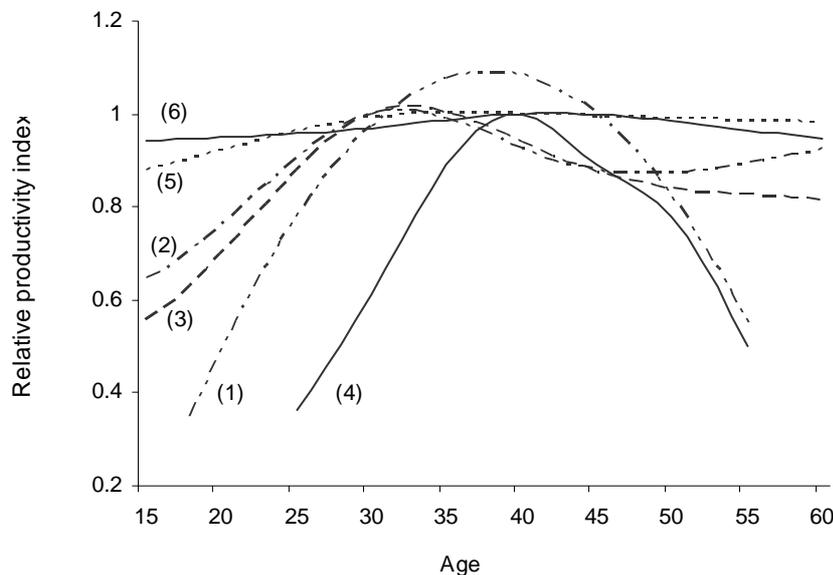
Statistical estimates of differences in worker productivity between age groups

The age distribution of wages reflects factors like education, occupation and industry, as well as those factors directly associated with the biological impacts of ageing. In order to just consider these direct effects, several studies of worker productivity control for measurable differences between age groups in their underlying characteristics (such as education, firm tenure and plant vintage).

The results (figure 4.4) from these large scale cross-sectional studies point to a robust inverted U-shape pattern between productivity and age. The estimated peak occurs around 35 to 40 years. The average rate of decline after the peak, until age 55, ranges from about 0.1 to 3 per cent per year. In most cases, the oldest workers were still more productive than the youngest workers.

¹⁵ For example, Medoff and Abraham (1980), Kotlikoff and Gokhale (1992), Haegeland and Klette (1999), Crepon et al. (2002), Ilmakunnas and Maliranta (2002), Ilmakunnas et al. (2004). For a survey of theories of divergence in wages and productivity, at a point in time, see Hutchens (1989). Such theories include those based on firm specific human capital and incentive wages.

Figure 4.4 Estimated relative productivity across age groups



a The vertical axis compares the average productivity of groups of workers of different age in index form. The most productive age group has a productivity index of one. All other age groups have lower indices. For example an age group with an index of 0.8 is 20 per cent less productive than the peak age group. **b** The studies did not estimate a continuous function, as above, rather there were discrete point estimates for broad age groups (for example 25 to 34 years). For the purposes of graphical illustration the Commission used a spline function to fit a smooth curve to the discrete point estimates of each study. For example, if the productivity index estimate was 1.0 for an age group ranging from 15 to 24 years and 1.5 for the age group 25 to 34 years then the midpoint of the age group was taken as representative and a smooth, continuous curve fitted, subject to the constraint that it passed through the given estimates at the midpoint age.

Data source: (series 1) Haegeland and Klette (1999), table 5 (manufacturing). (series 2) Crepon et al. (2002), table 4 (manufacturing). (series 3) Crepon et al. (2002), table 4 (non-manufacturing). (series 4) Ilmakunnas et al (1999), figure 2, profile 5 (manufacturing). (series 5) Ilmakunnas and Marilantha (2002), table 2, model A-G (manufacturing). (series 6) Ilmakunnas and Marilantha (2002), table 3, model E (business sector).

The variability in the estimated age patterns makes it difficult to choose a representative pattern for modelling purposes.¹⁶ However, a consistent finding is that, after controlling for *measurable* differences in worker characteristics, productivity levels peak at mid career.

The actual disparity in productivity between older people and other age groups will be greater than those shown in figure 4.4. This is because older workers have a

¹⁶ Note that differences in the estimated age patterns in figure 4.4 could be due to genuine differences in relative productivity patterns of workers between the samples. It could also be due to differences between the models. For example, education is not measured the same in each study – Haegeland and Klette measure years of schooling, divided into four groups, and Ilmakunnas while Maliranta identify eight groups of education attainment. Notwithstanding, the same general inverted U-shape pattern emerges.

greater tendency to have characteristics, such as lower education, that are themselves associated with lower productivity levels.

Are there differences in the productivity-age pattern across sectors?

From an economy-wide modelling perspective it is also relevant whether the productivity-age pattern is the same across all sectors. Only two of the studies illustrated in figure 4.4 compared samples of manufacturing and non-manufacturing workers and the results provide no basis for assuming significant sectoral differences in the age pattern of productivity of workers.¹⁷

Is the productivity-age pattern different for males and females?

Finally, since chapter 3 estimates future labour participation rates by gender as well as age we should consider whether the relative productivity-age patterns is the same within the male and female sub-groups. The broad evidence suggests that qualitatively similar profiles apply.¹⁸

Summing up on ageing and worker productivity

Although the evidence suggests there are differences in average productivity levels across age cohorts and genders, there are two arguments in favour of ignoring these in the base case projections:

- experimental estimates that take account of variations in productivity levels between age groups did not make a big difference to aggregate projections, a result confirmed in analysis by the Queensland Government (sub. 17, p. 28).¹⁹ The main reason for this is that age distribution of employment shifts away from

¹⁷ It is incorrect to compare the ‘flattish’ profile for the business sector (line 6 in figure 4.4) with the highly curved profiles for manufacturing (such as lines 1 and 4) because they are different studies with different models. A more valid approach is to compare manufacturing and non-manufacturing samples of workers from the same country, for the same period using the same model and estimation technique.

¹⁸ For example, Crepon et al. (2002) estimate the age-productivity differential between the peak and oldest workers, in manufacturing, to range from 5 to 17 per cent for males and from 2 to 14 per cent for females. In non-manufacturing the age differential ranges from 5 to 24 per cent for males and 14 to 27 per cent for females.

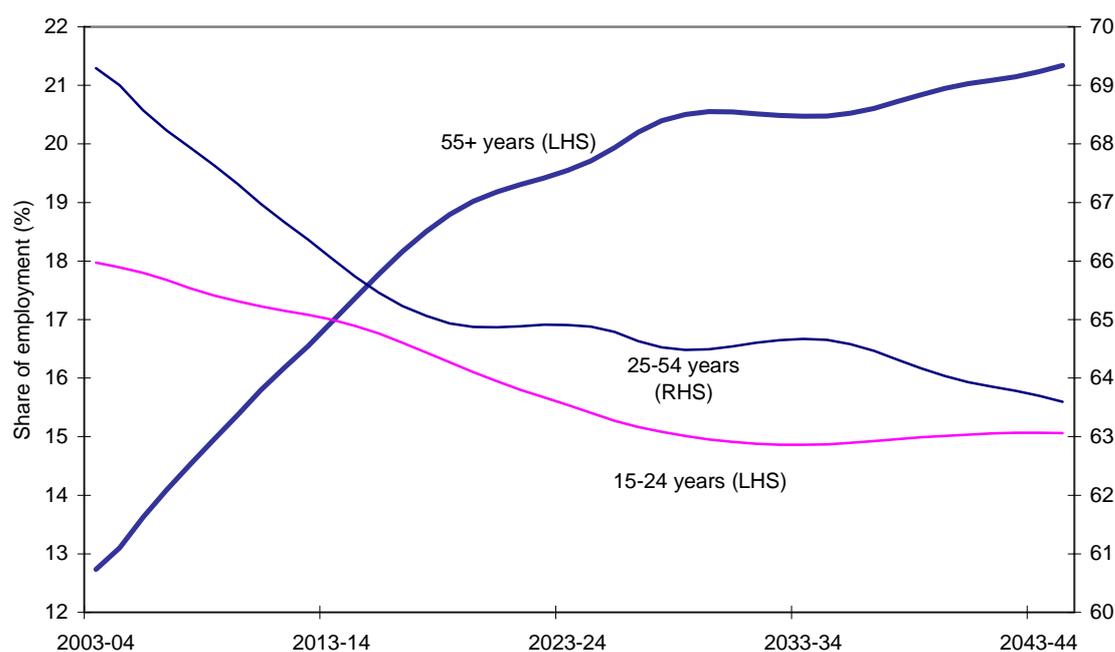
¹⁹ The Queensland Government found a small effect from relaxing the assumption of equal levels of productivity. It calculated that the long term average annual productivity growth rate would be 0.05 per cent per year *higher* than otherwise, under its medium participation scenario, if productivity levels by age and gender conformed to the profile of average weekly earnings in 1997.

younger (less productive) workers, largely offsetting the small adverse effects of productivity decline among older workers (figure 4.5). The ageing effects may well be even smaller if future increases in the educational attainment and health status of older workers reduce existing disparities between old and middle-aged workers; and

- it simplifies the analysis and enables other experiments about the effects of productivity on ageing to be conducted more readily (as in chapter 13).

Accordingly, the Commission has assumed equal productivity levels across age groups in the base case, as in the IGR and the Access Economics' models used by State Governments. Nevertheless, the effects on aggregate productivity growth and output per capita of relaxing this assumption are examined in chapter 5 (see figure 5.3).

Figure 4.5 The age distribution of employment
2003-04 to 2044-45



Data source: PC projections.

4.5 Capital deepening, technical progress and ageing

Section 4.4 examined the potential effect of a change in the age structure of the workforce on the average quality of direct labour inputs. This section examines the

implications of demographic change on the other components that determine labour productivity growth:

- the capital to labour ratio (capital deepening); and
- ‘technical progress’ or multi-factor productivity.

Global demographic effects on savings and investment

Investment in capital has to be funded from savings. Since Australia is an open economy, the relevant pool of savings is a global one. This then raises the question of the capacity for continued strong long-run inward investment flows into Australia. Among other things, this depends on:

- global demographic trends; and
- the effects of global ageing on labour supply growth, investment demand, and lifecycle savings and consumption behaviour;

The first is straightforward in qualitative terms. There are clear signs that the shift to older age structures is not an Australian, nor even a developed country, peculiarity. China, for example, will experience profound population ageing over the next half century. However, for empirical purposes, the precise timing, nature and extent of population ageing matters. For instance, it matters whether the ageing arises from reduced fertility or increased longevity, since life cycle savings theory suggests that different savings responses should ensue.²⁰

The second issue is more complex:

- while the aged run down superannuation assets and tend to liquidate fungible assets, such as bank deposits, during retirement, they often do not draw down illiquid assets, like housing (though this may change in the future — chapter 10). The effects on the household savings rate, properly measured, are therefore muted (and sometimes ambiguous). In any case, the precise effect on savings at any time depends on the particular consumption-savings behaviour of different age groups and changes in the global age structure;
- public savings are expected to decline because of the effects of ageing populations on government expenditure and revenue (though many countries are

²⁰ On the issue of timing, Tosun (2001) estimates that living standards of both the developed countries (as a group) and developing countries (as a group) are higher than otherwise if ageing occurs earlier in the developing countries than in the base case.

expected to reform public retirement pension arrangements and/or take other actions to limit the increase in public debt as a consequence of ageing);²¹ and

- the amount of capital required to achieve the desired capital-labour ratio will fall as the growth of the labour supply slows. At given factor prices, this depresses investment demand.

Several studies have attempted to unravel the forces at work, using multi-region, general equilibrium models, intended to capture the differential impacts across countries and the important linkages between countries.²² Some of this analysis suggests higher world interest rates (and therefore lower investment levels). This occurs because, even while investment requirements are lower with ageing, existing national savings are lower still, creating an excess demand for investment. Some results also point to large swings in current account balances and an increase in the ‘intensity’ of world capital flows. However, as noted by the Queensland Government (sub. 17, p.29), the collective findings from global modelling is not clear cut from the perspective of Australia. This points to the importance of using sensitivity analysis for productivity growth rates when projecting the impacts of ageing.

That said, past trends in capital deepening in Australia do not portend a crisis in investment because of ageing. There have been large changes in global capital markets over the past 40 years and significant changes in Australia’s (and global) demographic structure. Yet, in the past 40 years, the contribution of capital deepening to Australia’s labour productivity growth has been remarkably stable over productivity cycles (figure 4.6).

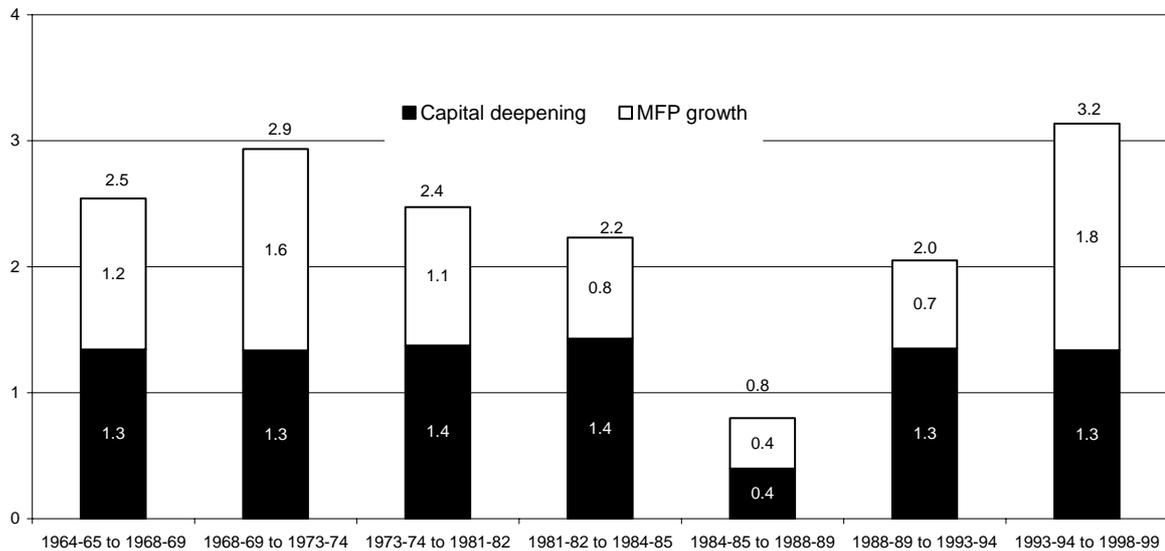
The effects of ageing on technical progress

A major underlying reason for labour productivity growth is ‘technical progress’ in its broadest sense — better ways of doing things — whether in people’s heads, new institutional structures, or embodied in capital. Some see this as the prime route by which ageing affects labour productivity (see Feyrer 2002).

²¹ A number of empirical studies allow for some fiscal policy response over the long term in order to limit budgetary impacts of ageing, though budget positions still worsen somewhat. Some models even allow fiscal expenditure to be responsive (endogenous) to changes in the median voter age, reflecting evidence that people of different age have different attitudes/preferences for government expenditure and vote so as to increase the chances their preferences will be fulfilled — Auerbach and Kotlikoff (1992) comment that ‘one of the greatest unknowns is how the political process will change as an increasing fraction of the voting population becomes elderly’.

²² For example, Masson and Tryon (1991), Turner et al. (1998), Brooks (2000) and Guest and McDonald (2004).

Figure 4.6 **Components of labour productivity growth, 1964-65 to 1998-99**
ABS productivity cycles for the market sector



Source: PC (2003).

Ageing could affect technical progress in several ways:

- On the negative side, an older population may be inherently less creative and less entrepreneurial, or their depreciating skills may create impediments to the adoption and diffusion of new knowledge;
- On the positive side, a slowdown in the rate of labour supply growth might create incentives for labour saving innovation.²³ Other forces — such as fiscal pressures facing governments in areas such as health and aged care — might also prompt better ways of doing things.

The potential links between ageing and technical progress are not well understood.

Age of inventors and entrepreneurs

If productivity growth is driven by innovation, then the ages at which workers are generating and implementing new ideas may be important. Creative output in science and invention varies substantially by age, with the peak generally between

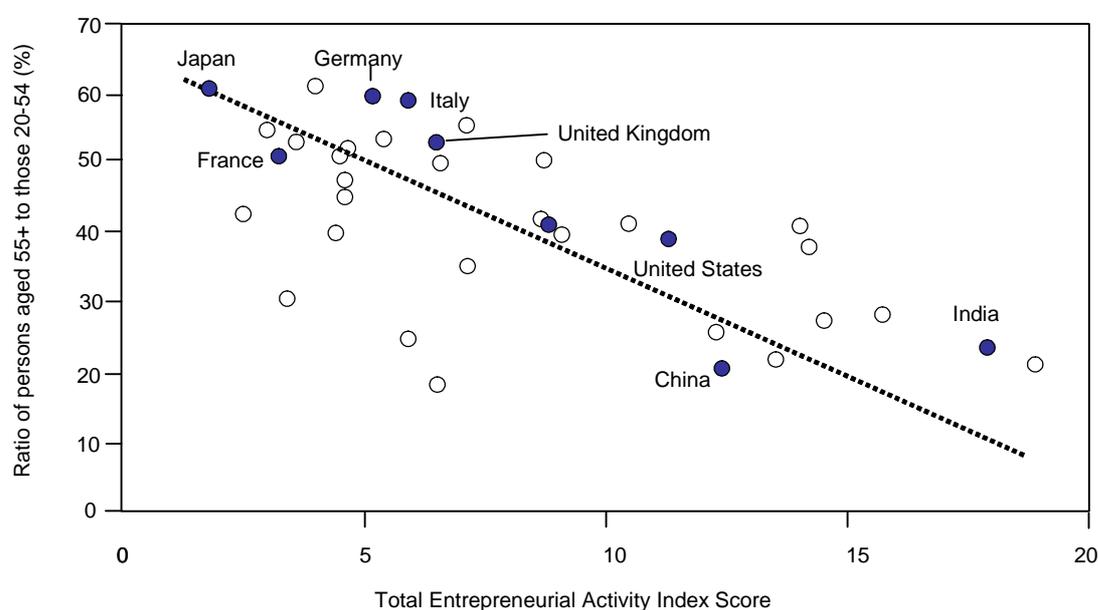
²³ Aside from innovation effects, a slow down in the rate of labour supply growth may also stimulate capital deepening and the out-sourcing of labour intensive activities to labour 'rich' countries.

ages 30 and 40.²⁴ Thus, slower growth in the absolute number of younger people may reduce the pace of major creative breakthroughs.

For most countries, however, idea *adoption* may be more relevant than idea creation. Entrepreneurial activity is one way in which new technologies are introduced into the economy. While it is possible that older people may have greater access to capital for starting their own businesses (and are generally believed to have better skills and understanding of the target industry through experience), some evidence suggests that entrepreneurial activity is higher among younger people. For example, Feyrer (2002) notes that the median age of CEOs of the 500 fastest growing companies in the US was 42 years in a 2001 survey (compared with 56 years for Fortune 500 CEOs). He also notes that Zacharakis et al. (1999) found that the majority of those involved in a sample of 'start-up' companies across ten OECD countries were aged 25 to 44 years. Schieber (2003) found a negative relationship between a measure of entrepreneurial activity and ageing (figure 4.6). On the other hand, the Queensland Government (sub. 17, p. 30) pointed out that many new products and services are brought to market by large firms, which obscures the link between entrepreneurial activity and individual demographics.

Figure 4.7 Ageing and entrepreneurship

Ratio of persons aged 55+ to those 20-54 by Entrepreneurial Activity Index Score



Data source: Schieber (2003).

²⁴ Lehman (1953) is often cited as evidence. A more recent study (reported by the *Canberra Times* (17 July 2003, p.19) was said to have found that two-thirds of 280 eminent scientists had made their most significant contributions before their mid-30s.

Labour scarcity as a spur to innovation

A well-known saying is that ‘necessity is the mother of invention’. Greenspan (2003) noted that economic historians have argued that one reason the United States surpassed Great Britain in the early nineteenth century as the leader in technological invention was its relative scarcity of labour. As supporting evidence he pointed out that:

... patent records of this period show that innovation did respond to economic incentives and that the scarcity of labour clearly provided incentives to develop new methods of production.

Romer (1987) also argues that incentives to generate labour-saving forms of knowledge are likely to be stronger when labour force growth is slower.

Empirical studies of cross country economic growth have consistently found a one per cent slower annual labour force growth to be statistically correlated with a rise in annual labour productivity growth of about 0.5 per cent (as cited by Gruen and Garbutt 2003, p.29). Correlation need not imply causation. Nevertheless, were the relationship valid, the projected slow growth in annual labour supply relative to the past (chapter 3) would imply an addition to present labour productivity growth rates of around 0.8 per cent.

However, in the Commission’s judgment, there is insufficient basis to project radical improvements to labour productivity of this extent when the evidence about the direction of causality or even the mechanism at work is unsubstantiated.²⁵

Industry structure considerations

The implications of demographic change for economy-wide growth in labour productivity could, in principle, be more closely assessed by examining:

- the differential impacts of ageing across industries; and
- any shifts in the structure of industries arising from ageing (as raised by the Queensland Government, (sub. 17, p.31).

Industries differ in their age composition, labour intensity, scope for technical change and existing productivity levels. This suggests that ageing may have differential effects on productivity across industries.

²⁵ Others have adopted a similarly position (for example, Turner et al. 1998; Guest and McDonald 2004; and Byrant 2003, p. 13).

The Department of Industry, Tourism and Resources (ITR) (sub. 33) examined differences across broad industry groupings in age, gender, skill and working hours profiles, in order to more clearly draw out the labour input implications of a decline in the growth in the overall workforce. For example, it identified that future mining growth is expected to come mainly from capital investment. On the other hand, cultural and recreational services have exhibited low labour productivity and are relatively labour intensive.²⁶

As noted above, ageing may also have implications for capital deepening and technical progress. Thus, while mining is unlikely to be constrained by labour shortages, it may face greater obstacles to growth if interest rates or capital flows are adversely affected by global ageing.

As well as influencing labour and capital inputs — with differential impacts on industries and their growth prospects — ageing will also have profound impacts on the composition of demand (appendix I), particularly increasing growth in health care and other ageing-related services. The productivity of these sectors is poorly measured — but there clearly could be potential for ageing to have aggregate productivity effects through compositional change.

In sum, a disaggregated industry approach offers scope for a better understanding of the economy-wide effects on productivity of ageing, but as yet, does not give precise guidance to any economy-wide impacts.

4.6 Convergence or divergence in State and Territory productivity growth?

Another issue is whether the same long-term average labour productivity growth rates should be assumed for each State and Territory. Average labour productivity growth rates since 1984-85 show some differences across jurisdictions (table 4.2).

²⁶ ITR noted that accommodation, cafes and restaurants; and cultural and recreational services exhibit low labour productivity, suggesting the potential of some special challenges in a tightening labour market. However, it also observed that these two industries display relatively high levels of part-time and female employment. These two characteristics may indicate a potential to raise labour input through lifting average hours worked by existing employees. It noted that scope for this may depend, in part, on the (dis)incentives arising from the interaction between the welfare and tax systems and employer workplace flexibility.

Table 4.2 State and Territory average labour productivity growth
1984-85 to 2002-03, all sectors

	1984-85 to 2002-03	1984-85 to 1989-90	1989-90 to 1993-94	1993-94 to 2002-03
	per cent per year	per cent per year	per cent per year	per cent per year
NSW	1.6	0.8	1.3	2.1
VIC	1.6	-0.2	2.0	2.4
QLD	1.4	-0.1	2.0	2.0
SA	1.5	1.2	0.3	2.2
WA	2.1	1.3	2.2	2.6
Tas	1.1	-0.6	1.9	1.8
NT	2.1	2.4	0.5	2.8
ACT	1.5	2.1	0.4	1.6
Australia	1.5	0.2	1.6	2.2

Source: Productivity Commission estimates using ABS DX data 2004 (GSP by State) and ABS labour force super-table 2004 (hours worked by State).

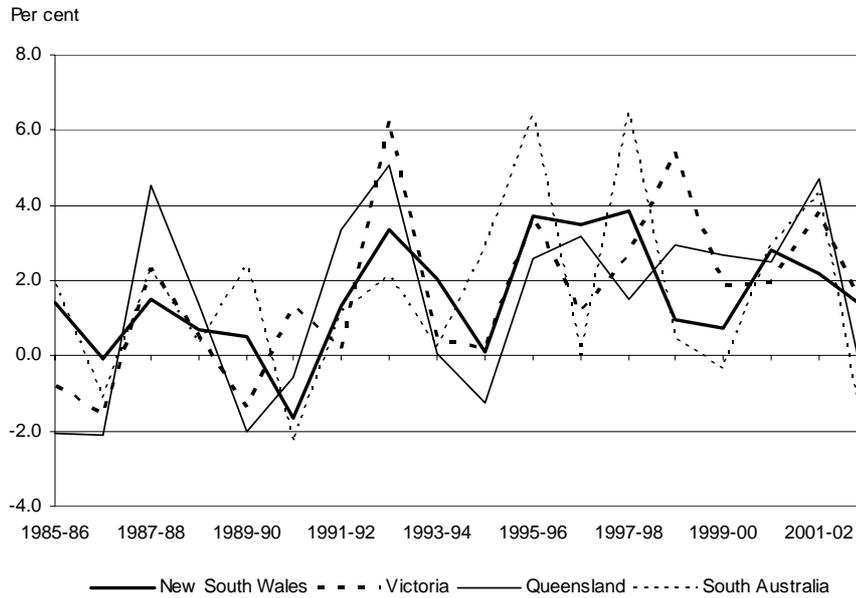
Some of this variation is likely to be due to statistical errors, random differences in supply and demand shocks that may not persist, or to structural and policy differences between jurisdictions.²⁷ The cyclical movements of productivity appear to be similar for all jurisdictions (figures 4.8 and 4.9), suggesting some common economic drivers of productivity growth. But it is also clear that rankings in productivity growth are highly volatile from year to year.

The neoclassical model of economic growth suggests there would be long run convergence in interstate per capita income *levels* (and labour productivity levels). In turn this implies that economies with lower levels grow faster, and vice versa, until a steady state in which all economies trend towards the same productivity growth rate.²⁸

²⁷ The Victorian Government (sub. 29, p.42) stated that ‘productivity growth can be influenced by state policy levers, particularly in education and training, research and development, infrastructure investment, and in legal and institutional arrangements such as natural resource allocation frameworks and a regulatory framework that fosters competition and innovation.’

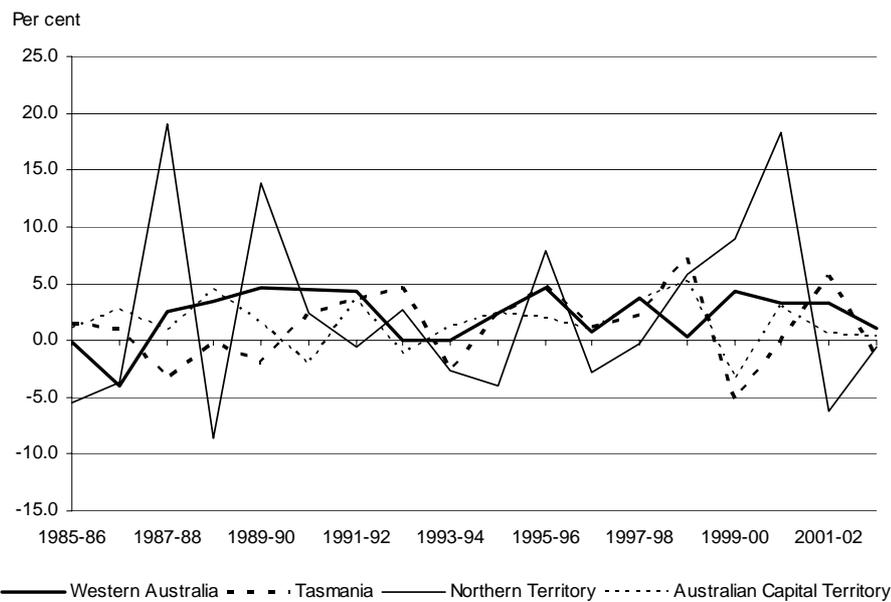
²⁸ In the neoclassical model, the process of convergence is driven by increases in the rate of investment in poorer economies (capital deepening), because developing economies face a higher return to capital, until their capital-labour ratio and the return to capital is equalised with that of higher income economies. Lower income economies also have the opportunity to absorb the latest technologies available in higher income economies. The convergence hypothesis is usually used in relation to countries. Within Australia we could expect less differences between States and Territories in the relative price of capital to labour and in technologies, compared with cross country samples, in which case interstate differences in labour productivity growth must be due more to other factors such as industry mix and policy environments, which are not subject to ‘natural’ convergence.

Figure 4.8 Annual labour productivity growth, 1984-85 to 2002-03
NSW, Vic, Qld, SA



Data source: Productivity Commission estimates, ABS DX data 2004 (GSP by State) and ABS labour force super-table 2004 (hours worked by State).

Figure 4.9 Annual labour productivity growth, 1984-85 to 2002-03
WA, Tas, NT, ACT



Data source: Productivity Commission estimates, ABS DX data 2004 (GSP by State) and ABS labour force super-table 2004 (hours worked by State).

Nguyen et al. (2003) found no empirical evidence that labour productivity *levels* across the six Australian states either converged or diverged between 1984-85 and 1998-99 — meaning *growth* rates were neither positively nor negatively correlated with initial levels, as suggested by the neoclassical model. There was some evidence that the dispersion in the levels of labour productivity had increased. However, if mining was excluded (which underpins some of the high average growth in the period for Western Australia) there was no statistically significant increase or decrease in the dispersion of levels. Bodman et al. (2003) research found evidence of a tendency towards stable gaps between productivity *levels* across the six states for the same period — which is consistent with similar cross-State productivity *growth* rates.

In the absence of evidence to the contrary, the simplest characterisation of inter-state productivity is appropriate. Accordingly, in the Commission’s projections, average long term productivity growth rates have been assumed to be the same for each jurisdiction.²⁹

²⁹ Moreover, assuming otherwise is problematic — aside from the difficulty of how they may diverge, compounding of different rates may result in unrealistic differences in income levels as well as possibly complicating the central focus on the effects of ageing on government budgets.

5 Economic growth implications

Key points

- Population ageing will depress Australia's economic growth. GDP per capita growth rates are projected to fall steadily to around 2025, with only a partial recovery thereafter.
 - With an assumed baseline productivity growth rate of 1.75 per cent per annum, GDP per capita growth would slump to nearly 1.25 per cent a year by the mid 2020s — roughly half its present rate.
- The main way in which ageing affects economic growth is by constraining labour supply growth.
- The available evidence suggests that the biological aspects of ageing and other changes in the mix of worker and job traits accompanying ageing will make a negligible difference to Australia's aggregate productivity and economic growth performance.
- In the absence of any resurgence in workforce, economic growth over the next four to five decades will overwhelmingly depend on productivity growth.
- Notwithstanding a projected growth slowdown, per capita incomes will still be much higher than today — indeed by 2044-45 they will be nearly double those of 2003-04. These conventional measures of output will, if anything, tend to understate the true increase in living standards in Australia, because:
 - following standard National Accounts conventions, the calculations pre-suppose that there are no productivity gains in sectors such as education and health, where output is hard to measure;
 - they do not take account of the benefits from increased volunteering rates. Over the next 40 years, the value of volunteering is expected to rise from 1.8 to around 2.2 per cent of GDP, mainly due to the growing share of adults in the population; and
 - they fail to take into account the value of increased leisure associated with a greater share of retirees in the population.

The elements of the labour market jigsaw (chapter 3) can be combined with productivity assumptions (chapter 4) to give a picture of how economic growth may fare over the next half century. This chapter is a brief summary of Australia's economic growth prospects under several scenarios.

Section 5.1 describes the baseline outcomes for economic growth, including by jurisdiction. Section 5.2 considers the effects of ageing *per se* on productivity and economic growth. Section 5.3 places the impacts of ageing on economic welfare in perspective.

5.1 Economic growth over the next forty years

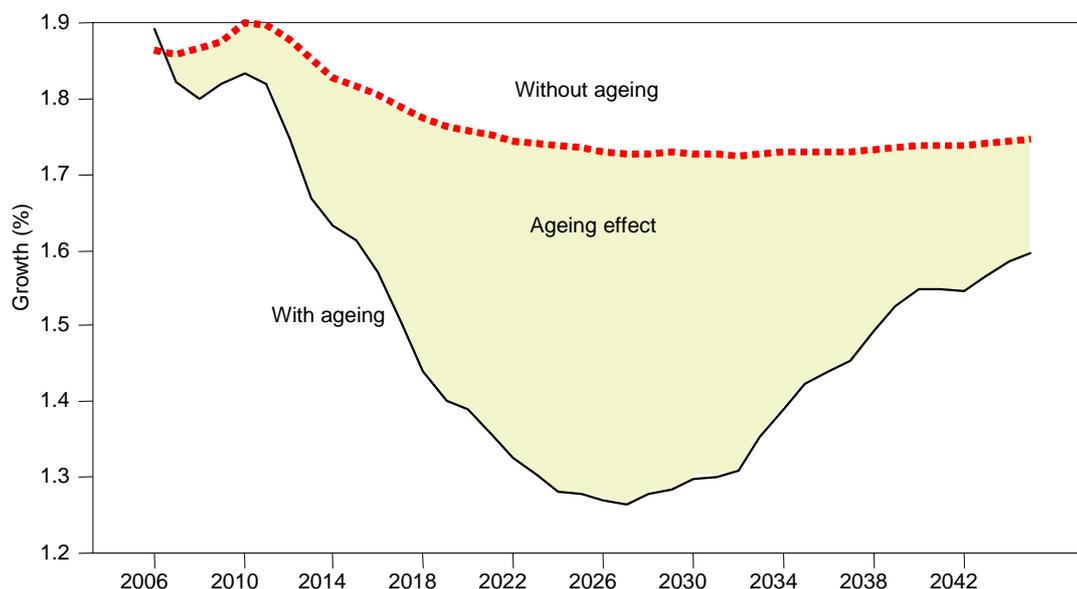
Population ageing depresses economic growth. Australia's GDP per capita growth rates are projected to fall steadily over the period to around 2025, with a partial recovery thereafter (figure 5.1). For example, given the assumed baseline productivity growth rate of 1.75 per cent per annum, GDP per capita growth would slump nearly as low as 1.25 per cent a year by the mid 2020s — roughly half its present rate. This is primarily due to the effects of ageing on labour supply growth.

In the absence of any resurgence in workforce, economic growth over the next four to five decades will overwhelmingly depend on productivity growth.

To illustrate its significance, suppose that Australia was able to sustain the so-called 'miracle' productivity performance of the 1990s through further economic reforms, continued gains from ICT and other technologies, and increasing human capital. With an annual productivity growth rate of 2.05 per cent, Australians would be better off in cumulative GDP terms by around \$3 900 *billion* by 2044-45 relative to the assumed base-case growth rate of 1.75 per cent (table 5.1). This equates to an average productivity dividend of just under \$165 000 per person over this period — a good buffer against the spiralling costs of ageing and health spending.¹ This is the power of compound interest.

¹ Its effect on government budgetary costs of ageing, however, are less dramatic, since wage costs associated with health and aged care could be expected to increase with productivity — as noted by Gruen and Garbutt (2003). Also, to the extent that the gain is in labour productivity alone and not in multifactor productivity, then it has to be paid for through some investment (eg capital equipment or greater human capital accumulation). So the gain is not a pure welfare benefit.

Figure 5.1 Economic growth in Australia — a 40 year projection
Per capita GDP, 2005-06 to 2044-45



Data source: Commission calculations.

Table 5.1 The GDP effects of different productivity growth scenarios

	2.05% pa after 2003-04	1.75% pa after 2003-04	1.70% pa after 2003-04	1.45% pa after 2003-04
<i>Average growth in GDP per capita</i>	%	%	%	%
1990s	2.15	2.15	2.15	2.15
2000s	2.12	1.94	1.91	1.76
2010s	1.88	1.58	1.53	1.28
2020s	1.59	1.29	1.24	0.99
2030s	1.72	1.42	1.37	1.12
2040s	1.87	1.57	1.52	1.27
Real GDP per capita in 2044-45 (\$)	\$80 154	\$71 040	\$69 623	\$62 940
Increase over real GDP per capita in 2003-04 (\$)	\$42 048	\$32 934	\$31 517	\$24 834
Additional real GDP June 2004 to June 2045 (\$ billion) relative to baseline	\$3 892	..	-\$617.4	-\$3 579

^a GDP is in 2001-02 prices.

Source: Commission calculations.

Of course, the story looks rather worse if Australia were to record lower productivity growth rates:

- If our productivity performance were just 0.05 percentage points worse per year (taking Australia back to the average productivity growth rate that prevailed over the peak to peak years from 1969-70 to 1992-93 — prior to the ‘miracle’ years)

by 2044-45 Australians would be cumulatively worse off relative to the base case by around \$620 billion in constant 2001-02 prices;

- If the growth rate were to fall as low as 1.45 per cent per annum, then Australians would be cumulatively worse off relative to the base case by around \$3600 billion in constant 2001-02 prices, *adding* to the difficulties in meeting any financing costs associated with ageing or lowering expectations of what services can be provided. It should be noted that such a productivity growth rate is just 0.05 percentage points below that which was assumed in a New Zealand projection exercise (Intergenerational Report p. 32). Some of the bleaker scenarios that visualise demographic pressures on rates of accumulation of physical entrepreneurship and R&D capital could readily result in productivity growth rates this low.

State and Territory economic growth

The pattern of economic growth follows a similar profile over time in all jurisdictions, but the reduction in growth rates is steeper, relative to the Australian total, in those characterised by more ageing — such as Tasmania and South Australia (figure 5.2 and table 5.2). The ACT appears to be the jurisdiction with the least volatile growth rates over the next forty years (though not with the highest average growth rate).

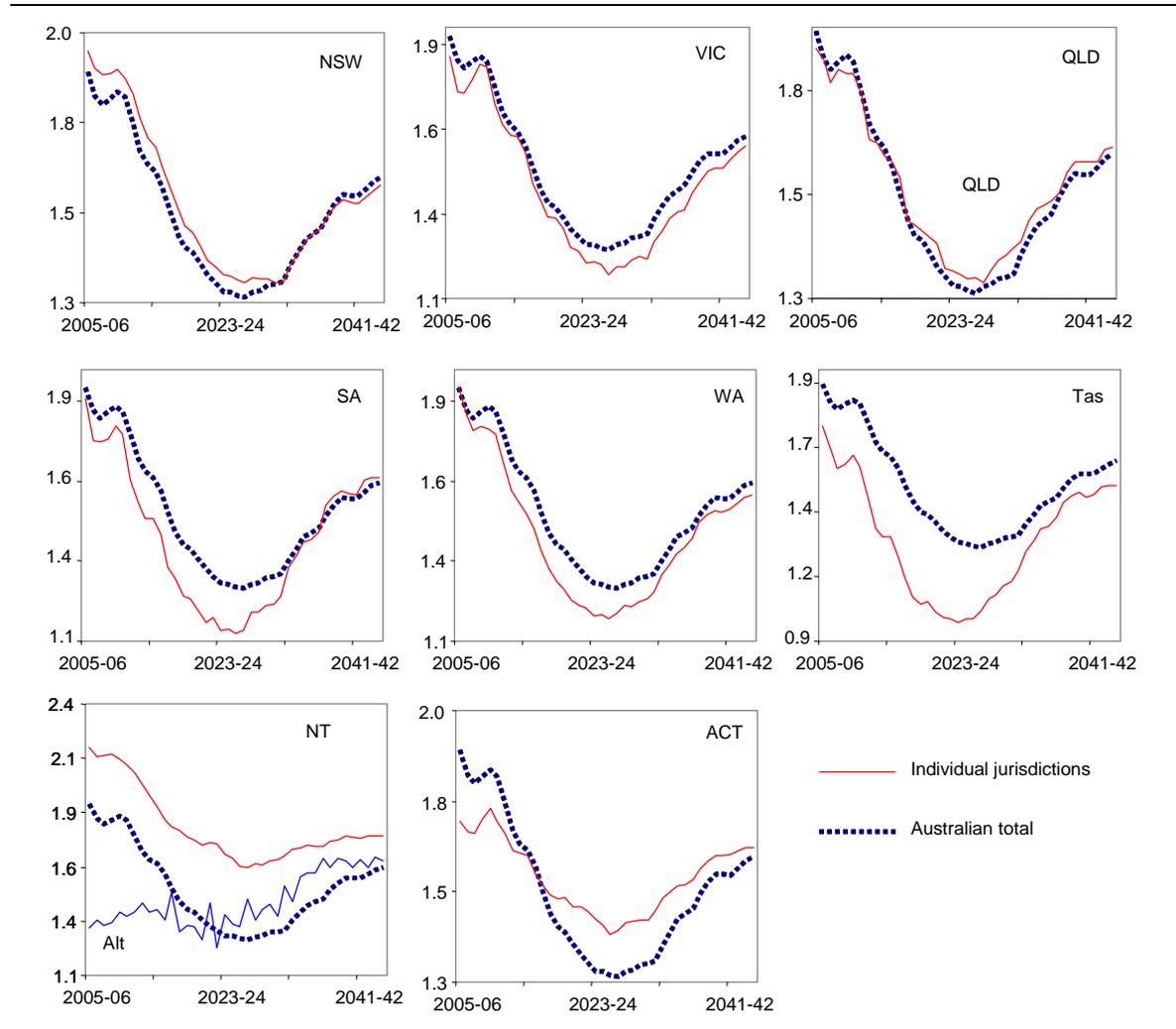
Table 5.2 **Average GSP per capita growth rates over**
1990-91 to 2044-45^a

<i>Jurisdiction</i>	<i>2000-01 to 2009-10</i>	<i>2010-11 to 2019-20</i>	<i>2020-21 to 2029-30</i>	<i>2030-31 to 2039-40</i>	<i>2040-41 to 2044-45</i>
	%	%	%	%	%
NSW	1.89	1.65	1.33	1.42	1.55
VIC	2.08	1.55	1.24	1.36	1.53
QLD	1.90	1.58	1.33	1.46	1.59
SA	1.92	1.44	1.16	1.41	1.59
WA	1.94	1.47	1.20	1.38	1.53
TAS	1.47	1.25	1.02	1.33	1.48
NT	2.38	1.87	1.65	1.69	1.74
NT alt ^b	1.71	1.38	1.36	1.55	1.62
ACT	1.75	1.57	1.42	1.52	1.61

^a Commission estimates based on baseline effective labour supplies for each jurisdiction and the assumption of 1.75 per cent per year productivity growth in each jurisdiction. ^b The alternative Northern Territory estimates are based on separate estimates of Indigenous and non-Indigenous populations (chapter 2), separate participation rates (chapter 3) and make assumptions about the relative productivity levels of CDEP versus mainstream Indigenous productivity levels. Details are available on request. These alternative estimates of GDP for the Northern Territory are used throughout this report.

Source: Commission estimates.

Figure 5.2 Projected state GSP growth rates over the next 40 years
2005-06 to 2044-45



^a Commission estimates based on baseline effective labour supplies for each jurisdiction and the assumption of 1.75 per cent per year productivity growth in each jurisdiction. In the case of the Northern Territory, the alternative growth rates are based on splitting the Territory into two groups — Indigenous and non-Indigenous (see notes to table 5.2).

Data source: Commission estimates.

5.2 The role of ageing

Per capita GDP in 2044-45 will be significantly less than if there were no population ageing. For example, with an annual productivity growth rate of 1.75 per cent, GDP per capita without ageing is more than \$8 000 or 11 per cent more by 2044-45 than with ageing. Ageing creates a \$3 200 billion dent in cumulative national output from 2003-04 to 2044-45. On (an average) per capita basis, this is a loss of roughly \$140 000 per person over this period. The magnitude of these effects reflects the important influence of ageing on Australia's labour

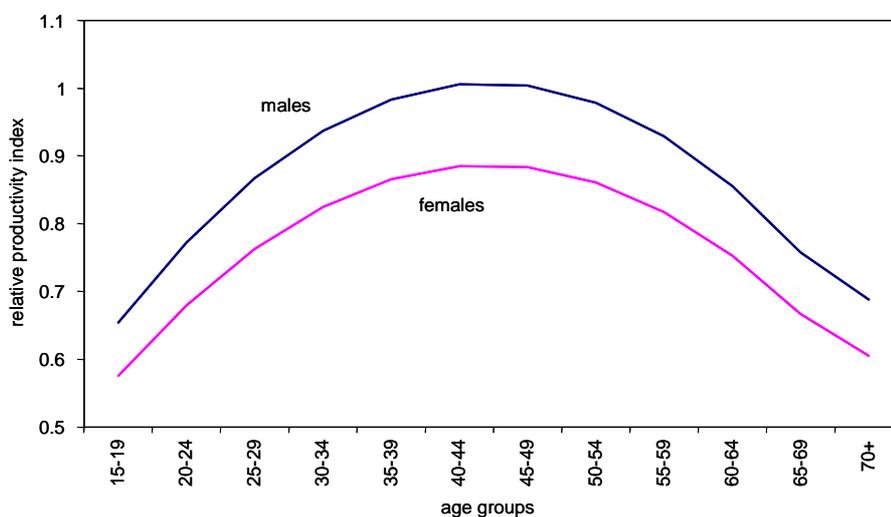
supply — with effective labour supply per capita decreasing over the next 40 years (chapter 3).

In contrast, the available evidence suggests that the biological aspects of ageing and other changes in the mix of worker and job traits accompanying ageing will make a negligible difference to Australia’s aggregate productivity and economic growth performance. This was established by undertaking a simple simulation:

- The simulation took account of the fact that productivity levels follow an ‘inverted u’ profile with increasing age (chapter 4). A particular profile was assumed (figure 5.3).
- The aggregate labour productivity growth and economic growth rates were estimated (figure 5.4), taking account of the changing age structure of employees and the assumed productivity profile.

Despite using quite large productivity age-sex margins, the impacts on productivity and growth are small — with a total accumulated loss in national output of around \$372 billion by 2044-45. This outcome is not surprising given that the average age of employees only increases slightly over the next 40 years (chapter 3).

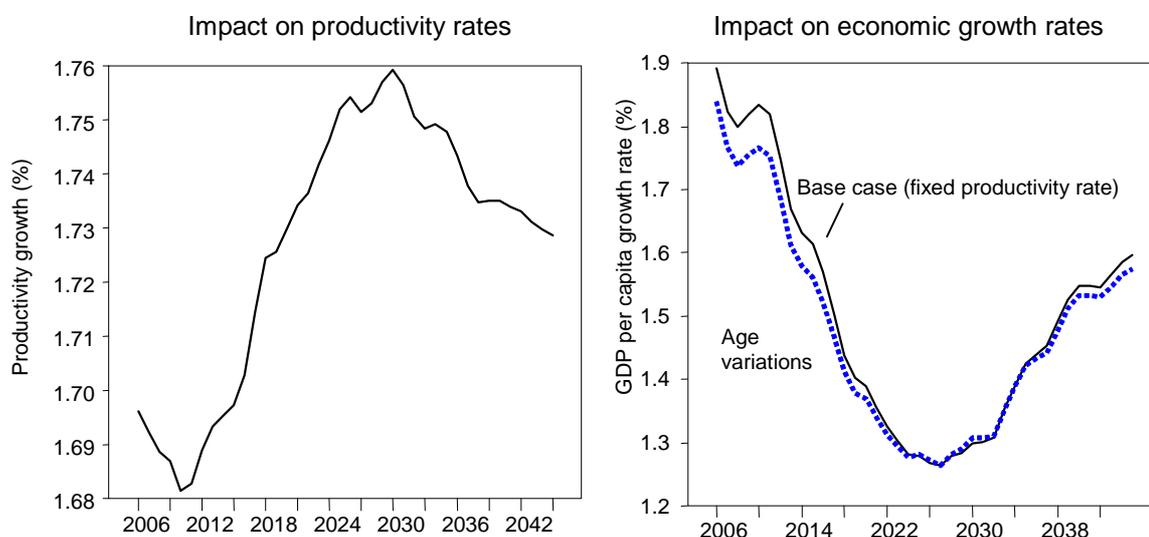
Figure 5.3 The effects on relative productivity rates of age and gender
An illustrative case



a Based on data on relative hourly wage rates by sex and age, corrected by the bias in wage rates as productivity measures.

Data source: Commission calculations.

Figure 5.4 The effects of varying productivity levels by age
2005-06 to 2044-45



a Relative labour productivity differences between different ages were estimated from relative hourly wage rates by sex and age, corrected by the bias in wage rates as productivity measures. These relativities can be combined with data on actual hours and GDP to calculate an actual level of productivity per hour for different age-sex groups. It is assumed that productivity levels of any age-sex group increase by 1.75 per cent per annum. The ultimate productivity rate (and accompanying GDP levels) will then be determined by shifts in the proportions of workers at different productivity levels.

Data source: Commission estimates.

Indeed, the effect of ageing on productivity is not always negative. There are some years in the 2020s and 2030s when projected changes in demographic structure result in a (very slight) productivity premium over the standard 1.75 per cent growth rate. This reflects the fact that changes in the demographic structure place less weight on the less productive young as well as more weight on the less productive old.

The direct impacts of ageing on productivity are swamped by uncertainties about the future rates of productivity growth associated with technical change, increased efficiency and capital deepening.

What difference would greater labour participation by older people make to economic growth?

Raising labour participation rates for older workers is unlikely to make a significant difference to economic growth:

- aggregate participation rates are not influenced greatly by even substantial proportionate increases in participation rates by older people — reflecting their currently low participation rates (chapter 3);

-
- older workers are more often employed on a part-time basis; and
 - older workers' productivity may on average be somewhat lower.

For example, suppose that by 2044-45, male workers aged 55 years and over could achieve a participation rate 10 percentage points higher than under the baseline case (scenario two in box 3.4 in chapter 3). Combined with a productivity age profile shown above, and age-specific trends in part-time work and hours, then relative to the base case in 2044-45, this would give rise to a:

- 3.9 per cent (not percentage points) boost in aggregate participation;
- 3.7 per cent increase in total hours worked; and
- 2.4 per cent improvement in GDP per capita.

This case study reveals the potential importance of feedback effects when considering different scenarios for projections. For instance, as noted in chapter 3, Gruen and Garbutt (2003) raise the prospect of Australia increasing its participation rates to the 80th percentile of those in the OECD. In considering the impacts of this scenario on economic growth, they assume that all other important variables — unemployment rates, average hours worked and productivity — remain fixed at the levels projected in the Intergenerational Report.

This assumption makes the experiment tractable, but it may lead to an overstatement of the output effects of the acceleration in participation rates.² This is because people not in the labour force are different from those who are — on average, they are more likely to be less skilled, to be disabled and to have different preferences for hours worked.

Accordingly, depending on the policy instruments used to elicit it, a significant rise in long run participation rates would probably also be accompanied by a higher unemployment rate, more part-time work (at lower average hours per week) and lower average productivity. This does not invalidate the experiment, but it may modify the conclusions reached from it.

5.3 Placing these projections in context

It appears likely that economic growth will slow as a result of population ageing. However, it is important not to dramatise these impacts. Per capita incomes will still be much higher than today — indeed nearly double those of 2003-04 by 2044-45.

² The authors are aware of this possible limitation, at least in relation to productivity, and argued that productivity may not be affected if the reason for increasing participation is greater education of people currently not in the labour force (p. 28).

The measures of output used in the above analysis will, if anything, tend to understate the true increase in Australian living standards. This is because — following standard National Accounts conventions — the calculations above presuppose that there is no productivity gains in sectors, such as education, where output is hard to measure.

They also do not take account of the economic benefits from increased volunteering, which is not counted in the usual measures of growth. The Commission used data provided by the Australian Institute of Family Studies (sub. 10, p. 14) to project the future value of volunteering. These estimates are based on the 1997 ABS time use survey (Cat. No. 4153.0) and measure both formal and informal volunteering. Over the next 40 years, the value of volunteering is expected to rise from 1.8 to around 2.2 per cent of GDP (table F.3 in appendix F), reflecting the growing share of adults in the population. This effect somewhat offsets the reduction in *measured* economic growth rates associated with ageing.

Moreover, in the modelling adopted above, nothing adverse is happening to the incomes of individuals from a lifecycle perspective. The aggregate slowdown in growth merely reflects the fact that there are more people in retirement or the part-time years of their working lives. It should also be recalled that people value the leisure received in retirement and often choose to retire voluntarily — thus revealing their preferences.

That said, the weakening economic growth prospects of Australia have significant revenue (and spending) consequences. These form the focus of the remainder of this study.

6 Health expenditure

Key points

- Government health expenditure has been steadily rising in real terms and is now nearly 6 per cent of GDP. New technology and rising demands have been the main drivers.
- Views differ on the relationship between ageing and health care expenditure. The Commission's assessment is that, in combination with demand and technology, ageing will place significant additional pressure on future expenditure.
- Reflecting higher levels of need, government health expenditure per person is significantly higher for older than younger people:
 - Across OECD countries, expenditure per person over 65 averages four times that of people under 65.
 - In Australia, this pattern of expenditure has existed for some time and shows no sign of changing.
- With the proportion of the population over 65 expected to double to over 25 per cent by 2044-45, health care costs will inevitably rise:
 - Although, people are living longer, and may be healthier, in many cases better health is a result of ongoing (and costly) treatment.
 - Even if health costs are predominantly related to the last years of life, there will be pressure on aggregate expenditure as the incidence of deaths rises in an ageing population.
- The Commission projects that government health expenditure (excluding aged care) will rise from 5.7 per cent of GDP in 2002-03 to 10.8 per cent in 2044-45.
 - Projections are sensitive to assumptions about the growth in costs arising from non-demographic factors (with different assumptions, projected health expenditure in 2044-45 ranges from 9 per cent to just under 13 per cent).
 - However, in all cases, expenditure is projected to be about one third higher than it would be if the population age structure remained as it is today.

Many of the concerns about the ageing of the population surround future health costs. After briefly describing current government health spending (section 6.1), this chapter examines the determinants of future health care expenditure, including the debate about the role of ageing (section 6.2). The analysis in this section underpins the projections of health care spending by governments presented in section 6.3.

6.1 Government expenditure on health

Total recurrent government health expenditure in Australia (excluding aged care) was around \$43 billion, or about 6 per cent of GDP in 2002–03.¹

The Australian Government's role

The Australian Government currently provides two-thirds of government health expenditure (\$29.6 billion in 2002-03), equivalent to 4 per cent of GDP. It funds Medicare and the Pharmaceutical Benefits Scheme (PBS). Medicare provides patient subsidies for medical practitioner services, optometry, diagnostic imaging and pathology. Under the PBS the Australian Government subsidises a large range of pharmaceutical products to provide patients with timely, reliable and affordable access to prescribed medicines.

In addition, the Australian Government:

- provides specific purpose grants for public hospital services provided by State governments;
- provides a 30 per cent rebate to subsidise the cost of private health insurance; and
- funds a range of other health-related services including medical research, public health and indigenous services, and health information management.

State and Territory Governments

State and Territory Governments spent \$13.5 billion on health services, equivalent to 1.8 per cent of GDP in 2002-03. Funding for public hospitals is the major item of state health expenditure — \$6.7 billion in recurrent funding or 52 per cent of total state health expenditure. In addition, a substantial proportion of health spending on capital by the States and Territories is also for public hospitals. Other State health expenditures include funding for community and public health, ambulance services and dental services.

¹ Values for current health expenditure are from the Australian Institute of Health and Welfare (AIHW) 2004a. Following the format suggested by the World Health Organisation, the AIHW includes high level residential care (RCS 1-4) in health expenditure. For this report, this component has been excluded from health expenditure and included in the aged care projections (chapter 7). Projections of total health expenditure are provided in appendix A.

6.2 Influences on health care expenditure: what role for ageing?

Older people typically need more health services than younger people. As such, the ageing of the population will increase the level of resources devoted to health care.

However, real health expenditures have been rising for other reasons as well — notably because of demand, technology and growth in prices in the health sector relative to the economy generally.² The contribution of ageing relative to these other factors has been a matter of considerable debate. Within the media and among some policy makers, ageing is sometimes presented as a looming crisis for the health system. For example, referring to US pension and health payments, Dr Greenspan (2004, p. 3) stated:

This dramatic demographic change is certain to place enormous demands on our nation's resources — demands we almost surely will be unable to meet unless action is taken.

But among many health economists, ageing is often viewed as a relatively minor influence on future health care needs (box 6.1). It is argued that:

- the effect of ageing is swamped by the effect of demand and technology;
- we will be healthier in the future, lessening health costs; and
- most costs are not related to age as such, but merely with the last years of life, so that living longer will not involve significantly higher health costs.

Each of these issues is assessed in this section. (In appendix B, the lack of correlation between ageing and past health expenditure in developed countries is explored in more detail.) The debate about the significance of ageing as a driver of health expenditure is important to the Commission's task in this study because it has implications for the choice of methodology used to project health expenditure. More broadly, it is important because it will influence policy makers' responses to increases in health care costs.

² This results in higher real expenditure on health for a given level of services. Excess health inflation has been significant over the last 10 years for private health expenditure, but less so for government expenditure. Owing to shortages in some areas of the health workforce (eg nurses), health costs may rise more quickly than inflation over the short term.

Box 6.1 Does ageing matter?

A number of prominent economists have suggested that the influence of ageing on future health expenditure is often overstated.

For example Jacobzone (2003) says that:

The 'doomsday prophecy' which presents ageing as a threat to social and health systems is in fact a naïve fallacy, which results from a lack of understanding of the real impact of ageing. Demography by itself, is a secondary factor in the overall increase of health expenditure (p. 263).

Zwiefel et al (1999) argues:

The limited impact of age on HCE [health care expenditure] suggests that population ageing may contribute much less to future growth of the health care sector than claimed by most observers (p. 485).

Seshamani and Gray (2004) conclude that:

The widespread belief that ageing populations will automatically generate higher hospital expenditure is therefore over-mechanistic and based on a misapprehension of the association between age and hospital costs (p. 232).

Similarly, in Australia, Richardson and Roberston (1999) argue that:

Application of the simple needs model suggests that the impact of future ageing on the need for medical services will be so small that, in the absence of other factors, the size of the health sector would diminish in relation to GDP. ... any future problems arising from health sector expenditure will be primarily due to non-demographic factors (p. 348).

Richardson reemphasised this point in his submission to this study:

The key theme of this submission is that ageing per se will have a minimal quantitative impact and an impact which can easily be absorbed by GDP. Consequently, a relatively minor adjustment to an already small impact factor is of little quantitative significance for the capacity to fund future health expenditures (sub. 16, p. 7).

Finally, while criticising some aspects of Richardson and Robertson's (1999) analysis Gregory (1999) states that:

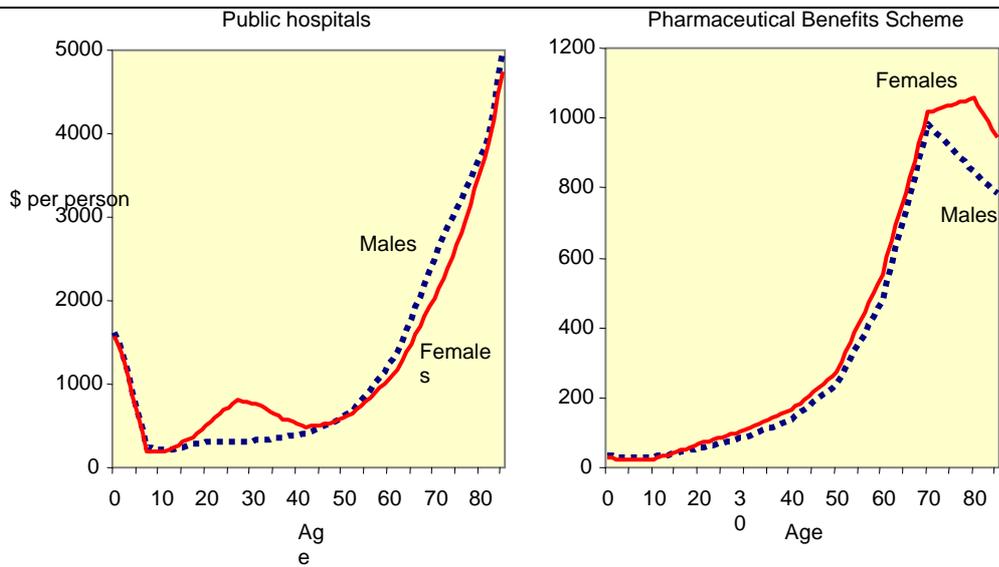
The major issue in health expenditure, ... is what determines expenditure within each cohort rather than the impact of the changing age structure on expenditure. This is a very important message which should be repeated and repeated because so many lay people find this message difficult to believe (p. 394).

The age profile of health expenditure

The starting point for understanding the likely impact of ageing on health expenditure is that, as noted, health expenditure is significantly higher for older people than for younger people. For example, costs per person in the PBS are strongly age-related — average costs for a male aged 65-74 years are more than 18 times the average costs for a male aged 15-24 years (figure 6.1). Hospital costs follow a similarly steep profile, while Medicare costs also rise with age, albeit less

steeply. Across all health expenditure types, expenditure on those aged over 65 is around 4 times higher than that on those under 65, and rises to between 6 to 9 times higher for the oldest groups. Similar strong age-related relationships are observed across time and in all developed countries (table 6.1).

Figure 6.1 Costs of hospitals and drugs by age



Data source: PBS: Health Insurance Commission, unpublished 2002-03 data; Hospital profile is based on NSW unit record data provided by NATSEM, Thurecht et al 2003.

Table 6.1 Ratio of per capita health spending on over 65s to under 65s in selected OECD countries^a
1993, unless otherwise stated

	<i>Ratio of per capita spending on people over 65 years to those under 65 years</i>
Australia	4.1
Canada	4.7
Czech Republic	2.3
France	4.0
Germany ^b	2.9
Greece	2.7
Korea	4.8
Luxembourg	2.4
Norway	3.9
Switzerland	2.8
Turkey	4.0
United States	3.8

^a Countries for which data available. ^b 1991.

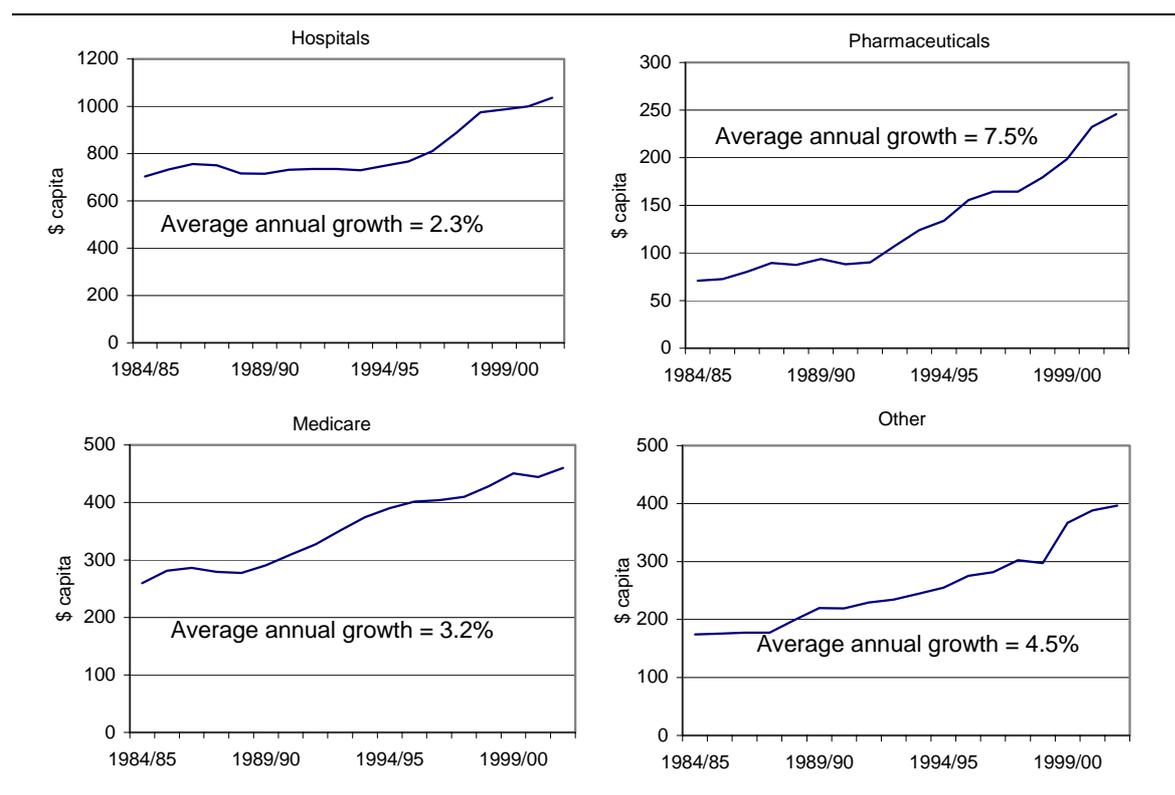
Source: OECD Health Database, 2002.

In combination with rapidly increasing numbers of the old (see chapter 2), the upward sloping age profile of health expenditure suggests that, all things being equal, ageing will increase health expenditure significantly.

The role of demand and technology

Non-demographic factors, particularly demand and technology, are also critical to future health expenditure. Indeed, over the last 20 years or so these factors have had a greater impact on health expenditure than ageing. Real per capita spending has been increasing for all major components of Government health expenditure (figure 6.2). Real average growth rates range from a high 7.5 per cent for pharmaceuticals to a more modest annual 2.3 per cent growth in hospital expenditure.

Figure 6.2 Real per capita increase in Government health care expenditure 1984–85 to 2001–02
2001-02 dollars



^a Average annual growth rate calculated between 1984-85 and 2001-02. Average rates can differ significantly depending on the beginning and end period of the calculation.

Data source: AIHW 2004b, AIHW health expenditure data cube (www.aihw.gov.au), ABS 2003b.

While data are not available to directly estimate the expenditure impacts of past ageing, consistent with other Australian studies (IGR 2002, AIHW 1999), the Commission estimates that ageing has added about 0.5 percentage points a year to

the per capita growth rate of health expenditure. Overall, the *age adjusted* per capita growth in real government health expenditure arising from new technology and greater demand, has ranged between 2 and 3 per cent per annum over the last 20 years or so.³ (Growth rates for health expenditure are analysed further in appendix D.) Thus the majority of growth in health expenditure has occurred because of factors other than ageing — notably greater demand for health services, combined with the emergence and diffusion of new medical technologies.

Demand for health care has been shown to be sensitive to income, particularly at the national level (appendix B). Wealthy countries not only spend more per person on health care than poorer ones, they also spend a higher proportion of their national income. Many studies have found that variation among countries in GDP per capita explains much of the difference in health costs. Greater national incomes raise the capacity for increased government funding of health care, create expectations of greater care and prompt investments in new health technologies.

Indeed, the introduction of new medical technology is often viewed by health economists and policy makers as *the* major driver of the rapid increase in health expenditure observed in many developed countries. For example, a leading American health economist Fuchs (1998a) cites a survey of 50 other health economists which reported that 81 per cent agreed with the statement that ‘the primary reason for the increase in the health sector’s share of GDP over the past 30 years is technological change in medicine’.

However, as Fuchs (1998a) states, the effect of technological advances on expenditure is rarely simple or immediate. Introduction of new medical technology can have two opposing effects.

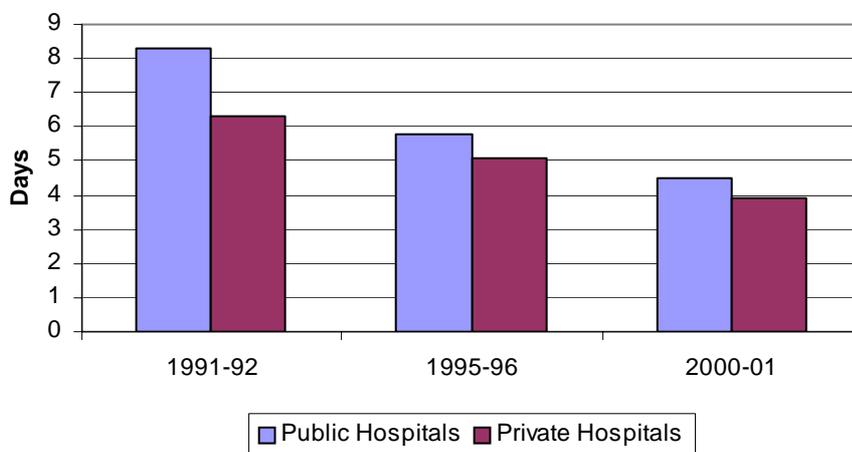
- Like the impact of technology in most other industries, it may make existing treatments cheaper. For example, for the over 65s, technology is likely to have been one of the factors contributing to a significant reduction in the average length of stay in public and private hospitals, with concomitant savings for the hospital system in accommodation costs (figure 6.3).⁴
- On the other hand, technology can *increase* the total cost of health care by making treatments more effective, and opening up new avenues for treating serious conditions.

³ The IGR (2002) used growth rates for Australian Government expenditure of 2.5 per cent and 3 per cent in its aggregate model.

⁴ Gray, Yeo and Duckett (2004), note that the falling length of stay has been the main reason why the proportion of beds occupied in hospitals by older people has remained stable in the presence of strongly increasing separation rates for older people. However, they note that the length of stay trend has reversed in the UK and speculate that further falls are unlikely in Australia.

Figure 6.3 **Average length of stay for the over 65s in hospital**

Length of stay per episode



Data source: DoHA 2003 p.73.

While this second impact may be a cost in expenditure terms, it also yields significant benefits — to a large extent it reflects the success of modern medicine in improving and extending peoples lives. For example, Beller (2001) finds that a large proportion of the decline in coronary heart disease is attributable to improvements in medical therapy. More generally, Thorpe et al (2004) find that, for four of the top five conditions accounting for increased medical expenditure in the US, a rise in the prevalence of treatment, rather than rising treatment costs per case, accounted for most of the spending growth.

The interaction of ageing with demand and technology

The past dominance of demand and technology on growth in health expenditure does not mean that ageing will be unimportant in the future. As described in chapter 2, the rate of ageing of the Australian population is only now beginning to accelerate (which, as discussed in appendix B is one reason why ageing has not shown up as significant in studies looking at the determinants of past health expenditure). While demand and technology will obviously remain important, how they interact with the future ageing of the population will have a significant influence on future health expenditure.

One way of characterising this interaction is to consider how demand and technology will affect the age profile of expenditure per capita:

- if they act to increase per person expenditure equally across all ages, an ageing population — given the rising profile of costs with age — will magnify the increase in costs arising from demand and technology (box 6.2);

- if demand and technology increase per capita expenditure for younger ages at a greater rate than for older groups (implying a ‘flattening’ of the age–cost profile) then the impact of ageing on health expenditure will be muted; however
- if demand and technology act to increase per capita expenditure more for older age groups, the cost impact of ageing will be exacerbated — there will be an increasing number of people in the age groups where per capita expenditure is growing fastest.

In the same vein, Professor Sheehan (2002) and Professor Richardson (sub. 16, p. 2) also recognise the necessity of examining movements in the age profile of expenditure over time. As Richardson notes, ‘drawing time series conclusions from cross sectional data [in this case, the age profile at a *point* in time] is problematical’.

Box 6.2 The impact of ageing: a stylised example

If older people use more health services, then ageing and demand/technology effects interact to produce greater costs. Consider the following example.

Suppose that at a given time, costs for each young person were \$100 a year, while costs for each old person were \$500 a year, and that over time demand pressures would lead to a trebling of costs for all ages. Assume for simplicity that there is no population growth. In one world, 95 per cent of the population is young and this structure holds true over time, whereas in a parallel world, 95 per cent of the population is young initially, but this proportion falls to 50 per cent over time. Average costs per capita would rise threefold in the world with the static age structure, but by nearly 8 times in the ageing world. Age and demand factors form a potent cocktail.

		Country A - no ageing		Country B - ageing	
		Young	Old	Young	Old
Now	Population	95	5	95	5
	Cost per person	100	500	100	500
	Cost	9 500	2 500	9 500	2 500
	Total Cost		12 000		12 000
Future	Population	95	5	50	50
	Cost per person	300	1 500	300	1 500
	Cost	28 500	7 500	15 000	75 000
	Total Cost		36 000		90 000

Source: Commission estimates.

What is the evidence for changes in the age profile over time?

While there are limitations in the data, it would appear that both in Australia and internationally, growth in health care spending is occurring either equally across age groups, or at a greater rate for older than younger people: in other words, the age profile of expenditure is either stable or steepening over time. There is no compelling evidence that expenditure growth is higher among younger groups or of a flattening of the age–cost profile.

Anecdotally, as reported in box 6.3, the community increasingly expects that new technology will be used to treat the aged. This has not always been so. Four factors are likely to underpin such changing expectations:

- greater wealth is resulting in increased demands for better services generally;
- new technology has improved the scope for safely treating the old — for example, advances in anaesthesia allows some procedures to be performed that would previously have been too risky;⁵
- increasing life expectancy means that there is a greater post–treatment payoff to treating the old in terms of improved health; and
- the greater political influence of the growing share of older people.

⁵ Fuchs (1998a) finds that the incidence of some procedures, such as hip replacements, has increased substantially for older people over a relatively short period of time — see chart in overview.

Box 6.3 **Changing attitudes to treatment for the aged**

The following comments shed some light on the interaction between community expectations, demand and ageing.

I think there is, for the very old and frail, a change in community expectations of what medical care is appropriate for those people, and that is responded to. In the past, when pneumonia, the old man's friend, came to visit, that was regarded as quite a good outcome. That is not acceptable to the community anymore. There is a greater tendency to do significant interventions in the really old ... (Evidence of Professor D. Cameron, President, Royal Australasian College of Physicians, SCARCPHF, Committee Hansard, 21 March 2000, p. 379).

People are being offered treatments and operations that were not available 10 years ago. Older people are able to undergo operations and procedures that previously were denied to them. For example, 10 years ago 75-year-old people often were not dialysed if they had chronic renal failure, but this would be a common occurrence now (Evidence of Dr P. Davoren, President, Doctors Reform Society, SCARCPHF, Committee Hansard, 22 March 2000, p. 402).

When I was in an intensive care unit 20 years ago, somebody over 75 would have a tough time getting in. They are now 85 and they are having complicated and major surgery ... I do not see politicians suddenly saying, 'Let's go back and we will not take anybody over 75 into intensive care units'. So the demand is going to increase (Evidence of Ms B. Morieson, Secretary, Victorian Branch, Australian Nursing Federation, SCARCPHF, Committee Hansard, 23 March 2000, p. 533).

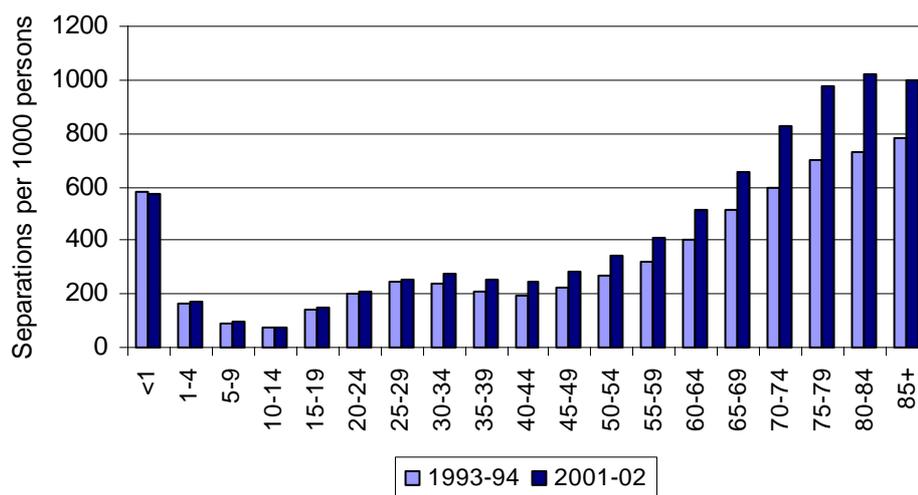
Source: DoHA 2003.

In Australia, this trend appears to be reflected in the use of hospital services. (figure 6.4). Over the period 1991-92 to 2000-01 separations for the over 65s increased from 26 per cent to 33 per cent of total separations.

- DoHA (2003) attributes most of this increase to greater use of private hospital services, particularly same day admissions for renal dialysis, cataract-related eye surgery, chemotherapy, lymphoma and non-acute leukaemia, colonoscopies, gastroscopies, and follow-up after completed treatment with endoscopy.
- In public hospitals, separations per capita have also increased at a greater rate among the aged than the young, although not to the same extent as for private hospitals (figure 6.5).

- The shift from public to private treatment for non-elective procedures such as dialysis is interesting in itself, and is likely to be indicative of capacity constraints within the public system.⁶

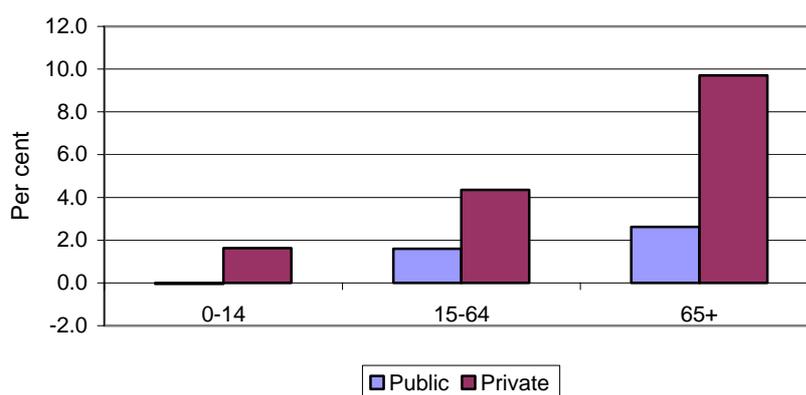
Figure 6.4 **Hospital separations^a per 1000 persons by age, 1993–94 to 2001–02**



^a Separations from public and private hospitals.

Data source: AIHW national morbidity data base.

Figure 6.5 **Average annual increase in public and private hospital separations by age group 1991-92 to 2000-01**



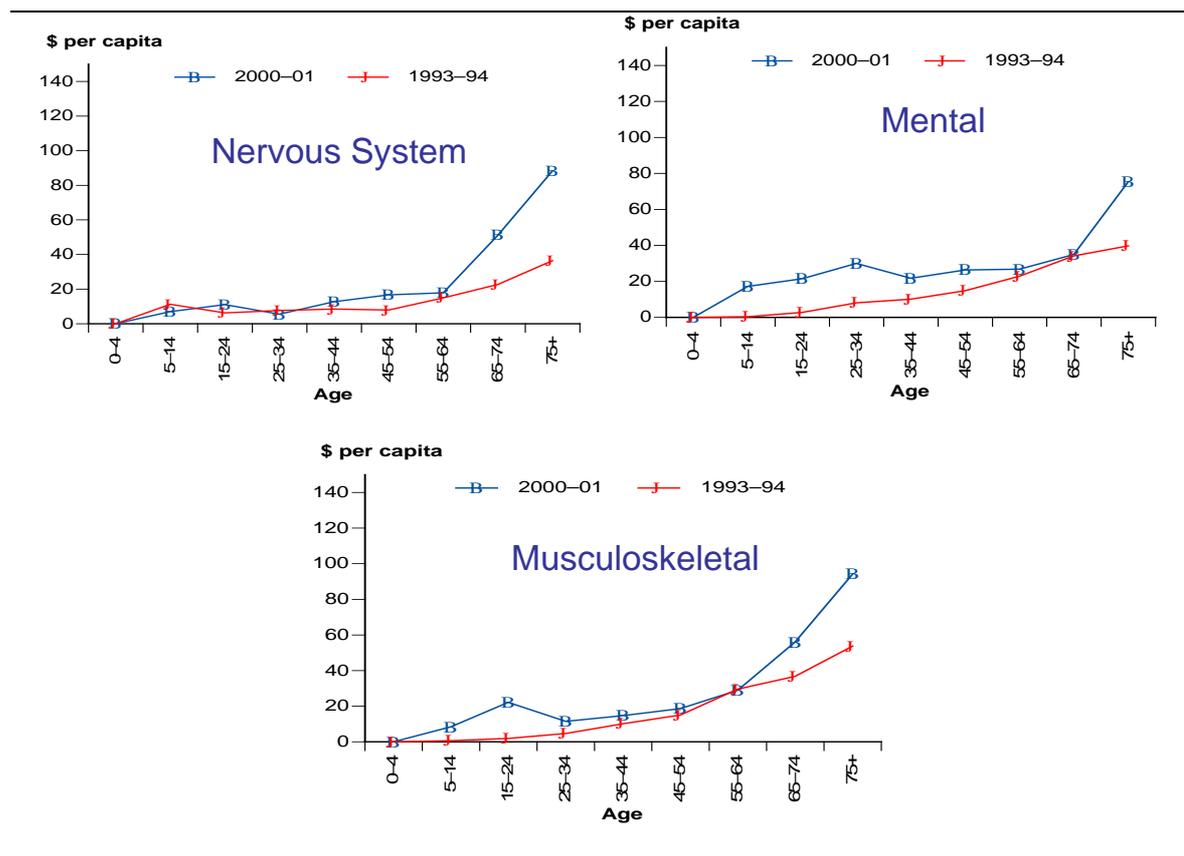
Data source: DoHA 2003.

⁶ In relation to expenditure, the Australian Government funds a portion of private hospital treatment through the 30 per cent rebate for private health insurance: and older people tend to have higher rates of private insurance than younger groups.

Of course higher *use* of services by older people need not translate to higher *expenditure* growth. For example, declines in the cost of particular procedures, such as cataract surgery, or reduced lengths of stay in hospital, may offset higher use by older people. The evidence on the change in the age profile of expenditure presents a slightly more mixed picture:

- In relation to Medicare, between 1994-95 and 2002-03 average growth in government spending was higher for older than younger age groups (with the exception of people over 85, for whom expenditure declined (HIC 2004)).
- In relation to pharmaceutical expenditure under the PBS, the AIHW reports that growth has been highest at older age groups (figure 6.6) across a number of disease groups.

Figure 6.6 **Per capita cost for prescribed pharmaceuticals by disease group**
1993–94 and 2000–01



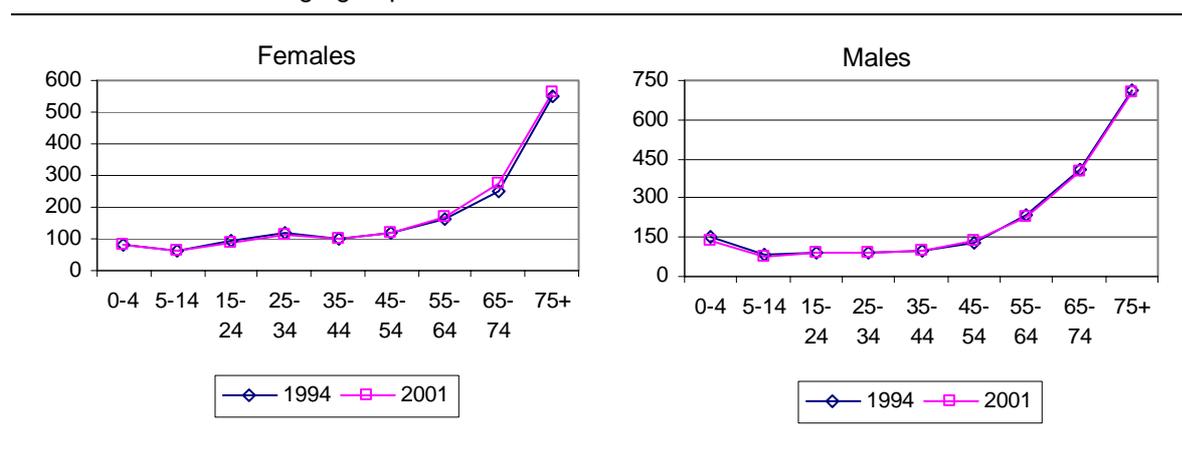
Data source: Goss and Mann 2004.

- The Australian Dental Association reports that dental expenditure increases with age. For example ‘in the 65 age group and above, the percentage of such people making a dental visit in the last 12 months increased from 21 per cent in 1979 to 61 per cent in 1999’ (sub. 3, p. 3).

- In contrast, the age profile of total health expenditure — which includes private as well as government expenditure — has not changed significantly in structure between 1993-94 and 2000-01 for either males or females. In fact, as shown in figure 6.7, the profiles are difficult to distinguish from one another. This means that technology and demand induced expenditure growth has been broadly constant across age groups. This is also consistent with the picture that emerges in Canada where data is available over a 20 year period for public hospital expenditure (Health Canada 2001).

In summary, the evidence for Australia is that demand and technology are acting to slightly increase — or at least maintain — the current age profile of expenditure across different components of health care. This strongly suggests that the rising share of older people in the future will compound the underlying growth in health expenditure arising from technology and demand.

Figure 6.7 Index of total health expenditure per capita 1993-94 and 2000-01
35-44 age group = 100



Data source: Mathers et al. 1998, AIHW 2004c.

Would being healthier in the future lessen health costs?

An argument sometimes advanced as to why ageing may not have the impact on expenditure implied by the analysis above is that older people may be significantly healthier in the future (Sheehan 2002, Richardson and Robertson 1999, Bryant et al. 2004). It is argued that a larger but healthier population will not make a significantly greater call on funds than the existing elderly cohort. If this were the case it would be manifested in the age profile of costs shifting — older people would still cost more than young people but at progressively older and older ages.

As discussed in chapter 2, whether older Australians are becoming more or less ‘disabled’ over time has been the subject of vigorous debate. Levels of disability are

very important to future aged care needs, and for the general wellbeing of older people. However, for health care *expenditure* it is the *prevalence* of chronic conditions, not the level of disability, that is most important.

Higher levels of disability are generally accompanied by more chronic conditions, but the opposite does not necessarily follow. A fall in age-specific disability rates and/or a rise in life expectancy could be accompanied by either an increase or decrease in chronic conditions:

- If lifestyle changes such as reduced smoking, or better medical treatment, prevent people developing conditions which disable them in some way, then lower disability would be associated with lower expenditure.
- On the other hand, if treatment with increasingly expensive technologies allows people to manage their conditions so that they are not disabling, then lower disability could come with a higher medical price tag.

Which scenario is more likely is difficult to determine with certainty. But the weight of evidence appears to support the view that better health in the elderly is *not* going to reduce health expenditure. For example:

- In the US, Lubitz et al (2003), found that people over 70 had similar cumulative health care expenditure until death whether or not they were disabled.⁷ Significant expenditure was incurred to maintain good health over 70. Lubitz concluded that the results ‘raise questions about [the] possibility ... that better health among the elderly will moderate expected increases in medical care spending for the elderly’.
- The OECD (2004) suggests that for countries reporting a decline in disability among the aged, there is evidence that this decline has not been accompanied by a decline in the prevalence of chronic conditions.
- In a survey article Jacobzone (2003) also concludes that ‘declines in disability may, in fact, be very costly to achieve in terms of health care’.

While the story on disability and morbidity continues to evolve, it seems unlikely that lower disability will avoid the fiscal pressure associated with ageing. *The Commission seeks further feedback from participants on this issue.*

⁷ As discussed later in the following section expenditures were not just related to the period before death.

What if most costs were associated with the end of life?

A related argument purporting to explain why an older population may not significantly increase health expenditure is based on the idea that health spending is not related to age *per se*, but to the costs at the end of life. Fuchs (1984) observed that if health expenditure is particularly large in the last year of life (and to a lesser extent the next-to-last year of life) then:

The principal reason why expenditures rise with age in cross-section (among persons aged 65 and over) is that the proportion of persons near death increases with age. (p.152)

Although Fuchs did not suggest that there is no effect of ageing on health care other than costs associated with death, he noted that:

As age-specific death rates fall over time, there will be fewer people in the last year of life, and this will tend to reduce age-specific health expenditures (p. 153).

More recently, Zwiefel et al 1999 and Jacobzone 2003 (p. 265) reiterated the point that they expect falling mortality rates to mitigate the impact of the demographic profile. For example Zwiefel's 1999 research for Switzerland:

Suggests that the terminal phase of life is costly independently of whether they occur at age 60 or 90. Consequently, per capita health care expenditure is not necessarily affected by the ageing of the population due to an increase in life expectancy.

Most recently, Gray (2004) argues that:

Taking proximity to death into account, [the] impact of ageing *per se* will be substantially less ... 'Traditional' projection methods do not accurately show effects of ageing populations on health expenditures.

This analysis raises two essentially empirical questions:

- Is it true that costs are associated with proximity to death?
- Even if they were, to what extent would this overcome concerns about ageing and health expenditure?

Do the costs at the end of life explain the age profile?

There is no evidence that the rising age-cost profile is generated solely by costs at the end of life. As would be expected, many studies find that the costs at the end of life are higher than in non-terminal years — often around 6 to 7 times higher. However, such multiples are not high enough for the costs associated with those who die to account for all health costs, even for older groups. For example:

-
- Menec et al (2004) in Manitoba found total deaths in all age groups represented 1 per cent of the population, yet accounted for 21 per cent of health expenditure in 2000-01. While this is significant, it means that the bulk of expenditure was for people who survived.
 - Hoover (2002) in the US finds evidence of significantly higher costs associated with the end of life, but also higher ongoing health care costs for the very old.
 - Similarly, also in the US, Lubitz et al (2003) found that for people reporting excellent health at age 70 years, 60 per cent of cumulative health expenditure until the end of life would be during the period when they had good, very good or excellent health. Moreover, a significant proportion of the costs incurred while people were in 'poor' health were aged care costs, rather than medical treatment.
 - Finally, while Gray (2004) and Seshamani and Gray (2004) suggest that proximity to death overshadows age as a determinant of health expenditure, their study nevertheless finds that age leads to a 30 per cent increase in costs from age 65 to 85 (appendix C contains some preliminary calculations for Australia using the proportion of costs associated with proximity to death in Gray 2004).

The limited data available in Australia also support the view that costs rise with age rather than only at the end of life. The hospital use statistics cited earlier show most growth to be in private hospitals and mainly for same day procedures. These procedures are typically associated with managing particular conditions rather than treatment or palliative care at the end of life.

Indeed, all these results are unsurprising in view of the evidence that medical technology has allowed the management of many chronic conditions leading to less disability (Jacobzone 2003). This phenomenon is incompatible with costs being predominantly at the end of life. It is of interest that Fuchs, who first raised the cost-of-dying argument no longer considers that costs of death are the main cost associated with age. Fuchs (1998a) suggests that:

The tendency of health care expenditures on the elderly to grow about 4 per cent per annum more rapidly than the Gross Domestic Product could plunge the nation into a severe economic and social crisis within two decades.⁸

Fuchs attributes most of the 'blame' for such growth to technology. Nevertheless, this technology is being used to address ongoing health care needs rather than just at the end of life.

⁸ Fuchs (1998b, p. 3) 'projected expenditures ... by extrapolating trends in age-specific constant dollar expenditures and population projections'.

It follows that while age-cost profiles may be steeper because more people die in older age groups, they would still be upward sloping even excluding this effect.

Deaths and the ageing population

Indeed, the proportion of costs associated with death is not as fundamental to the debate about ageing and health expenditure as it is sometimes presented. Even if costs at the end of life did explain most of the upward slope of the age profile of health expenditure, an ageing population would still lead to a major increase in health expenditure at some point in the future.

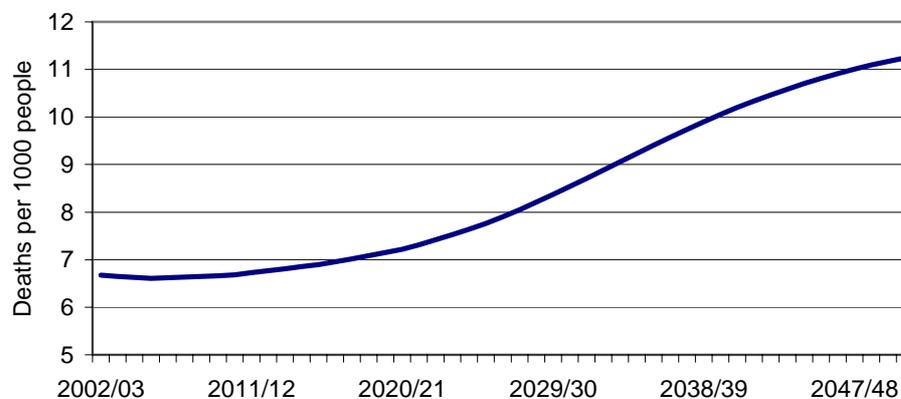
Ageing will not only mean a higher proportion of the population in older age groups (because of greater longevity), there will also be a higher incidence of deaths. The ABS projects the number of deaths in Australia to rise from around 130 000 in 2002-03 to over 279 000 in 2044-45. The number of deaths per 1000 people also rises by around 60 per cent between now and 2044-45 (figure 6.8). If all costs were related to the period immediately before death, ageing would still lead to substantially higher expenditure.

However, figure 6.8 also shows that the death rate does not increase substantially until the 2020s, when the baby boomers begin to reach the end of their lives. If all expenditure were related to death, the main effects of ageing would not be felt until the 2020s. But there would be significant pressure on expenditure after that time. Thus, the debate about whether costs are related to death or ongoing health is not about whether ageing will have an effect on aggregate health expenditure, but *when* it will have an effect.

In sum, neither the possibility of a healthier older population in the future, nor speculation that most costs are related to the very end of life undermine the proposition that ageing of the population will place much greater pressure on health expenditure. This conclusion is supported by the Commission's modelling of these effects (see appendix C). The Victorian Government also found in its modelling of health expenditure that using optimistic assumptions — where health costs were based on proximity to death, or lower levels of service use — had a relatively small impact on the projected fiscal deficit (sub. 29, p. 20) in that State.⁹

⁹ Each assumption reduced the projected fiscal gap of over 6 per cent of GSP by 0.4 percentage points.

Figure 6.8 Projected deaths per 1000 persons
2002–03 to 2050–51



Data source: ABS series B projections Cat. No. 3222.0, unpublished data.

6.3 Projecting government health expenditure

Underpinning any projections is the assumption that future expenditure will be conditioned by past trends and patterns. In the case of health expenditure, the stability of the positive relationship between age and expenditure, and the persistence of trends in (non-demographic) expenditure growth over a relatively long period of time (appendix D) lend support to this assumption.

Nevertheless, the future contains many unknowns. For example, if effective treatments were to be developed for Alzhiemers, it could significantly reduce needs for aged care and health costs for the elderly. Similarly, gene technology and biotechnology hold the promise of new treatments across a range of areas. On the other hand, not all developments are cause for optimism. Obesity rates are rising significantly and obesity is linked with a range of health problems. In addition, resistance to currently available antibiotics may make some conditions harder to treat. Uncertainty about the future does not invalidate projections, but it does indicate the need for sensitivity analysis and a focus on the nature of the result rather than absolute magnitudes.

Methodology

Government health spending has been projected by broad category of expenditure, and by the level of Government funding the service. For the Australian Government, the relevant expenditure categories are hospitals (mainly through

grants to the States), medical services (Medicare), pharmaceuticals (the PBS) and other expenditure. Reflecting their differing responsibilities, for the States and Territories own-source expenditure is projected for hospitals and other expenditure. The ‘other’ expenditure category, includes community and public health expenditure, dental services, aids and appliance and research and administration.

Each of the elements influencing health expenditure discussed in section 6.2 has been incorporated in the projection methodology, namely:

- projected change in Australia’s population based on ABS series B except for the Northern Territory (owing to the unique circumstances in the NT, separate projections have been undertaken for the indigenous and non-indigenous populations);
- the age profile of expenditure for each component of expenditure; and
- the impact of technology and demand on per capita costs for each component — the non demographic growth rate.

The IGR (2002) noted that projection results are very sensitive to the choice of non-demographic growth rate. Appendix C outlines the methodology in more detail, the assumptions used, sensitivity analysis, and the results of alternative projection techniques.

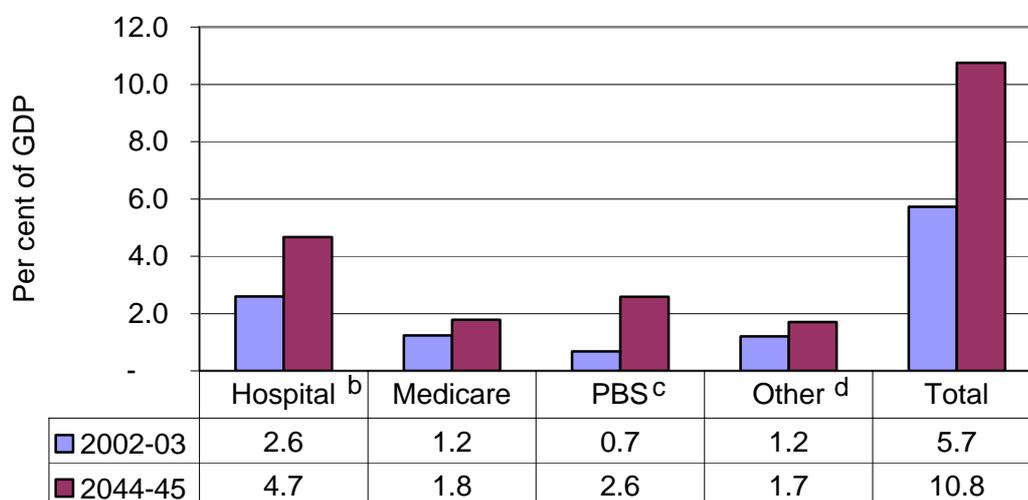
International comparisons of health expenditure are often made on the basis of total expenditure rather than public expenditure. To facilitate international comparison of the projection results appendix A uses an aggregate model to project total health expenditure in Australia.

Projected government health expenditure

Total Government health expenditure is projected to increase from 6 per cent of GDP to around 10.8 per cent in 2044–45. All components of health expenditure are projected to rise (figure 6.9). Hospital expenditure remains the largest component of expenditure, although its share is projected to fall slightly. Pharmaceutical expenditure is projected to increase by the greatest relative amount, with Medicare and other expenditure maintaining broadly stable shares of expenditure.

Figure 6.9 Projected Government health expenditure as a proportion of GDP^a

2003-04 and 2044-45



^a Projections use a non-demographic growth rate of 0.5 percentage points above the projected growth in GDP per capita. ^b Hospital expenditure includes all capital consumption on health (but excludes capital expenditure). ^c PBS includes expenditure under the Repatriation Pharmaceutical Benefits Scheme (RPBS). ^d Other expenditure includes other health professionals, aids and appliances, community and public health, dental, ambulance services and research and administration. Unlike the IGR, other expenditure excludes the private health insurance rebate which is allocated, consistent with the approach used by the AIHW, to the activity on which it is spent.

Data source: Commission estimates.

As discussed above, the change in expenditure as a proportion of GDP reflect the interaction of the age profile of expenditure and the underlying growth in per capita expenditure from non-demographic factors. Hospitals, Medicare and other expenditure are projected using a non-demographic growth rate of 0.5 percentage points above the projected growth in GDP per capita. The differences in the outcomes for these items are explained by the age profile of each. Hospital expenditure is strongly age-related, whereas ‘other’ expenditure is much less so. Pharmaceutical expenditure increases significantly because it is both strongly age-related, and has been projected using a higher non-demographic growth rate (see appendix C).

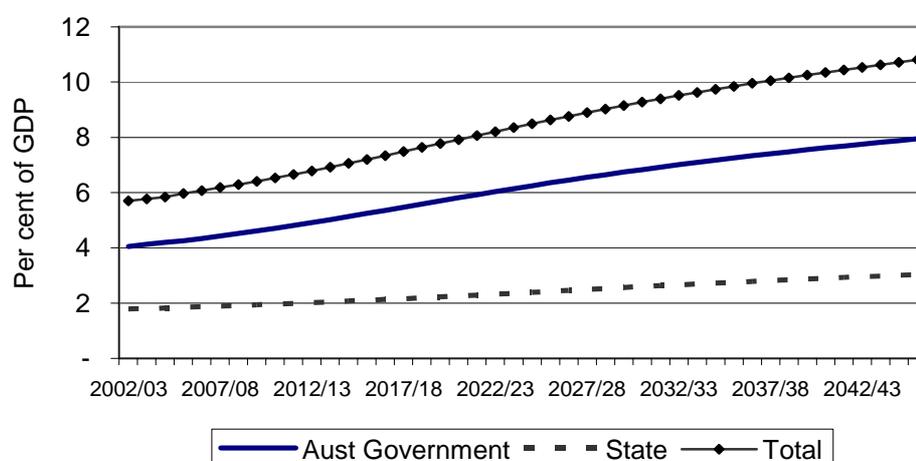
Small variations in the non-demographic growth rate have a significant impact on the results. If health costs per person increased at the same rate as the growth in GDP per capita (instead of 0.5 percentage points above it), total government expenditure is projected to be 8.9 per cent in 2044-45. On the other hand, at a growth rate of 1.0 per cent above GDP per capita, expenditure is projected to reach 12.9 per cent of GDP (more details are provided in appendix C and D).

Projections by jurisdiction

Figure 6.10 shows expenditure by jurisdiction. Australian Government expenditure is projected to nearly double, to around 7.7 per cent of GDP. Own-source State Government expenditure is projected to increase by nearly 70 per cent, to just over 3.0 per cent of GDP.

Figure 6.10 **Projected own-source health expenditure as a proportion of GDP**

2003-04 to 2044-45



^a Projected using a non-demographic growth rate of 0.5 percentage points above the projected growth in GDP per capita.

Data source: Commission estimates.

At the Australian Government level (table 6.2) the most notable feature is the projected increase in pharmaceutical expenditure from well below hospital and Medicare spending to similar levels in 2044–45. The IGR also found a rise in PBS expenditure, but more so than in this study. The difference lies in different assumptions relating to non-demographic growth of pharmaceutical expenditure. The IGR used a constant growth rate, whereas, partly based on developments in pharmaceutical funding since the IGR, this study has used a high initial growth rate which declines over time — see appendix C. More generally, the Commission’s results are consistent with those obtained by the IGR.¹⁰

¹⁰ The IGR projected Australian Government health expenditure would be 8.13 per cent of GDP in 2041-42, whereas the Commission projects a slightly lower total of 7.55 per cent for the same year. However, excluding PBS expenditure the Commission’s projections for other categories of health expenditure are slightly higher than the IGR — 5.03 per cent of GDP compared to 4.78 for the IGR.

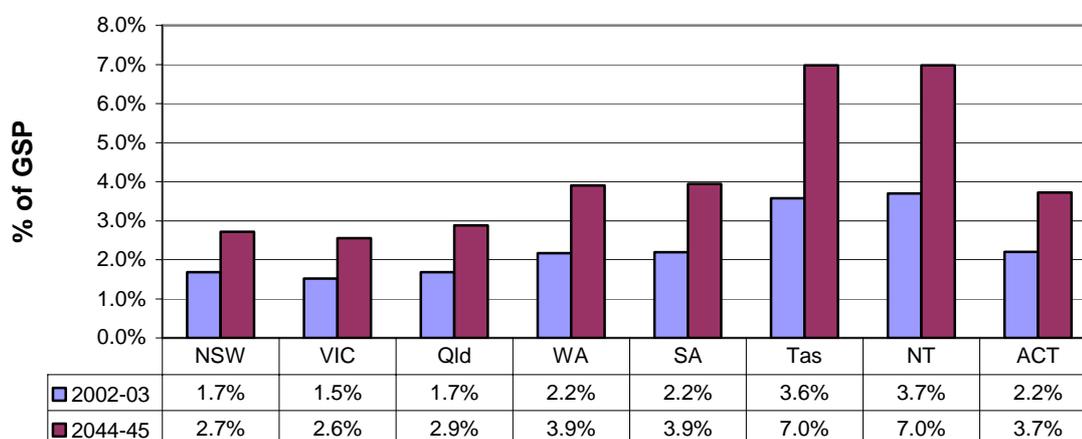
Table 6.2 Health expenditure as a share of GDP
2002-02 to 2044-45

	2002-03	2014-15	2024-25	2034-35	2044-45
	%	%	%	%	%
Australian Government hospital	1.41	1.66	1.95	2.26	2.53
Medicare	1.23	1.40	1.56	1.68	1.79
PBS	0.68	1.28	1.89	2.32	2.59
Australian Government other	0.61	0.66	0.72	0.78	0.84
Australian Government total	3.93	5.01	6.13	7.05	7.74
State and Territory hospital	1.19	1.41	1.66	1.93	2.15
State and Territory other	0.60	0.67	0.74	0.80	0.86
State and Territory total	1.79	2.08	2.40	2.73	3.02
Total government expenditure	5.72	7.09	8.52	9.78	10.76

Source: Commission estimates.

For State and Territory Governments, hospital expenditure is projected to remain the largest component of own-source expenditure by a substantial margin. Projected own-source government expenditure as a proportion of projected GDP for each State and Territory are contained in figure 6.11.

Figure 6.11 Projected own-source state health expenditure as a proportion of GDP by jurisdiction



Data source: Commission estimates.

With the exception of the Northern Territory, where separate projections have been made for indigenous and non-indigenous people (see box 6.4), the differences between jurisdictions occur because of different:

- starting points for own-source expenditure as a proportion of GDP;
- levels of ageing within each; and

-
- levels of projected GSP growth (which is also related to ageing).

For example, Tasmania is projected to have a high degree of ageing and a relatively large increase in expenditure, whereas the population structure in NSW is projected to age less with a correspondingly lower impact on expenditure. While Western Australia and the ACT have relatively young populations at present, they are projected to have similar levels of ageing, as measured by the *increase* in the share of the population over 65. This accounts for Western Australia and the ACT having a similar increase in expenditure to South Australia which has an older population at present.

Two points are important in interpreting the projected increases among States and Territories.

- First, different levels of expenditure as a proportion of GSP do not indicate the degree of fiscal pressure between jurisdictions. As discussed in chapter 13 (and appendix J) horizontal fiscal equalisation could be expected to largely eliminate differences in fiscal pressure among jurisdictions.
- Second, while hospitals are *funded* by both the Australian and State and Territory Governments, *delivery* of hospital services is a State responsibility. The Commission's projections assume that hospital funding increases at the same rate as the demand for services, regardless of source. However, several jurisdictions perceive a risk that Australian Government specific purpose payments for hospitals may not keep pace with demand (appendix J). Were this to be the case, it would clearly increase fiscal pressure on the States as a whole relative to the Australian Government.

Box 6.4 Health projections for the Northern Territory

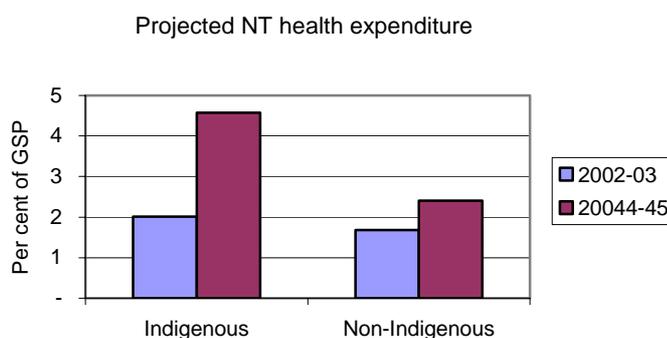
Indigenous people comprise 30 per cent of the total population in the Northern Territory. As emphasised by Northern Territory officials, indigenous people have a much greater need for health care than the non-indigenous population. Infant mortality rates are over 2 times higher than for non-indigenous people, and there are higher age-specific death rates for every age group. Average life expectancy is 50 years for males and 63 years for females — nearly 20 years less than for the non-indigenous population.

Indigenous people also bear a higher disease burden per head of population than non-indigenous people for all age groups. This peaks in the 35-54 age groups where indigenous people have 4.1 times the burden of disease and injury than non-indigenous people. Cardiovascular disease, acute respiratory infections, diabetes and neonatal disorders are areas of significant difference between indigenous and non-indigenous Territorians. Zhao et al (2004, p. 501) concludes that indigenous adults 'experience levels of health comparable to those of non-Aboriginal people 20-30 years older, and that a gap exists in both fatal and non-fatal health outcomes'.

Poor health leads to higher rates of hospital admission and use of community services. Costs per patient are also higher in the Northern Territory because of the costs of providing services in remote communities. As a consequence, expenditure per capita is much higher for indigenous people and it is concentrated at earlier ages. Average Northern Territory Government health expenditure in 1998-99 was \$3208 per indigenous person compared to \$1139 for non-indigenous people (AIHW 2001).

The Commission has constructed a separate age profile of expenditure for indigenous people in view of their very different use of services, and projected indigenous and non-indigenous health expenditure separately (figure below). It is the policy of all governments to improve indigenous health outcomes. To reflect this policy over time the indigenous age-profile becomes like that of the non-indigenous population.

While costs per capita are higher for indigenous people, expenditure per disability adjusted life year is almost 20 per cent below the national average, before the impact of remoteness on costs is taken into account. This indicates potentially greater levels of need for services. To reflect this, the Commission has non-demographic growth rate for the projections of indigenous expenditure in the Northern Territory.



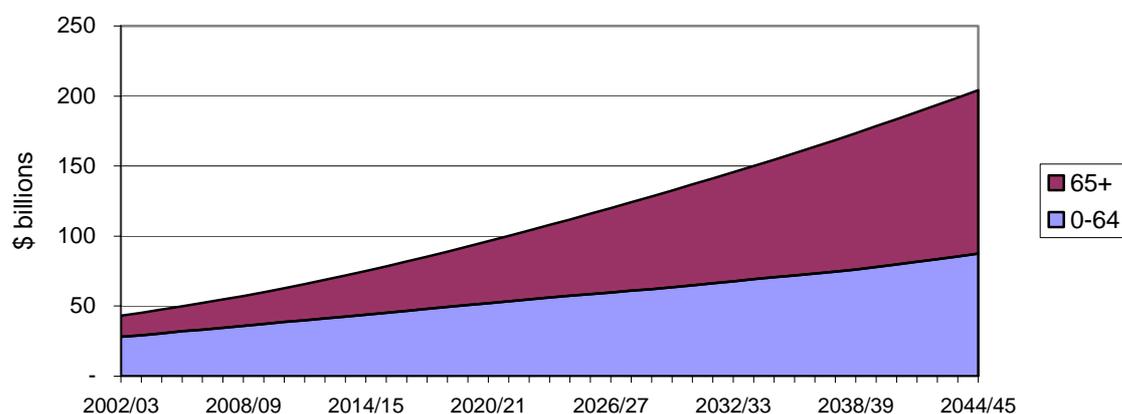
The impact of ageing on health expenditure trends

There is a number of ways of presenting the impact of the ageing of the population on expenditure.

One of the simplest is the proportion of expenditure on those 65 and above compared to the rest of the population. In 2002-03, the Commission estimates that one-third of total government expenditure was accounted for by services to the 65+ group. By 2044-45 this proportion is projected to increase to 57 per cent (figure 6.12).

Figure 6.12 **Projected government health expenditure on persons above and below 65**

2002-03 to 2044-45



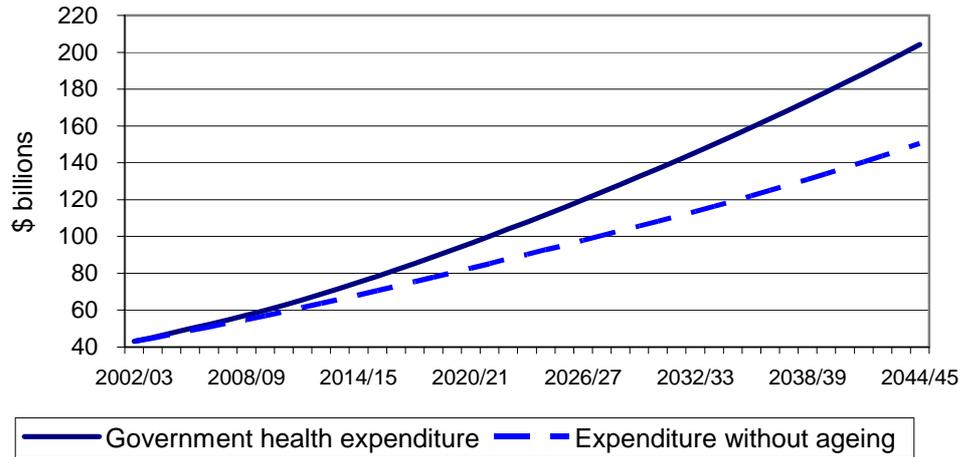
Data source: Commission estimates.

Another measure of the impact of ageing is the difference in projected expenditure with and without ageing (see figure 6.13). In this case, the without-ageing scenario assumes that population growth and non-demographic growth both occur as forecast, but that the age structure of the population (the shares of the population of each age) remains at current levels. If there were no ageing, expenditure is projected to reach \$150 billion in 2044-45, whereas with expected demographic change it is projected to be 36 per cent higher at \$204 billion.¹¹ As shown in table 6.3, variation

¹¹ To achieve a like with like comparison, the same non-demographic growth rate has been used for the ageing and non-ageing scenario to assess the impact of ageing on expenditure. To express the ageing effect as an increase in *health expenditure as a proportion of GDP*, it is necessary to adjust both the numerator (health expenditure) and denominator (GDP) for the absence of ageing. Without ageing, GDP will be higher (see chapter 5). And if the non-demographic growth rate is expressed as a premium over GDP per capita, it will also be higher in the absence of ageing. Under this experiment, without ageing, health expenditure would reach 7.64 per cent of GDP in

in the degree of ageing among States and Territories is reflected in differences in the increase in expenditure attributable to ageing.

Figure 6.13 Projected government health expenditure with and without ageing
2002-03 to 2044-45



Data source: Commission estimates.

In understanding the ageing effect expressed in this way, it should be emphasised that the percentage increase attributable to ageing is independent of other variables. If demand and technological developments led to higher non-demographic growth, the dollar value of the ageing effect would also be higher, leaving the percentage increase unchanged. For example:

- if non-demographic growth and population increase combined to increase expenditure by \$100 billion, the impact of ageing would be to increase total expenditure to \$136 billion; whereas
- if non-demographic growth and population increase combined to increase expenditure by \$200 billion, the impact of ageing would be to increase total expenditure to \$272 billion.

In each case the increase attributable to ageing is 36 per cent. In this way ageing can be said to compound any fiscal pressure created by demand and technology fuelled expenditure growth. Other ways of calculating the ageing effect are examined in appendix E. The clear message that emerges is that, whatever measure is used, ageing is likely to have a significant impact on health expenditure.

2044-45, compared with projected government expenditure of 10.75 per cent. The percentage increase attributable to ageing under this experiment is 40.7 per cent.

Table 6.3 Percentage increase in expenditure attributable to ageing in 2044-45^a

<i>Jurisdiction</i>	<i>Ageing will increase total expenditure by:</i>
	%
New South Wales	35
Victoria	36
Queensland	40
Western Australia	43
South Australia	43
Tasmania	44
Northern Territory	26
Australian Capital Territory	41
Australian Government	35
Total Government Expenditure	36

^a State and Territory expenditure is own-source expenditure.

Source: Commission estimates.

7 Aged care expenditure and carer payments

Key points

- The proportion of people aged over 80 is projected to treble to one-tenth of the population between now and 2044-45.
- This group constitutes the main users of aged care services. As a result, the ageing of the population will result in significantly increased demand for aged care.
- Government expenditure is projected to increase from around 0.8 per cent of GDP to just over 2 per cent in 2044-45. Residential care remains the largest area of expenditure:
 - These projections include modest reductions in age-specific disability rates. If there are no reductions in disability, expenditure is projected to be over 2.5 per cent of GDP in 2044-45.
- Payments to people caring for people with disabilities are projected to increase from 0.2 per cent of GDP to 0.25 per cent in 2044-45.
 - A small decline in the proportion of payments carers for people under 65 is more than offset by payments for those caring for the over 65s.

The previous chapter demonstrated the potential for ageing-related growth in government health expenditure. Governments also fund a range of aged care services designed specifically to meet the needs of Australia's frail older people for care and support. They also provide payments directly to carers.

7.1 Expenditure on aged care

Aged care services funded by Governments include:

- residential services, which are generally classified as high care (previously nursing home care) or low care services (previously hostel care);¹ and

¹ High level residential care is included as health expenditure in the Australian Institute of Health and Welfare's classification of health expenditure. However, in this report it is included in aged care expenditure projections and excluded from the health expenditure projections.

-
- community care services, which include Home and Community Care (HACC) program services, the Community Aged Care Package (CACP) program, the Extended Aged Care at Home (EACH) program and Veterans' Home Care (VHC).

In 2002-03, Governments spent approximately \$6 billion on aged care services. An ageing population will clearly increase the demand for aged care. This section presents long-term projections of Government aged care spending on residential and community aged care services.

Influences on government aged care expenditure

The level of government expenditure on aged care services in the future will primarily be influenced by four factors:

- growth in the number of aged persons;
- disability levels within the aged population;
- any change in the care mix from institutional residential care to care in the community; and
- changes in the average cost of care per person.

Each of these factors has been incorporated into the Commission's projections of aged care expenditure. The methodology for projecting aged care expenditure is similar to that used to project government health funding. Projections are based on current expenditure per person receiving aged care services (indexed for growth in costs) and the forecast number of older people (box 7.1).

The number of elderly

Of particular relevance for aged care expenditure is the number of people over the age of 80, as currently the use of formal aged care services increases rapidly for both males and females beyond this age. The proportion of 80 year olds is expected to treble from 3.3 per cent of the population in 2002-03 to 9.7 per cent in 2044-45.² This indicates that ageing will exert substantial pressure on aged care expenditure.

² Based on ABS series B projections.

Box 7.1 Projecting aged care expenditure

The main steps involved in projecting aged care expenditure are as follows:

- participation rates by age and gender for each aged care program are derived from program data and provide the demographic profile of the use of the program. For example, only 0.5 per cent of females in the 65–69 age group use high care residential facilities. This rises to over 37 per cent for those over 95 years;
- in contrast to other studies (IGR 2002 and Hogan 2003) the Commission has used participation rates for residential aged care for ages up to the 95 plus group, rather than having a single rate for people over 85.
- in any future year, the number of participants in a program is calculated by multiplying the participation rate by the projected population in that group for that year;
- expenditure for each group is given by multiplying the number of participants in each age group by the average cost per participant (expenditure per person is indexed by the expected growth in costs in the aged care sector); and
- total expenditure is the sum of expenditure on each age group.

While this yields an implicit age profile of expenditure at any point in time, factors influencing the participation rate (such as disability rates, and the availability of partners and children) can be directly modelled, as can factors affecting the average cost. In this way, the age profile of expenditure can change throughout the projection period.

Disability levels

The links between disability levels and use of aged care are not straightforward. There are many more people with disabilities over the age of 65 than require formal aged care services (Madge 2000, p. 26). A better guide to the proportion of the population likely to seek long-term aged care is the number classified as having severe or profound levels of disability. Reductions in severe disability among older people could partially offset greater demand for aged care from increased numbers of older people.

Measuring trends in the age-specific prevalence of disability remains a controversial subject (OECD 2004 and Gudex and Lafortune 2000). The definitions and thresholds appropriate for gauging the effects of disability on employment, health spending and aged care are different, complicating the assessment of disability trends. The underlying patterns are obscured by data inadequacies, changing definitions, shifting attitudes to disability, new and varying methods of diagnosis, and inexplicable differences in trends across countries with similar living standards.

The most comprehensive empirical evidence on the decline in disability comes from the United States. For example, studies by Fogel and Costa (cited in Manton and Gu 2001) find that morbidity and disability rates among male war veterans have declined by 0.6 per cent annually over most of the 20th century. Further, Manton and Gu (2001) find that declines in disability, including for severe categories, have accelerated over recent years.

The Australian data suggest (generally slowly) rising age-specific disability rates, but the ABS notes that this may partly reflect changes in attitude to, and increased diagnoses of disability. For example, there has been a substantially increased diagnosis of Attention Deficit Hyperactivity Disorder (Davis et al. 2001). In terms of age-specific disability trends among older people, the Australian results appear particularly at odds with results from many other countries, which either show declines or static trends.³

Although the evidence is mixed, particularly for Australia, the *Review of pricing arrangements in residential aged care* (Hogan 2004) concluded that age-specific rates of severe and profound disability are likely to decline moderately in the future. Based on the international evidence Hogan (2004) incorporated modest reductions in disability into the projections. In the Commission's projections, assumptions about changes in disability levels are reflected in the institutionalisation rate for residential aged care, and the participation rate for CACP and HACC programs. Notwithstanding findings of an acceleration in the fall in disability rates in some studies in the United States, the Commission has assumed a relatively conservative 0.5 per cent annual decrease in the relevant participation rates throughout the projection period (and conducted sensitivity testing assuming no change in disability). Hogan (2004) factored in declines of 0.25 per cent.

The effect of falling disability rates is significant, but only partially offsets the increase in the number of old people.

- For example, if there were no reductions in disability the number of low and high care residents is projected to rise by around 250 per cent between now and 2044-45.
- However, with the reduction in disability noted above, the increase in low and high care residents is projected to be around 180 per cent.

³ Those with declining rates are Canada, France, Sweden and the United States, while those where evidence about declines in prevalence have not been substantiated are Denmark, Finland, Italy, the Netherlands, Switzerland and the United Kingdom (OECD 2004). Australia appears to be exceptional in its apparently rising age-specific trends.

Change in the care mix and the role of informal care

It is government policy, and the wish of most older people, to remain, and be cared for in the community for as long as possible. Community Aged Care Packages provide an alternative home-based service for older people who are assessed as eligible for care equivalent to low level formal residential care. The number of CACPs has increased significantly since the scheme was introduced in the early 1990s.

Based on current trends and policy it is likely that there will be some change in the balance between low level residential care and community care (both formal and informal) over the next 10 to 15 years. The Commission's projections incorporate a modest change in care mix away from low level residential care to CACPs.⁴

However, there is uncertainty about how formal community care will evolve. The uncertainty arises because there are links between formal care in the community and informal care. Critically, over the longer term there is likely to be a significant reduction in the proportion of potential informal carers:

- there is an increase in the proportion of single person households. Many older people are currently cared for by their partner. The ABS projects that by 2021, under half of people over 65 will be living in couple families (AIHW 2004d, p. 31);
- there are fewer children per family, reducing the number of potential carers per family; and
- much greater workforce participation by women, combined with having children later, may somewhat reduce the capacity, or willingness, of women — who traditionally fulfil the caring role — to provide aged care.

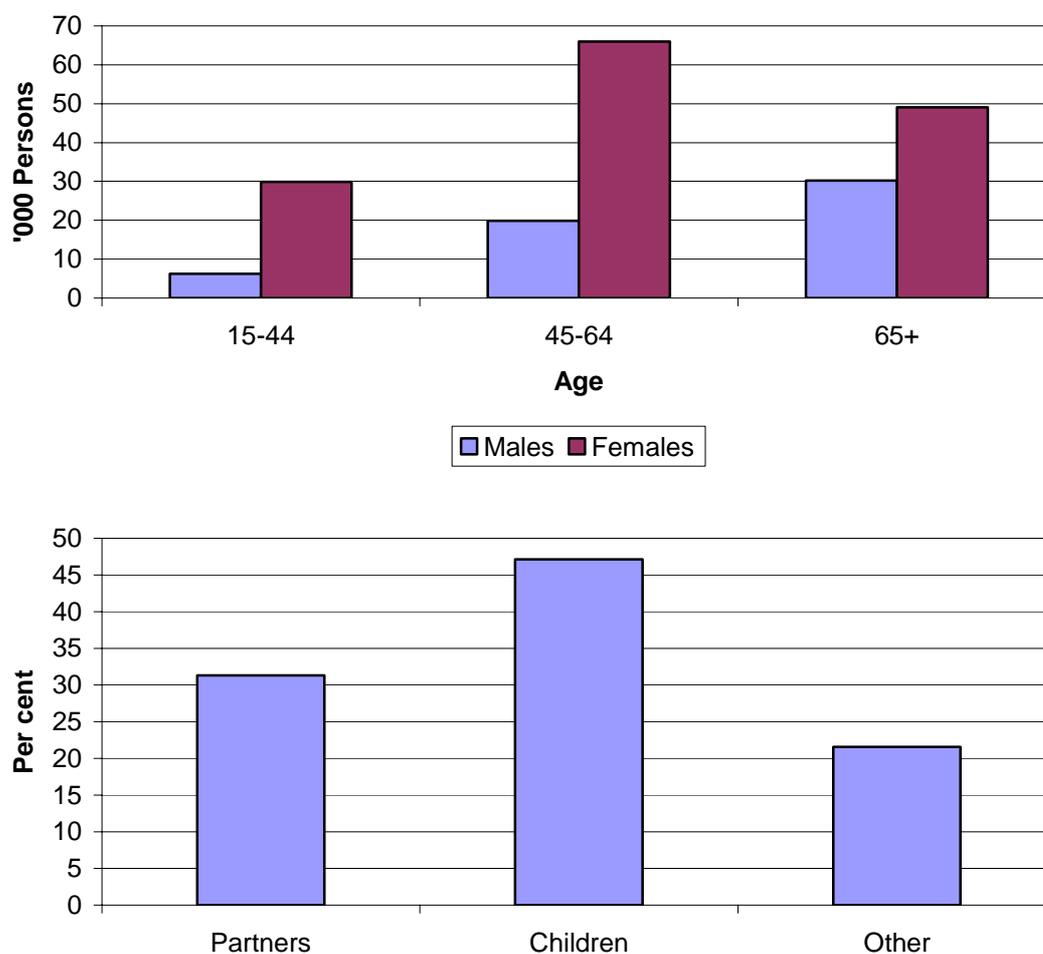
AIHW (2003) concludes that there is unlikely to be a significant shortage in the number of informal carers in the period 2003 to 2013. Among a range of complex factors, population ageing, up to that point, will bring with it a rise in the number of older carers offsetting a small relative decline in the proportion of younger carers. Under its baseline scenario, AIHW finds that the ratio of carers to people with a severe or profound disability is likely to fall only slightly, from 0.43 carers per 100 people with a disability in 2003, to 0.40 in 2013.

⁴ The Commission has assumed that there will be a trend from low-care residential care to community care (CACPs) that will plateau around 2015. Initially it is assumed that there is a decline of 2 per cent in the participation rate for low care and that these people take up CACPs instead. The initial figure then reduces according to a logistic function.

However, Australia's population will 'age' significantly after 2013, and the supply of carers may not keep pace with increasing numbers of the elderly.

While the pool of aged carers will increase with ageing, significant care is provided by younger cohorts. The under 65s (mostly women aged 45-64 years) provide over 60 per cent of all caring services to the elderly (figure 7.1 and AIHW 2004d, p. 5).

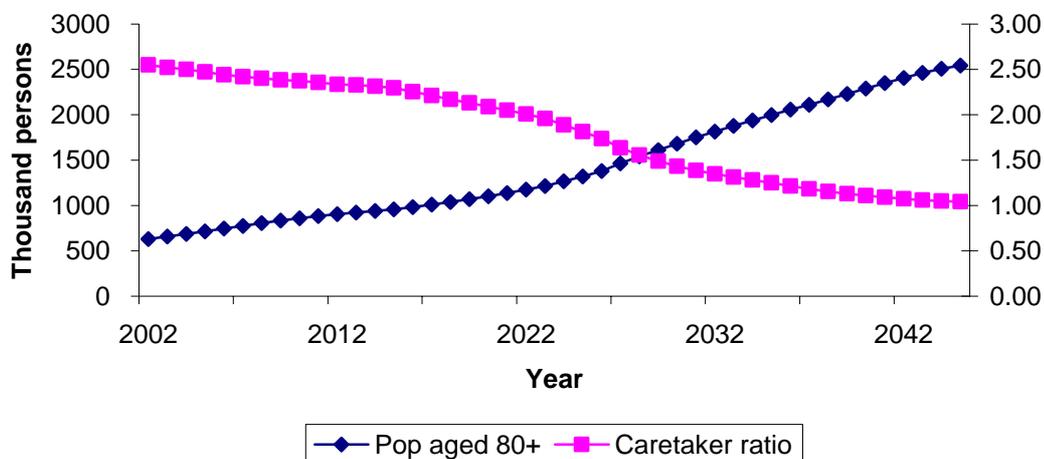
Figure 7.1 Who cares?
Providers of care to the over 65s



Data source: ABS 4430.0, 1998.

As noted by Hogan (2004, p. 91), over the longer term the pool of potential female carers will decline relative to the number of aged who may need care. Dubbed the 'caretaker ratio' internationally, the ratio of females between 50 and 64 to the population of people over 80 is projected to decline from 2.5 potential carers per person over 80 in 2002-03 to under 1.0 in 2044-45 (figure 7.2).

Figure 7.2 The caretaker ratio
Females 50-64 to population over 80



Data source: Calculated from ABS 2003b.

NATSEM (2004) also find that the potential total number of informal carers will not rise as quickly as those likely to require care. They project that between 2001 and 2031, the number of older people likely to need assistance because of a severe or profound disability is likely to rise by 160 per cent whereas the number of people likely to provide informal care is likely to increase, but only by 57 per cent.

The relative shortage of informal carers could have two opposing effects on the long-term demand for formal community care.

On the one hand, to the extent that formal care is *complementary* to (or ‘tops up’) informal care, the demand for formal community care could decline (with an increase in the demand for residential care). The AIHW (2004d, p. xvi) suggests there may be some complementarity between formal and informal care under current arrangements. The results of its study:

... supports a finding from the national Aged Care Assessment Program that people with high levels of dependency in core daily activities are more commonly able to remain in their homes if they have a primary carer.

On the other hand, to the extent that formal care *substitutes* for informal care, a shortage of carers could lead to an increase in demand from the elderly for formal community care. However, in the absence of informal support, formal care in the community could cost about the same as low level residential care. This would tend to reduce the scope for this form of care to expand indefinitely.

In sum, there are constraints on the feasibility of significantly expanding care in the community. The primary reason for this is limits on the availability of informal carers. Consequently, the Commission has projected only a *modest* switch to community care.

Change in the cost of care

The cost of aged care is dominated by labour costs, which represent around three quarters of total residential costs (Hogan 2004), and a slightly higher proportion of the cost of community care services. As such, changes in wage rates of nurses and other aged care workers are likely to primarily influence future costs of care. There is currently a shortage of nurses in general, and of aged care workers in particular. Hogan (2004) found that the aged care workforce would need to increase by 35 per cent over the next decade compared with an 8 per cent increase in the entire Australian workforce. As a result, there is likely to be some increase in aged care workers' wages relative to nurses and to other professions in the short term (over the next 5 to 7 years). In the longer term, however, there are minimal barriers to entry to working in aged care and it is unlikely that wages in the aged care sector will outstrip general wage rises.⁵

While capital costs — primarily nursing home and hostel buildings and infrastructure — currently comprise only around 30 per cent of residential costs, significant changes in these costs would affect the per person cost of care. Regulations governing care and consumer expectations could influence the infrastructure costs of providers:

- the introduction of accommodation bonds in the 1990s reflected the recognition that more capital was required in the residential care system to meet reasonable standards; and
- based on developments overseas, there may be demands from users and their families for higher standards of accommodation, including reduced numbers in each room.⁶

⁵ The likely increase in wages has been modelled as an increase in per capita unit costs that is 0.5 per cent greater than the projected increase in real incomes (1.75 per cent per annum) until the year 2010. Unit costs are then assumed to increase at the same rate as real income growth. While Hogan (2004) identified scope for productivity gains in the aged care sector, the need for intensive personal care suggests the scope for gains is likely to be less than in the economy generally. Increases in wages are therefore likely to translate to increases in unit costs.

⁶ Interestingly, Hogan (2004, p. 19) found that services with less beds per room were more efficient, possibly because facilities with a greater number of beds per room may have been older with poorer layouts and higher maintenance costs.

However, any changes in policy to accommodate such rising expectations are somewhat speculative. Moreover, such changes may be funded primarily from individual rather than government expenditure. As such, the projections are based on the assumption that the capital component of unit costs increases at the same rate as real incomes.

Projected aged care expenditure

On this basis, total government aged care expenditure is projected to increase from its present level of around 0.85 per cent of GDP to around 2.1 per cent in 2044–45. Residential aged care continues to dominate Commonwealth expenditure, increasing from 0.6 per cent of GDP to 1.3 per cent in 2044–45. Table 7.1 presents projections of the number of people in care and expenditure for each component of aged care. The Commission’s results are similar to those obtained by other recent studies of aged care in Australia (box 7.2).

Impact of disability and care mix assumptions

The assumption of a moderate change in the care mix from low level residential care to care in the community under the CACP will affect projected numbers in each form of care but have little impact on overall expenditure. This is because the cost of CACP packages is similar to that of low level residential care.

By contrast, the fall in age-specific disability rates incorporated into the projections does have a significant impact. Table 7.2 contains projections of expenditure assuming no change in disability rates. Under such a scenario, total Government aged care expenditure is projected to increase to 2.2 per cent of GDP in 2044–45, just over 20 per cent higher than the base case projection.

Table 7.1 Projected persons receiving care and aged care expenditure
2001-02 to 2044-45

	2002-03	2014-15	2024-25	2034-35	2044-45
Number of places/persons					
High care residential	97 303	137 482	178 169	240 805	297 312
Low care residential	53 878	57 973	73 307	100 868	124 007
Total residential	151 181	195 455	251 476	341 672	421 319
CACP	27 452	46 488	61 681	83 867	100 849
HACC	661 062	820 257	1 044 210	1 228 886	1 314 326
Expenditure (% of GDP)					
	%	%	%	%	%
<i>Commonwealth</i>					
Residential	0.57	0.72	0.90	1.20	1.47
CACP	0.04	0.06	0.08	0.11	0.13
HACC	0.09	0.10	0.13	0.15	0.15
Other	0.04	0.05	0.06	0.08	0.09
<i>Total</i>	<i>0.74</i>	<i>0.93</i>	<i>1.17</i>	<i>1.53</i>	<i>1.84</i>
<i>State</i>					
HACC	0.06	0.06	0.07	0.08	0.09
Residential	0.06	0.08	0.10	0.13	0.16
<i>State Total</i>	<i>0.12</i>	<i>0.14</i>	<i>0.17</i>	<i>0.21</i>	<i>0.25</i>
Total Government	0.85	1.08	1.34	1.75	2.09

Note: ^a In order to reflect the impact of ageing on the numbers of people in residential aged care, the Commission has used existing institutionalisation rates by age and sex, rather than the Australian Governments planning rule of 100 residential care places and CACPs per 1000 people over 70. The above results show a higher number of high care places, but a lower number of low care places than implied under current guidelines. Indeed, the Government has allocated more high care places and CACPs than required under its planning guidelines.

Source: ABS 2003b, SCRGSP 2004, Commission calculations.

Box 7.2 Comparison of results with other studies

There are a range of recently published projections of future aged care expenditure. Indeed, the Commission has previously published estimates of aged care expenditure in its submission to the Hogan Review (Productivity Commission 2003) and in an earlier study by Madge (2000). The projections in this report:

- lie within the range of projections of residential aged care expenditure contained within the submission to the Hogan review; but
- are somewhat higher than those in Madge (2000) (the difference arises because that study assumed higher reductions in disability than used in this report).

The IGR projected that total Australian Government aged care expenditure would increase to 1.77 per cent of GDP by 2041-42 (under the assumption of no change in disability rates). In 2041-42, the Commission's projection is also 1.77 per cent. The similarity exists despite different demographic projections, disability assumptions and GDP projections underpinning the two exercises.

The Commission's results are also consistent with those of Hogan (2004). Hogan projected that *total* aged care expenditure — including individual contributions to formal aged care — would increase to 2.33 per cent of GDP in 2042-43. The equivalent figure in the Commission's projections is 2.58 per cent. Although, there are slightly greater differences at the individual program level.

Overall, it can be concluded that aged care projections are quite robust with respect to minor variations in methodology and assumptions.

Table 7.2 **Aged care expenditure as a proportion of GDP — no change in disability rates or care mix**
2002-03 to 2044-45

<i>Expenditure as a proportion of GDP</i>	2002-03	2014-15	2024-25	2034-35	2044-45
	%	%	%	%	%
Australian Government	0.74	1.01	1.33	1.83	2.27
State Governments	0.12	0.15	0.18	0.24	0.28
Total	0.85	1.16	1.52	2.06	2.56
% Increase in total over base case	—	5.9	10.6	15.7	21.2

Source: Commission projections.

Expenditure by each jurisdiction

Table 7.3 shows projected state aged care expenditure by jurisdiction as a proportion of Gross State Product (GSP). In most jurisdictions expenditure is projected to almost double as a proportion of GSP by 2044-45. While there is

significant variation in aged care spending among jurisdictions as a proportion of GSP, this largely reflects different starting points.

Table 7.3 **Projected own-state aged care expenditure as a proportion of GSP**
2002–03 to 2044–45

	2002-03	2014-15	2024-25	2034-35	2044-45
	%	%	%	%	%
NSW	0.07	0.07	0.07	0.07	0.07
Vic	0.12	0.14	0.17	0.22	0.25
Qld	0.15	0.18	0.21	0.26	0.29
SA	0.16	0.21	0.27	0.36	0.44
WA	0.22	0.27	0.34	0.43	0.51
Tas	0.10	0.12	0.15	0.18	0.19
NT	0.03	0.03	0.04	0.04	0.04
ACT	0.05	0.07	0.09	0.10	0.10

Source: Commission projections.

7.2 Payments to carers

Australian Government payments to those caring for people with disabilities totalled over \$1.8 billion in 2003-04. These comprise two main programs, the Carer Payment and the Carer Allowance.

The *Carer Payment* (\$942 million in 2003-04) is an income support payment for people who, because of their caring responsibilities, are unable to work full time. Carer payment is paid at the same rate as other social security pensions. In March 2004, around 81 000 people were receiving the payment.

The *Carer Allowance* (\$909 million 2003-04) is a payment which is not subject to an income or assets test. It is available to people who provide daily care to a person with a disability. In March 2004 there were 185 000 recipients who cared for adults and 109 000 receiving payments who cared for children. Carer Allowance may be paid in addition to Carer Payment or other social security payments.

Payments to carers have increased substantially over the last few years, owing primarily to changed eligibility conditions. (However, the Budget's estimate of expenditure for 2004-05, on which the Commission's projections are based, shows a slight reduction on the previous year.)

Projected carer payments

Future payments to carers depend on the characteristics of those being cared for rather than those providing the care. As such, the ageing of the population will potentially affect carer payments in two ways. Firstly, the lower proportion of children in the population may reduce payments to carers of children with disabilities. Secondly, and in contrast, the greater proportion of older people in the population is likely to lead to a substantial increase in the number of older people requiring care. However, declining age-specific disability rates could lower the level of disability among the young and old, and consequently moderate the level of carer payments.

Consistent with current policy, the Commission has assumed that the eligibility conditions for carer payments remain unchanged throughout the projection period. Thus carer payments are projected using:

- the current cost per recipient of each payment (indexed by the projected growth in GDP per person);
- an age profile of the people being cared for (adjusted for assumed declines in age-specific disability rates);⁷ and
- the projected population of Australia by age and sex.

Under this methodology, total payments to carers are projected to increase by around 20 per cent as a proportion of GDP — from 0.20 per cent in 2003–04 to 0.25 per cent in 2044–45.⁸ As shown in table 7.4, a small decline in payments to those caring for people under 65 is more than offset by payments to carers caring for people over 65.

Once again, the assumed decline in disability rates has a material impact on the projections. If disability rates did not decrease, total expenditure is projected to be around 25 per cent higher, at 0.31 per cent of GDP in 2044–45.

Implicit in these projections is that it is the demand for care that drives payments and supply adjusts accordingly. For example, if more people require care it is assumed that more people will become available to provide that care and receive carer payments.

⁷ The projections factor in age-specific disability rate declines of 0.5 per cent per annum — the same assumption used in the aged care projections.

⁸ Increased payments in the Budget between 2002–03 and 2004–05 (estimates) account for part of the increase.

Table 7.4 Projected payments to carers as a proportion of GDP
2002–03 to 2044–45

	2002–03	2014–15	2024–25	2034–35	2044–45
	%	%	%	%	%
Carer Payment					
Under 65	0.07	0.07	0.07	0.06	0.06
65 plus	0.03	0.05	0.06	0.08	0.08
Total Payment	0.10	0.13	0.13	0.14	0.14
Carer Allowance					
Under 65	0.07	0.07	0.06	0.05	0.05
65 plus	0.03	0.04	0.04	0.05	0.06
Total Allowance	0.10	0.10	0.10	0.11	0.11
Expenditure carers					
Under 65	0.14	0.14	0.13	0.12	0.11
65 plus	0.06	0.09	0.11	0.13	0.14
Total expenditure	0.20	0.23	0.24	0.25	0.25

Source: Commission projections.

This is likely to be the case for those being cared for who are under 65. However, as noted in previous sections, for demographic and social reasons, there may be a growing shortage of carers for older people. If there is a shortage in the supply of carers then payments to carers may not be as high as projected. But this would not represent an overall saving to government expenditure. With demand for care undiminished, any reduction in carer payments because of a lack of carers is likely to be offset by an increase in expenditure on other aged care programs such as residential care or formal community care. Therefore, the Commission does not consider that its projections of carer payments overestimate the net impact on Australian Government finances of current policy.

8 Personal benefit payments

Key points

- Personal benefit payments are significant. The main payments — Age Pension, Family Tax Benefit, unemployment allowances, Disability Support Pension and Parenting Payment Single — cost the Government \$54 billion a year and represent 7 per cent of GDP.
- Personal benefit payments are age-dependent. An ageing population will affect the share of people who can access payments and has implications for Government budgets.
- Over the next 40 years:
 - spending on Age and Service Pensions is expected to increase significantly — from under 3 per cent of GDP in 2002-03 to nearly 5 per cent in 2044-45;
 - there is also an expected increase in spending on Disability Support Pension and Parenting Payment Single; however
 - spending reductions on unemployment allowances and Family Tax Benefit are likely to offset the overall increase in personal benefit outlays associated with an ageing population.

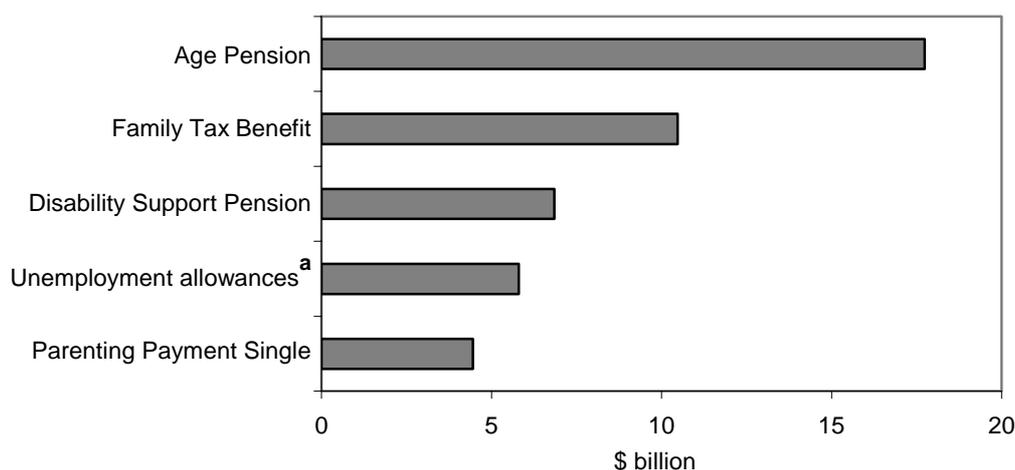
The Australian Government provides income transfers to individuals and families to help address their needs. These include unemployment allowances, Age Pensions and a range of family support benefits. The application of these benefits is often age-dependent. For example, family benefits are typically accessed by younger people, while the Age Pension is limited to older persons. As a consequence, a shift to an older population structure will affect the share of people who can access benefits, with implications for Government budgets.

This chapter examines the likely trajectory of expenditure on the Australian Government's major personal benefit payments. These are Age and Service Pensions, Family Tax Benefit, Disability Support Pension, unemployment allowances, and Parenting Payment Single. It considers the nature and size of the payments (section 8.1), the extent to which payments are age-related (section 8.2), develops methodologies for projecting payments over the next forty years (section 8.3) and produces estimates of future Government budget pressures in these areas (section 8.4).

8.1 Nature and magnitude of payments

In 2002-03 personal benefits (administered by the Department of Family and Community Services) amounted to almost \$54 billion, representing over 7 per cent of GDP. The largest payment is the Age Pension. Other significant payments are Family Tax Benefit, unemployment allowances, Disability Support Pension and Parenting Payment Single (figure 8.1 and box 8.1). Together these payments form 84 per cent of total personal benefit payments. Other payments to individuals such as Child Care Allowance, Sickness Allowance, Maternity Payment, Widow Allowance, Special Benefit and Partner Allowance account for only a small proportion of government expenditure and have not been examined. Estimates of Carers Allowance are presented in chapter 6.

Figure 8.1 Expenditure on personal benefit payments, \$ billion, 2002-03



^a Unemployment benefits include Newstart Allowance, Youth Allowance other and Mature Age Allowance.

Data source: FaCS 2003.

In addition to personal benefits administered by the Department of Family and Community Services (FaCS) the Department of Veteran's Affairs provides Service Pensions to eligible veterans, their partners and widows. Eligibility is dependent on age, qualifying service, residency, and meeting the income and assets tests. In 2003-04 Service Pension and War Widows Pension payments paid to those aged 60 and amounted to over \$3.8 billion, representing 0.5 per cent of GDP.

Box 8.1 Personal benefit payments: a brief description

Age Pension is intended as a safety net for individuals who have limited opportunity or capacity to save for retirement. The age of qualification is 65 for males and for females the qualifying age is being increased gradually to 65 years (between 1995 and 2014). Qualification is also subject to the income and assets tests. In 2002-03, Age Pension outlays were over \$17 billion — 33 per cent of Australian Government Income support payments or 2.4 per cent of GDP. In June 2003 there were nearly 1.9 million recipients of the Age Pension.

Family Tax Benefit has two components, Part A and Part B.

Family Tax Benefit Part A is paid to low and middle income families with dependent children up to the age of 21, and/or older children between the ages of 21 and 24 years who are studying full-time and not receiving Youth Allowance.

Family Tax Benefit Part B provides extra assistance (over part A) for families with only one main income earner, particularly those with children under five years. It is paid to families with dependent children up to the age of 16, and dependent children aged between 16 and 18 years who are studying full-time.

In 2002-03 Family Tax Benefit outlays were \$10.5 billion — 19.5 per cent of personal benefit payments or 1.4 per cent of GDP. Over 1.8 million families or 3.5 million children received the benefit.

Disability Support Pension is available to individuals who have a physical, intellectual or psychiatric impairment that results in a continuing inability to work. It is subject to the income and assets tests. In 2002-03 Disability Support Pension outlays amounted to \$6.9 billion, representing 13 per cent of personal benefit payments or 0.9 per cent of GDP. There are about 570 000 recipients of Disability Support Pension.

Unemployment allowances are difficult to measure because of the range of labour market assistance available. The main payments are Newstart Allowance, Youth Allowance, and Mature Age Allowance.

- Newstart Allowance is available to people aged between 21 years and retirement age who are unemployed and satisfy the activity and income and assets tests.
- Youth Allowance is available to students aged 16 to 25 years and unemployed 16 to 21 year olds who satisfy the income and assets tests. Of relevance to unemployment payments is Youth Allowance Other, which excludes full time students.
- Mature Age Allowance recognises the labour market difficulties faced by older unemployed Australians. Qualification is over 60 and less than Age Pension age, no recent workforce experience (13 weeks) and previously in receipt of a payment such as Newstart Allowance, Parenting Payment or Widow Allowance. It is subject to the income and assets tests, but is not activity tested.

In 2002-03 outlays on Newstart Allowance, Youth Allowance Other and Mature Age Allowance amounted to \$5.8 billion representing 11 per cent of personal benefit payments and 0.8 per cent of GDP. There are over 650 000 recipients of these allowances.

Parenting Payment Single is available to sole parents who are the primary carers of children aged under 16 years. In 2002-03 Parenting Payment Single outlays amounted to \$4.5 billion — 8.3 per cent of personal benefit payments or 0.6 per cent of GDP. There are about 320 000 recipients of Parenting Payment Single.

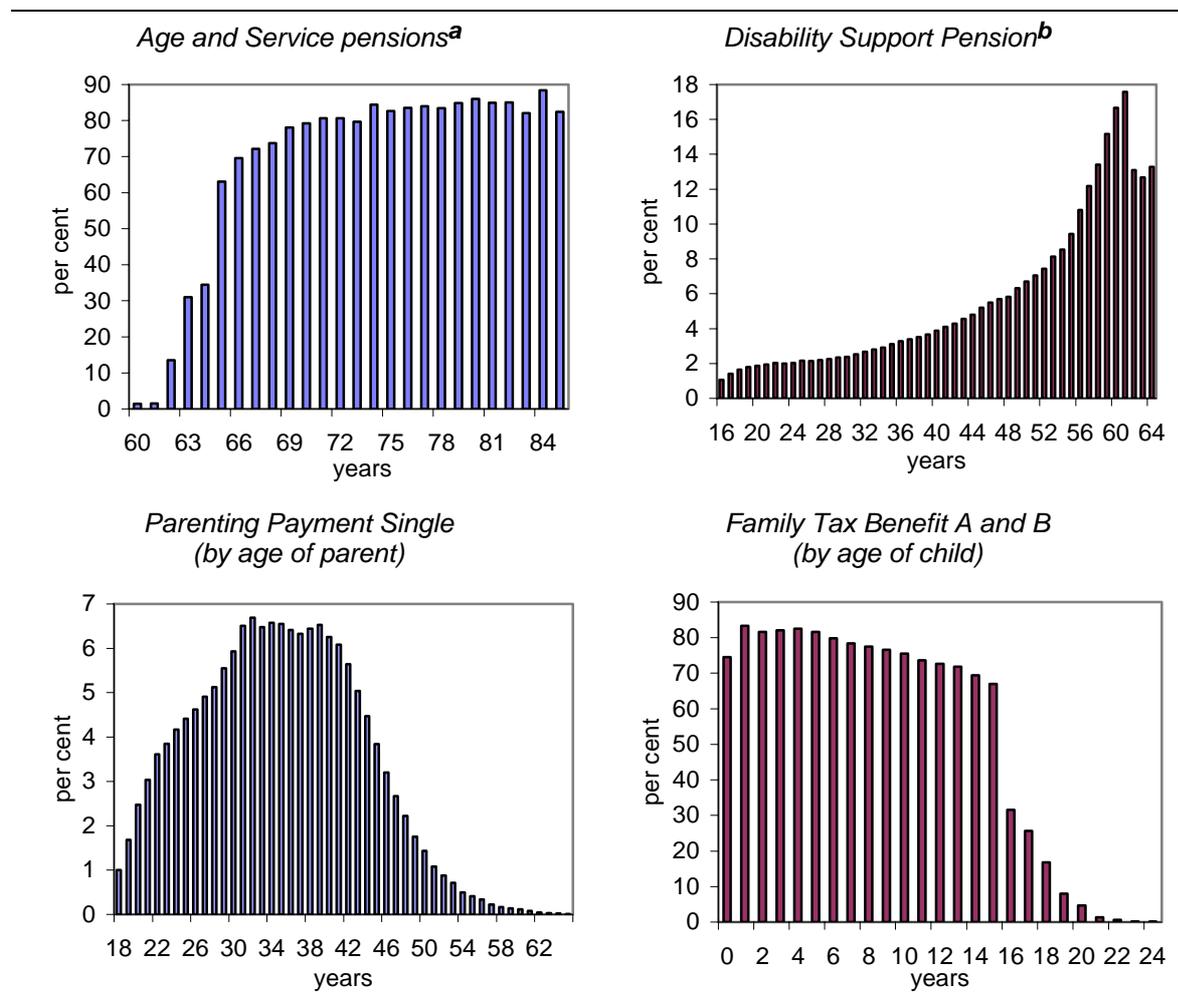
Source: FaCS 2003, unpublished data from FaCS and Centrelink.

8.2 Age related nature of benefits

Government expenditure on payments to individuals and families is largely determined by the population of various age groups.

- About 80 per cent of the population aged over 65 years receive an Age or Service Pension.
- Older people are far more likely than younger people to receive a Disability Support Pension.
- Associated with the age-related nature of raising children, the majority of Parenting Payment Single recipients are aged between 30 and 45 years.
- The majority of children aged between 0 and 15 years are covered by Family Tax Benefit (figure 8.2).

Figure 8.2 Age related nature of benefits, coverage rate by age

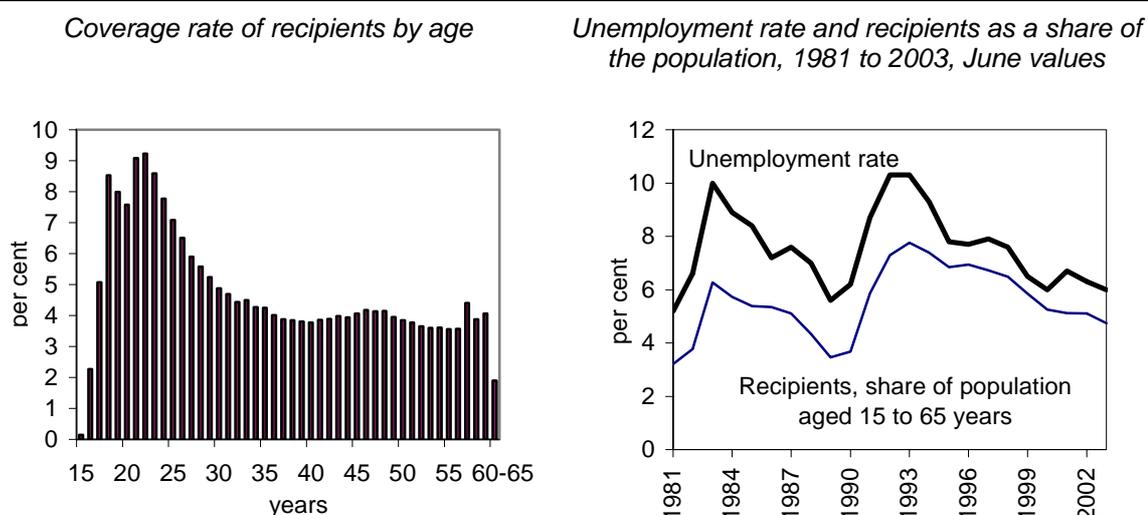


^a Includes Age Pension, Service Pension and War Widows Pension, last observation represents 85 years and over. ^b After 60 years for females (increasing to 65 by 2014) and 65 years for males the coverage rate for Disability Support Pension falls as recipients meet the age qualification for the Age Pension.

Data source: Age and Service Pension latest available data provided by Centrelink and the Department of Veteran's Affairs. Other data provided by FaCS.

- The most important age-related aspect to unemployment benefits is that they are not accessed after age 65 years. For those under 65 years, the coverage rate for unemployment payments is highest for people aged between 17 years and 25 years. However, total expenditure on unemployment allowances is not driven primarily by the age structure of the *labour force*. Unemployment occurs at all ages under 65 years and is influenced by regulatory arrangements and the stage of the economic cycle (figure 8.3).

Figure 8.3 **Recipients of unemployment allowances^a**



^a Unemployment allowances are measured by FaCS as the number of customers on Newstart Allowance and Youth Allowance Other. It does not include Mature Age Allowance for 60–65 year olds, which is taken into account in the Commission’s projections.

Data source: Recipient numbers FaCS (2001), FaCS (2004) and unpublished data from Centrelink, unemployment rate from ABS dx database, table LMUR-909, June values.

As the population ages, all else being equal, expenditure on Age and Disability Support Pensions (as a percentage of GDP) will increase and expenditure on Family Tax Benefit and Parenting Payment Single (as a percentage of GDP) will fall. However, in addition to demographic factors, there are a number of other factors that influence the number of recipients and government expenditure on personal benefit payments over time. These include changes in the policy framework and administration, labour market conditions and socioeconomic factors such as fertility rates, labour force participation and changes in living patterns. All need to be considered when making projections. The key drivers differ for each payment — box 8.2 looks at the key past drivers of Disability Support Pension as an example.

Box 8.2 The key drivers of Disability Support Pension

The percentage of the population receiving Disability Support Payment over the last two decades has doubled. This is despite ABS statistics on age-specific disability rates indicating no significant trend in the prevalence of disability within the community (see ABS cat. 4430.0). There are a number of factors contributing to the increasing numbers of recipients. These are discussed below.

Demographic factors

Older people are far more likely than younger people to have a disability and to have developed a degenerative condition as a consequence of ageing. Currently there are about 680 000 recipients of the Disability Support Pension. Of these, 75 per cent are aged 40 years and over. As the population ages, all else being equal, there will be an increase in the proportion of people with a disability.

Policy framework and administration of income support payments

In recent times, changes in the way Disability Support Pension and other substitute payments have been administered have had a significant effect on the number of recipients and coverage rates. In particular, changes embodied in the Disability Reform Package of 1991 represented an easing of the disability eligibility criteria, producing an increase in the number of disability support recipients and an increase in the proportion of the population receiving the payment. In 1992-93, a year after the introduction of the reform package coverage rates grew 13 per cent compared with an annual average of 2 per cent over the previous 5 years.

Loss of access to other forms of support, such as Veterans' Affairs Service Pension, Widow B and Wife Pension, and the gradual lifting of the minimum age for qualification for the age pension for women (from 60 to 65 by 2014) has also increased and will continue to increase the number of Disability Support Pension recipients in the future.

Labour market conditions

Some studies have linked the growth in disability pensions to economic cycles whereby economic downturns and recessions reduce the capacity for people with disabilities to retain or find work. For example, one factor behind the steady rise in Disability Support Pension recipients during the 1970s and 1980s was the overall increase in unemployment during that period and its selective impact on particular groups.

Changes in living patterns

Finally, changes in living patterns have also played a role. The increase in numbers of Disability Support Pension recipients since 1980 has been influenced by the higher number of people living alone either by choice or as a result of separation and divorce. Since the Disability Support Pension requires that an applicant meet both the assets and income tests, a single person who lives alone is more likely to be eligible for a pension than someone living with a partner who may be earning income.

8.3 Methodology for projections

The Commission adopted a methodology similar to that of the IGR (2002) in making projections for age-related benefit payments, but was able to use more up-to-date data and new demographic projections:

- historical data were typically collected on the *coverage rate* — the number of recipients of a payment expressed as a proportion of the relevant age-sex group;
- a model of future trends in coverage rates was developed. In most cases a logistic function was chosen to provide a tapering of growth in coverage rates over time;
- estimates of future expenditure on personal benefit payments per beneficiary were estimated using current indexation arrangements; and
- projections of total spending on any given benefit category were made by combining projected coverage rates with demographic projections and assumed changes in real benefits per beneficiary.

The exception to this approach are projections for Age and Service Pensions. Here, the Commission's estimates were based on Treasury projections, given that it has developed a complex model of expenditure in this area.

Age and Service pensions

Treasury projections of coverage rates and average pension payments and ABS series B population projections were applied to 2002-03 estimates of recipient numbers and expenditure on Age and Service pensions to project expenditure for six age groups for both males and females. Service pension estimates include the Age Service Pension, War Widows Pension and the Income Support Supplement for War Widowers.

Family Tax benefit A and B

The Commission's projections for Family Tax Benefit A and B did not utilise historical data. Although the Australian Government has provided assistance to families since 1941, the nature of assistance has changed markedly over the period. On 1 July 2000 a new system of financial assistance to families with children was introduced. The family tax system was again overhauled in the 2004-05 Australian Government Budget. Given the substantial nature of recent changes made to family assistance, historical data is of limited relevance in considering future outlays.

Rather, it was assumed that the key driver for projections of coverage is the prospective number of children.

Expenditure on Family Tax Benefit is the budget responsibility of both FaCS and the Australian Taxation Office (ATO). However, the Commission has limited its estimates to expenditure on Family Tax Benefit by FaCS. ATO expenditure on Family Tax Benefit represents a small component of overall expenditure and its inclusion would not significantly change the results.

Outlays for Family Tax Benefits A and B were projected separately.

Family Tax Benefit A

Coverage rates were derived for each child age, up to the age of 24 for 2002-03. These rates were assumed constant and multiplied by the relevant population base (using ABS series B population projections) to project future recipient numbers.

Total expenditure was calculated by multiplying the total projected number of children covered by Family Tax Benefit A by the average annual payment per child in 2002-03. Expenditure estimates were then adjusted in line with changes announced in the 2004-05 budget.

It was not possible to project expenditure for each child age or age group, as information on average Family Tax Benefit A expenditure by child age or age group is not available. Further, FaCS advised that any attempt to estimate average expenditure by child age or age group would be fraught with difficulties.

Family Tax Benefit A is indexed in line with the CPI. In addition, benefits to children under 16 are linked, via legislation, to average weekly earnings. While the benefit has not been adjusted to average weekly earnings in the past the Commission estimates that by 2007-08 an adjustment to average weekly earnings will be made. Children aged under 16 account for almost 93 per cent of recipients and an even greater rate of expenditure (indeed, the maximum rate for children under 16 is more than twice the value of the maximum benefit for children aged over 16). Data on expenditure by age is not available so the Commission assumed that children aged under 16 account for 95 per cent of expenditure and indexed 95 per cent of total expenditure on Family Tax Benefit A to average weekly earnings from 2007-08.

Family Tax Benefit B

Coverage rates were derived over time for each age up to the age of 18 for 2002-03. These rates were assumed constant and multiplied by the relevant population base (using ABS series B population projections) to project future recipient numbers.

Expenditure data is available for 2002-03 based on the average rate per family (rather than child). To project expenditure, child recipient numbers were converted to 'family units' based on the current rate of 1.9 children per family. Expenditure was then calculated (for the under 5 years and 5 to 15 years age groups) by multiplying the total projected number of children covered by Family Tax B by the average rate of payment. Expenditure estimates were then adjusted in line with changes announced in the 2004-05 budget. Unlike Family Tax Benefit A, Family Tax Benefit B is indexed only to the CPI.

Disability Support Pension

Coverage rates were derived for six age groups (16 to 19 years, 20 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years and 60 to 64 years) for both males and females using a coverage trend model. As discussed in box 8.2 the Disability Reform Package of 1991 had a substantial impact on coverage rates, consequently trends were based on historical time series data extending from 1991-92 to 2002-03. The primary approach was to allow a tapering of growth based on logistic curves. Exceptions are the rates for 50 to 59 and 60 to 64 year olds. Based on recent trends, the following was considered appropriate:

- for males aged 50-59 years and 60-64 years a slight, gradual decline in coverage rates;
- for females aged 50-59 years a constant coverage rate; and
- for females aged 60-64 years an increase in coverage rates reflecting the phased increase in Age Pension eligibility age until 2014 and then constant thereafter.

Future recipient numbers were calculated for each age group by multiplying the estimated coverage rate to the relevant population base (using ABS series B population projections). Full rate and part rate recipient numbers by age were then calculated using current data on the percentage of full rate and part rate recipients at each age in each age group. For example, in June 2003, 19 year old, full rate female recipients accounted for 27 per cent of female recipients in the 16 to 19 age group and 58 year old, part rate male recipients accounted for 2 per cent of male recipients in the 50 to 59 age group. These shares were applied to data for all years.

Expenditure on Disability Support Pension (for full rate and part rate recipients by age) was calculated by multiplying the number of full and part rate recipients by the average annual expenditure of full and part rate recipients, at each age. In 2002-03, age-specific average annual expenditures were calculated by applying the percentage of average expenditure accounted for by each age in June 2003 to annual expenditure for 2002-03. For all other years average expenditure by age was grown in line with average weekly earnings (assumed 1.75 per cent per annum). Total expenditure on the Disability Support Pension was calculated as the sum of expenditure on full and part rate recipients at each age.

Unemployment allowances

Coverage rates for unemployment allowances in 2002-03 were calculated as the number of recipients of Newstart Allowance, Youth Allowance other (which excludes full time students) and Mature Age Allowance divided by population. They were derived for ten age groups, for both males and females. Coverage rates between 2003-04 and 2044-45 were estimated based on the projected unemployment rate (see chapter 3). Future recipients of unemployment allowances were then calculated using ABS series B population projections.

Expenditure estimates were calculated by multiplying the projected number of recipients by average annual expenditure for males and females in each age group. Average expenditure by age was estimated by applying expenditure by age in March 2004 to annual expenditure for 2002-03. Unemployment allowances are indexed to the CPI.

Parenting Payment Single

Coverage rates were derived for six age groups (16 to 19 years, 20 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years and over 60 years) for both men and women using a coverage trend model based on a logistic function. Trends in the logistic functions were based on historical time series data extending from 1988-89 to 2002-03.

Future recipient numbers and expenditure were calculated using the same approach as for Disability Support Pension.

8.4 The projected growth in payments

Government spending on personal benefit payments, as a percentage of GDP, is expected to increase over the next forty years. The principal payments are projected to increase from 6.5 per cent of GDP in 2002-03 to 8.1 per cent in 2044-45, or by 25 per cent (table 8.1).

Expenditure on Age and Service Pensions account for the majority of this increase. By 2044-45 the proportion of the population reaching Age and Service Pension age will double. And expenditure on Age and Service Pensions are projected to increase from 2.9 per cent of GDP in 2002-03 to 4.9 per cent in 2044-45.

Also associated with an ageing population is an increasing prevalence of disability. Expenditure on Disability Support Pension is projected to increase from 0.9 per cent in 2003-04 to 1.1 per cent in 2044-45.

Expenditure on Parenting Payment Single is also projected to increase over the period. This is the result of the increasing numbers of one parent families within the community.

These increases in expenditure will be partly offset by decreasing expenditure on unemployment allowances and Family Tax Benefit.

- Unemployment allowances are projected to fall from 0.8 per cent of GDP in 2002-03 to 0.3 per cent in 2044-45. This primarily reflects the indexing of unemployment benefits to the CPI which grows at a slower rate than GDP. The indexation of unemployment benefits is discussed in the following section.
- Spending on Family Tax Benefit A and B is projected to increase over the next decade in line with increases in payments announced in the 2004-05 budget. However, it is expected to fall over the forecast period — from 1.4 per cent in 2002-03 to 1.1 per cent in 2044-45. This principally reflects lower proportions of the population in the relevant age groups (essentially under 15 years) and the policy of indexing some components of family payments to the CPI, which grows at a slower rate than GDP.

Overall, in the current policy environment, spending on Age and Service Pensions is expected to increase significantly over the next 40 years. There is also an expected increase in spending on Disability Support Pension and Parenting Payment Single. However, spending on unemployment allowances and Family Tax Benefit are expected to decline and will potentially offset the overall increase in personal benefit outlays associated with an ageing population.

Table 8.1 Payments to individuals, projections, per cent of GDP

	2002-03	2008-09	2014-15	2024-25	2034-35	2044-45
Age and Service Pension	2.86	3.03	3.38	4.09	4.67	4.90
Family tax benefit A and B	1.39	1.40	1.27	1.18	1.14	1.08
Disability Support Pension	0.91	1.01	1.05	1.06	1.07	1.08
Unemployment allowances	0.77	0.66	0.58	0.49	0.41	0.34
Parenting Payment Single	0.59	0.63	0.66	0.69	0.71	0.71
Sum of above payments	6.51	6.73	6.94	7.50	7.99	8.11

Source: Commission estimates.

Some qualifications

These projections are sensitive to changes in government policy. For example, the long-standing policy of indexing unemployment allowances to the CPI, in comparison with the Age Pension which is indexed to average weekly earnings, will mean that over time the value of unemployment allowances will fall relative to the value of the Age Pension.

Although there have not been any non-CPI related increases to unemployment allowances since the Age Pension has been indexed to average weekly earnings (except for July 2000 when unemployment allowances were increased as part of a package of measures to compensate for the impact of the GST) such an approach is not likely to be sustainable in the long term. For example, under current indexation arrangements, in 2044-45 the maximum value of Newstart Allowance (for a single) will be less than half the maximum value of the Age Pension (for a single), compared with over 80 per cent currently. Were this pattern to persist, then by 2100, the maximum Age Pension could be over ten times higher than maximum Newstart Allowance (assuming 1.75 per cent real wage growth in line with productivity growth).

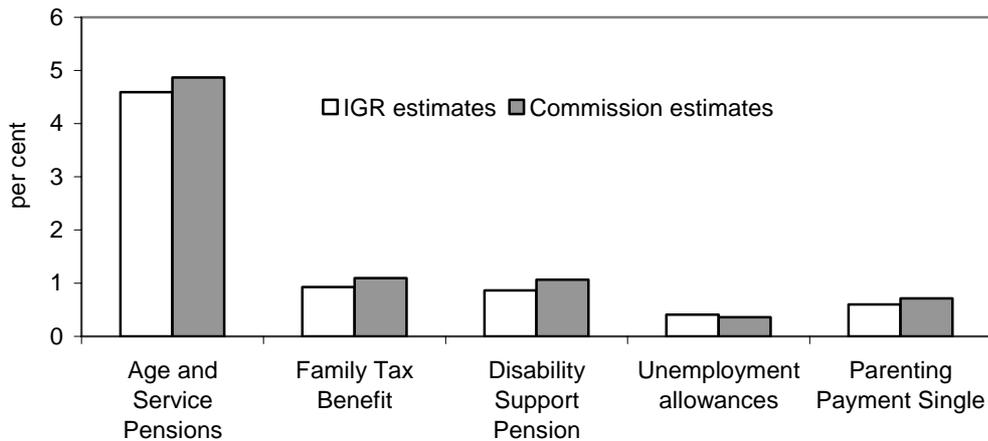
It is therefore likely that the Government will make ad hoc adjustments to unemployment allowances over periods of this length in order to maintain some degree of parity between the two payment rates.

Therefore, projections on the basis of CPI indexing (as above), while consistent with stated government policy, are likely to underestimate the long run value of unemployment allowances. For example, if to achieve parity, unemployment allowances were increased in line with average weekly earnings (as is the approach with the Age Pension), total expenditure on unemployment allowances are projected to reach 0.7 per cent of GDP in 2044-45, compared with 0.3 per cent under the current indexation policy.

Recent changes in policy partly explain the (relatively small) discrepancies between the Commission's projections and those in the IGR (2002). The Commission projects that in 2041-42 payments to individuals will increase to about 8.1 per cent of GDP. This compares with an estimate of 7.4 per cent in the IGR (2002). The most significant differences are between Family Tax Benefit and Disability Support Pension projections (figure 8.4).

Figure 8.4 Payments to individuals, projections, 2041-42

A comparison with IGR estimates, per cent of GDP



Data source: Commission estimates and IGR (2002).

These differences arise because the Commission uses more recent data and new demographic projections. In addition there have been two policy changes since the release of the IGR (2002):

- expenditure on Family Tax Benefit was increased significantly in the recent budget; and
- changes to Disability Support Pension announced in the 2002-03 budget to tighten the eligibility criteria for the payment were blocked in the Senate and were therefore omitted from the Commission's analysis.

Over the next 40 years there will be a number of changes in government policy relating to payments to individuals. It is therefore important to understand that the Commission's projections are made on the basis of current indexation arrangements and policy settings (see chapter 1).

9 Education expenditure and ageing

Key points

- The flipside of an ageing population is fewer young people. The share of 5 to 24 year olds in the population is projected to decline from around 28 per cent to just over 20 per cent by 2044-45.
- However, participation rates are projected to increase for university and vocational education and training (VET) — particularly for older age groups. Participation is likely to be stable for primary and secondary schooling.
- Overall, nationally there are likely to be relatively fewer students in the schools and universities.
- Government expenditure on education is projected to decline from 4.9 per cent to 3.7 per cent of GDP in 2044-45:
 - the effects are biggest at the State level, reflecting their pre-eminent role in funding school education;
 - all of the States and Territories, except the Northern Territory, are projected to have similar reductions in their education expenditure as a proportion of Gross State Product;
 - decreases range between 22 and 26 per cent, except in the Northern Territory where, owing to a younger population, the projected decline is minimal.

The young account for most government-funded educational spending. Accordingly, population ageing is likely to reduce pressure on education expenditures, partially offsetting other budget areas where ageing will exert upward pressures. This chapter examines the factors that influence education spending, with a focus on the likely impact of ageing on aggregate education expenditures over the next 40 years.

9.1 Structure of education and funding

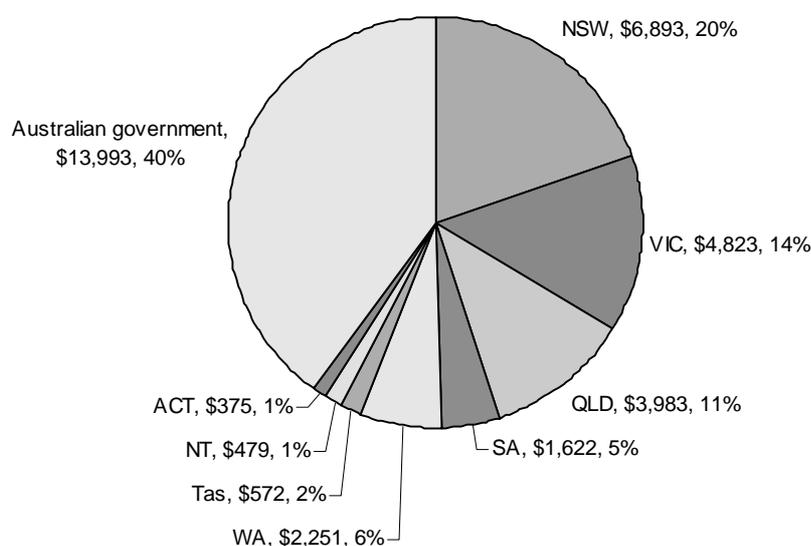
Education comprises three broad sectors: schools (both government and non-government); vocational education and training (VET); and universities. The Australian Government also provides income support payments for students.

Total government expenditure on education amounted to \$35 billion in 2001-02, or 13.4 per cent of the combined expenditure of all Australian governments and 4.9 per cent of GDP.

The majority of education expenditure is by the States and Territories — accounting for 60 per cent of the total (figure 9.1). However, the Australian Government provides the bulk of government funding for universities and non-government schools (table 9.1).

Funds for education are also provided by non-government sources. For example, fees are charged for non-government schools and for university and VET courses undertaken by domestic and foreign students. Universities also receive revenues from interest on investments as well as for contract research and advice.

Figure 9.1 Education expenditures by Australian, State and Territory governments, 2001-02, \$million



Sources: SCRGSP 2004, DEST 2003, NCVET 2003, FaCS and DEST 2004.

Table 9.1 **Shares of total government education funding, 2001-02 ^a**

	Funding			Share of total government education funding		
	State and Territory	Australian Govt.	Total	State and Territory	Australian Govt.	Total
	\$m	\$m	\$m	%	%	%
Schools	18 143	5620	23 763	51.9	16.1	67.9
- Government	16 721	2008	18 729	47.8	5.7	53.5
- Non-government	1422	3612	5034	4.1	10.3	14.4
VET	2529	1137	3666	7.2	3.3	10.5
University	322	4383	4704	0.9	12.5	13.4
Other		2853	2853		8.2	8.2
Total	20 994	13 993	34 987	60.0	40.0	100.0

^a: The ABS *Government Finance Publication, 2001-02* (Cat. No. 5512.0) reports education expenditure, rather than funding. Hence, for some of the education sectors, figures vary from those above. The GFS figures are as follows: Australian Government school expenditures — \$5.8 billion; total school expenditures — \$21.3 billion; Australian government VET expenditures — \$1.1 billion; total VET expenditures — \$3.9 billion; Australian Government university expenditures — 4.0 billion; and total university expenditures — \$9.7 billion. The GFS total university figure is much larger than in the table because the GFS records total university expenditures, while Government funding is shown in table 9.1. The GFS also includes Other education (pre-schools and adult education not elsewhere classified), which we have not included (these expenditures were \$2.6 billion in 2001-02). The GFS does not include government student income assistance payments, which are included in the table 9.1 as 'Other'.

Source: SCRGSP 2004, DEST 2003, NCVET 2003 and FaCS and DEST 2004.

9.2 Method for projecting government expenditure

The affects of ageing on education expenditures can be calculated from:

- the changing age structure of the population;
- participation rates in education by different age groups for each sector; and
- changes in average costs per student in each sector (box 9.1).

Different jurisdictions have varying responsibilities for funding education, and the participation trends within jurisdictions can also differ. Therefore, the Commission has projected funding by jurisdiction and by source of funding for each of the three sectors.

Box 9.1 **Projection methods**

Education funding projections were calculated using projections of the population, education participation and per student costs of education services. The population and participation rate projections were made for individual years of age for the educationally relevant years.

Population projections (Pop) were multiplied by participation rates (P) to arrive at student numbers or annual hours studied, which were then multiplied by average costs (AC)¹ to arrive at a total funding figure.²

$$F = \sum^i (P_{it} \times AC_t \times Pop_{it})$$

The Population projections used were taken from the ABS's B series (ABS 2003b) for all States except the NT. The projection used for the NT was based upon Commission projections (see footnotes to table 2.2).

Participation rates were calculated in the base year by dividing student numbers by population estimates for each year of age. Finishing participation rates were also calculated based on assumptions discussed below. Rates for intermediate years were then calculated using a logistic formula.

Average costs were assumed to grow at the same rate as real incomes (1.75 per cent, the same figure used in the IGR). This reflects historical experience, based on links between real wages and economy wide productivity growth and community expectations about services levels.

The effects of ageing were found by subtracting an age-adjusted projection from the projection calculated as described above (the base case projection). The age-adjusted projection was made in the same way as described above, except that a simulated population projection was used which retains the 2001-02 base year's age structure for all years.

The assumptions described above are broadly similar to those used in the IGR. The IGR also assumed that real funding per student increases at the same rate as real incomes, that school participation rates would remain constant and that VET and university participation rates would rise.

Changing age structure of the population

Accompanying the rising shares of older people in the population are falling shares of younger people. The falling proportion of the young is particularly important for

¹ Average costs are dollars of funding per student or per student hour.

² Average costs were calculated for Government primary school students, Government high school students, Non-government school students, University students and for VET annual student hours.

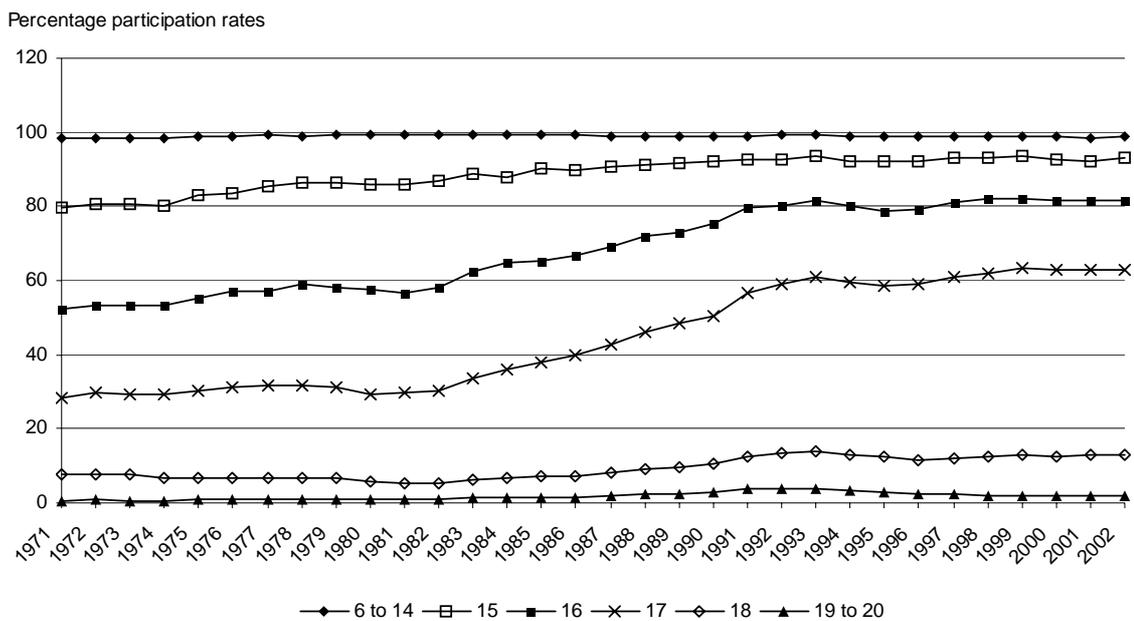
future education expenditure. For example, the share of 5 to 24 year olds in the population — the group with by far the highest participation in education — is projected to decline from around 28 per cent to just over 20 per cent in 2044-45.

Trends in participation

Schools

Participation rates for the voluntary years of schooling, grew strongly over the 1980s, but levelled off during the early 1990s (figure 9.2). Based on these trends, overall school participation rates were assumed to remain constant in the base case projections.

Figure 9.2 School participation rates by age group, 1970-71 to 2001-02



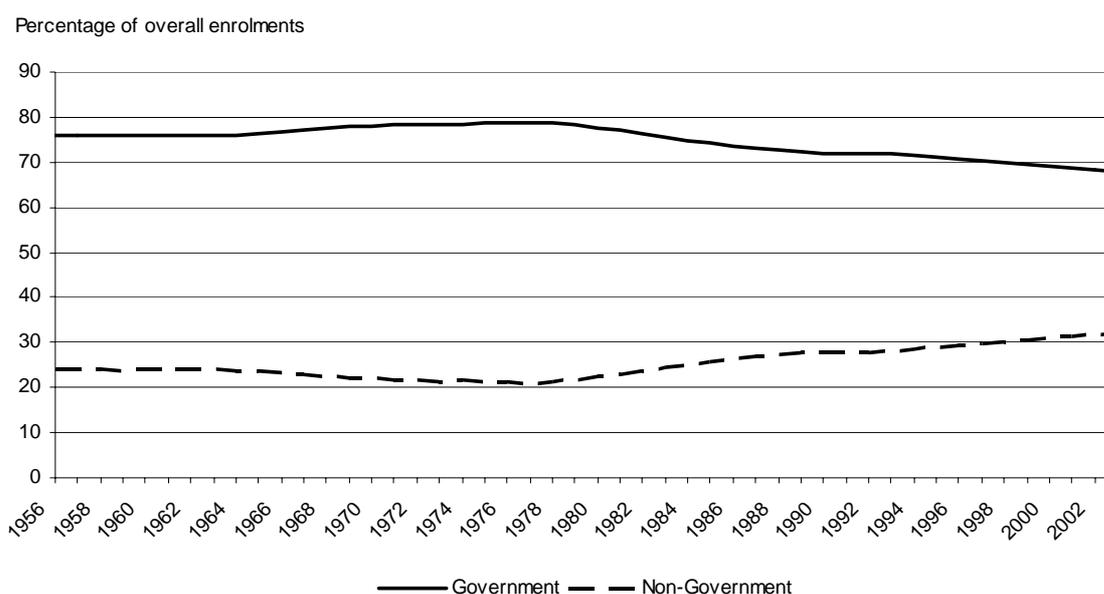
Data sources: ABS 2003, *Population by Age and Sex, Australian States and Territories*, (Cat. No. 3201.0); and ABS 2004, *School Student Numbers By Age*, special request consistent with ABS Schools publication (Cat. No. 4221.0).

Shift in enrolments from government to non-government schools

An important trend in the schools sector is the shift in enrolments from government to non-government schools. Between 1980 and 2003, the non-government schools' share of total enrolments rose from 22.3 per cent to 32.1 per cent (figure 9.3). Currently, the rate of shift between the sectors is averaging 0.4 percentage points

per year.³ This trend is likely to reduce the overall government contribution to school education, while shifting the balance of funding from the State and Territory governments (which provide the bulk of the funding for public schools) to the Australian Government (which provides most of the public funding for non-government schools).

Figure 9.3 Proportion of enrolments in government and non-government schools



Data source: ABS 2004, *School Student Numbers By Age, 1956 to 2003*, special request consistent with ABS Schools publication (Cat. No. 4221.0).

Were this trend to continue at its present rate, it would result in a substantial reduction in the government schooling. However, given the policy commitments of governments to maintaining a strong government school sector such an outcome is unlikely. Indeed the rate of shift to private schooling has declined to its present rate from a peak in the early eighties of 0.7 percentage points per year.

In the Commission's projections, the shift is assumed to slowly abate, reducing from the initial rate of 0.4 percentage per year to 0.1 percentage points per year by 2044-45. Under this assumption, the share of school students in non-government schools rises from 31.2 per cent to 41.9 per cent over the projection period.⁴

³ That is at the end of a year the proportion in non-government schools has risen by 0.4 per cent while the proportion government schools has declined by 0.4 per cent.

⁴ Taking total enrolments to be 100 per cent, the shift was assumed to be 0.35 percentage points per annum for the decade to 2012-13, 0.25 percentage points for the subsequent decade, 0.20

Trends in university and VET participation

Participation rates for university and VET study have been rising over the 1990s. The average rate of increase has been 0.4 percentage points per year for university participation and 2.7 percentage points for VET participation.

University and VET participation has grown faster for students aged 15 to 24 years, compared with mature age students (24 years and over) (table 9.2).

Table 9.2 Growth in university and VET participation rates

	<i>Universities — students</i>			<i>VET — students</i>		
	<i>Student Participation rates 2002^a</i>	<i>Average annual percentage point growth 1989 to 2002</i>	<i>Growth normalised to a ten year period</i>	<i>Student Participation rates 2002^b</i>	<i>Average annual percentage point growth 1994 to 2002</i>	<i>Growth normalised to a ten year period</i>
	%	%	%	%	%	%
15 to 19	12.7	0.22	2.2	25.7	0.77	7.7
20 to 22	17.0	0.57	5.7	20.4	0.68 ^c	6.8 ^c
23 to 24	6.9	0.25	2.5			
25 to 29	3.7	0.12	1.2	13.1	0.45	4.5
30 to 39	1.9	0.03	0.3	11.0	0.36	3.6
40 to 49	1.1	0.03	0.3	9.7	0.49	4.9
50 plus	0.2	0.01	0.1	3.7	0.27	2.7
Total	2.5	0.04	0.4	8.6	0.27	2.7

^a Full time equivalent university students per person in the age group population x 100. ^b VET students per person in the age group population. ^c 20-24.

Source: DEST 2004, *University student numbers by age, 1989 to 2002*, special request; NCVET 2004, *VET students by age, 1994 to 2002*, special request; and ABS 2003, *Population by Age and Sex, Australian States and Territories*, (Cat. No. 3201.0).

Tertiary participation rates rise because enrolments are increasing and/or because course durations are increasing. An examination of enrolments and hours attended data shows that the number of hours VET students take to complete a course is increasing for mature age students (NCVER 2004) — suggesting an increase in course durations. There is also evidence that the duration of university courses is increasing (Aungles, Karmel and Wu, 2000).

On the other hand, a major driver of tertiary participation is the proportion of the population in their early twenties who choose to enrol in tertiary study. Currently, by the age of 25, around 65 per cent of the population have undertaken either

percentage points for the decade after that, 0.15 percentage points for the decade after that and 0.1 percentage points thereafter.

university or VET study (Aungles, Karmel and Wu 2000).⁵ While this proportion is currently growing, it will eventually plateau.

The Commission has modelled university and VET participation rates as initially increasing in line with the current trend rates. Growth then gradually declines so that participation rates are stable by 2035. Participation rates were assumed to increase by 30 per cent over the projection period.

Trends in costs per student

Schools

Average school costs per student have been growing at above the rate of per capita GDP growth (table 9.3 and figure 9.4).

Table 9.3 **Growth in real school funding, 1991-92 to 1999-2000.**
per student and per capita GDP

	1991-92 to 1999-00 MCEETYA ^a	1977-78 to 2001-02 ABS ^a
	% real growth	% real growth
Government schools	3.4	
Non-government schools	4.9	
All schools	4.1	2.9
Per capita GDP	3.0	2.0

^a The Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) and the ABS draw information on government education expenditures from State and Territory education departments and from the Department of Education Science and Training (DEST). MCEETYA also incorporates information from DEST's survey of private schools.

Data source: MCEETYA (Various Years); DEST, 2004, *Non-Government School Expenditures*, special request based on DEST Non-Government Schools survey; ABS 2003, *Government Finance Statistics, Expenditures on Education*, special request consistent with ABS Cat. No. 5512.0, ABS 2003.

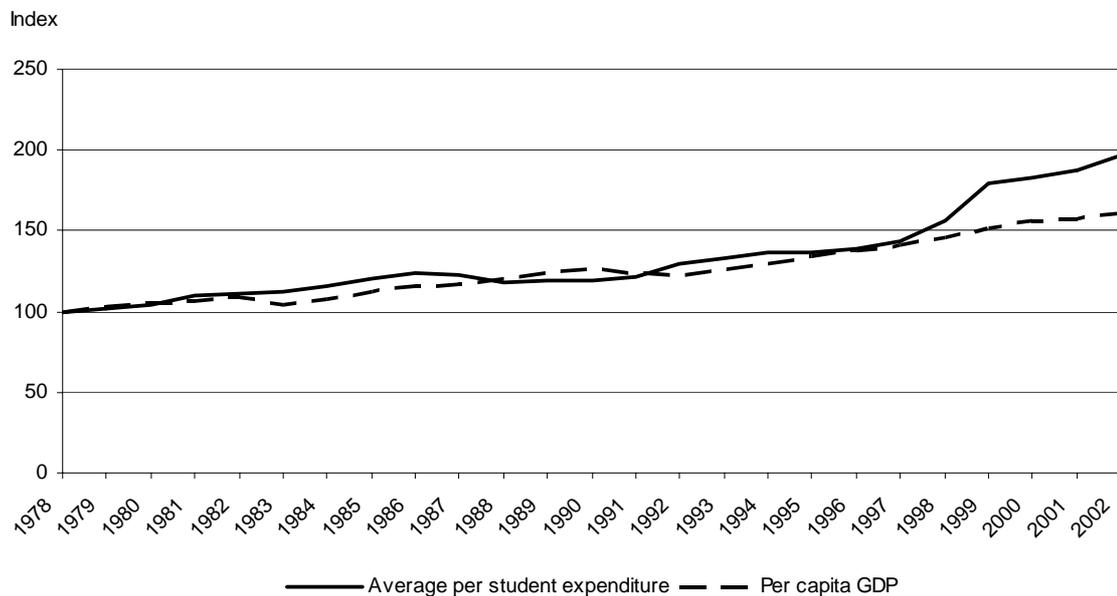
University costs per student

University funding is derived from the Australian and State Governments, student contributions and from other sources. Other sources include revenues from fees from foreign students, full-fee paying domestic students, returns on investments, fees for contract and research services and donations and bequests.

⁵ 1995 data.

Figure 9.4 Growth in real school funding per student and per capita GDP, 1978 to 2002

Constant prices (index = 100, 1978)

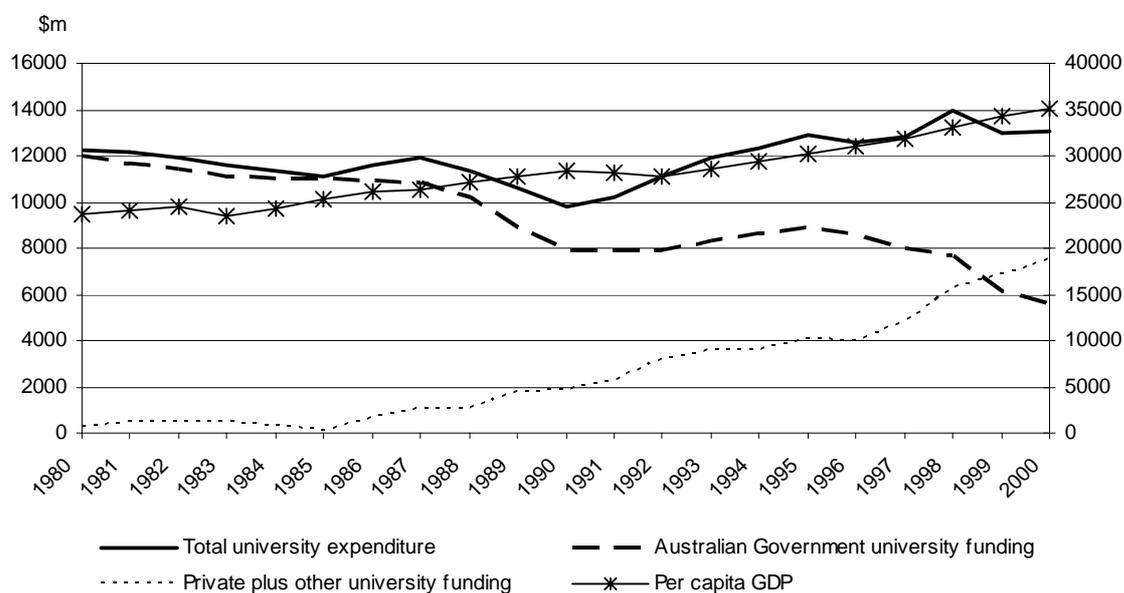


Data sources: ABS 2003, *Government Finance Statistics, Expenditures on Education*, special request consistent with ABS Cat. No. 5512.0, ABS 2004, *School Student Numbers By Age, 1956 to 2003*, special request consistent with ABS Schools publication (Cat. No. 4221.0).

The student contribution towards places funded by the Australian Government is set by higher education providers within bands established by the Government. The contribution can be paid to the institution at the time of study, or deferred and progressively repaid when the individual reaches a certain level of income under the Higher Education Contribution Scheme (HECS). Where a student elects to defer their whole HECS liability, the university receives the full amount from the Government. As noted in PC (2002), HECS involves a number of explicit and implicit subsidies including for students who do not meet the minimum income threshold, and through not charging a market rate of interest on outstanding student debts.

Therefore, the net Australian Government contribution to universities comprises its direct payments to institutions *less* revenue received through HECS. The introduction of HECS in 1989 has meant that, while total university funding per student has increased as a proportion of GDP, net public funding per student has declined as a proportion of GDP (figure 9.5).

Figure 9.5 Growth in real university funding per student and growth in real per capita GDP, 1979–80 to 1999–00



Note: Private plus other expenditure was derived as total expenditure less Australian Government funding.

Data source: ABS 2003, *Government Finance Statistics, Expenditures on Education*, special request consistent with ABS Cat. No. 5512.0.

Depending on the data source used, the annual decline, in real terms, in all government funding over the second half of the 1990s, has been between 8.8 and 3.4 per cent (tables 9.4 and 9.5).

The decline in the net government contribution per student can be expected to continue in the short term:

- Firstly, in the next few years, the numbers of people who are required to start making HECS repayments will exceed the numbers who can cease paying because they have met their liabilities. This means that overall HECS collections will continue to rise until the number of completing repayers matches the number of new repayers.
- Secondly, universities have recently been allowed to increase the student contribution by up to 25 per cent above current HECs levels.

However, the system will eventually reach a ‘steady state’ — with the number of people ceasing to make payments equalling those beginning to pay HECS — at this point government expenditure per student is likely to begin to rise again.

In the Commission’s projections, average government expenditure per university student is projected to initially *decrease* at the current trend rate of 3.4 per cent a

year. However, over a 10 year period this trend is assumed to gradually reverse until government per student funding *increases* at 1.75 per cent a year (the assumed growth rate in real incomes in the economy).

These growth rates result in government funding falling from 48 per cent of total university expenditure in 2001–02 to 34 per cent in 2044–45.

Table 9.4 **Growth in university funding per domestic student, by source, 1995 to 2001**

Nominal and real prices

<i>Revenue Source</i>	<i>1995 nominal</i>	<i>2001 nominal</i>	<i>1995 real</i>	<i>2001 real</i>	<i>Growth in real funding per domestic student^b</i>
	\$m	\$m	\$m (2002 prices) ^a	\$m (2002 prices) ^a	% Annual compound growth
Australian Government grants (1)	4308.1	4470.2			
Commonwealth Hecs payments (2)	739.7	1481.5			
Private HECS repayments (3) ^c	321.0	686.0			
Revenue from Australian Government (1+2-3)	4726.8	5265.7	5476.0	5389.7	-3.6
Revenue from State governments (4)	103.7	178.0	120.1	182.2	3.6
Revenue from Government (1+2-3+4)	4830.5	5443.7	5596.1	5571.9	-3.4
Domestic student fees (5)	439.2	857.1			
Student up-front HECS payments (6)	162.3	289.7			
Private HECS repayments (3)	321	686			
Revenue from Australian students (5+6+3)	922.5	1832.8	1068.7	1876.0	6.1
Revenue from foreign student fees	441.2	1163.5			
Other revenue from investment income, contract research, donations and Other	1191.8	1762.1			
Revenue from foreign students and other sources	1633.0	2925.6	1891.8	2994.5	4.3
Total	7386.0	10202.1	8556.5	10442.4	-0.1

^a Using ABS GDP deflator (0.8632 in 1995, 0.9770 in 2001, and 1.0 for 2002). ^b In 1995 there were 557 989 domestic students, in 2001 there were 684 975 domestic students. ^c From DEST 2004, p.61.

Sources: DEST 1995, *Finance 1995, Selected Higher Education Statistics*; DEST 2001, *Finance 2001, Selected Higher Education Statistics*; DEST 2004, *Report for the 2004-2006 Triennium*.

Table 9.5 **Growth in real university funding per student, 1979-80 to 2000-01**

	1979-80 to 1989-90 ABS data ^a	1989-90 to 1994-95 ABS data ^a	1994-95 to 1999-00 ABS data ^a	1995 to 2001 DEST data ^a
	%	%	%	%
Average per student ^c government university funding	-4.0	2.3	-8.8	-3.4
Average per student private (domestic students) university funding ^d	20.8	17.0	13.1	6.1
Average per student other university funding ^e				4.3
Average per student university expenditure	-2.2	5.8	0.3	-0.1
Per capita GDP	1.8	1.2	3.1	2.7
GDP	3.4	2.4	4.3	3.9

^a Private and other funding has been estimated from the ABS data using Total university expenditures less Australian Government funding. ^b DEST figures include research grants. ^c Domestic students only. ^d Payments made for courses by domestic students. ^e Includes fees from foreign students, other research grants, income from consultancies, contract research and royalties and returns on investments.

Source: ABS 2003, *Government Finance Statistics, Expenditures on Education*, special request consistent with ABS Cat. No. 5512.0; DEST 1995, *Finance 1995, Selected Higher Education Statistics*; DEST 2001, *Finance 2001, Selected Higher Education Statistics*; DEST 2004, Report for the 2004-2006 Triennium.

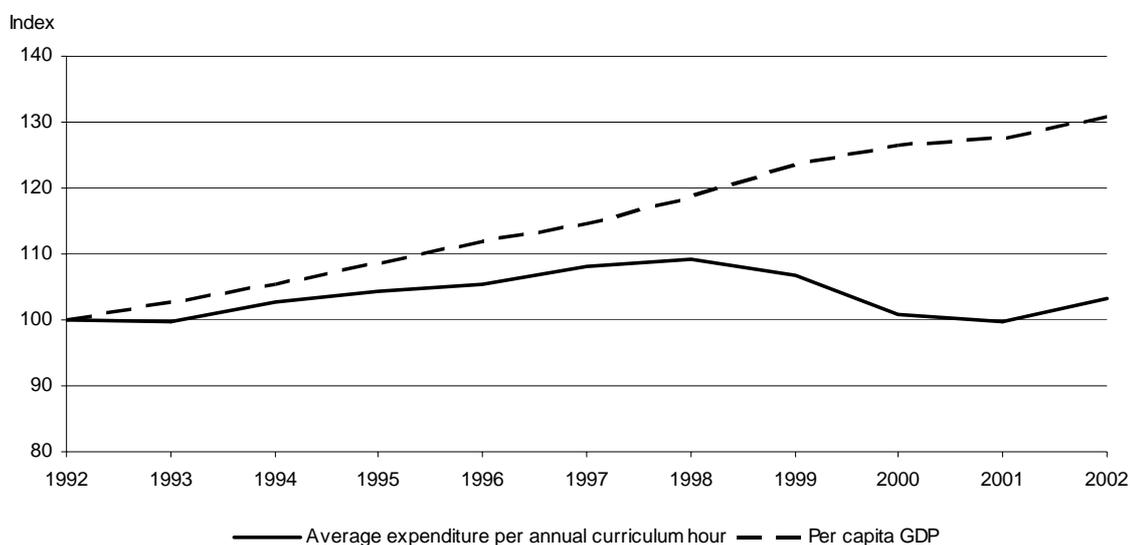
VET costs per student

Average VET costs (real expenditure per annual curriculum hour) have been relatively stable over the 1990s (figure 9.6).

Even though average VET expenditures remained stable, this does not mean that teaching services did not expand or that the quality of services delivered did not improve. There has been a push in the VET sector for improved cost effectiveness. This includes moves to employment of a greater proportion of lecturers on a casual basis. In real terms, employee costs fell eight per cent between 1997 and 2000 (Burke 2003). The sector is also expanding the amount of private fees it receives from overseas students (Burke 2003).

The Commission has also modelled VET costs per student as increasing in line with rises in real incomes.

Figure 9.6 **Growth in real VET funding per student and growth in real per capita GDP**



Data source: NCVER 2004, *VET students by age, 1994 to 2002*, special request, NCVER 2004, *VET Expenditure, 1992 to 2002*, special request.

Costs may not respond immediately to falling student numbers

Many educational costs do not vary significantly as student numbers vary year by year. For example, assets such as buildings and grounds, library facilities and executive functions are not reduced if student numbers fall.

As noted in the impacts section below, student numbers *are* likely to fall in some segments of education. Moreover, even in those segments where modest growth in absolute numbers occurs in aggregate, it is likely that there will be reduced enrolments in many geographic areas (that is demand and supply is likely to be more mismatched when growth in student numbers is slow).

This suggests that fixed costs per student might initially rise as a result of demographic pressures. In the long-run, closures of non-viable (small) institutions is likely to occur, so that these pressures are likely to mainly operate over the short and medium term. There is some evidence of these effects:

- States and Territories with low population growth have maintained or increased per student expenditures (Aungles, Karmel and Wu 2000).
- Around 11 out of 20 OECD countries experienced significant rises in average costs when they experienced either falls, no change or moderate rises in student numbers (OECD 2003).

However, these adjustment effects are likely to be relatively low in importance by the end of the projection horizon used in this study.

Other education costs

Expenditure projections were made for education income support payments. These are Australian Government payments to school, TAFE and university students under the Youth Allowance, Austudy, Abstudy and Assistance for Isolated Children schemes. Per student expenditures were calculated using current expenditures and total students for the school, and university sectors. For the VET sector an average cost per curriculum hour was calculated. Total costs were then projected using the student number and curriculum hours projections.

9.3 Projected education expenditures

The changing age structure of the population means that, at the national level, there will be fewer students in the education system. Government expenditure is projected to decline from 4.90 per cent to 3.74 per cent of GDP in 2044-45 (table 9.6). This occurs despite increases in projected participation rates within the tertiary education sectors.

Table 9.6 **Projected government education funding as a share of GDP, by level of government and education sector**

	2001-02			2044-45		
	State and Terr Govts.	Australian Govt	Total	State and Terr Govts.	Australian Govt	Total
	%	%	%	%	%	%
Schools	2.54	0.79	3.33	1.79	0.67	2.47
-Government	2.34	0.28	2.62	1.60	0.19	1.79
-Non-government	0.20	0.51	0.70	0.19	0.48	0.67
VET	0.35	0.16	0.51	0.40	0.18	0.58
University	0.05	0.61	0.66	0.03	0.47	0.51
Other ^a		0.40	0.40		0.19	0.19
Total	2.94	1.96	4.90	2.22	1.51	3.74

^a Income support payments.

Source: SCRGSP 2004, DEST 2003, NCVET 2003, FACS and DEST 2004, ABS 2003b and Productivity Commission estimates.

For the Australian Government expenditure is projected to decline by 0.42 percentage points as a share of GDP (in comparison, the IGR projected a slightly lower fall of 0.25 percentage points in 2041-42).

- A reduction in university expenditure and income support payments as a proportion of GDP are the major components of the overall decline.
- The decline in expenditure on non-government schools is much smaller, while VET spending is projected to increase slightly because of significantly higher participation.

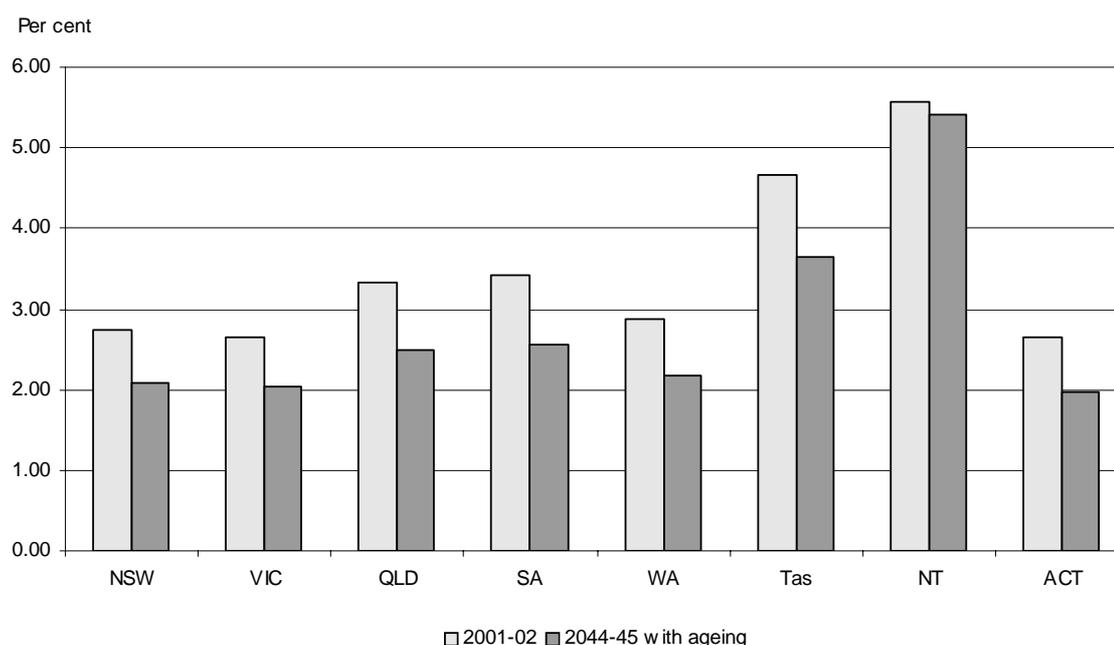
For the States and Territories, the fall in the government school expenditure as a proportion of GDP is largely responsible for the overall reduction, offset slightly by an increase in VET funding.

Each of the States and Territories, with the exception of the Northern Territory, are projected to have similar percentage decreases in their education expenditure as a proportion of GDP (figure 9.7). Projected reductions range between 22 and 26 per cent, except in the Northern Territory where the projected fall is 3 per cent.

In the Northern Territory, there are two factors which reduce falls in education expenditures:

- the younger initial age structure of the indigenous population, along with higher fertility rates means there is less ageing; and
- it has been anticipated that the school participation rate for the indigenous population will rise until it matches the rate for the non-indigenous population.

Figure 9.7 Projected government education expenditures as a proportion of GSP, 2001-02 and 2044-45



Source: SCRGSP 2004, DEST 2003, NCVET 2003, ABS 2003b and Productivity Commission estimates.

The impact of ageing

In table 9.7, the impact of demographic change is isolated from non-demographic factors such as projected changes in participation rates and unit costs. It shows that the impact of ageing is significant. Total government education expenditure is projected to be nearly \$25 billion, or 26 per cent, lower than if the age structure remained as it is today.

Table 9.7 **Impact of population ageing on government education expenditures in 2044-45**

<i>Sector</i>	<i>Expenditure with projected ageing</i>	<i>Expenditure if there were no ageing attributable to ageing</i>	<i>% reduction</i>
	\$ billion	\$ billion	%
Schools	45 743	64 282	28.8
-Government	33 268	46 765	28.8
-Non-government	12 475	17 517	28.8
VET	10 732	13 306	19.3
University	9426	12 062	21.9
Other ^a	3435	4497	23.6
Total	69 336	94 146	26.4

^a Income support payments.

Source: SCRGSP 2004, DEST 2003, NCVET 2003, FACS and DEST 2004, ABS 2003b, and Productivity Commission estimates.

10 Other expenditure

Key points

- The ageing of the population is likely to increase government expenditure in a range of areas beyond those canvassed in previous chapters. However, these are not likely to be major causes of fiscal pressure.
- Older people have higher than average levels of home ownership than the general population.
 - Nevertheless, ageing is likely to create pressure for greater housing assistance to older people who do not own their own homes, and who, typically, have low incomes.
- There will be increased growth in demand for community and disabled transport. That said,
 - public transport concessions to pensioners and other older people are unlikely to result in a large revenue drain; and
 - the private car will become an even more important means of transport for older people.
- A reduction in the proportion of younger people is likely to see overall crime rates fall in the future, reducing expenditure pressure in law and order.
 - However, this takes place against rising community expectations in relation to safety issues, so there may be little net savings.
- There will be some residual costs to governments related to ageing arising from the structure of government employee superannuation schemes. This said, however, most governments have already acted to address unfunded superannuation liabilities and the remaining unfunded gap is unlikely to be a major source of fiscal pressure.

States and Territories identified a number of areas of government expenditure where the ageing of the population may exert some fiscal pressure, even though they are not the main drivers of expenditure. The four most important of these are housing, transport, law and order, and unfunded government superannuation liabilities. The emphasis of this chapter is on the broad direction and scale of the impact of ageing on budgets in these areas, rather than seeking to provide projections of expenditure.

10.1 Housing assistance trends

Older people have high levels of home ownership. Nevertheless, ageing is likely to exert some fiscal pressure on the two major sources of government expenditure on housing — Commonwealth Rent Assistance (CRA) and State and Territory public housing.

Tenure type and housing cost by age

People aged over 65 have higher levels of home ownership than younger groups. For the community as a whole, just over 70 per cent of households own their homes in full or in part. In the over 65 age group the ownership rate reaches over 84 per cent (table 10.1).

The high level of home ownership among the elderly is a reflection of life-cycle patterns. Young singles tend to be renters, while young couples are usually at an early stage of buying a home through mortgage. Over time most of the mortgage is paid back, leading to the situation that in the over 65 group more than 80 per cent of households own their homes outright and only 3.6 per cent continue to pay some mortgage. More detailed analysis of the life-cycle pattern of home ownership is presented in Kendig and Gardner (1997), Kendig and Neutze (1999) and Yates (1997).

Given that the majority of those aged over 65 years own their homes outright, they face on average, lower housing costs than younger households (table 10.2). This suggests that a lack of access to affordable housing is not a major problem in this age group as a whole, and that recourse to government housing assistance measures will be limited.

However, while this may be true in broad terms, those over 65 who do not own a home can face serious financial difficulties in renting accommodation in the private market. Due to below average income levels, renters, particularly from private landlords, tend to spend a larger proportion of their income on housing than younger cohorts (table 10.2).

Table 10.1 Housing tenure over the life cycle^{a b}
Per cent

<i>Tenure and landlord type</i>	<i>15-24 years</i>	<i>25-34 years</i>	<i>35-44 years</i>	<i>45-54 years</i>	<i>55-64 years</i>	<i>65 and over</i>	<i>All households</i>
Owner without a mortgage	2	7.2	17.1	38.8	63.9	80.7	38.2
Owner with a mortgage	14	43.6	52	40.5	19.7	3.6	32.1
<i>Renters^c:</i>							
State/Territory housing authority	5.1	4.5	5.4	4.2	4.5	6	5
Private landlord	70.4	40.7	23	13.9	8.6	5.1	21
Total renters	78.4	47	29.4	19	14.7	12.5	27.4

^a The reference person is the husband or wife who responded to the survey in a couple or the respondent in a lone person household. These figures relate only to people residing in private dwellings, excluding those located in non-private dwellings, such as hospitals, nursing homes, public hostels, prisons or emergency shelter. ^b Figures do not add up to 100 per cent because of missing responses. ^c Total renters also includes boarders.

Source: ABS 2002, *Housing Occupancy and Costs, Australia, 2000-01* (Cat. 4130.0.55.001).

Table 10.2 Housing costs vary by age and tenure^a
Median housing cost as a proportion of income, per cent

<i>Tenure and landlord type</i>	<i>25-34 years</i>	<i>35-44 years</i>	<i>45-54 years</i>	<i>55-64 years</i>	<i>65 and over</i>	<i>All households</i>
Owner without a mortgage	3	2	2	3	4	3
Owner with a mortgage	21	19	14	13	8	18
<i>Renters^b:</i>						
State/Territory housing authority	21	19	21	21	21	20
Private landlord	20	22	22	28	30	22
Total renters ^c	20	22	21	23	23	21

^a The reference person is the husband or wife who responded to the survey in a couple or the respondent in a lone person household. ^b These figures exclude people living in non-private accommodation such as nursing homes or hostels. ^c Total renters also includes boarders.

Source: ABS 2002 *Housing Occupancy and Costs, Australia, 2000-01* (Cat. 4130.0).

Trends in housing assistance

Commonwealth Rent Assistance

Assistance to private renters is provided mainly by the Australian Government through the Commonwealth Rent Assistance (CRA) scheme.¹ Rent assistance is a non-taxable income supplement paid to individuals and families in recognition of the housing costs they incur in the private rental market. All pensioners, allowees (recipients of allowances such as Newstart Allowance), beneficiaries and people receiving more than the base rate of Family Tax Benefit Part A, may be eligible for this assistance. It is paid at the rate of 75 cents per \$1 of rent paid above a designated rent threshold,² subject to maximum rates depending on household composition.

The Australian Government provided over \$1.8 billion in CRA to around 941 000 income units in 2002-03.³ As at 30 June 2003, the average payment across Australia was \$73 per fortnight. On a capital/rest of State or Territory basis, Sydney had the highest average rent assistance (\$78 a fortnight). The lowest (\$69 a fortnight) was in non-capital Tasmania (SCRGSP 2004). Average payment also varies by primary benefit type (table 10.3).

The distribution of CRA recipients among those receiving Department of Family and Community Services (FaCS) payments is presented in table 10.3. The mix of clients by payment type reflects the fact that the proportion of social security recipients receiving CRA varies by age. Older clients (income units) tend to be less likely to receive CRA, consistent with their relatively low usage of private rental accommodation and higher levels of home ownership. As at November 2002, among FaCS clients, 43 per cent of all income units with a head aged 25 years received CRA. This proportion decreased to 39 per cent for those with a head aged 30 years, and 30 and 26 per cent for those aged 40 and 50 years respectively. People over 65 recorded the lowest levels of receipt of CRA (14 per cent) (SCRGSP 2004).

¹ Paid mainly by the Department of Family and Community Services (FaCS), although some payments are made through the Department of Veteran Affairs and the Department of Education, Science and Training.

² The threshold is set dependent on the circumstances of each customer.

³ Income units are analogous to family units except that non-dependent children and other adults are treated as separate income units.

Table 10.3 **Income support and CRA, June 2003** ^{a b}

<i>Primary benefit type</i>	<i>Income units</i>		<i>Proportion of CRA recipients</i>	<i>Average fortnightly payment</i>
	<i>Persons</i>	<i>Per cent</i>		
Age Pension	157 518	16.7		69
Disability Support Pension	166 163	17.7		76
Newstart	192 819	20.5		70
Parenting Payment (single)	193 583	20.6		87
Parenting Payment (partnered) ^c	25 347	2.7		99
Youth Allowance	88 653	9.4		59
Family Tax Benefit ^d	79 551	8.5		74
Other Qualifying Benefits	37 074	3.9		74
Total	940 708	100		73

^a Data are for CRA recipients who were clients of the DFACS only. Data exclude those paid Rent Assistance by, or on behalf of, DVA or DEST. ^b Components may not sum to 100 per cent as a result of rounding. ^c Income units classified as Parenting Payment (partnered) only if partner does not receive an income support payment. ^d Income units classified as Family Tax Benefit only if neither the person nor partner receives an income support payment.

Source: SCRGSP 2004.

Public housing

Public housing comprises dwellings owned (or leased) and managed by State and Territory housing authorities. The Commonwealth State Housing Agreement (CSHA) provides the funding for public housing. Public and community housing accounted for most of the \$1.4 billion provided in housing assistance under CSHA in 2002-03.⁴

A total of 338 000 public housing dwellings were occupied at June 2003. The public housing stock is augmented by houses leased from private owners by State/Territory and local government housing authorities. As indicated in table 10.1, around 5 per cent of Australian households live in public housing. Community housing, which is managed by not-for-profit organisations and local governments adds another 7.8 per cent to the public housing stock. The total market value of public and community housing is estimated at around \$44 billion in 2002 prices (SCRGSP 2003).

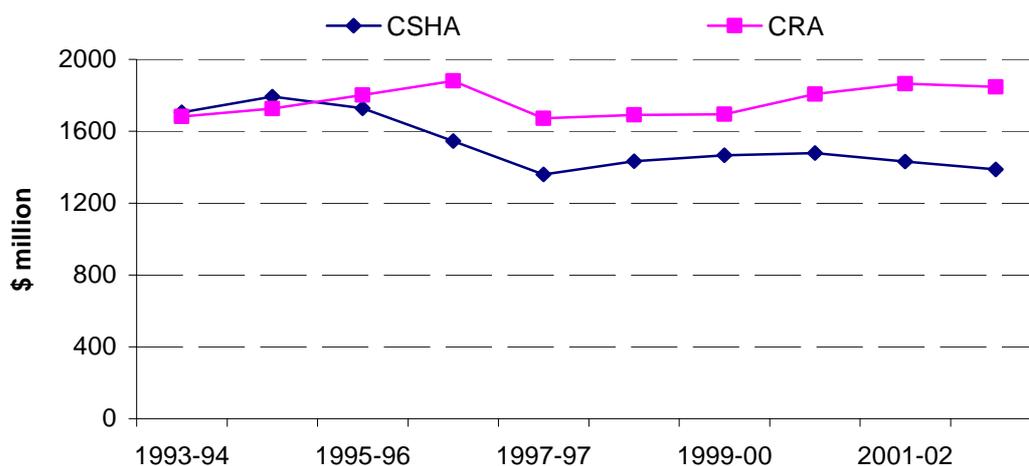
⁴ Other CSHA outlays are related to the Aboriginal Rental program, crisis accommodation, specific types of rent subsidies, assistance in home purchasing, bond loans and relocation expenses. These account for less than 17 per cent of CSHA outlays.

Expenditure on CSHA declined by approximately 18.6 per cent in real terms between 1993-94 and 2002-03 (SCRGSP 2004), while expenditure on CRA increased by approximately 9.8 per cent over the same period (figure 10.1). The decrease in real expenditure on CSHA has had a marked effect on net additions to the public housing stock. The number of *new* dwellings has fallen significantly over the period from 1982 to 1997 (AIHW 2002).

Public housing rents are generally set at market levels and rebates are granted to low income earners in order to provide affordable housing to people on low incomes. The rebates are determined so that tenants should pay no more than 25 per cent of their assessable income in rent. In most cases this is a higher subsidy than the CRA provides to those renting in the private market.⁵

Public housing is available to people on low incomes and those with special needs. Around 29 per cent of public housing tenants reported health or disability problems (AIHW 2002). According to the ABS, approximately 80 per cent of households who rented from a State or Territory housing authority in 2000-01 relied on pensions and allowances as their principal source of income. Priority rankings across States and Territories are not uniform, but generally a high priority for public housing is given to those on low incomes who have health and/or disability problems. This criterion tends to favour older people. Other priority criteria favour younger demographic groups, such as single mothers.

Figure 10.1 **Real government expenditure on housing assistance**
2002-03 dollars



Source: SCRGSP 2004.

⁵ While rent rebate in public housing is dependent on household income, CRA is not linked to household income but to the amount of rent paid and household size and composition.

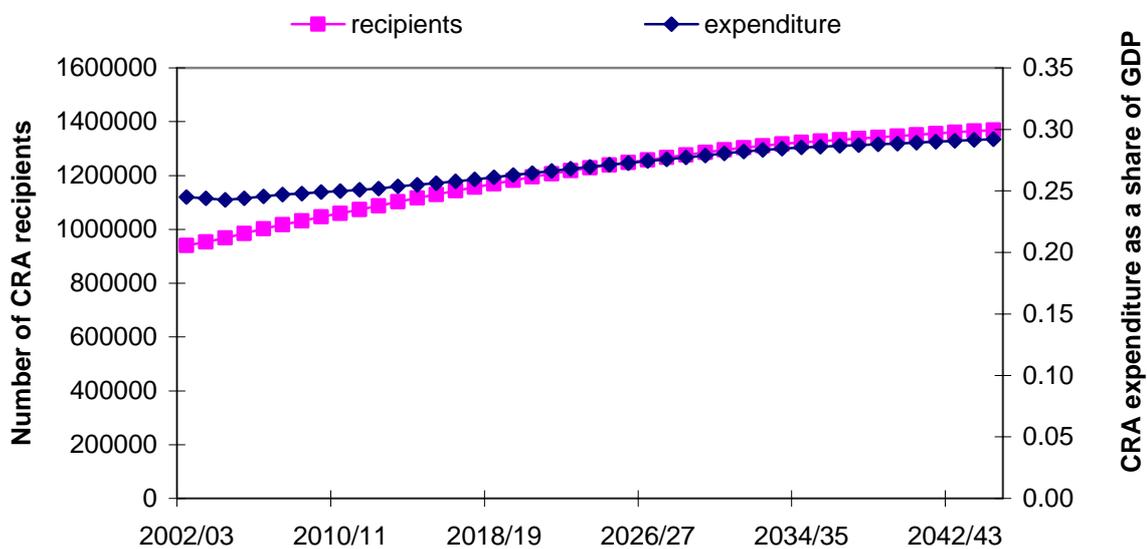
The fact that priority criteria tend to favour elderly low income people with disabilities is also reflected in the age distribution of public housing tenants. Among households with a reference person aged over 65, 6 per cent are living in public housing, whereas among all age groups just under 5 per cent rely on this type of accommodation (table 10.1).

Future government expenditure on housing

Rent Assistance

The number of CRA recipients over the period 2003-04 to 2044-45 (see box 10.1 for methodology) is expected to increase in line with increases in the number of income support recipients (figure 10.2). Expenditure on CRA is projected to increase from current levels of 0.21 per cent of GDP, to 0.29 per cent in 2044-45. As discussed below, this figure could rise if the trend away from public housing is maintained.

Figure 10.2 **Projected CRA expenditure and recipient numbers**



Data source: Commission estimates.

Box 10.1 Methodology for projecting demand for rent assistance and public housing

For CRA, estimates of income support recipients (chapter 9) in conjunction with information on the distribution of CRA recipients among FaCS clients in 2003 (table 10.3) can be used to derive estimates of the number of CRA recipients over time. This approach takes the number of CRA recipients as at 30 June 2003, for a given primary benefit (such as Age Pension), and applies an annual growth rate from present to 2044-45. The growth rate is equal to the projected growth rate in the number of recipients of the primary benefit. This approach assumes that the share of CRA recipients for any given primary benefit remains constant over time. The Commission has not projected recipient numbers for all of the primary benefits presented in table 10.3 where this is the case, an average, weighted growth rate has been applied. Finally, the Commission has only projected the number of recipients of Youth Allowance 'Other' (essentially non-students), growth in this benefit has been used as a proxy for growth in all Youth Allowance recipients.

Expenditure estimates were calculated by multiplying the projected number of recipients (by primary benefit type) by average annual expenditure (table 10.3). Although CRA is indexed to CPI, other payments such as pensions, are indexed to average weekly earnings. It is likely that over the long run, the government will make ad hoc adjustments to CRA payments in order to maintain some parity between it and other forms of welfare payments. Hence, projections on the basis of CPI indexing alone, while consistent with stated Government policy, are likely to underestimate the long-run value of CRA expenditure. For example, were CRA payments increased in line with average weekly earnings, total expenditure on CRA is projected to reach 0.29 per cent of GDP in 2044-45, compared with 0.14 per cent under the current indexation policy.

For public housing, the number of households occupying public housing expressed as a share of all households for a given age group (table 10.1), combined with Commission projections of household numbers (chapter 11), can be used to derive projections of the demand for public housing over time. This approach assumes that the 'intensity of use' of public housing for a given age group remains constant over the projection period. Hence, growth in the demand for public housing for a given age group is analogous to growth in the number of projected households for that age group. One limitation of this approach is that projections of future demand are based on current levels of use, thereby excluding those on waiting lists. Accordingly, these projections should be treated as lower bound estimates.

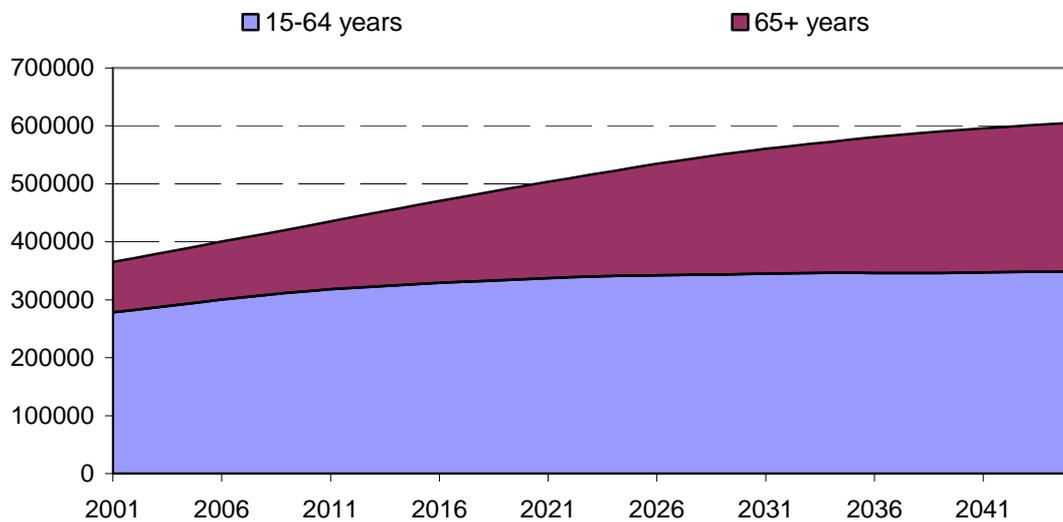
Public housing

The higher propensity to use public housing by those over 65 years, combined with growth in the number of 65+ households, is likely to result in an increase in the demand for (the available stock) of public housing. Figure 10.3 shows the projected numbers of people in public housing, were supply to accommodate increased

demand. In turn, were the additional demand for public housing to be met, it is likely that expenditure would increase as a share of GDP over the projection period.

However, provision of housing assistance is an evolving area of government policy, and there appears to be a move away from public housing towards other forms of housing assistance (evident in expenditure trends in figure 10.1 above). In this case, increased demand for housing assistance created by the ageing of the population is likely to be manifested in other forms of assistance, and possibly in increases in rent assistance beyond that projected above.

Figure 10.3 Projected demand for public housing
By age of household reference person.



Data source: Commission estimates.

10.2 Spending on transport services

In 2002-03, Australian governments spent over \$11 billion on transport services (table 10.4). States and Territories are the main provider of funding, with transport representing 12 per cent of total State expenditure. Funding for roads is the biggest component, comprising two thirds of total transport expenditure.

Table 10.4 Government transport expenditure, 2002-03,

Billions of dollars

	<i>AG</i>	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas</i>	<i>NT</i>	<i>ACT</i>	<i>Total</i>
Road	1 257	2 046	1 546	1 149	404	575	185	51	105	7 318
Water	203	62	15	88	39	3	10	1	0	421
Rail	31	1 178	1 015	670	56	270	0	5	0	3 225
Air	153	0	0	2	0	0	0	1	0	156

Source: ABS 2004 *Government Finance Statistics, 2002-03* (Cat. 5512.0).

The impact of ageing on total transport spending is likely to be limited. The majority of expenditure is for transport infrastructure, and ageing will not fundamentally affect the requirements for road and rail networks, or their configuration.

Nevertheless, the ageing of the population may have implications in a number of transport areas, including subsidies for public transport, transport of the disabled and access to services generally by older Australians.

Subsidies for public transport

Net government expenditure on passenger public transport was around \$2.7 billion in 2001-02 (table 10.5). Fare concessions are offered on most services to pensioners and older people. Notwithstanding a greater proportion of older people in the future, it is unlikely that fare concessions will be a significant revenue drain on transport budgets.

First, from the available data it appears that older people are not particularly intensive users of public transport. For example:

- For urban rail and bus transport the share of use by older people is less than their share in the population.
- For regional rail and bus travel the share of use is also lower than other groups, (but does exceed the share of older people in the population) (see figure 10.4).

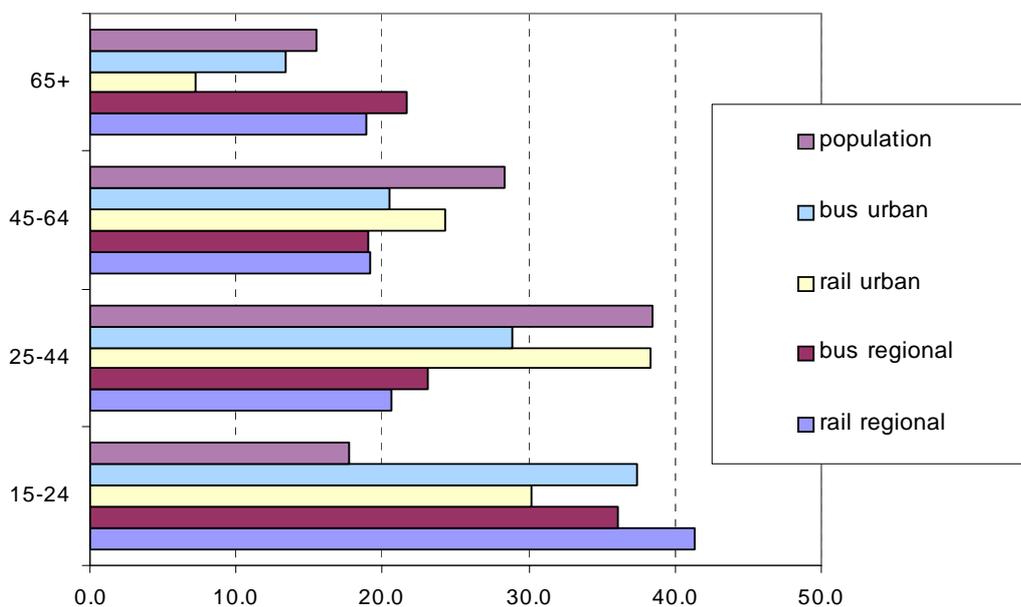
Table 10.5 Net government expenditure on passenger public transport in 2001-02

	<i>Buses, trams & ferries^a</i>	<i>Passenger trains</i>	<i>Total</i>
	\$m	\$m	\$m
New South Wales	606	696	1 302
Victoria	459	351	810
Queensland	174	4	178
South Australia	161	1	162
Western Australia	213	79	292
Tasmania	19	0	19
Northern Territory	6	0	6
Australian Capital Territory	29	0	29
Total net expenses	1 667	1 131	2 798
Net expenses as a percentage of GDP	0.23	0.15	0.38

^a The data on buses, trams and ferries are included in the ABS statistics under categories 3219 and 3281, which include also road expenditure items not classified elsewhere. The figures presented in the table are based on estimates of net government expenditure on buses, trams and ferries obtained from transport authorities.

Source: Unpublished data from ABS.

Figure 10.4 Use of public transport by age



Data source: Source: BTRE 2002, Steer Davies Gleave (2001), TransportNSW (2002) and unpublished data from the transport authorities in Adelaide, Perth and Queensland Rail.

Fare concessions create an incentive to use public transport, generally outside peak times. A greater number of older people using networks is unlikely to increase the need for infrastructure beyond that required to service other groups.

Indeed, while a greater number of older people may not place greater demands on public transport services, it could be that the decline in the number of school age children associated with demographic change may reduce costs somewhat:

- school age children are among the heaviest users of services (figure 10.4 under represents their use because surveys typically interview people over the age of 15);
- school children travel during the morning peak, adding to any congestion on public transport; and
- most jurisdictions provide some form of subsidised school travel, which often includes dedicated school bus services.

Thus a reduction in the number of children may reduce the loads on the general public transport system during peak times and the need for dedicated services.

Transport assistance to the disabled

Australian governments also spend on special purpose programs designed to improve the access of disabled people to medical facilities, shopping centres and public transport. The majority of severely disabled people are over 65.

There are three types of programs which provide transport access to the disabled:

- general ‘community transport’ provides free or subsidised transport services from the home to shops, medical practitioners, transport stations and the like;
- the more specialised ‘patient travel scheme’ is designed to assist disabled people living in remote areas (usually more than 100 km from the service provider) to access medical specialists; and
- the taxi subsidy scheme, which subsidises the taxi fares of permanently and severely disabled people.

Community transport encompasses a wide range of services and organisations. There is a heavy involvement by voluntary organisations who often provide assistance free of charge and are reimbursed for motor vehicle running expenses. Other services are provided by paid employees. The vehicles used range from ordinary cars to mini-buses and vehicles fitted to accommodate wheelchairs. Most elderly people live in urban areas, so community transport is carried out mainly in

the cities. However, more expensive access services are also provided to people living in rural and remote areas.

Given the wide range of organisations involved in community transport it is difficult to provide a precise estimate of the net cost to government. From the information obtained from discussions with State Government agencies involved in this area, it appears that total government expenditure in 2002-03 around Australia was between \$55 and \$65 million. A significant portion of funding comes from the Home and Community Care (HACC) program (see chapter 7). Additional funds for community transport come from other program areas under the health or transport portfolios.⁶

In terms of government expenditure, the patient travel scheme is probably larger than the community transport program. In 2002-03 between \$70 and \$75 million was devoted to this program nationwide. Direct funding comes from State health departments. The program is more costly on a per capita basis in States where a significant share of the population live in remote regions, such as Queensland, Western Australia and the Northern Territory. Occasionally, the patient travel scheme also covers travel to medical specialists in another State. Modes of transport range from taxis to planes.

The taxi subsidy scheme covers up to 50 per cent of the taxi fares of permanently and severely disabled people. Eligibility is conditional on medical certificates. In 2002-03 between \$80 and \$90 million was spent on this scheme nationwide. Taxi subsidies are administered by State/Territory departments of transport.

Population ageing generally will increase demand for specialised transport services to assist frail and disabled people who live in the community. In addition, transport assistance to the disabled may become more important in an ageing society where governments support a policy of assisting the frail and disabled to live in the community rather than in residential homes.

Access to services by older people

Aside from the special needs of those with disabilities, transport plays a key role in facilitating continued access by older people to shops, medical services and the community generally. As the Victorian Government noted:

⁶ In NSW, Queensland and South Australia community transport is coordinated mainly by the State Department of Transport whereas in Victoria, Western Australia and Northern Territory it is coordinated mainly by the State Department of Health.

access to an integrated transport network is essential to the economic and social participation of Victorians of all ages (sub. 29, p. 60)

It suggests that as a result of ageing, public transport may shift towards local transit (relative to commuter transport). Troy (1999, p. 464) also supports this proposition:

Given that the aged proportion of the population is increasing we may need to pay more attention to the development of local area transport services, such as mini-bus services, to enable the aged to participate, to make better use of social infrastructure and to avail themselves of the services available in the city.

Such public transport initiatives are likely to become more important in the future.

However, the need for further infrastructure should not be overstated. The primary means of access to services by older Australians will continue to be the private car. At present even for those over 65, the private car is the dominant mode of transport. In addition, travelling by car as a passenger is also an important means of transport for the elderly. Between 1994-96 in Victoria over 30 per cent of all trips by females over 65 were as a car passenger (compared to under 10 per cent by males) (Steer Davies, Gleave 2001). While many of the trips as a passenger for females are likely to be accompanying a partner, travel by car with offspring, other immediate family or friends is also likely to be an important means of accessing services for both males and females who do not drive.

As the Victorian Government noted, the number of older drivers is likely to increase substantially (sub 29, p. 60). This is not just because there will be more older people, but because a greater proportion of older people will have driver's licences. Steer Davies and Gleave (2001) predict that, in Victoria, the percentage of over 65s holding a drivers licence will increase, for males, from 84 per cent in 1996 to 99 per cent in 2031, and for females, from 44 per cent to 94 per cent. The rapid increase in the proportion of older female drivers partly underpins their conclusion that there will be greater reliance on the car by older people.

In all, this will be positive for mobility and access to services by older people. Use of the existing road network is also likely to involve few extra age-related costs for governments. However, Steer Davies and Gleave do sound a note of caution in that the ageing population may raise some safety concerns as crash rates tend to rise with age after the age of 25.

10.3 Law and order

Several State Governments (subs. 17, 21, 23 and 39) have indicated that they expect spending on law and order to be affected by population ageing. State and Territory

law and order portfolios fund and administer three broad facets of the judicial system: crime prevention and law enforcement; the detention and rehabilitation of convicted offenders; and the provision and maintenance of a legal infrastructure.

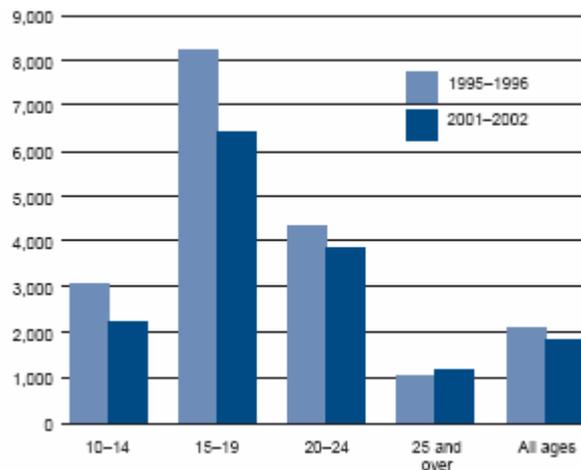
When compared with other State spending priorities, such as education or health, the State and Territory law and order budgets are relatively small expenditure items. For example, NSW has budgeted 1.24 per cent of GSP for the coming financial year (NSW Treasury, 2004) — and this varies little between the jurisdictions. Comparatively, nearly triple this amount was earmarked for NSW education and NSW health.

Broadly, there are two drivers of spending on law and order: the propensity to commit crime; and feelings of security and public safety. An ageing population will cause these two drivers to work against each other, with the net effect unclear. These effects are examined in turn.

Offenders and the victims of crime

The Australian Institute of Criminology reports data on offenders from Victorian, Queensland and South Australian police departments. Significantly, the majority of offenders are aged less than 25, with crime highest among those aged 15-19 (figure 10.5). Rates of crime for specific offences such as assault, sexual assault and robbery repeat this same profile.

Figure 10.5 **Offenders by age**
Rate per 100,000 persons



Data source: ACI (2003).

Assuming crime trends continue, population ageing will cause the offending population (youths) to decline relatively. Consequently, less resources will be

required (per capita) to police and protect the community as total crime rates fall. The ACT Government, for example, forecasts a decline in policing expenditure as a direct result (sub. 21, pp. 15-16):

... the incidence of incarceration for those under 30 is significantly higher than for those aged over 55. Consequently, as the population gets older, it is expected that the cost of maintaining law and order in the territory will decline.

Not only are perpetrators typically younger, but so are their victims. Some 35,000 persons aged 25-34 were either assaulted, robbed or murdered in 2003 — more than seven times the number of these crimes committed against the over 65s. By far the most common offence is assault, with nearly 160,000 incidences reported across all ages in 2003. Most commonly males aged 15-44 are the victims of assault, followed by women aged 25-44. Sexual assault and robbery come a distant second, with around 18,000 and 17,000 respective incidences that year.

Figure 10.6 shows the rates of assault, sexual assault and robbery per 100,000 persons by age. Each offence encompasses the same distinct age profile that peaks well before the middle aged. Notably, the incidence of sexual assault is particularly skewed towards the younger ages. Both assault and robbery decline with age after peaking for the early 20s.

Perceptions of community safety

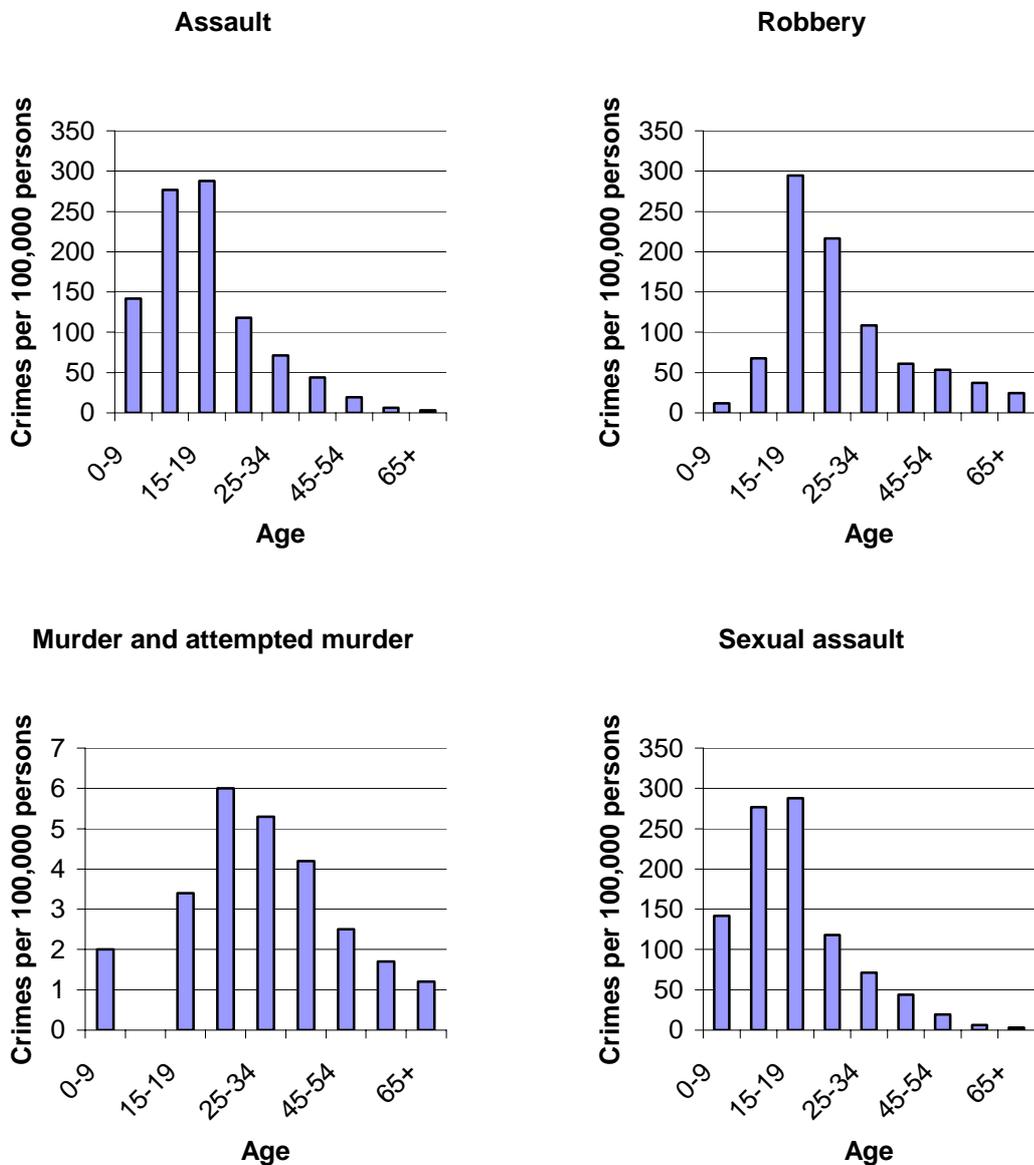
State concerns about the fiscal pressures of ageing on law enforcement reflect growing demands for community safety. In its submission to this inquiry, the Queensland Government noted that (sub. 17, p. 41):

Although less likely to be a victim of crime, older people have higher levels of fear of crime than the general community for a number of reasons, including lack of physical strength, lower income (and thus a theft is likely to have more of an economic impact), a feeling of social isolation, and a reliance upon the media for information about crime.

It is argued that the elderly do not require more resources to *keep* them safe, but more resources are required to make them *feel* safe.

However, these concerns aren't necessarily supported by surveys on this issue. For example, there seems to be little indication in the ABS survey of Crime and Safety that the elderly were significantly more likely to feel *unsafe* or *very unsafe* than the younger cohorts (figure 10.7). The elderly are more likely to feel unsafe during the day, but only by a small margin. The elderly are in fact less likely to perceive crime as a problem in their neighbourhood than younger cohorts. McCoy (1996) has previously argued that even where the elderly indicate they are more fearful of crime, the extent of this heightened fear is still quite low.

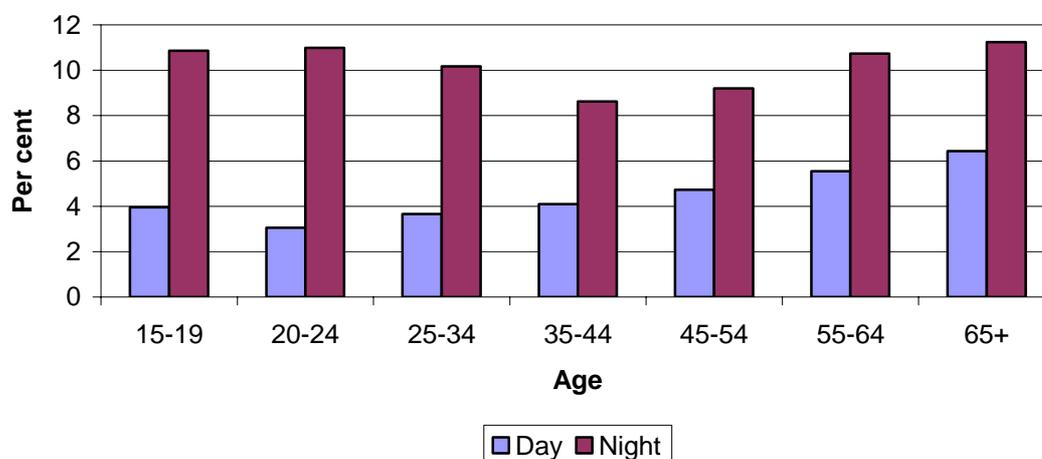
Figure 10.6 Victims of crime
 Crime rates per 100,000 persons, 2003



Data source: ABS 2004, *Recorded Crime, 2003*, (Cat. 4510.0).

The Centre for Cultural Risk Research’s report on *Fear of Crime* (1998) found a variety of conflicting opinions in the literature. The report found that consistently, the excess fear reported by the elderly was dependent on the phrasing of the question. Several criticisms of the literature have consequentially emerged. La Grange and Ferraro (1987), for example, claim that poor methodological issues have led to an over exaggeration of the elderly’s fear of crime. They go on to say that although the impact of crime on the elderly may be significantly greater — they are not likely to be more fearful than other groups in the community.

Figure 10.7 **Feeling unsafe?**



Data source: ABS, 2003, *Crime and Safety, Australia, 2002*, (Cat. 4509.0).

Perhaps rather than being strictly age related, growing demands for public safety are more likely part of a community wide phenomenon. Consequentially, as a proportion of GSP and of State and Territory budgets, increasing community concerns and expectations may stimulate law and order spending, but the ageing component *per se*, is likely to be small.

In sum, all things equal, ageing is likely to reduce the incidence of crime and is unlikely to increase peoples' need for greater security. On balance, ageing *per se* is likely to reduce rather than increase law and order spending as a share of State and Territory budgets. However, general community expectations about safety may generally rise with income levels — and this could well offset savings from any expected crime reduction by 2044-45.

10.4 Superannuation expenditure

Under a number of government employee superannuation schemes, expenditures depend, in part, on the demographic profile of members. For example, an increase in longevity extends annual pension obligations, while a trend to later retirement acts, in general, to increase the annual retirement entitlement.⁷

⁷ Estimating future superannuation liabilities and associated annual expenses is a complex task best undertaken by actuaries. Many factors such as mortality, morbidity, investment returns, workforce advancement and salary growth, retirement and resignation rates, and decisions about preservation and lump sum preferences determine the outcome. All governments provide for regular review of the liabilities and associated annual expenditure.

In addition, a significant proportion of the superannuation entitlements of public sector employees is unfunded — government contributions at the time of past service were insufficient to meet future obligations. As a consequence, future budgets will bear the cost of past under-funding. However, accrued entitlements for ongoing service (in defined benefit schemes) are now fully funded in most cases.

The stock of net unfunded superannuation liabilities in 2004-05 as a share of GSP is estimated between 5 to 15 per cent (table 10.6). Most governments have announced or committed to extinguishing the unfunded liability well before 2044-45 (box 10.2), based on two broad strategies:⁸

- closure of some unfunded defined benefit schemes, with new government employees, in a few cases, entering accumulation funds (as for private employees); and
- making capital injections from consolidated revenue either into a specific reserve fund or more directly into the superannuation fund.

Capital injections are likely to be the only means of achieving full funding of liabilities in the near future for schemes that have only recently been closed. While closure of defined benefit schemes has a significant impact, it is slow to take effect, as many members will remain in active service for some time — for example, while the Commonwealth Superannuation Scheme was closed from 1 July 1990, there are still more than 37 000 contributors. Further, for schemes which remain open, capital injections offer the only means of significantly controlling the medium term budgetary implications.⁹ Clearly, the practice of making capital injections means that government superannuation expenditure in that year will be higher than otherwise. However, due to the powerful effects of compounding this will result in lower future expenditure than otherwise.

⁸ Once the unfunded past service liabilities are extinguished there will still be annual superannuation expenditure in respect of the compulsory 9 per cent superannuation guarantee and any employer productivity contributions under wage agreements. However, such expenditure will move largely in line with public sector salaries and public sector employment, which is unlikely to significantly exceed gross product growth, and demographic effects will become irrelevant.

⁹ If not for reforms the future budgetary impacts were forecast to be quite onerous. For example, without capital injections the unfunded liability of the only open scheme in Western Australia was estimated to increase from \$0.5 billion in 1997 to \$2.3 billion by 2007 and \$15.8 billion by 2026 (1998-99 Budget Papers). However, as a consequence of budgeted injections of about \$520 million announced in the 1997-98 and 1998-99 Budgets, the unfunded liability of that scheme was estimated to be effectively capped at around the then current level and be extinguished by around 2013. The unfunded liability of the other two schemes, totalling about \$4 billion at the time was forecast to be kept in check by virtue of them being closed.

Box 10.2 Full funding targets and capital injections

The New South Wales Government expects its superannuation entitlements to be fully funded by 30 June 2030, fifteen years earlier than anticipated when the funding plan was introduced in 1993. NSW began making capital injections into the General Government Liability Management Fund in 2002-03.

The Victorian Government is aiming for 100 per cent funding of superannuation liabilities by 2035 and expects to comfortably achieve this. The unfunded prior service cost is being funded by annual payments direct to the State Superannuation Fund. Over the past five years the government has made payments of about \$1.8 billion more than originally budgeted.

The financial assets of the Government currently exceed the net present value of superannuation entitlements, and on that basis superannuation liabilities are already fully funded.

The unfunded liability of the open scheme in Western Australia was forecast in 1998-99 to be extinguished by around 2013. The unfunded liability of the two closed schemes is forecast to decline slowly without any additional funding.

The South Australian Government closed the principal defined benefit schemes in 1994 and commenced a program of cash payments to fully fund liabilities, which is currently expected to be achieved by 2034.

The Tasmanian Government's Fiscal Strategy set a target date of 30 June 2018 by which to eliminate the net unfunded liability for past service. A Superannuation Provision Account was established in 1994, to which the government makes annual payments, most recently of around \$130 million.

The Australian Capital Territory Government's goal is for the assets of their Superannuation Provision Account, established in 1991, to be 90 per cent of the superannuation liabilities by 2040. Use of this account is legislatively limited to superannuation purposes only. The 90 per cent target recognises the potential movements in both assets and liabilities over this time frame. Annual budget injections are calculated on the basis of maintaining a constant level of real funding, which the Government says provides a measure of inter-generational equity.

The Northern Territory Government forecasts extinguishment of its unfunded superannuation liabilities by 2060. In 2002-03 there was a commitment to catch-up funding of \$10 million each year, but this has been suspended while the Government reviews the impact of recent poor equity returns and significant change in other jurisdiction's treatment of liabilities.

The unfunded superannuation liabilities, for the four main schemes for which the Australian government is obligated, was estimated in 2002 to decline from about 12 per cent of GDP to around 8 per cent by the mid 2040s, in the absence of additional funding. This reflects closure of the two oldest and more expensive schemes more than a decade ago. As part of the 2004 Federal Election it was announced that a re-elected Coalition Government would establish a dedicated fund out of future budget surpluses to increase national savings and the plan is to fund superannuation liabilities.

Source: various Budget papers

Table 10.6 **Unfunded superannuation liabilities, Australian governments, 2004-05**

General Government Sector

	<i>Australian</i>	<i>NSW</i>	<i>Vic</i>	<i>Qld^b</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Gross liabilities		33 933		13 607		12 058 ^d			
Superannuation fund assets		17 155				6 327 ^d			
Net liabilities (balance sheet)	89 007	16 778	12 877	0	5 381	5 837	2 133	2 270	1 513
Reserve fund or other assets		4 021					793	1 361	
Net unfunded liabilities	89 007	12 757	12 877	0	5 381	5 837	1 340	906	1 513
Net unfunded liabilities as % GSP ^a	10.4	4.2	5.9	9.2	5.7	10.9	9.7	5.3	14.7
Nominal interest expense ^e	4 702	913	855	757	288	338	121	126	89
Additional budget funding 2004-05	610 ^j	1 140	966 ⁱ		522 ^h	242	124	122	10 ^g
Anticipated full funding date (year)	unknown ^k	2030	2035	2005	2013 ^c	2034	2018	2040 ^f	2060

^a There may be slight differences to government estimates because the Commission has used gross product estimates calculated for this (ageing) study as well as the same price deflator for all jurisdictions. ^b Queensland consolidates the superannuation assets and liabilities into its balance sheet, whereas for all other governments only the net unfunded liability of the (separate) superannuation funds are identified. The Queensland General Government Sector holds financial assets which are greater than total liabilities, and in that context, superannuation is considered to be fully funded. ^c This was the forecast in 1998-99 for the unfunded liability of about \$600 million for the open scheme. The unfunded liability of the two main closed schemes was estimated to have stabilised and to begin to decline slowly from around that time. ^d Estimated 30 June 2004. ^e Under the Uniform Accounting Framework the financial statements of all Australian governments include a nominal superannuation expense, calculated as a charge against the unfunded liability. It is akin to a debt service charge. The Commission was unable to separately identify the expense in the ACT statements, so an estimate was made, based on a similar notional interest rate used by other governments. ^f The target is 90 per cent asset coverage rather than full funding. ^g During 2002-03, the Northern Territory Government planned to contribute \$10m annually from 2003-04, but suspended this pending review of recent poor investment returns and significant changes in other jurisdiction's treatment of liabilities. ^h Total amount allocated for 1997-98 to 2001-02 (1998-99 Budget Papers, p.132). ⁱ 2003-04. ^j Payments in 2003-04 and 2004-05 to extinguish the liability to the Telstra and Australia Post superannuation schemes. ^k During the 2004 Federal Election it was announced that a re-elected Coalition Government would establish a dedicated fund out of future budget surpluses to fund superannuation liabilities.

Source: various Budget Papers.



11 Revenue

Key points

- Government revenues, as a share of GDP, are not as sensitive to ageing as expenditure.
 - This is because those factors that drive GDP are also the prime determinants of taxation revenue — keeping the two roughly in balance.
- Over the next 40 years, the ratios of Australian Government income taxes to GDP and of State Government payroll taxes to GDP are projected to stay the same.
- States' gambling taxes should also remain roughly constant as a share of GDP over this period, because while the old spend less than young adults, there will be proportionately more adults than at present, offsetting the ageing effect.
- The other major age-related State tax — conveyancing duties — is also subject to 'tug of war' effects. Older people move less often, reducing the number of transactions for a given stock of dwellings. But population ageing will also swell the total number of households, as average household sizes fall. Together with a trend to continuing real house price growth, that may result in conveyancing duties rising by around 0.4 percentage points of GDP.
- The States' GST revenues may decline as a share of GDP because tax-exempt consumption — particularly on private health care goods and services — is expected to grow. But the effect is modest, with a projected reduction in the ratio of GST revenues to GDP of 0.3 percentage points.
- Total tax revenues for both the Australian and State Governments are projected to remain roughly constant as a share of GDP.
- Overall, it is the expenditure consequences of population ageing, not its revenue implications, that are the fundamental source of the fiscal pressures associated with ageing.

Population ageing, together with other influences, will affect government taxation revenues as well as expenditure requirements. Both sides of government activity — revenue and spending — determine the net fiscal pressure experienced by different jurisdictions. Were the tax revenue to GDP ratio to rise sufficiently, this would offset the impacts of the increasing social expenditures associated with ageing, and concerns about the fiscal impacts of ageing would largely be misplaced. Conversely, were the revenue to GDP ratio to fall, then fiscal pressures would be accentuated. This chapter briefly considers the likely outcomes for ageing-related State and Australian Government taxation revenue over the next forty years.

11.1 Relevant features of the tax system

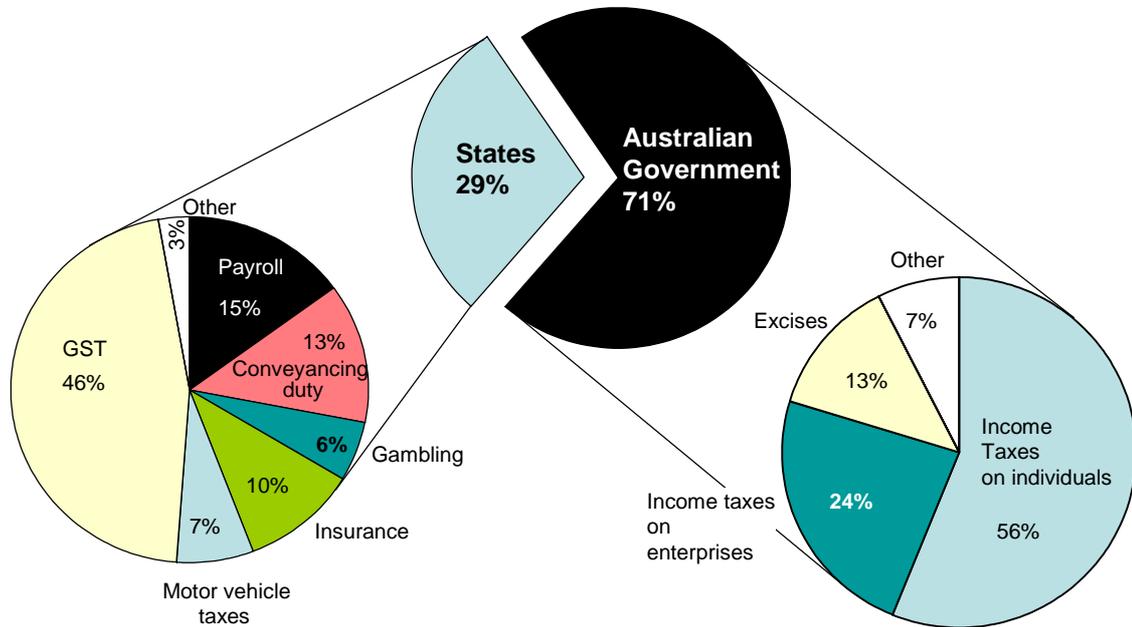
The Australian Government collects the bulk of taxation revenue in Australia. This is true even if the Goods and Service Tax (GST) is deemed a State tax (figure 11.1). Over the very long run, both State and the Australian Governments have increased their taxation revenues as a share of GDP (figure 11.2). However, since 1971-72, the rate of growth of Australian Government tax revenue to GDP has increased only slowly (0.2 per cent per year to 2003-04). In contrast, and from a lower base, tax revenues to GDP have continued to rise steeply for States and Local Government, at around 2.3 per cent per year to 2003-04 (and by 1.7 per cent per year to 1999-00, the year before GST revenues were available to the States).

That said, probably the best overall perspective of taxation is the combined tax revenues from all levels of Governments. This recognises that:

- State and Australian Government finances are linked because of the importance of grants made by the Australian Government to the States (appendix J); and
- that responsibilities for various spending activities have shifted between different levels of government.

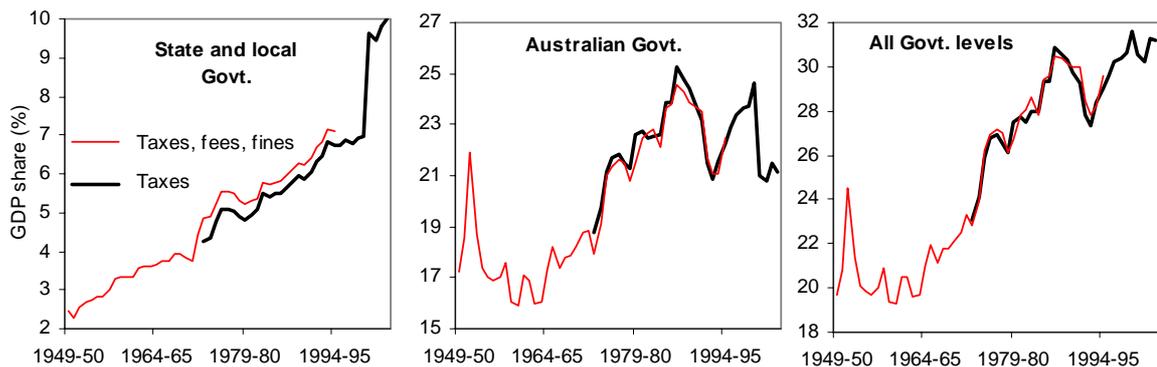
Such combined tax revenue has climbed at around 0.6 per cent per year over the last 30 years, but growth rates appear to be abating (figure 11.2).

Figure 11.1 Taxation revenue for the Australian and State Governments
2002-03^a



^a This excludes Local Government, which collected around \$7 billion of property taxes in 2002-03. The GST has been shown as a State. The Australian Government collects this tax fully passes it on to the States.
Data source: ABS 2004, *Taxation Revenue, Australia*, Cat. 5506.0, April.

Figure 11.2 Taxes have risen relative to GDP over the long run
1949-50 to 2003-04



^a The most recent data are primary and secondary taxes collected by each tier of government. The older series (from the RBA database and Foster and Stewart, 1991) are on a different basis, but is likely to illustrate tax rate trends over the long term. GST revenue has been treated as a State tax, which is why the ratio climbs abruptly in 2000-01 for State and Local Governments (and why correspondingly, the tax rate falls for the Australian Government). The State and Local Government data include property taxes collected by local governments.

Data source: Foster and Stewart (1991), RBA database from Econdata and ABS, *National Accounts*, Cat. 5206.0.

11.2 Whither Australian Government taxes?

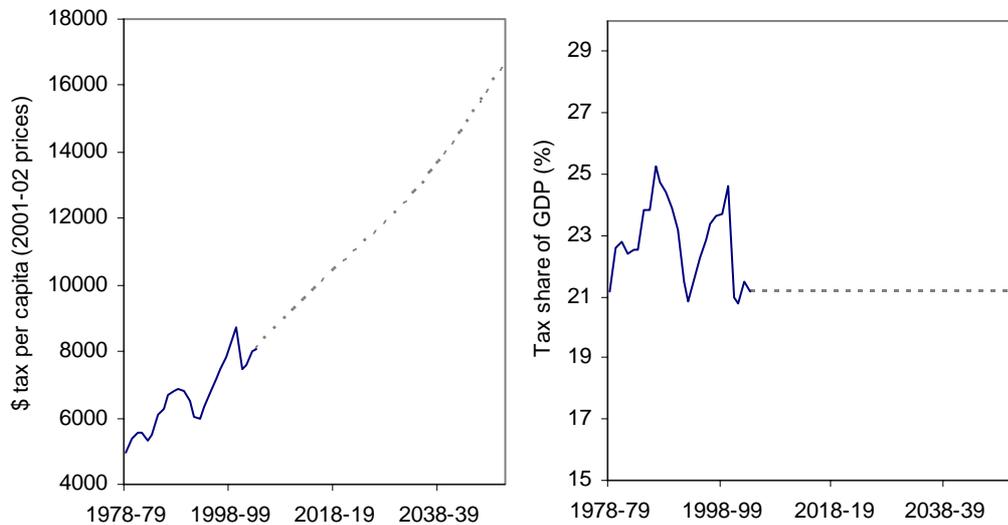
As noted by the Intergenerational Report (p. 53), it is common to project taxation revenue as a constant share of GDP. This approach has been adopted by the US Congressional Budget Office, the UK Treasury, the New Zealand Treasury and the Intergenerational Report itself. This method has the advantage of simplicity, but also reflects the fact that the same factors that determine GDP (labour supply, productivity and profits) also determine the revenue base that is the source of much taxation.

The Commission has adopted a similar approach for Australian Government taxation revenue. In the case of corporate income taxes, the underlying assumption is that tax rates remain unchanged — consistent with the ‘no policy change’ basis for this study. However, individual income taxes are more complex because of progressive tax scales. Unless the Government were to alter tax thresholds, inflation and real wage growth would place more personal income in higher tax brackets. Since real per capita incomes are projected to double by 2044-45, and nominal per capita incomes to increase by nearly fivefold over the same period,¹ no change in income tax thresholds would result in large increases in income tax as a share of GDP. Virtually all full time working taxpayers would be taxed at the highest marginal rate. This is not consistent with the Government’s declared policy of maintaining taxes roughly constant as a proportion of GDP. Consequently, the underlying assumption that has been adopted for individual income taxes is that tax thresholds are indexed, so that overall, revenue does not rise as a share of GDP. It is assumed that excise and other Australian Government taxes also rise in line with GDP.

Consequently, the picture for trends in Australian Government tax revenue (figure 11.3) is identical to that of GDP, with the same (proportionate) ageing effects as described in chapter 5.

¹ Based on an assumption of 1.75 per cent productivity growth and 2.125 per cent long-run inflation rates (in line with Budget forward estimates).

Figure 11.3 Australian Government tax revenue projections



Data source: Commission estimates.

11.3 What about State and Territory taxation revenues?

With the exception of payroll taxes, the situation for State and Territory tax revenues is less straightforward. This is because population ageing may affect several revenue sources through mechanisms that are distinct from those influencing GDP. For example:

- spending on gambling is partly determined by age, so that gambling tax revenues may be affected as the age structure changes;
- certain expenditure classes — most notably health care — are exempt from the GST. As the population ages and demand for health-related goods and services rises as a share of total spending, GST revenues, as a share of GDP, may fall; and
- conveyancing taxes are a function of household formation, house price movements and the propensity to move — all of which are influenced by ageing.

It is less clear that other areas of State revenue (such as taxes on insurance, land taxes on commercial properties and motor vehicle taxes) are affected by ageing — and these are not analysed.

Payroll taxes

The structure of payroll taxes is complex, with a progressive rate structure based on payroll size, and exemptions for (small) businesses with total payrolls below a threshold (CGC 2003a). General Government employees are excluded from assessment, as are defence personnel. Thresholds are periodically revised as inflation and real growth raise average payrolls.

Despite the complex nature of the tax arrangements, the ratio of payroll tax to total wages and salaries has been remarkably stable in aggregate for the States as a group (figure 11.4). It has been less stable for individual States and Territories. For example, there was a significant drop in the implicit tax rate in the Northern Territory after the late 1990s. However, there are no obvious long term trends in implicit payroll taxes, suggesting that the best estimate of the future tax rate is the present one.

The underlying premises for using a fixed implicit rate for payroll tax revenue projections are:

- *no significant changes in the payroll size distribution of firms over the long run.* A shift away from small business to big business, for example, would tend to increase payroll tax revenues as the share of exempt payrolls declined. Historically, there has been an economy-wide shift towards smaller businesses.² Much of this past growth reflects structural changes in the private sector that have increased the importance of the (historically small-business dominated) service sector compared with goods producing industries. However, it appears that the small business share of employment of the economy may fall in the future — against past trends. This reflects the fact that those industries with the greatest employment growth are now increasingly being dominated by bigger businesses.³ Nevertheless, it is likely that any future changes in the size distribution of firms will have only second-order effects on payroll tax revenues, just as past shifts in favour of small business failed to erode payroll revenues.
- *no change in the relative importance of general government or defence personnel over time.* This is a reasonable assumption for all jurisdictions, except

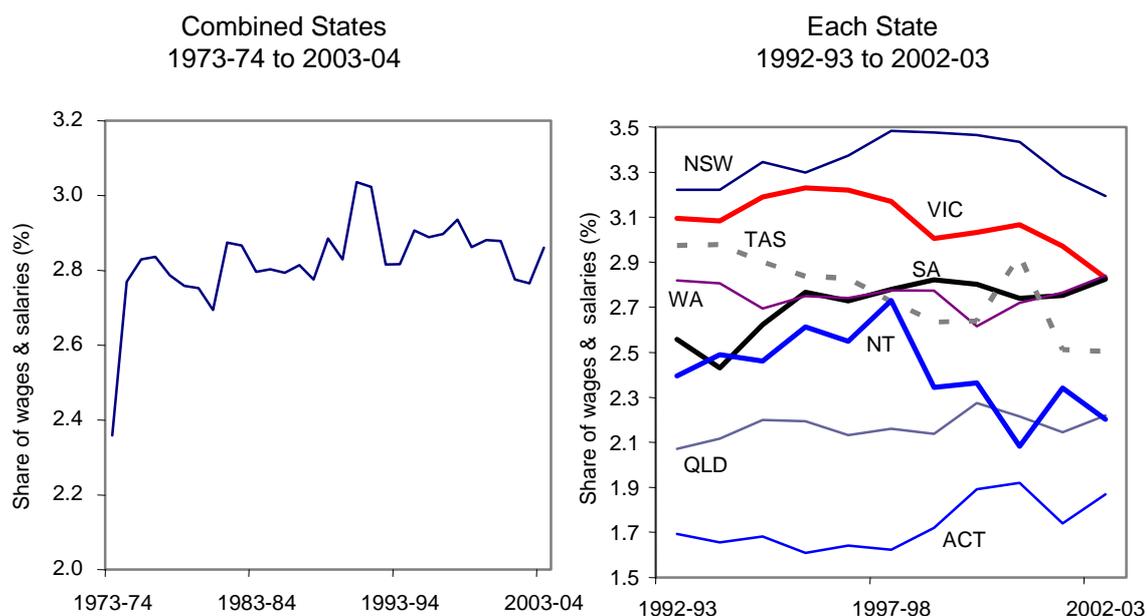
² So from 1983-84 to 2000-01, the share of employees in small business increased from 45.1 to 47.2 per cent (ABS 2002, *Small Business in Australia 2001*, Cat. 1321.0, p. 18).

³ For example, the small business employment share of goods producing industries has increased from 32.4 per cent in 1983-84 to 48.9 per cent in 2000-01, but the economy-wide employment share of these industries has fallen from 33 to 23 per cent over the same period. In contrast, the small business employment share of services producing industries has decreased from 51.4 per cent in 1983-84 to 46.7 per cent in 2000-01, but the economy-wide employment share of these industries has increased from 67 to 77 per cent over the same period (ABS 2002, *Small Business in Australia 2001*, Cat. 1321.0, p. 18).

perhaps, the Northern Territory and the ACT, where there is more risk that these shares will alter.

- *continued periodic indexation of thresholds for nominal growth in wages; and*
- *no change in average tax rates.*

Figure 11.4 Implicit payroll tax rates^a



^a Average (implicit) payroll tax rates were calculated by dividing payroll taxes by total wages and salaries.

Data source: ABS, *National Accounts, National Income Expenditure and Product*, Cat. 5206.0 and ABS, *Taxation Revenue Australia*, Cat. 5506.0.

Assuming a fixed ratio of revenue to wages and salaries, average payroll tax revenue can be projected for each jurisdiction and the combined States by:

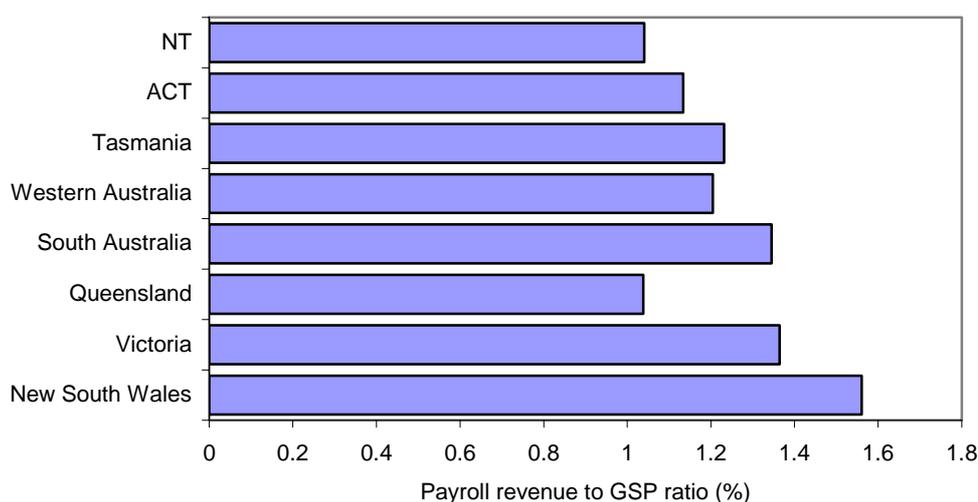
- estimating (constant price) average wages and salaries for each jurisdiction to 2044-45, based on the labour supply estimates from chapter 3 and the assumption that average real wages grow at the underlying productivity rate of 1.75 per cent per year; and
- applying the implicit payroll tax (from figure 11.4) for each jurisdiction for 2002-03 to projected wage and salaries.

This is equivalent to assuming that payroll taxes stay fixed at their 2002-03 share of GSP for the period to 2044-45 (figure 11.5).⁴ Since GSP grows at different rates across states, the combined States' payroll revenue to GDP ratio is not constant over the projection horizon. But the change is a small one, with the ratio falling by only

⁴ Reflecting the method used to construct gross state product.

0.05 percentage points to 2044-45 (representing a fall in payroll tax revenue per dollar of GDP of around 4 per cent).

Figure 11.5 Payroll tax revenue to GSP
2002-03 to 2044-45



Data source: Commission estimates.

Goods and Services Tax

The GST is now the single most important source of taxation revenue for States (figure 11.1). Various submissions by State Governments highlighted the risks to this important source of revenue posed by the disproportionate growth of consumption items that are exempt from the GST.⁵ There are several ways in which aggregate GST revenues may be affected by ageing .

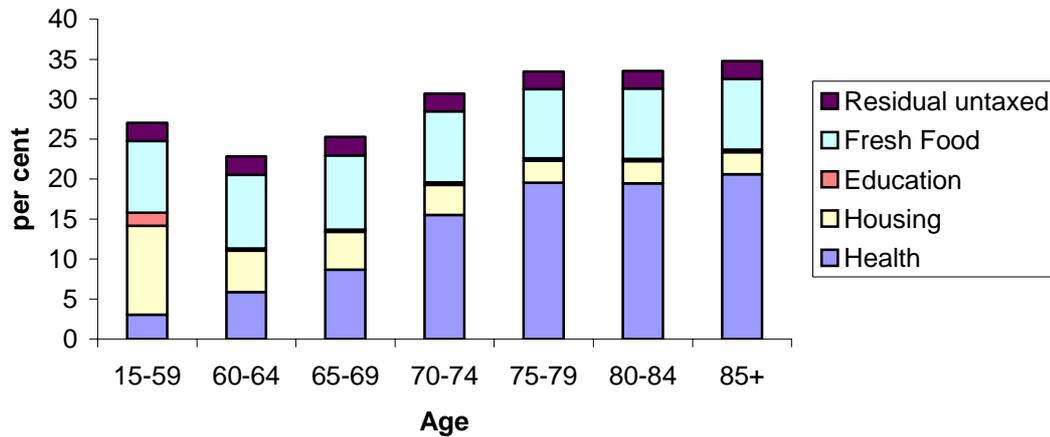
The importance of tax exempt items

Some consumption items, such as health care, fresh foods and many educational goods and services, are exempt from taxation (Western Australian Government, sub. 39, p. 17). Indeed, GST-free items accounted for over 30 per cent of household consumption and nearly 20 per cent of GDP in 2003-04. The old spend proportionately more on these exempt items than other groups (figure 11.6). For example, about 25 per cent of consumption by people aged under 60 years is untaxed — most of this is expenditure on mortgages, housing rents and fresh food.

⁵ For example, the Victorian Government, sub. 29, p. 36ff and Queensland Government, sub. 17, p. 44.

In contrast, around one third of the consumption of those aged over 75 years is untaxed, mainly reflecting untaxed health expenditure.

Figure 11.6 **How important are GST-exempt items in people's spending?**
2003-04

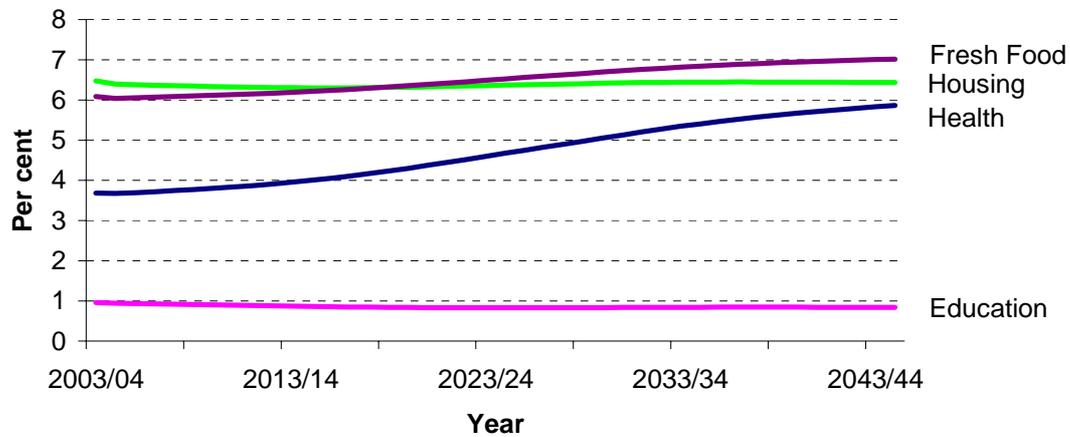


Data source: ABS Household Expenditure Survey, (Cat. No. 6535.0), AIHW (2004) and Commission estimates.

This pattern of expenditure by age, combined with the expected increase in the importance of health care spending, suggests that tax-exempt spending will rise in significance. The Commission estimates that tax exempt consumption spending will rise from 18.7 per cent of GDP in 2003-04 to 21.7 per cent of GDP by 2044-45 (appendix I). The main source of this change is increased private expenditure on health services, which will increase by just below 3 percentage points as a share of GDP. The surge in private health expenditures, however, is partly offset by a reduction in tax-exempt consumption in education and housing. This reflects relatively fewer children in education and an increase in homeownership that reduces tax-exempt rents (figure 11.7).

The relative increase in tax-exempt private consumption implies (for a given savings rate) a decrease in the ratio of *taxable* consumption to GDP from 41.1 per cent of GDP in 2003-04 to 38.1 per cent by 2044-45. This would reduce the Government's GST revenue from 4.11 per cent of GDP in 2003-04 to 3.81 per cent by 2044-45. This in turn represents a reduction in GST revenues to GDP of 0.3 percentage points or 7 per cent, much of which can be attributed to ageing. These results are similar to those suggested by jurisdictions. For example, the Victorian Government assessed a decrease in GST/GSP of 0.35 percentage points for that State (sub. 29, p. 36).

Figure 11.7 Expenditure on tax exempt items



Data source: Appendix I and Commission calculations.

Will changes in saving rates affect GST revenues?

There is evidence that people tend to save more in the years leading up to retirement and then subsequently (partly) run down assets. Accordingly, savings rates may increase over the next few decades as more people shift into the pre-retirement years,⁶ but then eventually fall as a greater proportion of the population reaches retirement age. This would imply a *long run* increase in household consumption to GDP ratios associated with population ageing, with implications for GST revenue.

However, it is very difficult to measure precisely the extent of this effect.⁷ Consistent national accounts data on consumption and GDP, collected since 1959-60,⁸ fail to show strong evidence of lifecycle effects. For example, the average consumption to GDP ratio in the first seven years of the series was 0.598 (when the young represented a much more significant share than the old). In the last seven years of the data to 2002-03 — when considerable ageing had occurred — the average consumption to income ratio was almost identical at 0.596. At times between 1959-60 and 2002-03, the private consumption ratio has dipped to as low

⁶ Fitzgerald (2004, p. 99), for example, has projected increased savings associated with the demographic shift to more mature aged people, who have higher savings propensities.

⁷ While the literature on savings and consumption behaviour is voluminous, no consensus exists about long run likely savings behaviour. The household data that are used to analyse the issue are often also flawed — such as standard National Accounts' measures of household savings — because they ignore capital gains (or losses) in stocks of wealth as changes in household income (Australian Government Treasury, 1999).

⁸ ABS National Accounts (Cat. No. 5204.0).

as 0.55, but much of this probably represents savings in bad times, rather than life cycle effects.

That said, there is the *potential* for a significant change in consumption ratios in the future because the assets that will be available to the old are likely to be relatively very large. As noted by the Victorian Government (sub. 29, p. 38), on the basis of estimates by Kelly (2003), the future old will be asset rich. Around 50 per cent of the nation's family wealth is projected to be held by people aged 65 years or more by 2031, whereas currently this group only holds around 22 per cent of aggregate wealth. Much of this wealth is in owner-occupied housing and superannuation assets. Were a proportion of this to be liquidated to finance consumption (and clearly, at least superannuation assets will be run down), then, all other things being equal, the ratio of total private consumption to GDP would rise.

For every percentage point increase in the ratio of household consumption to GDP: around 64 per cent of this additional consumption would be on taxable goods and services.⁹ Since 10 per cent of the amount is GST revenue, there would be a 0.064 per cent increase in the GST to GDP ratio.

However, a 1 percentage point increase in the household consumption to GDP ratio is relatively large, especially considering that present consumption to GDP ratios (and associated spending to household disposable incomes) are historically high. The maximum household consumption ratio in the past 50 years has been just 1.1 percentage points higher than the present ratio.¹⁰

It should also be noted that the dissaving observed among the old is also less than is predicted in conventional lifecycle models. This is because many older people do not run down their assets significantly because:

- they wish to leave bequests; or
- they are uncertain about how long they have to live (encouraging prudence when liquidating wealth to fund present consumption); and
- have a significant share of their wealth locked into assets that are not (currently) fungible or which they are reluctant to borrow against — primarily owner-occupied dwellings.¹¹

⁹ Estimated by noting that under the base scenario, the ratio of taxable consumption to total consumption will be $38.6/(38.6+21.3) = 64.4$ per cent in 2044-45.

¹⁰ Based on data from the ABS National Accounts, Cat. 5206.0.

¹¹ Cross-sectional data sets on wealth holdings show lower wealth among the old (for example, results from HILDA — Headey et al. 2004), but this is likely to represent the history of lower average lifetime wages for the old relative to younger groups, than evidence of dissaving per se. The NATSEM model of wealth among the future aged (Kelly 2003), shows greater wealth

Some studies even show that the old can actually be net savers (for example, Börsch-Supan and Essig 2003 for Germany).

Overall, the degree of dissavings associated with ageing and the consequent positive effects on GST revenues, are probably not as large as sometimes conjectured. They have been ignored in the Commission's base case.

However, it is possible that the behaviour of the future old will be different from that of the old in the past. For example, new financial instruments and attitudes to their use may make it more favourable to sell equity in the owner-occupied home, and changing patterns of intergenerational altruism may reduce bequests.

The effects of these changes on aggregate consumption would not be as great as might initially be expected because the savings behaviour of the old and other generations are linked. For example, were old people to leave less bequests, the effects on aggregate consumption would partly be offset by greater saving (less consumption) by the young, in anticipation of less wealth from bequests in middle age. Nevertheless, the aggregate consumption ratio could be expected to rise. To take an extreme scenario, were the household consumption to GDP ratio to rise by 5 percentage points by 2044-45 (which would represent considerable liquidation of assets by the old to finance consumption), then the GST to GDP ratio would be 4.16 per cent — virtually unchanged from its present rate.

So the shift towards consumption of tax exempt items that accompanies ageing is most likely to reduce long run GST revenues slightly as a share of GDP. But if the savings behaviour of the old changes, such reductions are likely to be smaller or, in extreme cases, non-existent.

The effects on individual jurisdictions

Judgments about the future GST revenue to GSP ratios of individual States is complicated by horizontal fiscal equalisation (HFE) (appendix J and South Australian Government, sub. 23, pp. 18-20). The actual GST tax revenues distributed to a jurisdiction are not determined by the amount of tax collected in that jurisdiction or by distributing equal GST revenue amounts on a per capita basis. Rather, the Commonwealth Grants Commission recommends distribution of GST revenue based on States' differential revenue raising capacities, service utilisation rates and costs. The socio-demographic characteristics of a State, including the share of the population in older age groups, are important to these calculations. For

holdings among the very old (75+) than either 55-64 year olds and 65-74 year olds by 2031 (though this will depend on the underlying assumptions of that model about consumption behaviour among the old).

example, the Northern Territory would generate around \$412 per person in GST revenue in 2004-05, on an equal per capita basis, but under HFE, it will receive \$1760 per person.¹²

Were the existing GST relativities — the weight given to each person in a State for the purpose of distributing the GST — to be fixed over time,¹³ there would be quite marked changes in GST to GSP ratios for individual jurisdictions. For example, the Commission estimates that the GST to GSP ratio would decrease by 0.8 percentage points in South Australia. However, as noted by the South Australian Government, the purpose of HFE is to take account of relative disadvantages of the States. Given ageing, the South Australian Government has forecast that its GST relativity will increase from around 1.2 in 2004-05 to about 1.35 by around 2040-41 (sub. 23, p. 21). This ameliorates the fiscal burden it would otherwise experience. So States that are more exposed to future fiscal pressures associated with ageing are likely to receive greater distributions of the national GST revenue.

This facet of HFE renders redundant any calculations of the future distribution of GST among jurisdictions. The ultimate distribution of the GST is effectively derived as a residual to ensure that no State or Territory faces a greater degree of fiscal pressure from factors like ageing.

Gambling taxes

Gambling taxes have played an increasingly important role as a revenue source for States, reflecting the strong growth of commercial gambling, particularly gaming machines, in many jurisdictions (appendix H). Unfortunately, there are limitations in available survey evidence on gambling expenditure by age. For example, the ABS Household Survey, the best survey of overall spending patterns by households, is not suited to estimation of this particular spending category. It severely underestimates total gambling, and is not a reliable basis for examining the relationship between age and gambling expenditure.

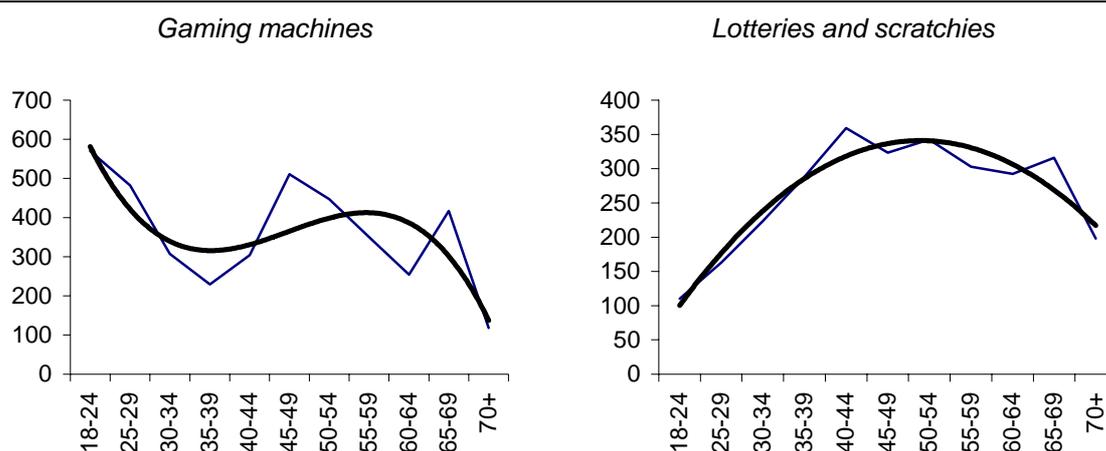
However, more reliable data are available. As part of its inquiry into gambling, the Commission conducted a special-purpose survey of gambling alone, geared to collecting detailed gambling expenditure data, as well as other aspects of gambling behaviour. These data reveal that overall gambling spending is highest for the

¹² Largely reflecting the budgetary disadvantages to that State arising from a substantial Indigenous population (Budget Paper No. 3, *Federal Financial Relations 2004-05*, 11 May 2004, p. 11).

¹³ And were States' shares of health care grants from the Australian Government also constant over time.

young, is fairly flat until retirement and then falls significantly for subsequent years (appendix H). However, the story for individual gambling forms varies. Gaming machine spending follows that of aggregate spending, but that on lotteries, for example, suggests more spending by the middle-aged than any other age group (figure 11.8).

Figure 11.8 Different games have different age appeal



Data source: PC calculations based on the PC Survey of Gambling (PC 1999a). See appendix H for details.

Two offsetting demographic factors influence spending on gambling in the future.

- Firstly, there are statutory bars on gambling by minors, so that the relevant age group for gambling expenditure is (predominantly) adults. The adult share of the population is expected to increase over the next 40 years for all jurisdictions. This will increase the proportion of the population that gamble and (all else equal) result in an increase in gambling expenditure to GDP.
- Secondly, the share of population in older age groups, is projected to increase. This will offset increasing gambling expenditure to the extent that older age groups continue to have a relatively lower propensity to gamble.

In Tasmania and South Australia, where population ageing is greater, the ageing effect outweighs the ‘adulthood’ effect, so that gambling expenditure and revenue is projected to fall over time as a share of GDP — albeit by a very modest amount (table 11.1). In the Northern Territory, by contrast, the adulthood effect outweighs the ageing effect, explaining the (small) rise in spending to GSP. In all other jurisdictions except Western Australia, the two effects effectively cancel each other out. In Western Australia, there is also very little impact on revenues, but the underlying mechanism is somewhat different from other jurisdictions. There is a slight increase in gambling revenue to GSP. This reflects the fact that this State has

a stronger reliance on revenue from lottery gambling, in which older gamblers spend more than the young.

The Victorian Government found a greater responsiveness of gambling revenue to ageing than these results — though still small in an absolute sense. They projected an increase in gambling revenue to GSP of around 0.11 percentage points for Victoria (sub. 29, pp. 37), in comparison with the zero change identified by the Commission. However, the basis for its result is different since the consumption data on which their projections are built show an increasing propensity to gamble with age.

Table 11.1 State and Territory revenue from gambling, projections
Per cent of gross state product

<i>Jurisdiction</i>	<i>2002-03</i>	<i>2044-45</i>	<i>Change</i>
	%	%	Points
New South Wales	0.48	0.47	0.00
Victoria	0.69	0.69	0.00
Queensland	0.49	0.49	0.00
South Australia	0.72	0.70	-0.02
Western Australia	0.28	0.29	0.01
Tasmania	0.60	0.58	-0.02
Northern Territory	0.39	0.42	0.03
ACT	0.32	0.31	-0.01
All jurisdictions (sum)	0.52	0.51	-0.01

Source: Appendix H.

Conveyancing revenue

Conveyancing revenue is raised through stamp duties imposed on the value of property purchased. It is a transactions-based tax — duty is payable when a transfer of ownership occurs. Arrangements between the States are similar, with each jurisdiction operating a tiered rate structure, with increasing marginal rates (appendix G). As in the case of payroll taxes, the revenue collected would rise as a share of each State's GSP, were the various thresholds to be left at their present levels. Such a setting would be untenable over the long term. Accordingly, the Commission's projections assume indexation of the thresholds, so that the average stamp duty tax rate is fixed over time.

Ageing has several, offsetting, impacts on conveyancing revenue. Demographic change directly affects the number of dwellings and potentially their prices, while the lower mobility of older people affects the volume of transactions. It is the combination of these three factors — dwelling numbers, price and transaction rates

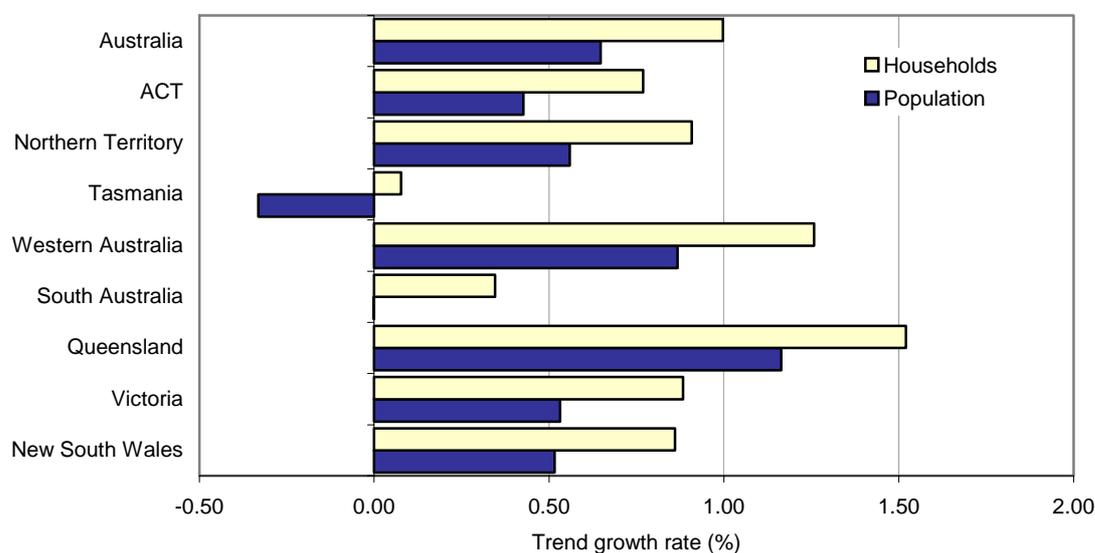
— that, with the assumption of a fixed stamp duty rate, determines overall conveyancing revenues.

Dwelling numbers

Demographic change affects average household size and through that, the number of dwellings in Australia. The Commission developed projections of future household numbers for every jurisdiction to 2044-45, based on the propensity of people of different ages and genders to belong to 15 different living arrangement types (such as a child in couple family, a female lone person, and a group household member). The projections incorporate slow changes in living arrangement propensities over time, as past ABS population census data reveal that some living arrangements are becoming more common (for example, as a result of family breakdown). These propensities were combined with changing population numbers and age structures to give detailed estimates of total household numbers. These showed that household numbers would rise faster than population numbers (figure 11.9), a process accentuated by ageing (appendix G).¹⁴

Figure 11.9 Household growth will outpace population change

Trend growth rates, 2003-04 to 2044-45



Data source: Appendix G.

¹⁴ The trend rate of growth of households is projected to be around 1 per cent per annum for Australia from 2003-04 to 2044-45. In the absence of population ageing, this would be reduced to around 0.67 per cent per annum.

Ageing tends to increase household formation for a given population because aged households are much more likely to be either a couple or a lone person household (and particularly a lone woman). For example, lone person households are projected to double over the 40 year projection period.

Dwelling prices

A forty year projection of house prices is clearly speculative. It is not appropriate to use recent historical trends, since these are too influenced by short-run factors that will not persist. Over the long run, factors such as household income, household formation and supply constraints are likely to be the main determinants of prices (assuming no policy changes in taxation or general urban regulations):

- On the basis of other projections in this study, per capita GDP growth is likely to be somewhat lower than in the past — reflecting slower labour supply growth. This suggests less buoyant household income trends.
- Household formation will also slow. This does not contradict the findings about the effect of ageing on household numbers — ageing increases household formation for a *given* population. But future population growth will be much slower than in the past. Indeed, using the ABS B series population projections, Australia will face a static population by the mid 21st century.
- But Australia’s biggest cities — particularly Sydney and Melbourne — will still come under population pressure because populations and households will still grow, at least to 2044-45. Since people often wish to live centrally within cities, these population pressures, combined with obstacles to higher density housing and re-zoning, suggests increasing supply constraints that will influence the prices of established homes.

The future of house prices is the product of this cocktail of influences, some pushing prices below the long run average rate of increase, and some above it. In the absence of a reliable model of house prices, the Commission has been guided by the Australia-wide long run real price trend. Since 1970, real prices for detached houses in Australia have grown at around 2.3 per cent per annum (PC 2004a) — and this is the figure generally used in the projections that follow. This trend rate is more likely to pick up the fundamental drivers of house prices than recent trends.

The national growth rate has been employed in projections for all jurisdictions, with the exception of Tasmania and South Australia. In these jurisdictions the long run historical data reveal persistently lower rates of real price growth than those experienced in other jurisdictions. They also face declining household projections after 2026 (Tasmania) and 2034 (South Australia), which would further dampen

house prices. A more conservative 1.2 per cent growth rate in real house prices per annum has been assumed for these States.

Transactions

While population and household growth remain the most important determinants of total transactions, some household types are much less likely to move than others. The Commission modelled the likelihood of moving for each of 13 age groups, for each jurisdiction, and by type of purchase (with altogether 273 purchase-rate likelihoods being estimated). In particular, older people move significantly less often than others (figure 11.10) — a factor considered by several State Governments (Queensland Government, sub. 17, p. 43 and Victorian Government, sub. 29, p. 37) as likely to reduce overall dwelling transactions.

Indeed, it was this factor that was seen by the Victorian Government (sub. 29, p. 37) as central to its finding that stamp duty would fall by 0.19 per cent of GSP:¹⁵

The projected decline in revenue ... arises because population ageing is expected to reduce both the rate of housing turnover and dwelling investment over the next few decades. This arises as retirees are less likely to move house and there is a smaller share of young families in the population buying houses. These effects are expected to more than offset falling average household size.

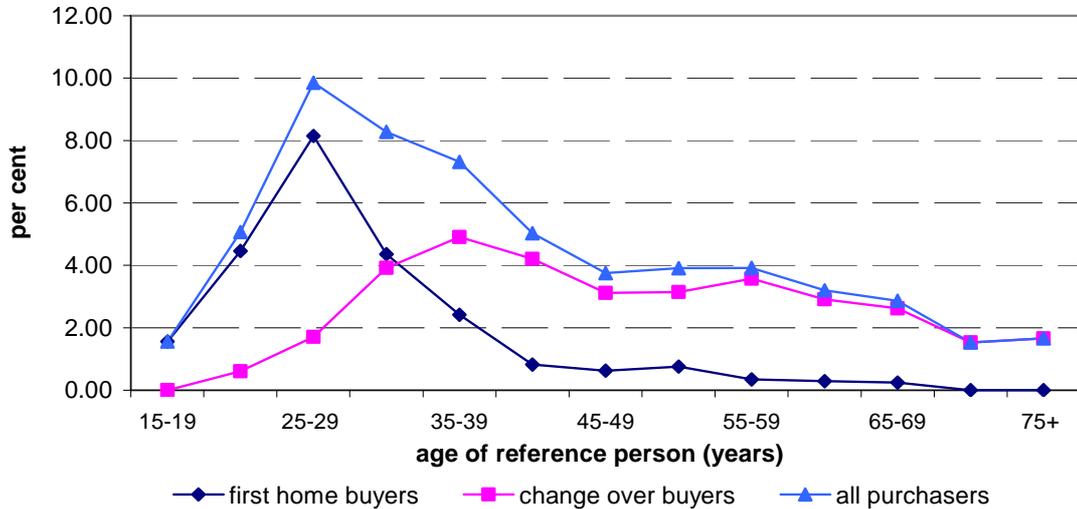
The net impacts on conveyancing revenue

Ageing increases household formation (for a given population), but decreases the number of transactions for a given number of dwellings. These patterns, combined with the assumed growth in real long run property prices over the next four decades, results in small overall increases in conveyancing duty as a share of GSP by 2044-45 — even for the most ageing States, South Australia and Tasmania (figure 11.11). The most important underlying reason for this outcome is the assumption that house prices will continue on average to rise at rates higher than real per capita GSP (as they have done over the long run). Were house prices to rise by around 1.75 per cent per annum — then conveyancing duty would be roughly fixed as a share of GSP for most jurisdictions. Lower growth rates would result in a contraction of the conveyancing revenue to GSP ratio.

¹⁵ Part of the reduction in stamp duties shown in the Victorian Government submission reflect the abolition of financial institutions' transactions taxes by 2005 (as part of the Inter-Governmental Agreement). Accordingly, the housing stamp duty revenue decline is less than 0.19 percentage points.

Figure 11.10 Who are the buyers?

Proportion of households who purchased a home by age of reference person (average within a year), 1999-2001



Data source: Commission estimates based on ABS unpublished data from the Surveys of Income and Housing Costs 2001.

Figure 11.11 Conveyancing revenue rises modestly as a share of States' gross product

Change in revenue to GSP, 2002-03 to 2044-45



^a The results for the Northern Territory are regarded as more unreliable than other jurisdictions (appendix G).

Data source: Appendix G.

11.4 Summing up

As a share of GDP, Government revenues are not as sensitive to an ageing population structure as expenditure. This is because those factors that drive GDP are also the prime determinants of revenue — keeping the two roughly in balance. Some State Government taxes may decline as a share of GDP — such as GST revenue — but the effect is not large, and is offset by a projected increase in conveyancing revenue. Overall, it is therefore the expenditure consequences of population ageing, not its revenue implications, that are the fundamental source of the fiscal pressures associated with ageing.

12 Impacts on local government

Key points

- There is wide variation in demographic change at the regional level.
 - Coastal areas, in particular, already have higher concentrations of older people and are expected to ‘age’ rapidly.
- Although local government is not the main provider of health and aged care services, provision of human services comprises around half of local government expenditure.
 - Ageing of the population will place increasing pressure on expenditure.
- Municipal revenue is unlikely to increase at a greater rate than the growth in GDP.
- Accordingly, in common with other levels of government, there is likely to be an emerging fiscal deficit at the local government level under current policy settings.

There is significant variation in the extent of population ageing among States and Territories. The disparities are even wider at the local government and regional levels. This chapter provides a perspective on ageing at the regional level and considers the economic implications of demographic change for local government.

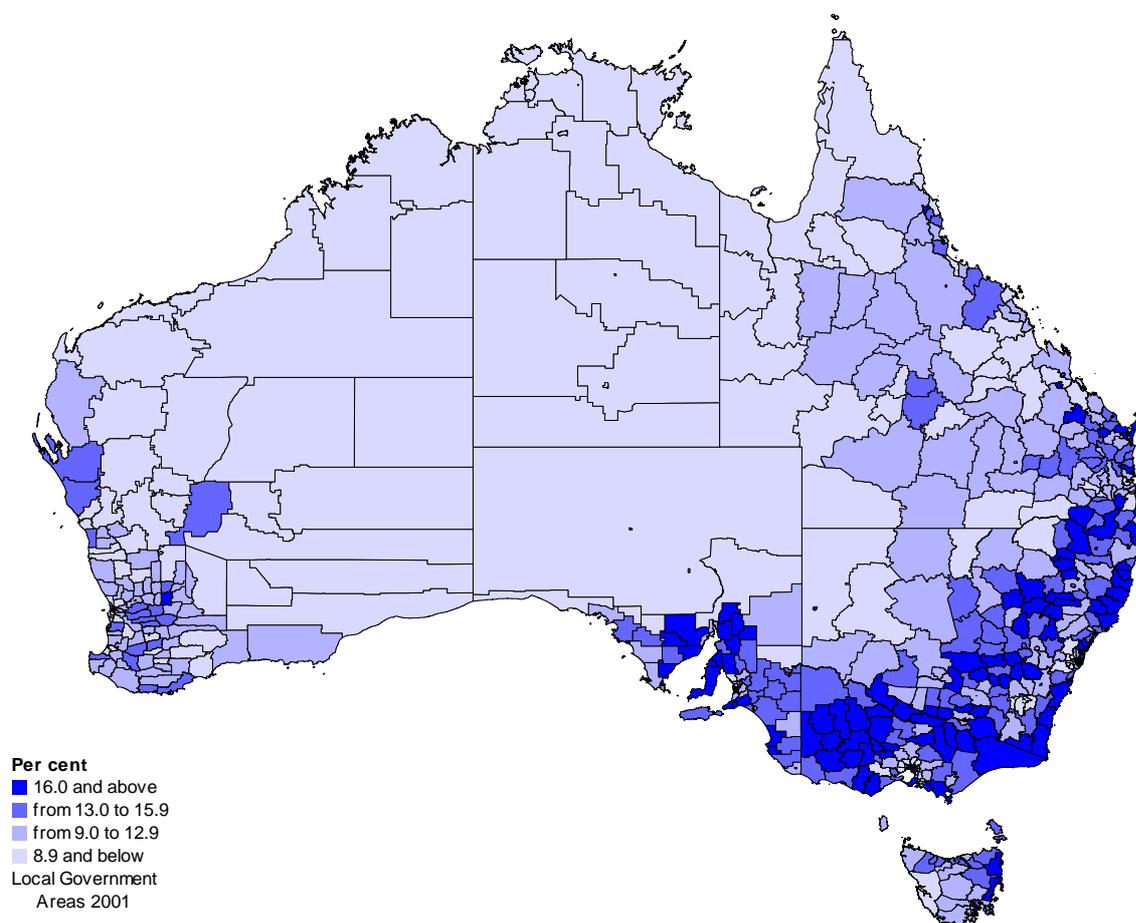
12.1 Demographic change at the regional level

The Commission has analysed demographic change at the regional level using ABS Census data from 1981 and 2001.

The dispersion of the population share of over 65 year olds across Statistical Local Areas (SLAs) is wide. It ranges from 30.9 per cent in Victor Harbor (a coastal town near Adelaide) to below two per cent in a number of SLAs in the Northern Territory and the Pilbarra region in WA. To better understand broad trends in regional ageing, regions have been divided into eight broad categories, ranging from inner-metropolitan to non-urban remote (box 12.1).

Figure 12.1, from ABS (2002), shows the relatively high concentration of the elderly along eastern Australia stretching from southern Queensland into South Australia.

Figure 12.1 Proportion aged 65 and over in 2001



Data source: Local Government Areas, as per 2001 Census.

Box 12.1 Regional categories

The 1251 statistical local areas (SLAs) in Australia have been grouped into the following categories

- Metropolitan cities — inner suburbs;
- Metropolitan cities — outer suburbs;
- Urban coastal cities;
- Non-urban coastal areas;
- Inland cities;
- Inland rural areas;
- Cities in remote regions; and
- Non-urban settlements in remote regions.¹

Metropolitan cities cover Sydney, Melbourne, Brisbane, Adelaide, Perth and Canberra. About half the population living in these cities were allocated to 'inner' suburbs and the rest to 'outer' suburbs, depending on distance from the central business district (CBD).

Urban areas cover only cities with a population above 20,000. Smaller towns are classified as non-urban areas. The non-urban inland areas correspond to what is commonly referred to as the wheat-sheep pastoral zone.

Remote regions cover the Northern Territory, the desert and semi-desert areas in western New South Wales, western Queensland, northern SA, eastern WA, as well as coastal areas north-west of Cairns in Queensland and north of Geraldton in WA. These remote areas are characterised by sparse population and the importance of mining and grazing. Cities in remote regions include Darwin, Alice Springs, Broken Hill, Mount Isa, Kalgoorlie and Roebourne.

Categorisation of SLAs is not always clear cut. For example, areas such as Redcliff, Caboolture and the Gold Coast could be classified as outer suburbs of Brisbane or as coastal urban regions.

Table 12.1 shows the proportion of over 65s in each category and the share of these regional categories in the national population.

The share of people over 65 increased substantially in all regional categories between 1981 and 2001. The heaviest concentration of the elderly occurs in coastal

¹ These eight regional categories were used as independent dummy variables in a regression with the dependent variable being the share of over 65s in the population. All the dummy variables turned out to be statistically significant at the one per cent probability level. However, adjusted R^2 reached only 0.248. These results suggest that the regional categories provide some explanation for the geographical distribution of the elderly, but their explanatory power is not particularly strong.

regions (both urban and non-urban), followed by metropolitan inner suburbs and then by inland regions (rural and urban). Ageing is less pronounced in metropolitan outer suburbs and remote regions. A similar pattern already existed in 1981, but the disparities between regional categories have widened as the overall share of the aged population has increased.

Table 12.1 The population share of over 65 year olds across regions

	<i>Share of over 65 year olds in 1981^a</i>	<i>Share of over 65 year olds in 2001^a</i>	<i>Share of over 65 – change between 1981 and 2001^a</i>	<i>Category share in national population 2001</i>
	%	%	%	%
Metropolitan inner suburbs	11.6	14.1	2.4	30.3
Metropolitan outer suburbs	6.2	9.9	3.7	30.6
Coastal non-urban	11.1	15.4	4.4	6.8
Coastal urban	10.9	14.5	3.6	15.9
Inland rural	9.6	13.9	4.3	9.7
Inland urban	10.0	13.3	3.3	4.4
Remote other	5.3	6.7	1.4	1.4
Remote urban	5.0	6.2	1.1	1.0
Total	9.4	12.7	3.3	100.0

^a Weighted average according to SLA population in 2001.

Source. Unpublished SLA data from ABS Population Census 1981 and 2001.

In metropolitan inner suburbs close to the CBD the proportion of the elderly tends to be relatively low. But it becomes considerably higher in the outer ring of inner suburbs, usually located more than 5 km from the CBD. Figure 12.2 — taken from 2001 Census data — illustrates this phenomenon in the suburbs of Sydney, as well as the systematic differences in the concentration of the elderly between inner and outer suburbs. The reason why many elderly prefer not to live close to the CBD is a matter for conjecture — it might be related to high real estate prices, urban pressures and congestion problems.

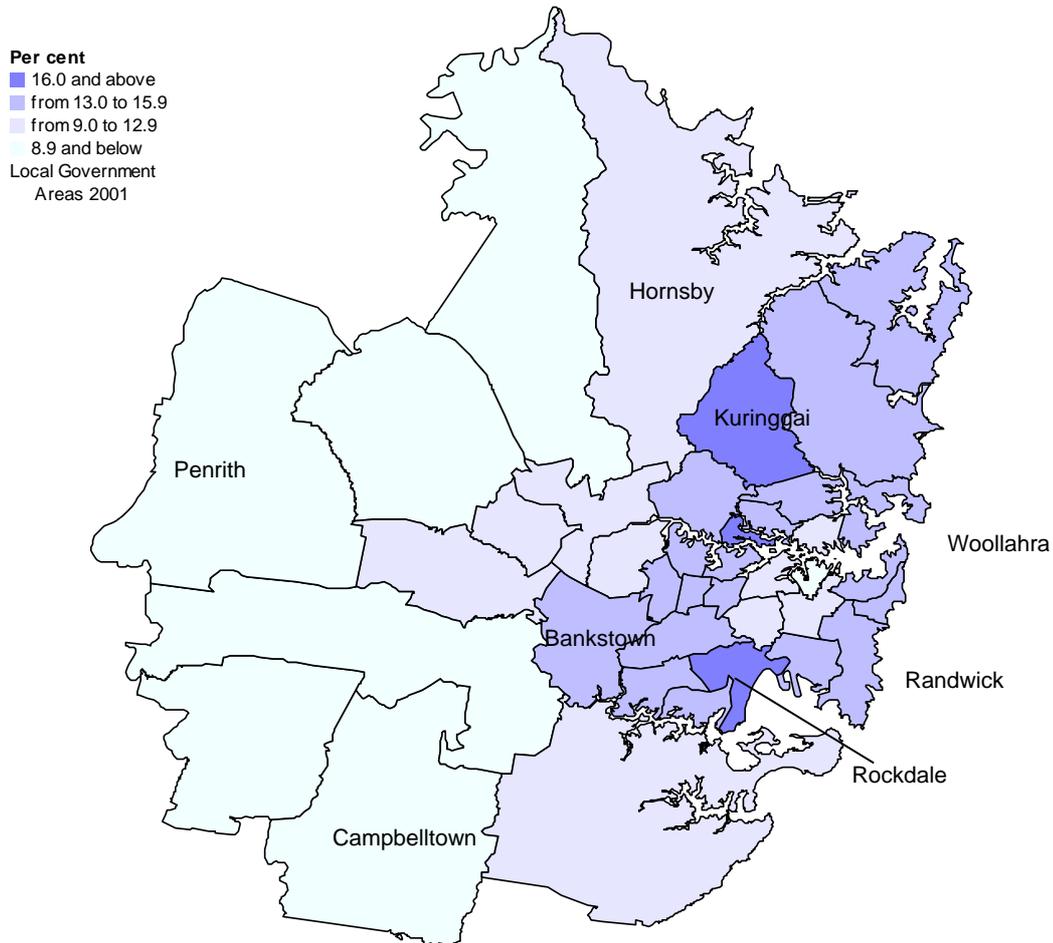
The relatively low proportion of aged people in metropolitan outer suburbs could reflect their ‘mortgage belt’ status, being heavily populated by recent homebuyers, such as young families and recent immigrants of working age.²

The share of elderly is also low in remote regions. In remote regions life expectancy is below the national average, reflecting the larger proportion of indigenous people.

² It should be noted that some coastal areas, which are categorised in this study as metropolitan outer suburbs, such as the Mornington Peninsula near Melbourne and Victor Harbor near Adelaide, have exceptionally high concentrations of over 65s.

Moreover, the mining and grazing enterprises in these regions tend to attract younger people and older people tend to leave these regions upon retirement, often seeking better medical and other facilities.

Figure 12.2 Proportion aged over 65 in Sydney SLAs in 2000



Data source: Based on 2001 Census data on LGAs.

The effect of internal migration and natural growth

The Australian Local Government Association (sub. 18, p. 15) notes that internal migration has a significant impact on the age structure of regions. Defying national trends, some regions are becoming younger, either because they are gaining relatively more young people or losing relatively more older people. The opposite is also the case; some regions are ageing through gaining relatively more older people or losing relatively more younger people (table 12.2).

Table 12.2 Effects of internal migration on population ageing 1996-2001

Becoming younger

Gaining young and working age, losing seniors

Brisbane City, Sydney Outer North, Darwin, Melbourne West

Gaining young, losing working age and seniors

Melbourne Inner, Adelaide Central, Perth Central, Global Sydney, ACT, Melbourne North, Melbourne South, Melbourne East, Sydney Inner West, Adelaide Plains, QLD North

Losing young and working age, losing seniors more

WA Pilbarra-Kimberley, NT Lingiari, Sydney Mid West, QLD North West, Sydney South

Balanced

Balanced gains

Perth Outer North, Perth Outer South, QLD Gold Coast

Balanced losses

Sydney Outer West

Becoming older

Gaining young and working age and seniors more

NSW Central Coast, Brisbane North, QLD Sunshine Coast, WA Peel-South West, NSW Illawarra, NSW Hunter

Losing young, gaining workforce age and seniors

Adelaide Outer, VIC Loddon, Melbourne Westernport, VIC Central Highlands, VIC Barwon, VIC Goulburn, VIC Ovens-Hume, NSW South-East, NSW Mid North Coast, NSW Richmond-Tweed, Sydney Outer South West, QLD Wide Bay-Burnett

Losing young and workforce age, gaining seniors

TAS North, TAS Hobart-South, VIC Gippsland

Losing young and middle aged, losing seniors less

WA Gascoyne-Goldfields, WA Wheatbelt-Great Southern, SA Eyre and Yorke, SA Murraylands, SA South East, VIC Mallee-Wimmera, VIC West, TAS North West, NSW Murray, NSW Murrumbidgee, NSW Central West, NSW Far and North West, NSW North, QLD Pastoral, QLD Far North, QLD Mackay, QLD Fitzroy, QLD West Moreton

Source: ALGA (Sub. 18, p. 15).

The Commission has analysed inter-regional migration using census data. Although information on movements of the elderly between regions have not been directly available, the census data for 1981 and 2001 can be decomposed into natural growth and net migration flow for each SLA.

The starting point for the 'natural' growth calculation is the age profile of each SLA in 1981. By applying the national average death rate corresponding to each age bracket and the national average birth rate of each female age bracket over the 20 years from 1981 to 2001, the theoretical size of each SLA population and its age profile that would have occurred in 2001 if there was no migration into or out of the region can be calculated. The projected changes can then be compared with actual changes: the difference representing the effect of regional migration. This is made up of internal migration plus net immigration from abroad, but we do not have sufficient information in the data to identify separately these two components. However, the estimated overall effect of migration on regional population growth and changes in the age profile is shown in table 12.3.

Table 12.3 Regional demographic change between 1981 and 2001

	<i>Total (all ages) population growth 1981 to 2001</i>	<i>Net migration = Total growth less natural growth ^a 1981 to 2001</i>	<i>Share of over 65 - difference btwn actual & expected ^a 1981 to 2001</i>	<i>Main reason for migration induced change in share</i>
	%	%	%	
Metropolitan inner suburbs	8.0	-1.7	-1.5	Old out
Metropolitan outer suburbs	51.6	32.1	-1.1	Young in
Coastal non-urban	39.6	28.9	0.6	Old in
Coastal urban	46.5	34.8	0.2	Old in
Inland rural	10.9	-1.7	0.4	Young out
Inland urban	24.2	9.9	0.5	Old in
Remote other	7.5	-13.2	-3.7	Old out
Remote urban	8.0	-14.6	-3.9	Old out
Total national	27.6	14.1	-0.8	Young in

^a Weighted average according to SLA population in 2001.

Source. Unpublished SLA data from ABS Population Censuses 1981 and 2001.

The second column in table 12.3 shows estimated total population growth that can be attributed to migration in the eight regional categories. It is calculated by taking away from total population growth the estimated increase due to natural growth. The third column shows the difference between the actual proportion of over 65s in 2001 and the expected proportion based on natural changes (birth and death) alone. This difference reflects the effect of migration on the age profile, specifically its impact on the share of over 65 year olds.

Based on the relationships between net migration and the share of over 65s in the population (box 12.2), the main reasons for the migration induced effect on the age structure are as follows.

- **Inland rural areas** recorded a migration induced increase in the share of over 65s, accompanied by net emigration, indicating that most older people tended to stay while many younger people left.
- **In metropolitan inner suburbs** there was also lower than expected population increase (emigration) but the share of over 65s is significantly lower than would be expected on the basis of natural growth. This finding suggests that older people tended to leave inner suburbs during the 1981-2001 period. Detailed examination of the SLA data indicates that the emigration of older people from inner suburbs was usually strongest for suburbs close to the CBD.
- **In outer metropolitan suburbs** there is also a negative variation between the actual and expected share of over 65s. Given the above average population flow into outer suburbs, it appears that the below expected increase in the share of the

elderly was caused mainly by an influx of younger people into these suburbs from other areas and overseas migrants (a group with a low average share of over 65s).³

- **Inland cities (the rural urban region)** recorded population growth only slightly below the national average, but the change in the share of over 65s was well above the theoretically expected. This indicates that these cities received some immigration of older people during the study period, possibly in order to benefit from better developed facilities (for those from rural areas) or in order to benefit from lower cost of living (particularly housing) for those from metropolitan areas.
- Both **remote regions** recorded significantly lower growth than expected on the basis of natural increase, indicating a negative net migration effect accompanied by a lower than expected increase in the over 65s. This is consistent with the observed strong tendency for the old to move out of these areas.
- By contrast, **urban coastal areas** (both urban and non-urban) appear to have been the major recipients of elderly migrant inflow during the study period.

The 'drift' to the coast

The migration of retired people to the coastal 'sun belt' stretching between northern New South Wales and southern Queensland has been well publicised. From the census data it appears that the migration of the elderly to non-metropolitan coastal areas is actually more widespread and covers also the coastal regions of Victoria, SA and WA.

The census data are confirmed by the ABS (2002b) analysis of the regional distribution of the aged which gives considerable emphasis to the concentration of the elderly in non-metropolitan areas along the eastern coast. The top concentration ratios are located between Hervey Bay in Queensland and the Eyre Peninsula in SA.

³ According to ABS Cat. 3412.0 (Migration) in 1999-2000 the share of over 65s in total permanent arrivals to Australia was 2 per cent. Their share in the total population at that time stood at around 12.5 per cent. The low share of elderly among overseas immigrants explains why at the national level the actual proportion of over 65s is 0.8 percentage points below the level expected on the basis of natural growth alone. Immigration from abroad also explains the relatively low proportion of over 65s in Sydney, a major port of call for immigrants.

Box 12.2 Interpreting the relationship between expected and actual migration between regions and the ageing of regions

Internal migration can cause a region to age in two ways:

- If the region receives a large influx of older people then the share of over 65s will tend to rise.
- If more younger people tend to leave the region than older ones, the effect will be also to increase the share of over 65s.

While available data does not directly provide information on the size and age distribution of regional migration, we can infer the main reason for the migration induced change by combining information on estimated total net migration with the estimated change in the share of the elderly caused by migration.

- In a region with an above expected level of net migration, a below expected increase in the share of the elderly indicates that the net migration is mainly attributable to the inflow of younger people.
 - Conversely, if that region had an above average increase in the share of the elderly it would be attributed to a disproportionately strong inflow of older people.
- In a region which experienced negative or below average migrant inflow, an above average increase in the share of the elderly can be attributed mainly to the emigration of younger people.
 - Conversely, a below average increase in the share of the elderly indicates in this case a disproportionately strong emigration of older people from the region.

The third column (which represents the migration induced change) in table 12.3 shows that migration had a positive effect on the share of over 65s in the two coastal and the two inland regions but had a negative effect in the two metropolitan and two remote area regions.

As indicated in table 12.1, the share of the elderly along the coast is similar to their share in metropolitan inner suburbs and the wheat-sheep inland zone. Two distinguishing features of the coastal experience are that:

- older people actually move to coastal areas, which is much less common for inner suburbs and inland regions; and
- the distribution is not even, and there are pockets of very high concentrations along the coast.

Projected demographic change

The *State of the Regions Report 2003* (ALGA 2003), contains projections by broad age group at the statistical division level (a grouping of local government areas). The Queensland Government (sub. 17, p. xi) has also projected demographic

change at the Statistical Division level (table 12.4). Each of these projections confirm that the variations present in the existing profiles are likely to continue into the future, and in some cases may be exacerbated. For example in Queensland, what shows the increase in the number of people over 65 by 2026 is likely to vary between 37 per cent in the Central West to 200 per cent in Moreton.

The Victorian Government also identified the trend for the regions to age more than metropolitan areas, noting that Melbourne will be less affected by ageing than will regional Victoria (sub. 29, p. 10).

Table 12.4 Projected number of persons aged 65 and over, Queensland Statistical Divisions
2001 and 2026

<i>Statistical Division</i>	<i>2001</i>	<i>2026</i>	<i>Change between 2001 and 2026</i>	
			<i>Number</i>	<i>Per cent</i>
Brisbane	177 850	411 567	233 717	131.4
Moreton	103 620	311 151	207 531	200.3
South East Queensland	281 470	722 718	441 248	156.8
Wide Bay-Burnett	36 677	99 085	62 408	170.2
Darling Downs	27 245	56 119	28 874	106.0
South West	2 749	4 159	1 410	51.3
Fitzroy	18 467	39 292	20 825	112.8
Central West	1 331	1 825	494	37.1
Mackay	12 958	35 756	22 798	175.9
Northern	18 254	39 706	21 452	117.5
Far North	21 143	54 609	33 466	158.3
North West	1 935	4 700	2 765	142.9
Queensland	422 232	1 057 967	635 735	150.6

Source: Queensland Government (Sub. 17, p. xi)

12.2 Economic implications of ageing for local government

As for other levels of government, ageing of the population is likely to cause some fiscal pressure for local governments through an imbalance between expenditure and revenue growth. Given the disparity in ageing across regions, some areas are also likely to face significant pressure on infrastructure planning and provision.

Expenditure

Traditionally local governments were mainly responsible for roads, utilities and other property related services. However, over recent decades they have increasingly been drawn into providing a range of human services. Indeed, education, health, welfare, housing and community amenities and recreation and culture represented 49 per cent of local government expenditure in 2002-03 (table 12.5). Often these services are delivered in collaboration with other levels of government and non-government agencies. ALGA (sub. 18 p. 9) noted that the provision of such services has been recognised by the Commonwealth Grants Commission:

... the composition of services provided by local government has changed markedly over the last 30-35 years and local government is increasingly providing human services (social welfare type services) at the expense of traditional property based services (particularly roads).

Table 12.5 Local government expenditure by purpose, 2002-03

Proportion of total expenditure, and total expenditure

	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas</i>	<i>NT</i>	<i>Total</i>
	%	%	%	%	%	%	%	%
General public services	15	12	20	17	10	14	38	15
Education, health, welfare and public safety	11	21	3	7	11	6	5	11
Housing and community amenities	26	18	30	19	15	36	27	24
Recreation and culture	11	17	11	17	23	12	7	14
Services to Industry ^a	2	1	2	3	1	-	1	1
Transport and communication	29	22	28	25	33	23	14	27
Other	7	8	7	12	8	8	8	8
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Total	5 663	3 970	4 492	1 074	1 596	512	284	17 591

^a Industry includes: agriculture forestry and fishing; mining manufacturing and construction; and fuel and energy.

Source: ABS Cat. 5512.0.

The use of a number of human services is significantly age-related, including:

- health and aged care,
- home support services;
- subsidy of medical services;
- financial support to aged care facilities;

-
- local community transport; and
 - a range of cultural and recreation services.

Examples of health and aged care services include:

- rural and remote councils providing housing, salary top-ups or subsidised travel to attract doctors, nurses and dentists. For example the Shire of Laverton in WA provides incentives of \$170 000 a year to retain a doctor and around \$48 000 to nurses who complete at least six months service at the local hospital (HRSCEFPA 2003, p. 33).
- in Victoria, services provided as part of the Home and Community Care program (HACC). For example, in the City of Whitehorse, HACC services consume over 10 per cent of the Council's recurrent expenditure (sub. 18, p. 10). The Municipal Association of Victoria states that the local government contribution is estimated at more than 30 per cent of the total cost of HACC services. With population ageing these services are projected to increase significantly in the future (chapter 7).

Thus, while local government is not the *primary* provider of key aged-related services such as health or aged care, the ageing of the population is likely to result in increasing demands on the resources of local government in these areas.

From discussions with the states, one jurisdiction also noted that internal migration more broadly can affect local councils. It said that the Local Government Grants Commission has observed a population shift from the rural areas towards the city the coast. This would adversely affect the revenue base for some local governments, while boosting that of others. In addition, it suggested that some councils may need to seek assistance for infrastructure needs responding to the shifts in the population. While this trend is not solely related to the ageing of the population, it is nevertheless likely to add to fiscal pressures on some local governments.

The degree of fiscal pressure that demographic change will place upon local government depends on the extent to which revenue growth will match increasing expenditure demands.

Revenue

Local government has three major revenue sources (table 12.6):

- Taxes on property (municipal rates), which comprise 38 per cent of revenue.

- Grants from the Australian and State Governments (averaging 12 per cent of council revenue, although for some rural and remote councils grants can account for more than 50 per cent of revenue (ALGA, sub. 18, p. 12).
- Fees and charges, which have been increasing as a proportion of total revenue and now comprise 32 per cent of revenue on average.

Table 12.6 Local government revenue, 2002-03

	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas</i>	<i>NT</i>	<i>Total</i>
	%	%	%	%	%	%	%	%
Taxation revenue	36	46	28	59	46	35	26	38
Current grants and subsidies	12	13	9	14	11	14	24	12
Sales of goods and services	34	20	45	19	21	41	35	32
Interest and other	19	21	18	8	22	10	15	19
	\$ m	\$ m	\$ m	\$ m	$ m	$ m	$ m	$ m
Total	6 586	3 977	5 151	1 069	1 648	507	188	19 126

Source: ABS Cat. 5512.0.

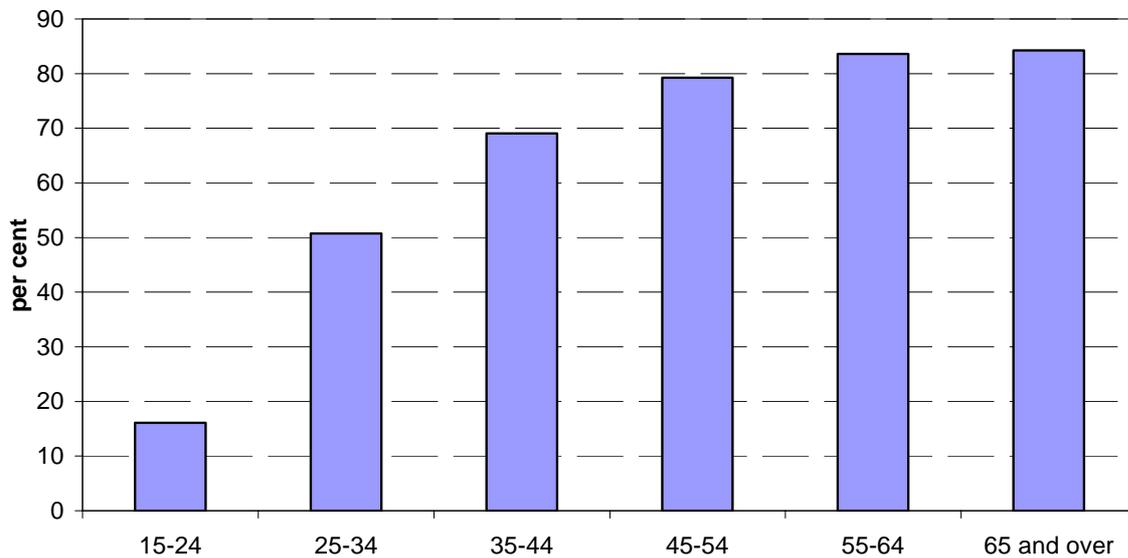
Municipal rates

In the longer term, property prices in most areas are likely to increase at least in line with the real growth in GDP per capita (appendix G). All things being equal, taxes on property are likely to grow at the same rate.

However, there is likely to be an increase in the proportion of ratepayers eligible for pensioner concessions on municipal rates. At present, just under half of all local councils provide pensioner rate concessions (table 12.7). Such concessions are generally provided to holders of Pensioner Concession Cards issued by Centrelink or the Department of Veterans Affairs. The number of pensioners, particularly age pensioners, is projected to increase significantly (chapter 8) resulting in a lower rate base.

The extent to which councils with ageing populations are affected also depends on the proportion of pensioners who are rate payers (property owners). However, if current trends of relatively high levels of home ownership among those aged 55 years and over continue (figure 12.3), municipal rate receipts are likely to come under increasing pressure.

Figure 12.3 Home ownership by age of reference person



Data source: ABS (*Housing Occupancy and Costs, Australia, 2000-01*, Cat No. 4130.0).

Variation in impact among local government areas

The impact of increasing pensioner concession rate eligibility is likely to vary significantly by local government area for a number of reasons:

- as noted, the demographic profile of residents varies considerably among municipalities;
- the proportion of local councils who offer pensioner rate concessions also varies considerably among States and Territories. The impact of such concessions in South Australia, where they are offered by less than three per cent of local councils will obviously be considerably less than in New South Wales⁴ where all councils are required to provide pensioner rate concessions (table 12.7); and
- the size of pensioner rate concessions varies from \$10 to \$400 per annum. This is, in turn, reflected in large variations in the total cost to local government of providing pensioner rate concessions (table 12.7). In Queensland alone, the cost to local councils of pensioner rate concessions varied from \$580 to approximately \$21 million (Hough 2004).

⁴ The Nambucca Shire Council (sub. 1) reported that pensioner rate subsidies already equate to some 10 per cent of its rate revenue and it only has a population of 19 000.

Table 12.7 Local government pensioner municipal rate concessions
2002-03

<i>Jurisdiction</i>	<i>Proportion of local councils providing pensioner rate concessions</i>	<i>Cost to local government (\$'000s)</i>
NSW	100.00 ^a	67 771
Vic	12.66	3 008
QLD	75.20	46 030
SA	2.94	131
WA	4.20	176
Tas	24.14	652
NT	16.67	19
ACT	na	na
Total	46.78 ^b	117 786

^a All NSW local councils provide a pensioner rate concession as part of a joint NSW, local government scheme. The cost to the local government sector of the scheme in 2002-03 was \$60 million. In addition to this around 16 per cent of NSW local councils provided a further concession amounting to \$7.7 million. ^b Excluding the joint NSW local council scheme, the total proportion of local councils providing concessions was around 24 per cent.

Source: Hough (2004), table 1.

Collectively, pensioner rate concessions provided by local councils amounted to \$117 million in 2002-03. In addition, a further \$264 million in pensioner rate concessions were provided by State and Territory Governments (table 12.8). The concessions provided by State and Territory governments offer greater coverage (since they are available to all eligible pensioners irrespective of where they reside) and are often of higher value. Hence, while it is likely that local government taxation revenues will come under pressure from increasing proportions of pensioner households, such pressures are likely to be ameliorated by the presence of state-based schemes.

Table 12.8 State government pensioner rate concessions
2002-03

	<i>Pensioner rate concession provided ^a</i>	<i>Number of recipients</i>	<i>Cost to State Government (\$m)</i>
NSW	\$250 or 50 per cent	413 200	74.0 ^b
Vic	\$135 or 50 per cent ^c	398 600	57.5
QLD	\$180 or 20 per cent	247 500	41.7
SA	\$190 or 50 per cent	143 000	28.5
WA	50 per cent	156 000	38.4
Tas	\$318 or 30 per cent	42 956	13.1
NT	\$300	17 000	7.2
ACT	\$250 or 50 per cent	15 000	3.9
Total		1 433 256	264.3

^a The lower value concession applies. ^b This is 55 per cent of the total mandatory pensioner concessions provided. The other 45 per cent, around \$60 million is funded by the local government sector in NSW.

^c Scheduled to increase to \$160 in 2004-05.

Source: Hough (2004) table 1.

Financial Assistance Grants

The Australian Government makes Financial Assistance Grants (FAGS) to local government through special purpose payments (SPPs). In discussions, jurisdictions suggested that another area of potential impact relates to whether SPPs to local government will grow in line with growing demand as the population ages. They suggested that to the extent SPPs reflect this additional demand, the fiscal pressure will be borne by the Commonwealth, rather than local government. On the other hand, the *State of the Regions Report* (ALGA 2003) argues that there is a risk that ageing-related fiscal pressure on the Australian Government may be transmitted to local government through reduced grants.

Under current government policy, per capita FAGs are indexed by the Consumer Price Index. FAGS will, therefore, increase in line with population growth and inflation. However, under this indexation arrangement they are likely to decrease as a proportion of GDP. Even though the current indexation arrangements were only introduced in 2000, FAGS to local government have been decreasing over the last decade — from 0.25 per cent of GDP in 1991-92 to 0.19 per cent of GDP in 2003-04 (Webb 2003, and Commission estimate). FAGs are therefore unlikely to represent a source of revenue growth that would offset any increased spending associated with ageing.

Fees and charges

Fees and charges are applied to a wide range of local government activities and include water charges, waste disposal fees, child care fees, fees for planning applications and for a range of licensing and regulatory activities. Fees and charges have risen from 17 per cent of local government revenue in the 1970s to 32 per cent today (ALGA, sub. 18, p.11).

Fees and charges are levied for specific services and do not represent a revenue source to fund general programs. ALGA suggests that further increases in revenue from fees and charges is unsustainable. Although it is difficult to assess the scope for increases in such a diverse revenue source, it does seem unlikely that future growth will match past trends. Over the last 15 years or so, user charges have been applied to many services that were once provided free of charge. The scope to bring further activities into the net may be limited, in which case future increases may rely more on increasing existing charges.

Infrastructure planning and provision

The *State of the Regions Report* (ALGA 2003), suggested that local government will face increasing pressures relating to the need to upgrade or modify infrastructure which may not have been built with consideration of ageing populations. Planning processes for development of age related infrastructure may also come under pressure.

As discussed, there is a relatively strong trend of migration to coastal areas among older people, resulting in a sizeable proportion of the population in some areas being over 65. At present, this cohort largely comprises the ‘young old’ who are for the most part healthy and independent. However, as these people age, their use of services such as aged care and health is likely to rise significantly. In some areas planning processes are likely to come under significant pressure as a consequence.

In the case of aged care, the Commission estimates that, nationally, the number of people in high and low care residential aged care is likely to increase by 66 per cent by 2024-25 and 178 per cent by 2044-45. On the assumption that people will want aged care in the region where they currently live, for regions with a higher concentration of older people the increases may be much larger. For example, even without further migration, the demand for residential aged care in Hervey Bay (on the Queensland coast) may double in the next 15 years and double again in the following 20.⁵ This could pose challenges for such Councils in designating sufficient land for new developments in a timely fashion and ensuring that new facilities are integrated with existing service delivery.

Fiscal pressure from an ageing population

Owing to the wide range and variation in services provided by local councils the Commission has not attempted to project local government expenditure. However, the picture that emerges from this brief discussion is that local councils will not be immune from the fiscal pressure that the ageing of the population is likely to create for other levels of government. Local councils are increasingly involved in the provision of human services which are more likely to face expenditure pressure from ageing than traditional activities such as provision of roads and utilities. In areas with a high concentration of elderly people there may also be pressure on local government planning processes to provide sufficient land and infrastructure for aged care.

⁵ Assumes no further migration to Hervey Bay, Australia wide mortality rates and, for simplicity, no reduction in disability rates.

At the same time, local government revenue is unlikely to increase at a greater rate than the growth in GDP, and some components such as FAGs will grow at slower rates.

Overall, therefore, with current policy settings, many local councils are likely to face an emerging fiscal deficit as Australia's population ages.

13 Implications of population ageing

Key points

- Assessing the fiscal pressures of ageing — the margins between additional spending and revenue — at different levels of government is complicated by grants between the various tiers. Different assumptions about the future size of those grants changes where the fiscal pressures are borne. This means that the best single measure of fiscal pressure is for all Governments combined.
- By 2044-45, governments are projected to have a combined ageing-related fiscal gap of around 7 per cent of GDP. Cumulatively, the value of the fiscal pressure from 2002-03 to 2044-45 adds up to around \$2200 billion in 2002-03 dollars.
- Though dependent on assumptions about grants between the Australian Government and the States and Territories, it seems likely that most of the fiscal pressure would fall on the Australian Government. This reflects its particularly large responsibilities for health care.
- There are many uncertainties in the Commission's projections. The most important implication of this for public policy is the risk that the fiscal impacts of ageing could be significantly greater than the Commission has projected.
- While the potential fiscal and economic consequences are great, population ageing does not currently represent a crisis:
 - Productivity growth will ensure that Australians are much richer in the future, and better able to afford the costs posed by ageing.
 - It is also important to recognise that older people contribute to society in ways that are not reflected in GDP.
 - Australia does not face a pension crisis, in contrast to a number of other countries.
 - The rising government expenditures related to ageing will improve community wellbeing.
 - The impacts of population ageing will be felt gradually and are therefore amenable to timely policy action.
- Ageing nevertheless raises major policy challenges, predominantly because of the large emerging fiscal gap that would need financing.
- Population policies are not likely to be able to moderate significantly the effects of ageing.
- Higher economy-wide productivity and participation rates will boost economic growth, but their effect on fiscal pressure is muted because service demands and costs also rise with income. However, if fiscal pressures are partly financed through income taxes, better economic growth reduces fiscal pressure for any given set of (inflation-indexed) marginal tax rates.
- Improvements in the efficiency, effectiveness and productivity of Australia's health system would ameliorate the major source of fiscal pressure at its origin.

13.1 Introduction

This chapter draws together the various threads of this study. First, it matches the revenue and expenditure projections from previous chapters to determine overall fiscal pressures for different governments (section 13.2).

Second, it places the various projections in context, by noting some of the key uncertainties and how these could affect the potential outcomes (section 13.3).

Third, population ageing is sometimes perceived as an adverse social trend. Is this valid and if so how? Section 13.4 explores these issues.

Finally, population ageing has obvious policy implications because Government is largely responsible for the financing and provision of ageing-related services. A variety of policy options are potentially available. The Commission has not been asked to make recommendations, but its research findings can be useful in pinpointing those policy areas that are more likely to be fruitful than others (section 13.5).

13.2 Ageing and fiscal pressures

What is meant by ‘fiscal pressure’?

Fiscal pressure is the extent to which increases in government spending outpace revenue growth. This study only considers those revenue and spending areas that are age-related. The Commission has not, for example, modelled what might happen to defence spending, because it will not plausibly depend on population ageing. The Intergenerational Report and State Government submissions also emphasised ‘demographically-driven’ fiscal pressures, though most also provide projections of other spending (for example, the Intergenerational Report develops a defence spending scenario).

It should be emphasised that the projections of fiscal pressure in this chapter are related to ageing, but they are not attributable solely to population ageing. For example, technological change in health care is likely to increase overall costs, and this will occur to some extent regardless of population ageing. Where factors other than ageing are important — as they are in health care — the Commission has explored their relative importance.

Fiscal pressure at different levels of government

The incidence of fiscal pressure is complicated by the financial dependence of the States and Territories ('States') on the Australian Government (appendix J). Changes in the payments made by the Australian Government to the States as a result of ageing pressures can shift budgetary pressures between the different tiers of government. The implication of this is that *aggregate* fiscal pressure borne by governments collectively is the best single measure of the fiscal consequences of ageing, because it is not sensitive to assumptions that affect incidence. In other words, fiscal pressure is like water in a maze of tunnels: pumping it from one tunnel to another does not diminish the amount, but merely re-distributes it.

As noted in chapter 11, ageing has modest effects on the tax revenue shares of GDP. For the Governments as a group, tax revenue is projected to fall by around 0.2 percentage points of GDP from 2002-03 to 2044-45.

The more striking ageing story is on the expenditure side. Here, across all levels of Government, spending is projected to rise by around 6.8 percentage points of GDP over the same period, of which most is health and aged care (table 13.1). Social safety net payments — which includes aged pensions — rise relatively modestly. This is because the increase in payments associated with the aged pension are partially offset by the decline in payments that favour younger age groups, such as family payments and unemployment benefits. Australia has been successful, compared with many other ageing countries, in avoiding large future liabilities associated with aged pensions because reforms to superannuation were made relatively early.

Fiscal pressure rises smoothly over time for combined Governments (figures 13.1), reflecting the fact that population ageing is a gradual and continuous process. The fiscal pressures on the Australian Government are projected to be much greater than for State Governments (table 13.1 and figure 13.2), and indeed somewhat higher than found by the Intergenerational Report.¹

¹ The Intergenerational Report projected an increase in fiscal pressure of 5.3 percentage points of GDP between 2001-02 and 2041-42 compared with the Commission's 6.5 percentage points from 2002-03 to 2044-45. There are several contributing factors: different base year data, GDP variations, different population projections, the use of AWE instead of CPI for indexing some safety net payments and revised pension data, among other factors.

Table 13.1 How much fiscal pressure will there be?

Age-related government spending to GDP ratios

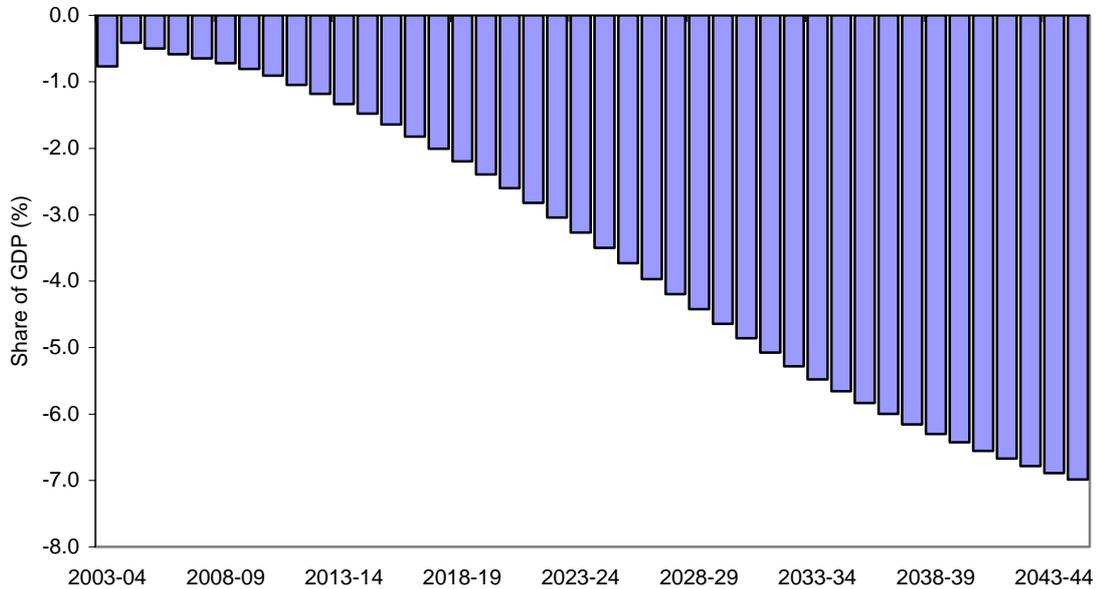
<i>Level of Government</i>	<i>2002-03</i>	<i>2044-45</i>	<i>Difference</i>
	Percentage points	Percentage points	Percentage points
All Government summary			
Health	5.7	10.7	5.0
Aged care & carers	1.0	2.3	1.3
Education	4.8	3.7	-1.1
Social safety net	6.5	8.1	1.6
Total	18.1	24.9	6.8
Australian Government summary			
Health	3.9	7.7	3.8
Aged Care & carers	0.9	2.1	1.2
Education	1.9	1.5	-0.4
Social safety net	6.5	8.1	1.6
Total	13.3	19.4	6.1
Combined States summary			
Health	1.8	3.0	1.2
Aged Care & carers	0.1	0.2	0.1
Education	2.9	2.2	-0.7
Total	4.8	5.5	0.7
Individual States (spending)			
NSW	4.5	4.9	0.5
VIC	4.3	4.8	0.6
QLD	5.1	5.7	0.6
WA	5.2	6.6	1.4
SA	5.8	6.9	1.1
TAS	8.3	10.8	2.5
NT	9.3	12.4	3.1
ACT	4.9	5.8	0.9

Source: Commission calculations.

The relatively modest pressure on the States in the Commission's 'base' projections reflects:

- the assumption that special purpose payments (SPPs) from the Australian Government to the States rise with service needs, rather than say being fixed in real per capita terms (appendix J); and
- the significant role played by the States in education funding. Two forces are at work here. First, population ageing results in a lower share of Australians of school age (the area of education for which the States have the greatest responsibility). Second, the Australian Government is a major funder of private schools, which are growing relatively rapidly, displacing students from State-funded public schools.

Figure 13.1 The pressure builds gradually
Relative to 2002-03



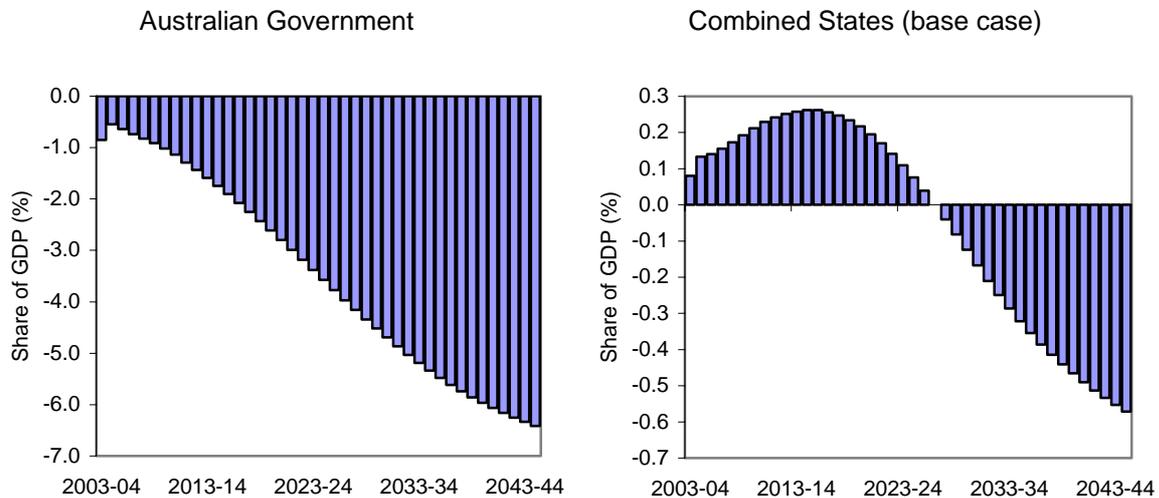
^a The graph shows the difference in the net fiscal position of combined State and Australian Governments relative to the position in 2002-03, or $N_t - N_{2002-03}$, where N_t (net fiscal position in year t) is defined as $R_t - E_t$, where R_t and E_t are age-related revenue to GDP and expenditure to GDP respectively. The graph does not show the actual fiscal deficit, since that would also depend on what happens to non-age related spending and revenue to GDP ratios. State Government general government spending was close to revenue in the base year (2002-03), while the Australian Government was running a fiscal balance of around 0.8 per cent of GDP in this year (Budget Paper No. 1, 2004-05). Accordingly, if non-ageing expenditures and revenues were to stay fixed as a share of GDP, then the actual fiscal balance would be equivalent to that shown, plus around 1 percentage point.

Data source: Commission calculations.

Of these factors, the first is the more important over the longer term. While the assumption about SPPs is consistent with the function of these payments, the Commission acknowledges that there are other possibilities, especially over the shorter term (appendix J). Were the demand for government services — such as health care — to outpace SPP funding, then clearly more of the fiscal pressure would be felt by the States. Appendix J explores the magnitude of this ‘portable’ fiscal pressure in detail. It could add as much as around 1.7 percentage points to combined States’ fiscal pressure (with a commensurate reduction for the Australian Government) by 2044-45.

Figure 13.2 The mix is uncertain but ageing fiscal pressures will vary by tier of Government

Relative to 2002-03



^a See note **a** in figure 13.1.

Data source: Commission calculations.

The Victorian Government (sub. 29, pp. 16-17) obtains roughly similar results:

- under its low fiscal impact scenario, there is only a slightly widening fiscal gap (less than 0.5 percentage points) from the decade 2002-01 to 2011-12 to the decade 2031-32 to 2041-42; whereas
- under the high fiscal impact scenario, the fiscal gap widens by around 2.5 percentage points between the two periods.²

The Queensland Government (sub. 17, attachment 4) and the Tasmanian Government (sub. 40, p. 50) have also emphasised the importance of the assumptions about SPPs in determining the extent of pressure experienced by State Governments. For example, the Tasmanian Government projects that if SPPs remain constant in real per capita terms (rather than as a constant share of GSP), then the fiscal gap will be widened by an *additional* 2.5 percentage points of GSP.

² The low fiscal impact scenario incorporates the assumption that Commonwealth health funding to Victoria is maintained as a share of hospital costs, in line with the costs of providing health services. It also uses case mix adjusted separations data and adjusts health costs for 'proximity' to death. The high fiscal impact is based on the Commonwealth only maintaining health SPPs in real per capita terms, uses bed days as the hospital utilisation measure and does not adjust for proximity to death.

Figure 13.3 ‘Apparent’ pressure will also vary by State and Territory
2044-45 relative to 2002-03



^a These estimates follow the same methods as in note a to figure 13.1, except that GST revenues are excluded. The NT estimates are higher than other jurisdictions because of high projected health spending for the Indigenous population.

Data source: Commission calculations.

The Commission has also calculated an ‘apparent’ fiscal pressure measure for each jurisdiction (figure 13.3), excluding the impact of GST grants. The pressure is more apparent than real because, as noted in chapter 11, horizontal fiscal equalisation can be expected to allocate the GST revenue in a way that will largely eliminate such apparent variations in fiscal pressure across the States. The figure is therefore an indication of how GST relativities may have to be altered to achieve roughly equal fiscal pressures for the jurisdictions.

Overall, as noted, the best measure of fiscal pressure is that which falls on governments collectively — it is only this measure that is free from the need to make assumptions about inter-government fiscal relations.

13.3 Uncertainties surrounding the projections

History is littered with faulty prognostication by experts over even quite short-term horizons. For example:

- In 1909 *Scientific American*, asserted:

That the automobile has reached the limit of its development is suggested by the fact that during the past year no improvements of a radical nature have been introduced.

-
- Ernst Rutherford, the famous physicist proclaimed in 1933 (following a similar view put forward by Albert Einstein a year earlier) that:

The energy produced by the atom is a very poor kind of thing. Anyone who expects a source of power from the transformation of these atoms is talking moonshine.

- In 1929, two weeks before the stock market crashed and the start of the Great Depression, Irving Fisher, a prestigious Yale University Professor of Economics, claimed:

Stock prices have reached what looks like a permanently high plateau.³

As emphasised in the introduction to this study, there are many uncertainties about how and to what extent population ageing may affect Australia's economic prospects over the next forty years. The Commission has made some informed judgments about these, but there are obviously many things that could plausibly occur to change the story.

For instance, given the importance of health care costs in shaping fiscal pressures, even small variations in outcomes in this area can make a large difference. To take some examples:

- the costs of health services may rise by more or less than projected. As noted in appendix D, the power of compound interest means that small errors in judging trends in prices or usage make a large difference to health care costs and fiscal pressures. (Something rising by 1 per cent per annum increases by under 50 per cent in 40 years; adding just ½ per cent point per annum to this makes the increase over 80 per cent);
- new health risks may emerge, such as new viruses, a greater prevalence of antibiotic resistant bacteria or larger than realised problems associated with rising obesity; or
- on the other hand, new technologies and better public health approaches may lower morbidity rates and increase health productivity — for example, treatments for Alzheimer's disease, better arthritis drugs, new antibacterials, a 'cure' for diabetes, or the use of robots in surgery and as aids.

Demographic uncertainty is also important. Were fertility to be much lower than projected and longevity somewhat greater, Australia could end up with nearly double the share of people aged 85 or more years than under the base case — with clear impacts on health and aged care costs (scenario P1 in chapter 2).

At the jurisdictional level, the results for the Northern Territory are particularly vulnerable to error. The NT Government is committed to reducing Indigenous

³ See <http://www.permanent.com/quotes.htm>.

disadvantage by increasing workforce participation rates, educational attainment and improving health and life spans. The Commission's baseline estimates for the Northern Territory have reflected these aspirations. However, achieving these objectives represents a major challenge — even over 40 years. For example, there have been few improvements in mortality among Indigenous Northern Territorians over the past few decades and a decrease in their involvement in mainstream employment. In the final report the Commission will undertake some sensitivity testing of its assumptions — particularly those relating to mortality — for Indigenous populations in the Northern Territory.

Global developments matter too. Australia has become an open economy sensitive to the state of world markets. Population ageing is a global phenomenon that could affect world growth, investment and migration flows, asset prices, innovation and entrepreneurship. Adverse or favourable developments in any of these areas may affect Australia's economic and productivity performance — and our capacity for financing the services that will expand with ageing. For example, citing results of complex overlapping generation models, Kotlikoff and Burns (2004, pp. 95ff) see risks of global capital shortages for ageing economies. All things being equal, these risk lowering average labour productivity, wages, and therefore the tax revenues, to meet ageing fiscal costs. (This at least reduces the prospect of an asset price 'meltdown', as diagnosed by other commentators.)

The Commission has used the Treasury's projections for aged care pensions in this study — and these are clearly sensitive to assumptions about the performance of private superannuation funds. Were these to perform badly because of poor global economic and corporate growth, then more people would be eligible for part aged-pensions, adding to the fiscal gap.

Some things are less uncertain. It is unlikely that deviations from the Commission's labour supply projections will be very substantial, or matter much to fiscal pressure. Future changes in participation rates are more likely to involve workers that are less skilled, less productive and working fewer hours than others. Consequently, while their labour market status may be very important to their own social and economic wellbeing, the impact on overall output is likely to be relatively modest. Even were there to be a significant economic growth dividend from greater participation, the strong link between GDP growth and health care spending suggests that the economic gains might be realised as better health care, rather than as lower fiscal pressure.⁴

⁴ The Intergenerational Report found a similar qualitative result, even though it did not have a link between GDP growth and health care demand. Even without this link, the Intergenerational Report (p. 61) found that increased labour supply resulting from greater participation by older

Surprisingly, *as measured*, fiscal pressures are also not likely to be very sensitive to broad changes in labour productivity. Productivity growth rates could well vary from the 1.75 per cent per annum assumed in projections over the next 40 years — but, as noted below, the impact of different productivity rates is mainly on Australians’ living standards, rather than as a palliative for fiscal pressures *per se*. The Intergenerational Report found similar results (p. 61). There are two important features of the modelling that underlie this result:

- Age-adjusted health costs per capita have been projected to increase at a rate 0.5 percentage points above that for GDP per capita (reflecting a combination of the effects of changing input prices, prevalence, and utilisation). The rationale for this is historical and methodological (appendix D and chapter 7). Consequently, if productivity growth rates rise, GDP rises, and so do health care costs — by the same proportion — producing no change in the ratio. However, were health care costs *not* to fully rise with GDP (as in some scenarios of the economic model used by State Governments in their submissions to the Commission), then economy-wide productivity gains can be partly realised as reduced fiscal pressures.
- It has been assumed that Australian Government tax revenue stays fixed as a share of GDP (chapter 11), as in the Intergenerational Report. This has some historical and policy basis, but more particularly, makes explicit the policy choice of whether to fund any shortfall of revenue through taxes. However, were it to become necessary to fund any residual fiscal gap through income tax increases, this creates a link between different productivity growth rates and the remaining fiscal gap (this is demonstrated in section 13.5). The higher the productivity rate, the more the fiscal gap is closed for given real marginal tax rates.

What should be the policy response to these uncertainties about health costs, demography and the global economy? First, as one participant in this study commented, prevarication is not an antidote to uncertainty. Policy responses still have to be made, even though the future is highly uncertain.

Second, it is clearly sensible to monitor the effects of ageing to see if the potential risks actually develop.

Third, downside risks are more important for policy makers than upside risks. Consequently, planning should be made on the basis that ageing may have more profound effects on fiscal pressure than those given in section 13.2, since there are

males made less than a 0.3 percentage points difference to fiscal pressure faced by the Australian Government.

credible circumstances in which this is possible. The Victorian Government (sub. 29, p. 40) emphasised the value of prudence in this context:

However, future economic prosperity is not certain, mainly because there are risks to the natural environment that could foreseeably impede future economic growth (e.g. climate change). In light of these uncertainties, prudent fiscal management and more broadly ‘precautionary’ policy settings in critical areas where errors could prove irreversible are appropriate.

Finally, these uncertainties suggest the development of long term policy approaches that are still beneficial (‘no regrets’) even if the expected outcomes do not eventuate. For example, improvements in the cost-effectiveness of the health sector will always be worth achieving.

13.4 The ageing ‘problem’ in perspective

Overall, the Commission projects that the ageing of Australia’s population will create fiscal pressures for Governments at around 7.1 per cent of GDP by 2044-45 — or around \$5 100 per capita⁵ in that year alone. The accumulated fiscal gap from 2002-03 to 2044-45 is projected to be around \$2200 billion in 2002-03 dollars.

Notwithstanding the projected magnitude of the fiscal gap, the predominant view in policy discussion is that these potential impacts do not constitute a crisis, at least not yet. There are several reasons for supporting this view.

First and foremost, is the fact that an ageing population is predominantly a reflection of this country’s success. Economic, political and technological dividends have allowed for greater life expectancy for Australians, as in other advanced countries.

Greater female reproductive control, education, and labour force participation, combined with lower infant mortality, has lowered fertility rates — also changing the age structure.

At least historically, there was a trade-off between female participation rates and fertility rates. Had many more children been born in Australia in the 1970s and 1980s, our current and impending population structure would have been younger, but our workforce would have included far fewer, and less educated, women. Given that education also promotes productivity, two of the ‘Ps’ necessary for economic growth — participation and productivity — would have been significantly lower (Day and Dowrick 2004, pp. 4-5).

⁵ In 2002-03 prices.

Indeed, as shown in chapter 3, labour force participation in Australia is currently at its highest rate since just before World War I. Moreover, the proportion of the total population in employment is the highest ever recorded in this country (figure 3.23). Even with the projected decline in participation, the ratio of actual employees to population will still be higher in 2050 than at any time in the entire century preceding 1990.

There are other reasons to temper any concern about an ‘ageing crisis’:

- Unfunded pension liabilities, while significant, will not exert as much pressure on Government budgets as they will in many other OECD countries.
- While Australia does share in common with other countries the prospect of substantial growth in health care expenditure, provided that this is well directed, it will promote community wellbeing and may reduce the need for other age-related outlays, such as residential nursing home care.
- Australia will also be a richer country when these impacts are felt, providing a greater capacity to absorb the additional costs of its ageing population. As noted, average per capita incomes in 2044-45 will be around 90 per cent greater than today.
- People contribute more to a society than just through their marketplace labour. Older Australians play a significant role as volunteers, carers and community members. In any case, the extra leisure that older people are enjoying is a good like others; it just does not get picked up in GDP estimates.
- Finally, the ageing of the population is a gradual phenomenon and its economic and fiscal impacts will also gradually build up over time. Events with long lead times cannot be considered crises as long as there is scope for anticipatory countermeasures.

Nevertheless, the emerging fiscal gap is large and, in the absence of other policy actions to ameliorate it (see below), would need to be financed. A key issue in this context is who should pay and when. All financing methods have different economic and distributional implications.

13.5 Implications of financing the fiscal gap

The choices in financing a fiscal gap come down to increased debt, greater user contributions to service costs and higher taxes.

Greater government borrowing can be used to finance short-term fiscal gaps. But continued borrowing for greater Government provision of services over the half-century (or more) of Australia’s demographic transition would not be

sustainable. It would result in a massive accumulation of Government debt that would have to be paid back by future generations through higher taxes (less private consumption), reduced government services (less public consumption) or inflationary pressures (cutting the purchasing value of future generation's savings).

There may be some scope to change the balance of public and private contributions in a number of the key spending areas. There have already been some shifts in this area (for example, in aged care funding). But the main area of increased costs is public hospital services, where Governments have been committed to free universal access. So there is little scope for user charges to realistically eliminate the gap.

The taxation option and intergenerational effects

Taxes of all types and across all tiers of government comprised around 31 per cent of GDP in 2002-03 — and will remain roughly stable over the Commission's projections. Were the future fiscal gap to be tax-financed, this implies an increase in the tax to GDP ratio of 7 percentage points or an average 23 per cent increase in average tax rates. Of course, if the gap were financed through selective taxes only — such as income taxes — this would require a bigger proportionate increase in these tax rates.

Much of the concern about tax financing as a policy response arises from the intergenerational impacts were the financing of gaps to be simply left to the future. As the Victorian Government noted:

The projected ageing of the Australian population has raised fears that the living standards of future generations will be unduly burdened by the costs of caring for a growing cohort of older people (sub. 29, p. 39).

But, as the Victorian Government (pp. 39-40) and other research has shown,⁶ the principles of intergenerational equity do not imply that there needs to be a substantial reduction in consumption by current generations to finance the future increase in fiscal costs associated with ageing.

The driver of this result is productivity. Increases in productivity mean that the current young will have lifetime incomes that are much higher than the generation that will be retiring soon. The male generation who started work in 1948-49 (and worked for 40 years) could expect average real lifetime wage earnings of around \$1 million (in 2002-03 prices). In contrast, the male generation which commenced work the year after the retirement of the 1948-49 cohort (1988-89) could expect real

⁶ For example, Day and Dowrick (2004) and Guest and McDonald (2002, 2003).

lifetime wage earnings of around \$1.9 million.⁷ This suggests that there would at least be a capacity to pay for the fiscal costs of population ageing.

To put this in perspective:

- By 2044-45, the average income of Australians is projected to rise by around \$35 000 per capita compared with 2002-03 (in constant 2002-03 prices). In that year, Australia will need to find around \$5000 per person to meet the fiscal gap, or around 15 per cent of the gain in annual income.
- Over the full period from 2002-03 to 2044-45, the accumulated fiscal pressure per capita is projected to be around \$90 000, while the accumulated additional GDP will be around \$700 000 per capita.⁸ So even after meeting the expenditure needs of Australia's ageing population, the dividends of economic growth mean that, on average, Australians will be better off by around \$600 000 per capita from 2002-03 to 2044-45 than they would have been in the absence of such growth.

Accordingly, several Australian economists (for example, Guest and McDonald 2003 and Day and Dowrick 2004) have advocated future income tax rate increases — with the effect of placing more of the burden of the fiscal gap on younger versus older generations.

A common concern associated with tax-financing of any fiscal gap is its effects on work incentives. Higher marginal taxes for given real incomes have damaging effects on (especially lower income) people's incentives to gain education, work and save. This would dampen future productivity and economic growth.

However, even were marginal tax rates for given real incomes to be fixed — by implementing complete indexation of resident individual income tax thresholds for inflation (to avoid bracket-creep) — a significant share of the projected fiscal gap would be covered as productivity growth pushed up workers' real earnings. 'Back-

⁷ These are estimates based on a standard curve describing how wages increase with experience over a lifetime, combined with average weekly earnings rising by a productivity rate of 1.75 per cent after 2003-04. Previous years used average weekly male earnings (from ABS, Average Weekly Earnings, Cat. 6302 deflated by the GDP deflator from ABS National Accounts data, Cat. 5206.0 and 5204.0).

⁸ Per capita is used here loosely, reflecting the fact that the population grows and its members change as people are born and die during the 40 year period. Consequently, the per capita measure is the sum over the 40 years of the annual per capita gains from GDP growth relative to the sum of the per capita fiscal gaps, even though the population being used to derive the per capita measures changes each year.

of-the-envelope' calculations⁹ suggest that with 1.75 per cent productivity annual growth and complete inflation indexation of tax scales after 2004-05, more than half of the 7 percentage point fiscal gap in 2044-45 could be automatically financed this way.¹⁰

If productivity growth rates were higher, then even more would be financed, underlining the fact that improving Australia's productivity performance is important not only to raise household living standards, but also to deepen the potential tax base. For example, under this taxation scenario were productivity growth to rise to 2.05 per cent per annum (the average over the 1990s), then the remaining fiscal gap to be financed falls to 2.5 per cent of GDP in 2044-45. (Of course, were productivity growth to falter, the remaining fiscal gap to be financed would expand again.)

That said, under such an approach, while there would be no bracket creep, *average* individual income tax rates would still rise (by about 8 percentage points) because with rising productivity, a greater proportion of people's real incomes would be taxed at higher rates.¹¹ Equally, this could be expected to involve some adverse incentive effects. For example, Australia might find it more difficult to attract skilled migrants from high income, lower-taxing countries, or to prevent a brain drain to them. On the other hand, given the global prevalence of population ageing, many other advanced countries may well be in more difficult circumstances than Australia. It should also be emphasised that this approach would seem counter not only to the current policy prescription of no (further) rise in the ratio of Australian Government taxation to GDP, but also the specific intention that at least 80 per cent of taxpayers will face no higher tax rate than 30 per cent.¹²

⁹ The calculations are approximations only. They are based on the assumption that the distribution of total individual taxable income follows the wage distribution in August 2002 — and that this distribution is unchanged over time. The calculations use separate distributions for part-time and full-time workers, and take into account projected numbers of part-time and full-time workers until 2044-45 (chapter 3). The actual tax scales for 2002-03 and the inflation-adjusted scales 2003-04 and 2004-05 are used for those years, with all other years using the inflation adjusted 2004-05 scales. Average earnings in any part of the distribution rises by a constant 1.75 per cent per annum under the base case.

¹⁰ The accumulated fiscal gap financed through real economic growth and fixed real tax thresholds from 2002-03 to 2044-45 is a little less than this, at just under 50 per cent.

¹¹ The Commission has also calculated that vertical equity would deteriorate slightly. For example, the ratio of incomes at the 90 per cent decile level grows relative to the 10 per cent decile, since less of low income earners income is covered by the tax free threshold. This could be corrected, with a relatively slight loss of effect on the fiscal gap, while actually improving the efficiency of the tax system.

¹² 2004-05 Budget Paper No. 1, p. 1.1.

Other policy options for (partly) financing the fiscal gap also have intergenerational impacts. For example, some of the accumulated wealth of the future old might be used to finance the gap, noting that the future old will own a much greater share of national wealth than the current old (chapter 11). On the face of it, implementing such a policy would appear to shift some of the fiscal costs on those who are responsible for those costs. However, to the extent that this group leaves bequests for their children, the shift will be partly illusory. Intergenerational impacts are hard to pin down because the consumption and savings behaviour of families across generations are linked.

Judgments about the appropriate intergenerational distribution of the financing burden of any fiscal gap clearly involve more than economic considerations and are outside the ambit of this report. However, this brief analysis suggests that it is important at least to take account of the following facts:

- future generations will have substantially greater lifetime incomes than present ones;
- at least some of the projected fiscal gap could be financed without increasing marginal tax rates at given levels of real income; and
- intergenerational impacts of ageing will ultimately depend, in part, on the extent to which wealth is re-distributed from older to younger generations within families.

13.6 Addressing the fiscal drivers

While the view that population ageing is currently a crisis can be dismissed, it still raises serious policy challenges. Governments are responsible for many of the costs that are strongly age related — health care particularly — and will have to respond to the budgetary consequences as these costs rise relative to tax revenues.

Governments also hold some important levers that might be used to mitigate the effects of ageing. Just as the outcomes of ageing are dependent on the 3Ps — population, participation and productivity — so too might some of the policy solutions to the fiscal gap lie here. For example, governments:

- have some effects on population through immigration and family policies;
- shape superannuation, wages and welfare policies, which affect labour participation and the growth of the future labour supply;
- are responsible for microeconomic reform, innovation and education policies that affect productivity growth; and

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- as regulators, purchasers and suppliers, have substantial potential to affect the cost effectiveness (and productivity) of Government-funded services, such as health care, that they provide to Australians.

The directions for policy attention can be divided into those that:

- deal with population directly through population policies;
- promote economic growth — through increased labour supply and productivity — so that the costs of population ageing are more affordable; and
- seek to increase the cost-effectiveness of government-provided services — particularly health and aged care.

What role for population policy?

Since the fundamental driver of the widening fiscal gap is population ageing, the question that arises is whether this could be ameliorated by policy action. To a large degree, the Australian Government can determine the extent of net migration (though it is less able to attract any number of skilled migrants). It can also *partly* influence fertility rates through social security payments, childcare subsidies and encouragement of family-friendly policies.

But it is unlikely that population policies of this sort would be able to moderate the trend to an ageing Australia to any great degree. As noted in chapter 2, a huge and rising migrant intake would be needed to maintain the existing age structure to 2044-45. Modest increases above present migration or fertility rates would make little difference. Indeed, increases in fertility rates would actually raise the overall dependency ratio over the medium term, with its own fiscal implications.

In sum, while the roots of population ageing are demographic, the appropriate policy responses are probably not. That is not to argue that population-related policies are not beneficial for other reasons, simply that their rationale should not be based on their ability to moderate the ageing of the population. (For example, the skilled component of migration is clearly relevant to Australia's economic performance, as noted by the Victorian Government, sub. 29, p. 55.)

Increased labour supply

With population ageing, labour supply and economic growth will slow as a greater share of Australians move outside the labour force. This is not, in itself, a problem, to the extent that:

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- people's exit from the labour market has not been induced by artificial (regulatory) incentives or by poor labour market prospects for mature workers; and
 - retirees have made prudent collective judgments about financing their old age.

However, there is compelling evidence that these assumptions are not warranted for everyone.

Labour force participation rates among Australians aged 55-64 are low relative to other age groups and by OECD standards (Gruen and Garbutt 2003). The rapid growth of disability pensioners is a major source of this disparity. This growth is partly testimony to injury risks in manual labour but is also, in part, associated with low demand for unskilled (particularly male) workers. It has created a large group of disadvantaged people with limited employment prospects as well as a substantial ongoing social welfare obligation for government.

Even in younger age groups, Australia appears to have lower workforce participation rates than many other OECD countries.

Some of this problem may be generational and may reduce over time. Younger cohorts are better educated than older cohorts (chapter 3). That, together with a growing tendency for lifelong training and education, and the development of new health technologies, suggest that (age-adjusted) disability pension rates may fall in the future and participation rates may climb somewhat. These assumptions have already been built into the Commission's projections.

However, there remains scope to explore further policy initiatives to enhance labour supply by:

- addressing artificial incentives to retire or remain outside the workforce;
- reducing injury risks;
- topping up workers' human capital and improving recognition of prior learning in providing credentials;
- promoting better job prospects for discouraged mature age Australians;
- increasing the scope and willingness for employers to hire and retain older workers; and
- facilitating age and family-friendly workplaces.

Apart from enhancing the well being of those involved, measures in these areas could well see an increase in participation rates above those projected. They are also likely to lower safety net funding obligations. But it should be recognised that

initiatives directed at bringing current ‘outsiders’ into the workforce may not make a large difference to overall economic growth once account is taken of the likely additional hours worked, unemployment rates and marginal productivity rates of these groups. This underlines the importance of taking early policy action to enhance participation rates in the future for today’s younger cohort of employees.

The role of productivity growth

It has been shown that even small increases in economy-wide productivity growth rates have large impacts on Australians’ well-being over a 40 year horizon. For example, the average employee on \$50 000 a year today would earn around \$100 000 40 years hence with 1.75 per cent growth (an increase of 100 per cent). But this would rise to around \$113 000 with a 2.05 per cent growth rate (an increase of 125 per cent). This is the power of compound interest.

Such productivity gains are obviously worth achieving in their own right. However, assuming no consequent increase in the tax share of GDP, their impact on the fiscal gap is likely to be muted. This is because (as noted previously), some of the ageing-related costs will rise with productivity (for example, wages of nurses in aged care facilities) and people’s expectations of services rise with income (as in health care). In this sense, apart from their purely private consumption payback, the principal benefit of productivity gains is that they allow greater consumption of health and aged care than would otherwise be affordable.

However, there are four ways in which productivity gains may be seen as beneficial in an ageing context:

- To the extent that the fiscal gap may need to be financed through income taxes, the bigger the productivity gains, the greater the share of the fiscal gap that can be covered at given (real) marginal tax rates.
- Productivity gains increase people’s absolute disposable incomes, even after taking account of the feedback of productivity on publicly funded consumption. The more it increases absolute income, the less justification for any intergenerational resistance to meeting the costs of ageing.
- Productivity gains can help close the fiscal gap if government service levels do not rise by the same proportion as any productivity dividend. While people’s expectations of service levels generally rise with greater national income, this may not continue if productivity were to rise strongly. At some point, such expectations may be moderated if the incremental value of such services were to fall, or if taxes and consumer charges needed to be raised greatly to sustain those service levels.

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- Productivity gains in government service provision (beyond those occurring in the general economy), have a significant potential to decrease fiscal pressures directly.

Effective and efficient services

The major source of future fiscal pressure is Australia's health care system. This reflects the (inextricably linked) development of new technologies, increasing expectations of care and an ageing population. This is not a problem per se. Few people would want to go back to 1960s medical technologies and practices. Health care has generally become more effective and less physically intrusive or traumatic — and this trend will desirably continue. However, there are inefficiencies and problems in the health care system that, if addressed, could significantly reduce the fiscal gap, while improving patient outcomes.

These inefficiencies were highlighted in the Commission's (2004b, pp. 244ff) inquiry into national competition policy. They are also evident in the 'Blue Book' — produced each year by the intergovernmental Review of Government Service Provision. For example, there are variations in performance between jurisdictions and between parts of the system, which suggest scope for learning how to provide better services. But there are also deep-seated difficulties across the whole system that invite reform:

- Coordination between different types of services, different types of providers and all levels of government remains a focus for better delivery. This would help avoid cost-shifting incentives, reduce distortions in user choices and provide better information for improved outcomes. In its inquiry into National Competition Policy, the Productivity Commission identified Australia's elaborate mix of funding and administrative responsibilities for health care as a key source of poor coordination:

Rising costs, inefficiencies in resource use, poor outcomes for some community groups and increasing difficulties with access are all indicative of scope for significant improvement. Overlapping roles and responsibilities between the Australian and State and Territory Governments either cause or contribute to many of these problems (PC 2004b, p. xxxiii).

- The healthcare labour market is characterised by a range of inflexible professional demarcation rules that determine who can do what for whom. While some of these are appropriate, others may become (or already are) increasingly redundant with new technologies and better training for health care workers. These issues will become more serious with impending labour shortages in some professional areas.

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- It is important to ensure that the adoption of new health technologies (and the continuation of old practices) paid for by the public purse is justified on evidence-based grounds. The Pharmaceutical Benefits Scheme uses an evidence-based approach in making recommendations about the listing of drugs, but other areas of the health system are not generally subject to systematic scrutiny. The Cochrane Collaboration has shown that many medical practices widely accepted in the past are not effective.¹³ Of course, it is also important to ensure that evidence-based medicine is not used as a cloak for inappropriate rationing or to undermine appropriate clinical freedoms of practitioners.
 - A significant share of total health costs arise from preventable diseases, such as smoking-related cancer, obesity-related diabetes II, and cardiovascular disease related to sedentary activity and eating habits. People are also often relatively passive consumers of health care (though this may be changing with more information available through the Internet), which reduces their role in achieving better health outcomes. For example, patient behaviours make a large difference to the effective management of asthma and diabetes. These facets of the health care system suggest a strong role for public health promotion and more effective involvement of better informed consumers in their own health care management.
 - Pricing signals in healthcare remain appropriately muted, given the importance of having wide community access to such services. However, their practical application can create excessive demand in some parts of the health system and deficient demand in others. The challenge is to ensure the ‘right’ amount of resources in the health and aged care sectors and their allocation in a way that best meets patients’ preferences and needs. Neither excessive rationing nor over-consumption is desirable.

There is a smaller range of concerns in the aged care sector (where technology has to date played a weaker role in cost growth). But funding arrangements, regulation of the sector and scarcity of specialist aged care nurses have been identified as areas where potential policy action may be required (Hogan 2004).

13.7 Summing up

The Commission’s preliminary analysis and projections do not reveal an impending crisis as Australia’s population ages. There is no ‘generational storm’ on the horizon (as one of America’s most distinguished economists — Laurence Kotlikoff— has described the situation for the United States).¹⁴ But the Commission’s analysis does

¹³ See www.cochrane.org.

¹⁴ Kotlikoff and Burns (2004).

suggest that the demographic transition will be large, with the population of the over 65s growing from 2.5 to nearly 7 million from now to 2044-45 (this is about one in every four Australians). A change of this magnitude will affect almost all facets of our lives — our economy, social life and consumption patterns. For all tiers of Australian governments, the pressing concerns are to provide adequate services, especially health and aged care, and to fund and manage these efficiently and equitably.

Fortunately, population ageing is a slow process, and the impacts on budgets are also gradual. This provides the opportunity for developing policies that smooth the costs of population ageing over long periods. The need to respond early to the problems posed by population ageing is receiving increasing recognition. There have already been a raft of policy initiatives over several years in superannuation and pension reform, which explicitly recognise the advantages of appropriately phased pre-emptive policies. Exercises such as the Intergenerational Report, the Australian Government Treasury's Demographic Challenges consultation process, the Hogan Report into aged care and this study itself provide some of the information for future action.

The broad options for future policy are to take early policy actions that reduce the magnitude of the projected gap — such as more efficient health care provision — and to finance the remaining gap. Early intervention will avoid the need for inefficient or inequitable 'big bang' interventions, such as excessive tax increases or service rationing, which would also face public resistance. Population ageing can only be conceived as a crisis if we let it become one.

A Total health expenditure

In line with the terms of reference, this study projects the fiscal pressure on Australian governments arising from an ageing population. However, international comparisons of health expenditure often focus on total public and private expenditure. To facilitate such comparisons, this appendix uses a single aggregate model (in contrast to the component models used for government expenditure) to project total Australian health expenditure.

Current expenditure

In 2002-03, health expenditure in Australia was \$72 billion or 9.5 per cent of GDP (AIHW 2004b). In common with many countries, health expenditure in Australia is increasing: since 1991-92 it has grown at a real average annual rate of 4.6 per cent a year, and from 8.1 per cent of GDP to its present level.

It should be noted that high level residential aged care (\$4.9 billion in 2002-03) is included in the above figure. However, elsewhere in this report this spending is excluded from health expenditure and projected separately as aged care expenditure.

Data

The key elements underpinning projected health expenditure are:

- the existing age profile of health expenditure for males and females — table A.1 shows that expenditure is significantly higher for older age groups;
- projected demographic change — consistent with the rest of this report ABS series B projections are used; and
- the assumed growth rate in per capita health spending.

As discussed in chapter 6, projections of health expenditure are particularly sensitive to assumptions about increases in per capita spending arising from demand (including prevalence of diseases), technology, and price. This growth is often termed the non-demographic growth rate. In the projections this growth rate is expressed as a premium over the projected increase in GDP per capita (see appendix

D). Owing to the sensitivity of results to this variable the projections incorporate a range of growth premia.

Table A.1 Australian health expenditure per capita by age group
2000-01 ^a

<i>Age group</i>	<i>Males</i>	<i>Females</i>
	\$ per capita	\$ per capita
0-4	1 876	1 564
5-14	1 091	1 240
15-24	1 271	1 732
25-34	1 230	2 126
35-44	1 402	1 936
45-54	1 915	2 343
55-64	3 179	3 305
65-74	5 657	5 371
75+	9 924	10 877

^a In the projections 2000-01 data is re-calibrated to sum to total expenditure in 2002-03.

Source: AIHW (2004e).

Projected expenditure

Total health expenditure is projected to increase in Australia to between 16 per cent and 20 per cent of GDP in 2044–45 (table A.2).

Table A.2 shows the sensitivity of the results to small variations in non-demographic growth — primarily technology and demand. However, the impact of ageing is also significant. The Commission estimates that expenditure will be 39 per cent higher than it would be if the population did not age. This is higher than the 36 per cent estimate for the government sector only because of the inclusion of high level residential aged care in the projection. The percentage increase remains unchanged regardless of the non-demographic premium. Therefore, ageing is likely to compound whatever increase is due to technology and demand.

Table A.2 Projected Australian health expenditure as a proportion of GDP

<i>Growth in per cap health exp above per cap GDP growth</i>	2002-03	2014-15	2024-25	2034-35	2044-45
	%	%	%	%	%
0.5 per cent premium	9.5	11.0	12.8	14.5	16.0
0.75 per cent premium	9.5	11.4	13.5	15.8	17.8
1.0 per cent premium	9.5	11.7	14.3	17.1	19.7

Source: PC estimates.

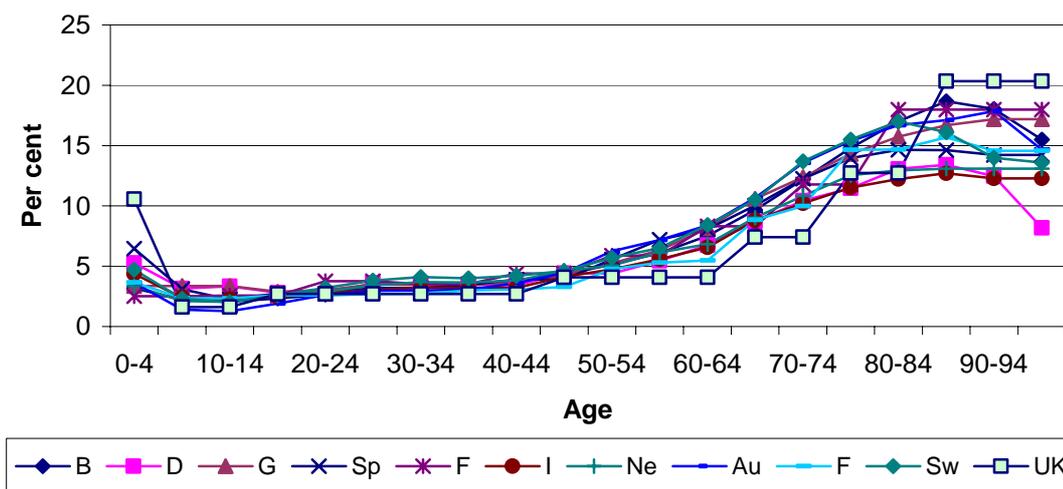
B Aggregate studies of age and health expenditures

The majority of studies examining the determinants of health expenditure have not found population ageing to be a significant determining factor in explaining growth in expenditure. For example, after surveying the literature, Bains (2003, p. 153) concluded generally:

...empirical evidence suggests that ageing was not a significant driving force in the increase in health expenditure, and that other factors¹ were more important.

Yet age-profiles of expenditure in most countries show that expenditure is higher for older age groups (figure B.1). As discussed in chapter 6 there is also evidence that profiles have been relatively stable over time, implying that an ageing population will lead to increased health expenditure. Thus there is an inconsistency between the data at the micro level and the data at the macro level.

Figure B.1 **European health expenditure**
Health expenditure as a proportion of per capita GDP



^aProfiles are drawn using data from the year 2000 except France, 1997; Belgium, Denmark, Spain and United Kingdom, 1998; and Italy, 1999.

Data source: Bains 2003, Figure 9.1.

¹ The factors Bains lists include income, insurance coverage and technology.

This appendix examines this apparent paradox and the various studies that underpin it.

The literature

A range of studies including Culyer (1990), Gerdtham et al. (1992), Hitiris and Posnett (1992), Zewifel et al. (1998), Richardson and Roberstson (1999), Moise and Jacobzone (2003) and Jönsson and Eckerlund (2003) have all found that ageing has not been a significant factor in the growth of health expenditure (table B.1). A partial exception is Karatzas (2000).

Variations in national income generally account for most differences in health outlays. In his seminal article, Newhouse (1977) provides a comparison of health expenditures across some thirteen developed nations (circa 1972). Using a simple regression of per capita medical expenditures against per capita GDP, differences in the level of national incomes are able to explain 92 per cent of the variance in per capita health outlays. Notably, Newhouse undertook this analysis before the ageing phenomenon began to gain any real momentum, and the residual, which was left unaccounted for, was unlikely to be explained by age related factors at that stage. While the result itself is quite robust, it does not support the inference that ageing is unimportant, as claimed by a number of later secondary studies that cite Newhouse as evidence against ageing.

Writing for the OECD, Gerdtham et al. (1992) examined the determinants of health care expenditure using data from some 20 industrialized countries over a two decade period. Their regression attempts to control for a variety of both ‘background’ and ‘institutional’ influences, including income, demography and fiscal constraints. Dummy variables were used to distinguish between health care provider systems. For example, a dummy variable was used to make the distinction between those systems which employed patient reimbursement schemes rather than provider reimbursement schemes. Similar to other studies, Gerdtham et al. found GDP per capita to be a highly significant variable, while ageing (proportion of population over 75) was not. Even at more disaggregated levels of health expenditure — ambulatory care, in-patient care and pharmaceutical — ageing registered as insignificant. Markedly, health expenditures proved very responsive to even the broadest distinctions between provider arrangements.

Table B.1 The literature in brief

<i>Author</i>	<i>Year</i>	<i>Nature</i>	<i>Notes</i>
Newhouse	1977	Cross national comparison of 13 developed nations, circa 1972	Compares per capita GDP with per capita HCE, and is able to attribute 92 per cent of the variance between HCE to per capita GDP differences across the nations studies.
Fuchs	1984a	Descriptive piece	Examines trends in HCE, and age specific morbidity and mortality. Fuchs concludes that spending is a function of death, and aggregate expenditure has been rising with the number of persons approaching their final years.
Culyer	1990	Reviews the success and failures of the reform process of European nations battling rising health care requirements.	Concludes that given the strength of the relationship between HCE and income, growing expenditures are consequently beyond the reach of policy.
Newhouse	1992	Using a fixed weight expenditure profile, to compare health spending between 1950 and 1987 (USA).	Examines the role played by access to insurance, increased incomes, supplier induced demand, and low productivity growth of health services, concluding that these factors, with ageing accounting for less than 50% of the rise in HCE. It is inferred that the residual can be explained by technology.
Getzen	1992	Cross country study of real HCE growth between 1960 and 1990.	If income is included in the regression, the significance of age dwindles away, implying that rising HCE and rising ages are the result of an indirect relationship with other variables. Moreover, concludes that ageing affects only the allocation of expenditures, but will not substantially increase the total level of HCE.
Gerdtham, Josson and MacFarlan.	1992	Cross country study of the determinants of total HCE. Circa 1985.	Tests a variety of background and institutional variables. Background variables are mostly socio-economic, and include ageing and per capita income, as well as alcohol and tobacco consumption. Institutional variables refer to funding arrangements, access schemes etc.
Hitiris and Posnett	1992	Uses a sample of 560 cross sectional and time series observations from the OECD to test the determinants of health care spending.	Their results reaffirmed that the vast majority of expenditures on health are caused by income discrepancies. The impact of demographic variables was quite limited under all their model specifications, if even found to be significant.
Hansen and King	1996	Critical study of the metric	Attacks the standard (time series) model where HCE is a function of real

		methods used in many of the above studies.	per capita GDP and a selection of non-income variables. Such conventional methods have tended to over simplify the issue - and the model itself may be misspecified. Tests if variables in standard OECD orientated models were stationary - they were not, implying that one of the crucial assumptions of an OLS regression is violated in most models.
Blomqvist and Carter	1997	Reviews methodological problems that arise from issues in the data.	
Fuchs	1998a	Descriptive piece with some forecasting about the elderly (not total) HCE	Estimates that by far the biggest driver of HCE growth is derived from "age specific consumption per older person" not the absolute number of the elderly or the age distribution of the elderly.
Lamers and Van Vliet	1998	Study of Dutch social insurance system.	Found that health outlays in the last year of life were some 15.3 times greater than costs than for those otherwise. This ratio significantly decreases (increases) significantly as age increases (decreases).
McCoskey and Sleden	1998	Applies different tests to the concerns of Hansen and King.	Findings contradict Hansen and King.
Richardson and Robertson	1999	Uses Aust. SSDs in a cross sectional comparison to test for explanatory determinants of HC use. A short cross-nation survey of OECD countries in 1960, 1975 and 1995.	Compares the use of GP services per capita across the 186 Australian SSDs. After standardising for a number of statistically significant variables (inc. urban/rural, aboriginality, public hospitals etc), found the age/sex variable explains only 3 per cent of the cross sectional variance.
Zweifel, Felder and Meiers	1999	Uses Swiss HC data 1983-1994 to test if rising health costs can be explained by "closeness to death."	Although calendar age variables were statistically significant the respective coefficients were of little influence on the model. Quarters to death however, contained much more explanatory power.
Karatzas	2000	Time series test of US aggregate per capita real HCE, 1962-1989	Constructs a variety of models which include economic, health stock and demographic variables to predict per capita real health expenditure.
Felder	2000	Uses the same data as Zweifel et al., adjusting for age, mortality, risk and wealth.	
Gerdtham and Lothgren	2000	Tests the data for stationarity and cointegration.	OECD health expenditure and GDP data from the period 1960-1997 proves to be non-stationary. The studies which have relied on this data set to reach their conclusions may have reached the wrong conclusions.

Salas and Raftery	2001	Questions Zweifel's methodologies and results econometrically	Identifies two particular problems with the Zweifel et al study: a) Study assumes HCE and time to death to be unrelated; and b) sample selectivity problems which they claim weren't properly controlled for.
Stoker et al	2001	Tests the determinants of health expenditures in the Netherlands, primarily as a function of years remaining.	Reaches similar conclusions to Zweifel et al. Significantly however, Stoker et al, attribute only 10 per cent of total health costs to the dying, arguing that any measures taken to reduce the costs of dying will have only a moderate impact on the total health budget.
Sheehan	2002	Cross country study of 20 OECD countries, 1989-1999	Tests for correlation between real health growth over the decade and growth in the proportion of over 65s. Reports a correlation coefficient of 0.04, and a number of countries reported highly counter intuitive results-suggesting that there is no relation between the two. Concludes that we are getting older later, rather than older younger.
Dow and Norton	2002	Explores the econometric methodologies of the paper by Zweifel et al	Building on the concerns of Salas and Raftery, Dow and Norton have additional problems with Zewifel et al. They highlight Zweifel et al.'s choice of model selection as one of the key flaws in their study.
Chernichovsky and Markowitz	2003	Time series study of Israeli HCE from 1966 to 1998	Uses median age, doctors per 1000 persons, mean years of schooling and GNP per capita to explain HCE per capita. Coefficient on median age is insignificant.
Moise and Jacobzone (OECD)	2003	Cross country study of OECD member states, 1997	Finds little correlation between per capita HCE and percentage of population aged over 65.
Jönsson and Eckerlund (OECD)	2003	Cross country study of OECD member states, 1998, and includes a case study of Sweden	Replicates Newhouse 1977 with more recent data, but now can only attribute 77 per cent of cross country comparison to differences in income.
Bains (OECD)	2003	Projects HCE to 2050 EU member states (excluding Luxemburg)	Projections map current age-sex-expenditure profiles against predicted pop changes. Ageing will increase public HCE as a percentage of GDP by between 0.7 and 2.3 percentage points.
Jacobzone	2003	Descriptive piece	Demography, he claims, is a secondary factor in the overall increase of HCE. The key factor is technology and rising relative prices for medical inputs, combined with the intensity of medical care at older ages. Points to the high concentration of medical costs at the end of life, and argues that failure to account for this will tend to overstate any future predictions.
Jewell et al.	2003	Tests for structural breaks in the data.	Counter's the conclusions of other econometric criticisms, claiming that after structural breaks are controlled for, the data proves to be reliable and stationary.

Chernichovsky and Markowiz (2000) source data from Israel — one of the fastest ageing populations in the developed world. In the Israeli experience, only GDP per capita and mean years of schooling² proved statistically significant. While their testing of Israeli data does not reveal a significant age effect, they recognise that their use of the common wisdom — assuming a simple linear relationship between individual and aggregate spending — may be oversimplified. They suggest shifting mortality and morbidity over the period has caused age specific shifts in the profile, making the relationship more complicated.

Karatzas (2000) offers one of the few recent papers which has defied this consensus. Karatzas brings together the three major hypotheses of rising health care costs, modelling real per capita US health care expenditure over the period 1962-1989 with income, health stock and demographic variables. Karatzas constructed four models to explain rising health spending, each focussing on a different set of explanatory variables. In general his results strongly support a demand push theory, however,

...what emerges from these exercises is that changes in the economic, demographic and health stock variables produce persistent changes in the per capital real healthcare, and these findings do not support the contention that the per capita real income is the only major determinant of per capita real health care spending (pp. 1088-1089).

Karatzas' Equation 4, which is the only of the four models to incorporate ageing, returns an R^2 value of 0.98. According to his results, a one per cent increase in the proportion of over 65s in the economy will cause total per capita health expenditure to rise by 2.55 per cent. Importantly, the model itself is not completely removed from income issues, also including a statistically significant measure of income distribution (the ratio of nominal wages to nominal GDP). Notably, as health care spending data is disaggregated to finer levels (for example per capita government outlays and per capita pharmaceutical expenditure) ageing, as a deterministic variable, plays a less prominent role.

Overall, while the macro-econometric studies are not universal in their conclusion, in general they do not find ageing as a significant determinant of health expenditure.

Why is ageing not showing up in the data?

Although it is difficult to be conclusive, there are a number of explanations as to why ageing has not been found to have a significant influence on health expenditure:

² Education is included as an indicator of economic development.

-
1. The degree of ageing has remained relatively small in most countries to date, especially in comparison to other demand side drivers — including income growth, technological change and increased coverage.
 2. The effect of ageing may have been offset by other demographic phenomena and institutional constraints.
 3. The studies may not be picking up the effect of ageing:
 - (a) The classification of health and aged care data is not always consistent across developed countries; and
 - (b) There is ongoing debate regarding the methodologies employed to test for the ageing impact.

Accelerating ageing

In a climate of rapid income growth and technological advances, ageing has historically been a relatively minor issue for most countries. In Australia, the proportion of the population aged over 65 grew at an average annual rate of 0.7 per cent between 1960 and 1990 (see table B.2). However, over this same period, the average annual rate of real GDP growth was 3.9 per cent (ABS, 2004). Relative to income growth, ageing has understandably played only a secondary role in driving health expenditures.

In table B.2, we compare the growth rate of the elderly cohort over the periods 1960-1990 and 1999-2050 for some 20 OECD nations. Of the nations listed, Japan recorded the fastest degree of ageing to 1990, the proportion of over 65s growing annually at a rate of 1.7 per cent. Belgium and France, were the slowest over the period with a growth rate of only 0.4 per cent. Forecasting ahead, growth for all countries is expected to accelerate, with 16 nations achieving annual growth of over 2.0 per cent, including Finland and Japan at 4.4 and 5.6 per cent respectively. Australia's rate of ageing is forecast to more than triple its recorded rate, rising to 2.6 per cent.

Thus, relative to the role of technology and demand, ageing may have been a relatively minor factor driving health expenditure. However, as ageing accelerates in the coming decades its significance is likely to increase.

Table B.2 Annual growth of elderly population, as a proportion of total population, selected OECD countries, per cent

<i>Country</i>	<i>1960-1990^a</i>	<i>1999-2050^b</i>
Belgium	0.4	0.6
France	0.4	0.8
Austria	0.5	1.1
United Kingdom	0.6	1.7
Switzerland	0.7	2.0
New Zealand	0.5	2.0
Iceland	0.6	2.5
United States	0.7	2.5
Denmark	0.9	2.5
Australia	0.7	2.6
Sweden	1.0	2.6
Norway	0.9	2.6
Germany	1.0	2.8
Italy	1.0	3.3
Netherlands	1.0	3.4
Greece	1.0	3.7
Spain	1.1	3.7
Canada	1.0	3.8
Finland	1.4	4.4
Japan	1.7	5.6
Unweighted average	0.9	2.7

^a From Getzen 1992; proportional change in per cent of total population aged over 65, 1960-1990.

^b From UN Division of Economic and Social Affairs, Population Division; proportional change forecasted of per cent of total population aged over 60, 1999-2050

Source: Getzen, 1992; and UN Division of Economic and Social Affairs, 1999.

Offsetting factors

With the modest level of ageing experienced in most countries to date, its impact may have been offset by other factors. The two factors commonly suggested include, compression of morbidity (falling age specific disability rates) and institutional rationing of health expenditure.

Compression of morbidity

Chapter 2 suggested that disability rates are falling but this is unlikely to reduce future health expenditure because of more intensive medical treatment.

However, over the period of the macroeconomic studies, a greater proportion of the gains may have come from lifestyle changes or the use of relatively cheap medications. In a report for the Myer Foundation, Byles and Flicker (2002, p. 2)

report that the dramatic increases in life expectancy since the late 1960s have been largely the result of:

...declines in deaths due to heart disease, stroke and lung cancer... mostly due to a reduction in smoking, but also due to control of blood pressure and cholesterol and improvement in medical treatments.

Cutler (2001) also attributes some of the reduction in disability in the US to reduced smoking and behavioural changes. To the extent that health of the elderly in the period from 1960 to 1990 improved from these factors it may have somewhat offset the modest impact of aging. However, the future extent of population ageing will preclude a similar effect.

Rationing

To some extent, the impact of ageing on the health expenditures may have been muted across the OECD, because of the public sector's significant influence in the market. Sticky policy mechanisms and institutional arrangements, including rigidities in expanding budgets with increased needs, may constrain spending.

Getzen (1992) argues that budget realities will limit (and presumably have limited) the impact of ageing on OECD public health expenditures. He maintains that ageing has not substantially increased the total health care bill, but only affects the allocation of expenditures:

Ageing will increase the demand for health care, but adjustment to budgetary realities will limit that increase so the *structural*, or aggregate, effect of one person becoming older is not 200 percent or 500 percent of average per capita spending, as is assumed in age group projections, but more of the order of 5-50 percent... A clear robust negative empirical result, that ageing is *not* a significant cause of rising health care costs... may also strengthen the recognition that spending is a result of political and professional choices... (p. S103).

Chernichovsky and Markowitz (2003, p. 7) agree:

In the supply driven public system, the health budget grows at a given rate that may be quite independent of particular or age-specific health needs, but once established, the budget is redistributed according to socially defined needs of age-specific costs.

Health systems differ among countries, and change over time. As such, the degree of rationing is also likely to differ among countries and across time within countries. Thus rationing is another factor that could obscure underlying demand pressure on health expenditure from ageing.

Rationing is a possible response by governments to future pressure on health expenditure from ageing. However, this would involve denial of care comparable to

the standards applying in other countries. In effect, while there might be no fiscal gap associated with health care, there would be a treatment deficit.

Classification of health data

In their article, *Ageing and health care costs*, Jacobzone and Oxley (2002) present data on total care costs for the OECD. They define total care to include long-term care for the aged, as well as health care. They note that while increases in spending on these two categories are driven by somewhat different sets of factors:

Nonetheless, the borders between these services are blurred: for example, because long-term care for the very dependent merges with hospital care and various kinds of ambulatory care may also help in keeping the elderly independent as long as possible

Such blurring in classifications are evident in widely differing proportions of expenditure on health and long term care among developed countries. Sweden is a good case in point. Sweden is often cited as an example of why ageing may not have a significant impact on health costs. It spends less as a proportion of GDP on 'health care' than Australia (8.8 per cent compared to 9.1 per cent in 2001) yet has a greater proportion of over 65s. However, according to the OECD (2004d), Sweden spends 4.5 per cent of GDP on home care services for the elderly. It appears that significant health care provided in a home-setting may be included in this category, rather than as health care.

By contrast, the OECD data for Australia record only 0.3 per cent of GDP as publicly funded aged care. In Australia's case, high level residential care (comprising the majority of government aged care expenditure) is classified as health expenditure, in line with the WHO guidelines. To avoid double counting, such residential care is likely to be excluded from the OECD data base on aged care.

Combining health care and aged care expenditure, Sweden's expenditure was 11.1 per cent of GDP in 2001 compared to Australia's 9.3 per cent.

Overall, the blurring of the boundary between health care and aged care provides further reason to be careful when interpreting the results of studies that examine the links between ageing and 'health care'.

Econometric issues

Perhaps as a result of a heightened policy interest, the literature's methodology and data selection are increasingly being subjected to a higher degree of scrutiny and

critique. Importantly, such critiques are not accompanied by an overwhelming consensus, and are themselves subject to scrutiny.

There is debate about specific studies — such as Zwiefel’s influential study on the costs of death (box B.1) — and of the methodology used in macroeconomic studies more generally.

Hansen and King (1996) raise the issue of ‘stationarity’ (or rather the lack of) in the data sets used by most studies. Loosely, time series data are stationary if the mean, variance and covariance do not change over time. Stationarity is one of the critical assumptions required when performing ordinary least square regression. Hansen and King (p. 127) survey the typical methodologies wherein real per capita health care expenditure is predicted as a function of real per capita income and other demographic or health stock variables. They argue that the

...results obtained may be misleading, or even completely spurious, if the variables employed are not individually, or collectively, stationary (p. 130).

Testing for stationarity in health care expenditures, GDP, ageing and provision data sets, across 20 OECD nations found non-stationarity in approximately two thirds of the variables, with no country possessing a data set entirely stationary in levels (Hansen and King, 1996, p. 130). Alternative testing for stationarity by both Blomqvist and Carter (1997) and Gerdtham and Lothgren (2000) have reached the same conclusions.

While there is support for Hansen and King’s results, it is not unanimous. Using a different set of tests again, McCoskey and Selden (1998), and more recently Jewell et al. (2003) have both been able to produce results strikingly different — finding that health care spending and GDP are stationary. As part of an ongoing debate however, these results too have been met with claim and counter claim, making a definitive judgement difficult to make.

Jewell et al (2003) identify a “more important shortcoming” in the literature. Before asserting that health care expenditure and GDP are non-stationary sequences (or stationary for that matter), it is necessary to test for structural breaks:

It is now well known that a structural break can be mistaken for non-stationarity. Therefore, it is possible that previous findings of non-stationarity in [health expenditures] and GDP may be due to the failure to allow for structural breaks (p. 314).

Using the panel LM unit root test, Jewell et al were able to identify structural breaks in 12 of the 20 countries surveyed (the vast majority of which happened between 1973 and 1983) (Jewell et al., 2003, p. 319). These structural breaks occurred during or shortly after a recession. They note:

Box B.1 **Debate on Zweifel et al 1999**

Zweifel et al. (1999) use data from two major Swiss private health care funds to test for a relationship between death and expenditures. Data from the two health care funds tracks the expenditure history of member decedents over the period 1983-1994. In their model age, gender and quarters to death are used to predict per capita total health care expenditure. Data from two samples returned significant coefficients on age variables (age of decedent and age of decedent squared) when testing the full sample of decedents, however, was insignificant when the sample was limited to just the over 65s. In addition the value of the ageing coefficients themselves suggested that ageing had only a minor influence on the health care costs recorded over the period.

Quarters to death yielded both statistically significant and sizeable coefficients leaving Zweifel et al. to conclude that the

...relationship between age and HCE [Health Care Expenditure] is in fact a relationship between increasing age-specific mortality and the high cost of dying... (p486)

And therefore:

...per capita HCE is not necessarily affected by the ageing of the population... Rather, an increase in the elderly's share of population seems to shift the bulk of HCE to higher age, leaving per capita HCE unchanged (p493).

The paper by Zweifel et al. has drawn substantial criticism for its methodology and methods of data selection. The data used in Zweifel et al (1999) pertains only to decedents and therein assumes no use for health care expenditure to actually prolong the time of death. Salas and Raftery (2001) ask that if there is no such relationship, then why is health care sought for in the first place? They argue:

...it is clearly plausible that HCE in a given quarter does contemporaneously affect health status and thence closeness to death (p670).

When performing their regression estimates, Zweifel et al. assume health expenditure and time to death to be weakly exogenous. Salas and Raftery point out, they should have assumed the relationship to be endogenous. The conclusions reached by Zweifel et al. may be biased and inconsistent as a result of this oversight. Notably in their defence, Zweifel et al. (2001, p673) make the point that thus far, health economists have been unable to find a relationship between health care expenditure and measures of longevity.

Methodological criticisms of Zweifel et al. can also be found in Dow and Norton (2002), who raise concerns about their choice of model. Dow and Norton write that Zweifel et al.

...invoke the Heckit model for inappropriate reasons, derive the wrong marginal effects for their main tests of interest, and use an unsatisfactory test of the Heckit versus the two part model. (p. 2)

...the business cycle might significantly impact health expenditures, since the government plays a major role in financing of [health expenditures] in most OECD countries. As such the structural breaks in [health expenditures] can be potentially influenced by significant fluctuations in the business cycle that directly impact government revenues. Close examination of the break points seems to support this conjecture, since many of the break points in [health expenditure] are consistent with recessionary periods (p. 319).

Having correctly controlled for these structural breaks, their findings support both GDP and health spending as being stationary variables in most countries, around one or two breaks. Controlling for stationarity in this manner overcomes the problems identified by Hansen and King.

A number of studies cited in this appendix have argued strongly that spending growth is solely attributable to income growth and ageing is irrelevant. The strength of such conclusions however, may weaken as a greater scrutiny to results is applied, or more accurate testing becomes available. However, with debate still raging among econometricians, our point here is not to rule out the macroeconomic studies for relying on potentially spurious results. But rather, our point is to treat these results need to be treated with some caution in seeking to draw conclusions on the role of ageing in aggregate health expenditures.

Conclusion

Macroeconometric studies find that ageing has not been the most significant factor influencing past growth in health expenditure. This is unsurprising because the degree of ageing to date has been modest compared with what is projected to occur over the next 40 years.

It is not possible to be definitive as to whether:

- ageing has had a modest influence on expenditure that has not been detected in macroeconomic studies of the determinants of health expenditure; or
- that other factors — such as improvements in health over the period in question — have meant that ageing has not had an impact on expenditure.

Nevertheless, the preceding discussion suggests that the macroeconomic studies do not collectively provide strong evidence for rejecting the proposition that ageing will exert significant pressure on health expenditure in the future.

C Health expenditure projection methods and sensitivity analysis

C.1 Methodology

For this study, four major categories of health expenditure (hospital, Medicare, pharmaceutical and other expenditure) and two levels of government (Australian Government and each of the State and Territory Governments) have been projected separately and aggregated to estimate total government expenditure.

The data required to project each component of health expenditure are the:

- age profile of expenditure for that component;
- projected growth and change in the age composition of Australia's population (ABS series B projections have been used); and
- the non demographic growth rate for that component — the change in per capita costs for each age group.

The projected expenditure for each component of health expenditure in year (t) is:

$$\sum_{age=0}^{85} (HCE_{age} (1 + g)^t POP_{age}(t))$$

Where:

- HCE_{age} is age specific per capita health care expenditure
- $POP_{age}(t)$ is the number of persons of a given age in a given year
- $age \in (0,85)$ the reference age for per capita health care expenditure and the population size
- $t \in (0,T)$ the reference year of expenditure prediction, where the year 2001 is given by $t = 0$
- g is the annual growth rate in per capita health care expenditures

Figure C.1 illustrates the way each element interacts over time. The first chart shows a typical age profile of expenditure (Medicare expenditure in this case) and the effect of non-demographic growth on the age profile. Under the assumption that costs for each group increase at the same rate, over time, the age profile shifts upwards but retains its overall structure. Table C.1 contains the age profiles used in this study. Each profile is expressed as an index. In combination with population data the index is calibrated to total expenditure for each component to calculate cost per person for each age group.

Table C.1 Index of age structure of government hospital expenditure

<i>Age group</i>	<i>Male</i>	<i>Female</i>
0-4 ^a	100	100
5-9	17	14
10-14	15	16
15-19	20	28
20-24	23	46
25-29	24	62
30-34	24	57
35-39	27	45
40-44	30	38
45-49	39	40
50-54	50	49
55-59	74	68
60-64	103	90
65-69	153	131
70-74	207	173
75-79	247	227
80-84	295	299
85+	371	364

^a Index 0-4 = 100

Source: Natsem 2003.

Expenditure for a particular age group in any year is the cost per capita for that age group multiplied by the population in that age group for that year. Total expenditure for that year is the summation of expenditure for each age group.

The second chart shows why expenditure is expected to rise with ageing. In 2044-45 there will be relatively fewer younger people and a greater share of older people in the population compared to 2002-03. As noted in the chapters, the proportion of people 65 and over will double to around 25 per cent of the population and those over 85 are projected to increase from 1.5 per cent to over 5 per cent of the population.

Table C.2 Index of the age profile of government health expenditure

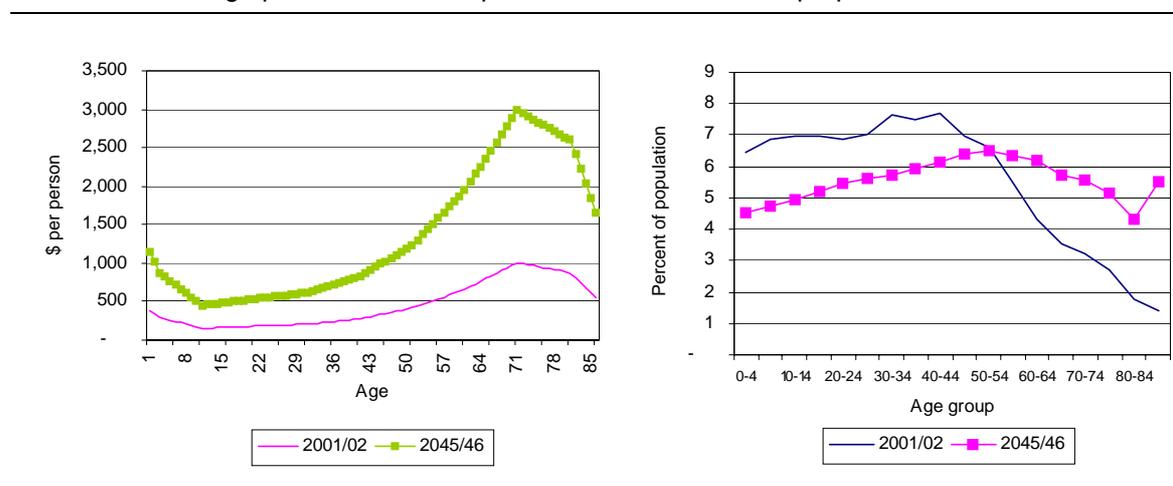
Age group	Medicare ^a		Pharmaceutical ^a		Other ^b	
	Male	Female	Male	Female	Male	Female
0-4 ^c	100	100	100	100	100	100
5-14	51	56	107	105	71	75
15-24	61	127	198	312	76	93
25-34	70	189	314	495	79	107
35-44	94	193	496	753	81	95
45-54	140	233	868	1,259	89	98
55-64	221	300	1,748	2,565	116	116
65-74	339	376	3,581	4,706	163	148
75-84	296	388	3,084	4,886	228	209
>=85	189	256	2,858	4,381	223	203

^a HIC data. ^b A profile constructed by applying the profile that most closely matches individual components of other expenditure (including a neutral age treatment for items such as research and administration). ^c Index 0-4 = 100.

Source: Health Insurance Commission (2004 and unpublished) and PC calculations.

Figure C.1 The ageing problem for health expenditure

Age profile of health expenditure, and increase in proportion of those 65+



Source: HIC 2004 and PC calculations.

Sensitivity analysis

As noted by the IGR (Costello 2002), projection results are very sensitive to the non-demographic growth rate. The Commission's projections are based upon a non-demographic growth rate which is expressed as a premium above the projected growth in GDP per capita. The baseline projections in chapter 6 used a premium of 0.5 percentage points (for each component other than pharmaceuticals). Table C.3

presents the results of using a non-demographic growth premia of zero percentage points and one percentage point above the growth in GDP per capita. A variation in the premium of 0.5 percentage points broadly translates to a change in total health expenditure as a proportion of GDP of two percentage points in 2044–45.

Table C.3 Projected Government health expenditure as a proportion of GDP

Under different non-demographic growth assumptions ^a

<i>Growth in per capita health exp above per cap GDP growth</i>	2002-03	2014-15	2024-25	2034-35	2044-45
	%	%	%	%	%
0.0 per cent premium	5.8	6.7	7.8	8.5	8.9
0.5 per cent premium	5.8	7.1	8.5	9.8	10.8
1.0 per cent premium	5.8	7.4	9.3	11.2	12.9

^a Growth assumptions apply to hospital, Medicare and other expenditure. Non-demographic growth in pharmaceutical expenditure is projected using a logistic function which asymptotes to the growth in GDP per capita plus the relevant premium — see appendix D.

Source: PC calculations

C.2 Alternative projection methods

Chapter 6 presented results for two alternative projection methods:

- a life expectancy adjustment; and
- a model incorporating the cost in the last year of life.

Details on these methods are provided below.

Life expectancy adjustment

The life expectancy for all age groups is increasing as age specific mortality rates fall. Early work by Fuchs (1984) and Manton (1982, cited in Fuchs) have suggested that health care among the elderly is not so much a function of time since birth (age), but time to death. This is predicated on the view that most of the expected additional years of life will be healthy years of life. If this were to be the case, health care use of a 75 year old in 20 years time will not be the same as a 75 year old today. It may, say, be more likely to approximate that of say a 71 year old. Thus it is possible to adjust the constant age cost projections to take account of changes in life expectancy contained within demographic projections (box C.1).

Box C.1 Life expectancy adjustment

The method employed by the Commission to adjust for increases in life expectancy involves a number of steps.

- most profiles of expenditure by age are calculated by age bands — 65–69, 70–75 etc — with each person within the band assumed to have the same expenditure. To adjust for life expectancy it is necessary to have an estimate of costs by individual age. Piecewise linear adjustment approximations were used to generate this profile. As Badham (1998) says ‘Each piece of the linear function is defined by two points, given by average age ... in an age band and the per capita cost for that age band.
- This expenditure profile is then recalibrated so that the profile applied to the present population results in the current level of total expenditure.
- For each age group over 65, and for each year until 2044-45 an ‘effective age’ is calculated, by subtracting the increase in life expectancy predicted by the ABS (unpublished data) for that age from current age. For example, a 70 year old male is projected to have an ‘effective age’ of 67 by 2021–22 and 66 by 2041-42.
- Total expenditure is estimated by multiplying the effective age by the corresponding costs for that age group cost profile.

Adjusting for increased life expectancy under this method will always reduce expenditure. Taking the ABS data as given, the magnitude of the impact will depend on the age cost profile. A profile where costs increase significantly with age will result in a larger impact than a ‘flatter’ profile. The Commission applied age adjustment to Commonwealth spending and to total health spending. Depending on the profile adjustment, this led to a reduction of between 5 per cent and 8 per cent by 2044-45.

This approach assumes that increases in life expectancy are costless to the health budget. But as described in chapter 6, there is growing evidence that increases in life expectancy are not costless. Rather they arise partly because of increasing use of medical treatment across a wider range of conditions. Hence this approach has been presented as a sensitivity test rather than incorporated in the core projection.

Projections incorporating the costs of death

A variant on the view that it is years-to-death that determines age related health care expenditure rather than calendar age, is the contention that the majority of health costs for persons over 65 are associated with the last one to two years of life. According to this view, it is more appropriate to project future health expenditure based on the number of deaths predicted in the future, rather than the number of people in any age group.

Ultimately, whether costs are mainly associated with the last two years of life is an empirical question. Many conditions which prove fatal, such as cancers, will involve high treatment costs. Equally, and unfortunately, some conditions leading to death are sudden and involve low costs. As a recent heart campaign to reduce heart disease stated ‘for many the first symptom of heart disease is death’. Overall, chapter 2 concluded that while costs at death are high, they do not explain all of the higher per capita spending on the aged.

To incorporate expenditures associated with the last year or so of life into a projection of health expenditure health costs have been divided into two types:

- those associated with the last year of life; and
- those related to the ongoing health needs of each age group.

Expenditure related to death is projected using the estimated number of deaths in each age group. Recurring health expenditure is projected in the same way as for the constant age cost projections above. Details on the method are provided in box C.2.

Box C.2 Projecting the costs of dying and recurrent health costs

Projecting expenditure associated with treatment before death involves estimating the number of future deaths by age and the cost of each death by age. However, estimates of the expenditure incurred in the last year of a persons life is not readily available. Moreover, the costs associated with deaths at age 80 may be different to the cost of a death at age 45.

To develop a feel for the importance of the impact of cost of death projections on total expenditure, the Commission has used a constant ‘cost of death’ measure across all age groups. This cost was assumed to be a fixed percentage of the expenditure per person of the population over 85 in 2001-02. This amount was indexed by the non-demographic growth parameter. The 85+ population was chosen because mortality rates are high among this age group and those suggesting that projections be made on the basis of future deaths argue a significant amount of the observed expenditure on this group are associated with the terminal phase of life (Zwiefel 1999).

Ongoing or recurrent health expenditure was calculated by deducting the total estimated death related expenditure for 2001-02 by age from the projected total expenditure for that age using the normal age profile. This was then divided by the number of people in each age group to derive per person recurrent expenditure for 2001-02. This figure was indexed by the non-demographic growth parameter. As in the normal model, recurrent expenditure for each age group was estimated by multiplying the residual per capita cost by the estimated population for that age group.

Total projected expenditure under this model is the sum of expenditure associated with death and recurrent expenditure.

Alternative projection results

Table C.4 compares the results of the standard approach with simulations that incorporate a life expectancy adjustment and costs related to death.

Both the life expectancy adjustment and death cost simulations result in a lower level of expenditure than the standard approach. However, under each method expenditure is projected to increase significantly in real terms and as a percentage of GDP. Indeed, the differences between each method are less than the impact of small variations in the non-demographic growth rate.

Gray (2004) and Seshamani and Gray (2004) have used longitudinal data from Oxfordshire in the UK to analyse the determinants of health costs. As reported in chapter 6, they find hospital costs to be strongly related to proximity to death. The Commission has undertaken some preliminary calculations of government hospital expenditure using the data contained in Gray (2004).

The proportions of hospital expenditure associated with the last year of life for each age group in Gray's presentation were combined with Australian expenditure and population data to calculate an implied cost per death for each age group. This was then used to project expenditure as described in box C2. The simulation resulted in hospital expenditure increasing from 2.68 per cent of GDP in 2002-03 to 4.3 per cent in 2044-45, only somewhat lower than the 4.7 per cent for the baseline projection. Gray (2004) appears to find a more significant difference than this and the reasons for the difference warrant further investigation.

Although more work — particularly on the costs incurred at the end of life would be useful — these preliminary estimates suggest that using other projection methods do not qualitatively alter the expected impact. The ageing of the population will place considerable upward pressure on health expenditure.

Table C.4 Projection methods compared

Total government expenditure, 2001–02, 2024–25 and 2044–45

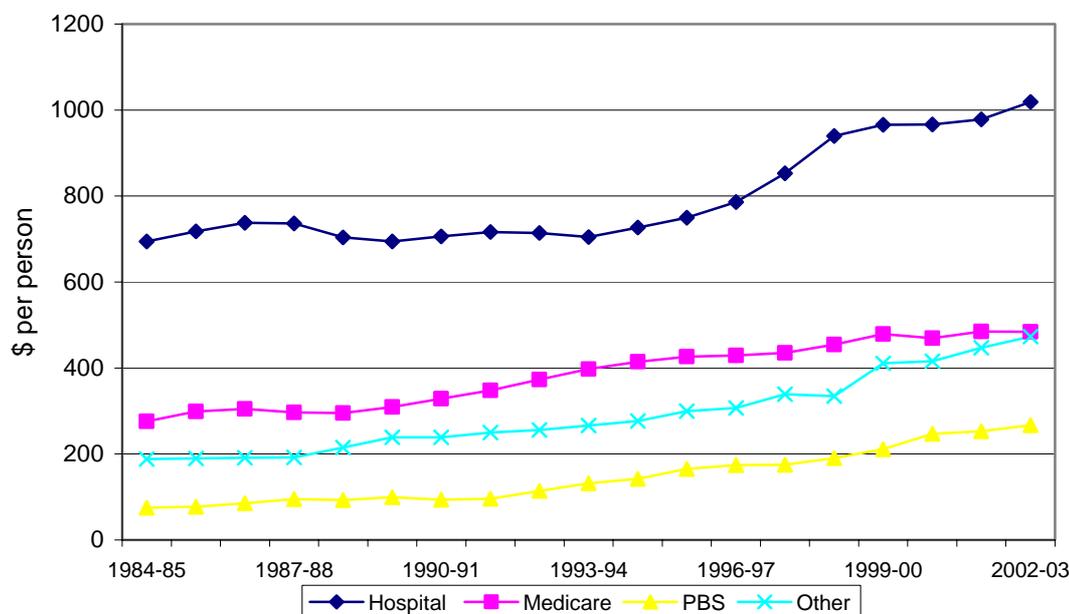
	2002–03		2024–25		2044–45	
	\$ billion	% GDP	\$ billion	% GDP	\$ billion	% GDP
Standard approach	43.1	5.7	107.4	8.2	204.2	10.8
Life expectancy adjusted	43.1	5.7	103.9	7.9	195.8	10.3
Cost of death	43.1	5.7	102.3	7.8	190.1	10.0

Source: PC calculations.

D Non-demographic growth in health expenditure

Real government expenditure per person has increased substantially over the last 20 years for all components of health expenditure (figure D.1).

Figure D.1 **Real government health expenditure per person**
1984-85 to 2002-03



Data source: AIHW expenditure data cube (www.aihw.gov.au).

A significant part of this growth has occurred because of non-demographic factors. Non-demographic growth is the real increase in per person costs that is not attributable to changes in the age structure of the population or population growth. It comprises:

- increases arising from the introduction of new technology;
- increased demand from consumers arising from greater wealth or changing community expectations;
- changing patterns of demand arising from increased prevalence of conditions; and

-
- any excess health inflation (where health prices rise at a greater rate than general prices).

Projections of health expenditure are sensitive to assumptions about the non-demographic growth rate.

Expenditure projections are usually based on the assumption that future expenditure will bear some relation to past expenditure patterns and growth. However, there are a range of issues associated with interpreting past trends and it is important not be locked into a mechanistic approach. This appendix discusses the factors important to determining the growth rates used in the projections in chapter 6.

Cost burden of disease

The future prevalence and treatment of major diseases will have a significant bearing on future health costs. The major burden of disease in Australia arise from long-term conditions such as cardiovascular diseases, cancers, mental illness and nervous system disorders.

Aggregate data on past trends of disease burden are not always a sound guide to future costs because ‘cohort effects’ are very important in determining the prevalence of disease. For example, smoking rates have declined, particularly among men, so smoking related diseases are unlikely to be the same burden in the future as past costs would indicate.

According to the AIHW (2004a):

- Cardiovascular disease is still the leading cause of death for both males and females despite a marked drop in death rates since the 1960s.
 - the decline in deaths associated with these diseases is related to environmental and behavioural (largely reduced smoking) factors as well as better treatment for cardiovascular diseases.
 - the range and quality of drugs available for preventing or treating cardiovascular disease have improved over the last 10 to 15 years. The use of drugs to lower cholesterol have quadrupled since 1996. Similarly use of Angiotensin–Converting Enzyme (ACE) inhibitors to lower blood pressure has more than tripled between 1990 and 2000.
- Cancer is the second leading cause of death — although overall death rates fell between 1992 and 2002 it now kills more middle-aged people than cardiovascular disease.

-
- Dementia is a major cause of severe and profound disability. Dementia overwhelmingly affects people over 65 years. If rates of dementia reflect the average in OECD countries, nearly a quarter of a million people will have dementia by 2020.
 - Type II diabetes prevalence has more than doubled over the past two decades and is estimated to affect around one million Australian adults. Obesity — one of the main risk factors for type II diabetes — has also doubled over the past two decades. About one in five are now obese.

The non-demographic growth rate is an amalgam of the prevalence and the future costs of treatment per person for the major disease categories. A forthcoming study — *The Australian Burden of Disease and Injury Study* (School of Population Health and AIHW) — will provide projections of both these elements for major diseases, and will be an important source of information for refining the Commission’s analysis in the final report of this study.

A link between growth in health expenditure and GDP?

The IGR projected non-demographic growth in health expenditures using stand-alone growth rates. A threshold issue is whether the non-demographic growth rate is expressed as an absolute number (such as 2.0 per cent a year), or as a premium over the expected growth in GDP per capita (say, 0.5 percentage points above the increase in GDP per capita).

This issue arises because there are links between growth in health expenditure and economic growth.

- A range of studies have found that a country’s GDP per capita is a strong predictor of its health expenditure (appendix B). Indeed, as a country’s wealth increases, it tends to devote an increasing share of national income to health. Studies show that the income elasticity of demand for health care consistently exceeds one at the national level (Getzen 2000). It appears that as increasing wealth satisfies other needs, the community is prepared to, and expects governments to, fund more health care. This is true of health systems, regardless of whether they are publicly or privately funded.
- Economy-wide productivity changes will raise wage rates throughout the economy, including the health sector. To the extent that labour productivity growth in the health sector is lower than the economy generally, this implies that the overall health costs associated with any given service level will rise. To the extent that labour productivity in the health sector is the same or higher than the economy as a whole, then costs fall relative to service levels. However, unlike

some other sectors — such as agriculture — the nature of many productivity gains in the health sector means that they cannot be realised as reduced inputs for the same service provision. The gains are often part and parcel of improved quality of outputs, which cannot then be reduced. It is somewhat akin to computer technology. New computers are very much more powerful and productive than older ones, but consumers do not have the option of purchasing a very cheap 286 computer.

It should be noted that even with these links, the basis for expressing the non-demographic growth rate would not matter if future GDP per capita performance was expected to be the same as past performance. If this were the case, whether the non-demographic rate was expressed as a stand-alone rate or a premium over GDP per capita would yield the same result. However, as discussed in chapter 5, it is uncertain that Australia can reproduce the same productivity performance that it experienced over the recent past. Ageing is also likely to have an impact on GDP per capita through reduced workforce participation. In this context, using stand-alone rates derived from past expenditure trends may overstate somewhat future non-demographic growth because those trends were partly dependent on a higher GDP performance. Thus, it would appear to be appropriate to:

- examine trends in health expenditure as a premium over the growth in GDP per capita; and
- based on these rates, project non-demographic growth as a premium over projected GDP performance.

This approach has been adopted in the projections in chapter 6. As an illustration, table D.1 shows the per capita growth in government health expenditure (not age adjusted), less growth in GDP per capita for the main components of health expenditure between 1984–85 and 2001–02.

Table D.1 Government health expenditure growth as a premium over GDP
Real average annual rate per capita, between 1984–85 and 2001–02

	<i>Annual health expenditure growth per person</i>	<i>GDP growth per person</i>	<i>Premium of health above GDP^a</i>
	%	%	%
Hospital	2.3	2.1	0.2
Medical services	3.4	2.1	1.2
Pharmaceuticals	7.6	2.1	5.4
Other	5.1	2.1	3.1
Total	3.5	2.1	1.3

^a Numbers may not add due to rounding.

Source: Commission calculations, AIHW Expenditure data cube.

While the choice of approach will affect the results, it should be recognised that expenditure projections are characterised by a high degree of uncertainty. Uncertainty about future growth rates is likely to outweigh the impact of choice of the projection base. No matter which approach is adopted, sensitivity analysis using different growth rates is critical (appendix C).

Over what time period should past growth trends be estimated?

Growth in Government health expenditure has been greater over some periods than others. The components of health expenditure have also increased at different rates over different periods. Year on year growth rates fluctuate dramatically, but average annual (or compound) growth rates also vary significantly depending on the time period selected for measurement.

Two opposing factors influence the time period over which to base the non-demographic growth rate. On one hand, the period should extend back long enough to constitute a clear trend and abstract from one-off factors. On the other hand, a trend rate based on a more recent period is likely to incorporate more recent influences on policy and expenditure. It is these influences that are likely to most heavily influence future expenditure.

Bearing in mind the need for a clear trend, the Commission considers that at least 10 years of data are necessary. However, relevance of the data would tend to rule out of consideration the volatile changes in health expenditure of the 1970s. While a significant element of judgement is required, the policy influences embodied in the trends from 1984–85 onwards (after the introduction of Medicare) are likely to constitute a broad indication of long-term growth in health expenditure.

The IGR, for example, used a range of periods as a basis for the non-demographic growth rate. Medicare and hospital projections were based on the trend over the last decade while pharmaceuticals was based on the trend over the last two decades. In its alternative modelling of aggregate Australian Government expenditure Treasury used growth rates that reflected the trend over the mid to late 1980s. This approach reflects that the past trends do not generate a definitive non-demographic growth rate and significant judgement is required.

Removing the effect of past ageing

The growth rates in table D.1 *include* the effects of ageing on expenditure over the last 20 years. This effect must be removed to project future expenditure (otherwise

the effect of ageing would partially be double counted through the growth rate and through the population projections).

It is not possible to directly observe and isolate the effect of ageing from previous increases in expenditure. However, under the assumption that the present age profile of expenditure applied in the past (which the available data tend to indicate is the case), the effect of ageing can be imputed. The age profile of expenditure is used to project expenditure backwards using past years' demographic profiles. The change in expenditure each year is a combination of population change and ageing. The change attributable to population is deducted from the total leaving the change attributable to ageing.

Under this method the past increase attributable to ageing is around 0.5 per cent to 0.6 per cent per annum. These figures are consistent with previous studies such as AIHW (1999) and the IGR (2002).

Component growth rates or an aggregate growth rate?

Individual components of health expenditure have grown at different rates over the last 20 years. The Commission has projected each component of health expenditure separately. This raises the issue of whether the non-demographic growth rate for each component should reflect its past growth, or the aggregate growth rate for total government health expenditure.

For short term projections, the growth rate for each component should be used since there is statistical evidence of persistence. In the short-term, expenditure for each component is most likely to reflect its past growth path.

Over a 40 year projection period, however, adopting different growth rates for components within the same broad class of expenditure can be problematic. Even fairly small differences in growth rates over such a long period will lead to significant changes in the share of expenditure of each component, which may not be credible. For example, depending on the period selected, the age adjusted compound hospital premium over GDP has either been negative (from 1984-85 to 2001-02) or up to 1.3 per cent (table D.2). Thus it is not certain that observed differences in growth *between* components at any point in time will persist for long periods in the future. While some shifts in shares could be expected, dramatic shifts are unlikely unless there are very different past growth paths.

Table D.2 Real per capita age-adjusted compound growth in Government health expenditure less per capita GDP growth

Selected periods

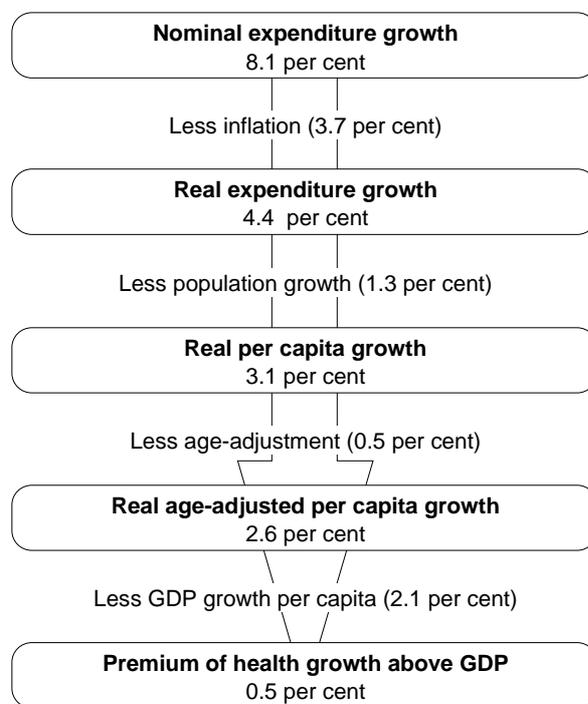
	1984-85 to 2001-02	1989-90 to 2001-02	1993-94 to 2001-02
	%	%	%
Hospitals	-0.2	0.6	1.3
Medicare	0.8	1.3	-0.5
Pharmaceuticals	4.9	5.8	5.8
Other	2.4	2.6	3.3

Source: PC calculations.

With the exception of pharmaceutical expenditure, the Commission has used the same growth rate (expressed as a premium above the GDP growth rate) for each component of health expenditure, and for State and Australian Government expenditure. The rate used is 0.5 percentage points above the projected growth in GDP per capita (box D.1). Sensitivity analysis has been conducted with premia of zero percentage points above the growth in GDP per capita and one per cent.

Box D.1 Derivation of the non-demographic growth rate

Average annual compound growth in Government health expenditure (excluding PBS) from 1984-85 to 2001-02



Source: AIHW Expenditure data cube. Commission calculations.

Pharmaceutical expenditure is treated differently because it has displayed a significantly higher growth rate over the last 20 years — and particularly over the last 10 years — than all other health expenditure.

Pharmaceutical growth per capita

Pharmaceutical expenditure under the PBS has increased at a real age-adjusted average annual per capita growth rate between 1984-85 and 2001-02 of over 6.5 per cent (a premium of 4.9 percentage points over GDP growth per capita). This is more than double total government health expenditure (with the pharmaceutical component removed) over the same period. A divergence on this scale justifies a different treatment of non-demographic growth.

One approach is to use a constant non-demographic pharmaceutical growth rate throughout the projection period. This approach was adopted in the IGR.¹ It found that expenditure under the PBS would increase from 15 per cent to 41 per cent of total Australian Government expenditure. As discussed above, a growth rate above that of other components results in a significant rise in the share of expenditure attributable to that component.

However, since the IGR was released there have been a number of developments, which indicates that very high rates of growth may not be sustained:

- there has been a slowing in the growth of PBS expenditure over the last two years;
- the Pharmaceutical Benefits Pricing Authority is increasingly incorporating risk sharing arrangements into its agreements with drug companies to minimise the expenditure implications of drugs being more widely prescribed than for their intended indications; and
- a number of high cost, widely prescribed drugs such as statins are due to come off patent in the next few years (Medicines Australia, sub. 32, p. 2).

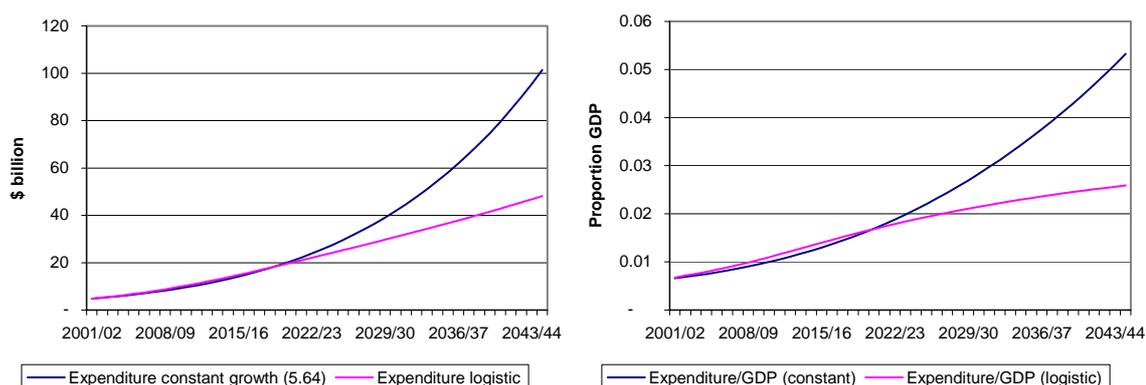
In the light of these developments, another approach is to initially have a significantly higher growth rate for pharmaceutical expenditure than for other components, but for the rate to trend down over time to the general growth rate. This also results in a shift in the share of expenditure towards pharmaceuticals, but not to the same extent as under the first approach. Underpinning this view is that while shares of individual components of health expenditure may gradually change they are unlikely to fundamentally alter their relationship with one another.

¹ The IGR used a real per capita age adjusted non-demographic growth rate of 5.64 per cent: the rate calculated from 1983-84 to the end of the (confidential) forward estimate period.

The latter approach has been used in the projections. Non-demographic growth is initially set at a premium of over 4 percentage points above growth in GDP per capita and trends via a logistic function to the growth rate for other components. The disadvantage of an essentially arbitrary logistic function is outweighed by the advantage of retaining long run balanced growth between different components of health expenditure.

Figure D.2 compares the results of both approaches (a logistic function and the constant IGR growth rate). The results of both approaches are similar until 2020. However, after that time they diverge dramatically. While a constant growth rate is acceptable for short term projections, the exponential rate of growth in figure D.2 demonstrates that it may be unrealistic for longer term projections.

Figure D.2 Effect of logistic vs constant non-demographic growth rate on Government pharmaceutical expenditure
2001-02 to 2044-45



Data source: PC calculations.

E Health cost decompositions

E.1 Decomposition methods

Ageing will have big effects on government funded social expenditures and particularly health care costs. Other factors will also affect such costs, such as growth in Australia's population, changes in real health prices and varying patterns of demand for services per capita. This appendix shows that different methodologies produce wildly different relative contributions of these various factors to the change in health spending. All of the answers are correct for the questions being posed — what distinguishes them is whether the questions, given the policy problems of interest, are sensible. This appendix outlines the many ways of representing the effects of ageing versus other factors on health expenditure and discusses their drawbacks and advantages.

The simple approach: partial allocation methods

At the most simple level, total real health expenditure per capita at any one time is the sum of spending across age groups:

$$E_t = \sum_{j=0}^{85} S_{jt} \times C_{jt} \quad \{1\}$$

where j represents each year of age up to 84 years and a residual group combining people of ages 85 and over; S_{jt} is the share of the total population of age j at time t ; and C_{jt} is the average (government) cost of health care in year t for the j th age group.

The change in expenditure between time t and $t-1$ is:

$$\Delta E = \sum_{j=0}^{85} \{(S_{j,t} \times C_{j,t}) - (S_{j,t-1} \times C_{j,t-1})\} \quad \{2\}$$

There are many different ways of casting questions about the effects of ageing and other influences on total costs, with each providing usually different perspectives. A common approach is the *discrete derivative* approach. This assesses the extent to

which per capita health costs would change from present levels if the age structure changed to that prevailing 40 years later, but all age-specific costs stayed at their current values. The total change in costs would be:

$$V_1 = E_t|_{C_{j,t}=C_{j,t-1}} - E_{t-1} = E_{t-1}|_{S_{j,t-1}=S_{j,t}} - E_{t-1} = \sum_{j=0}^{85} \Delta S_{j,t} \times C_{j,t-1} \quad \{3\}$$

where t-1 is the period 40 years before period t. This is akin to comparing today's costs with those of a fictional world in which population ageing occurs overnight.

An alternative version of this approach is to ask by how much would future health care costs change if all age specific costs remained at their *future* values, but the age structure had shifted to its present values? This is akin to comparing future projected costs with those of a fictional future world in which the last 40 years of population ageing is reversed, but with age-specific expenditures staying fixed at their future levels. It is calculated as:

$$V_2 = E_t - E_{t-1}|_{C_{j,t-1}=C_{j,t}} = E_t - E_t|_{S_{j,t}=S_{j,t-1}} = \sum_{j=0}^{85} \Delta S_{j,t} \times C_{j,t} \quad \{4\}$$

Both {3} and {4} are answers to the question: what happens to per capita health expenditure if age structure changes, but age-specific costs stay the same. The difference between them is the choice of the benchmark period — now or the future.

There are corresponding expressions to {3} and {4} that measure the effect of rising real age-specific costs per person (which collectively picks up the effects of excess of medical inflation above background inflation in the economy and increases in real health care demand per capita). These are, respectively:

$$V_3 = \Delta E_{|\Delta S=0, \text{ base year is } t-1} = \sum_{j=0}^{85} \Delta C_{j,t} \times S_{j,t-1} \quad \{5\}$$

and

$$V_4 = \Delta E_{|\Delta S=0, \text{ base year is } t} = \sum_{j=0}^{85} \Delta C_{j,t} \times S_{j,t} \quad \{6\}$$

It is possible to extend this approach to total real expenditure or even total nominal expenditure rather than per capita expenditure, by redefining E as:

$$\hat{E}_t = \sum_{j=0}^{85} S_{jt} \times C_{jt} \times POP_t \quad \text{or} \quad \tilde{E}_t = \sum_{j=0}^{85} S_{jt} \times C_{jt} \times POP_t \times PRICE_t \quad \{7\}$$

where POP_t and $PRICE_t$ is the total population and the general price index at time t , respectively. In the case of \hat{E} , the change in total real spending can be decomposed into a spending effect, and two demographic effects: changes in the age structure and changes in population numbers. This was the approach used in the Intergenerational Report.

Expressed as a share of the relevant definition of ΔE , ageing appears to play a small relative role (table G.1), especially when the initial year is used as the base year and the decomposition is applied to the change in *nominal* health expenditure. But the results, while easily derived and technically correct, are apt to be misunderstood and have several drawbacks as measures of the effects of various factors on health costs.

Table E.1 Different decompositions of the change in health spending using partial effect models^a

2001-02 to 2041-42

Definition of health expenditure	Ageing	Real age-specific per capita costs	Population numbers	General price effects	Sum of partial effects
	Share of total change				
	%	%	%	%	%
<i>Current base</i>					
(1) Real spending per capita	9.0	70.6	..	..	79.6
(2) Real health spending	6.4	49.7	7.0	..	63.1
(3) Nominal health spending	2.1	16.3	2.3	12.1	32.8
<i>Future base</i>					
(4) Real spending per capita	29.5	91.0	..	..	120.4
(5) Real health spending	27.4	84.6	29.6	..	141.5
(6) Nominal health spending	24.1	74.3	26.0	67.3	191.7

^a The growth rate in age-specific health costs per person was assumed to be 3 per cent per annum, while inflation was assumed to be 2.5 per cent per annum. These data will be updated to 2044-45 in the final report.

Source: PC calculations.

Drawbacks of the simple approach

Results vary with choice of base year

Different answers will be obtained depending on whether the current year or future year is used as the benchmark year. For example, ageing accounts for under 7 per cent of the total change in real health expenditure using a current base year approach, but over 27 per cent of the total change using a future base year approach. This drawback may be alleviated by expressing the change in expenditure as a ratio to an appropriate counterfactual. For example {3} can be normalised by initial year expenditure:

$$\frac{E_{t-1}|_{S_{j,t-1}=S_{j,t}} - E_{t-1}}{E_{t-1}} = \frac{\sum_{j=0}^{85} \Delta S_{j,t} \times C_{j,t-1}}{\sum_{j=0}^{85} (S_{j,t-1} \times C_{j,t-1})} \quad \{8\}$$

while {4} can be normalised by the expenditure that would occur in the future were age-specific costs to be at their future values, but with the present age structure:¹

$$\frac{E_t - E_t|_{S_{j,t}=S_{j,t-1}}}{E_t|_{S_{j,t}=S_{j,t-1}}} = \frac{\sum_{j=0}^{85} \Delta S_{j,t} \times C_{j,t}}{\sum_{j=0}^{85} (S_{j,t-1} \times C_{j,t})} \quad \{9\}$$

If all age groups face a common rate of change in per capita age-specific costs over time² (as assumed, for example in the Treasury's Intergenerational Report), then {8} and {9} give the same answer. If the rates are not common, then {8} and {9} will be different, but will still be similar for credible profiles of age-specific costs over time.

One of the advantages of formulations of this kind is that the percentage effect of ageing on health expenditure is the same — at 29 per cent — regardless of whether a broad or narrow definition of spending is adopted. Accordingly, the percentage effect on nominal spending of holding all other factors fixed at the initial values, but

¹ Where the effects of spending is being estimated, the counterfactual is appropriately re-defined.

² To be precise, {5} = {6} when, for any given set of years from t, t+1, t+2, ... v,

$$C_{j,v} = C_{j,t} \times \prod_{k=t}^{v-1} (1 + \zeta_k) \text{ for all } j, \text{ where } \zeta_k \text{ is the growth rate in age-specific costs per capita in year } k.$$

letting the age structure shift to its 2041-42 level is the same as the percentage effect on real per capita health spending of holding all other factors fixed at the initial values, but letting the age structure shift to its 2041-42 level. This is in marked contrast to expressing partial effects relative to ΔE as in table G.1, where the impact of ageing can be made to virtually disappear by expressing it over the change in nominal spending.

Table E.2 How much percentage difference does ageing and other influences have on health expenditure, all other things being equal?^a
2001-02 to 2041-42

<i>Ageing</i>	<i>Real age-specific per capita costs^b</i>	<i>Population numbers</i>	<i>General price inflation^c</i>
% points	% points	% points	% points
29.0	226.2	32.0	168.5

^a Each effect is measured as the percentage difference to spending in 2001-02 made by changing the relevant component of costs to its 2041-42 value. Thus, the effect of ageing is measured as: $\{E_{t-1}|_{S_{j,t-1}=S_{j,t}} - E_{t-1}\} / E_{t-1}$

while the effect of population on expenditure, holding all other influences fixed is $\{E_{t-1}|_{POP_{j,t-1}=POP_{j,t}} - E_{t-1}\} / E_{t-1}$ with a similar form for other effects. As noted in the body of the appendix, so long as all age groups face a common rate of change in per capita age-specific costs over time, the measured effects are the same as the percentage difference between spending in 2041-42 and the spending that would have occurred in the future had the relevant expenditure component been set to its 2001-02 value, with all other future expenditure components left unchanged. ^b A growth rate of 3 per cent real per capita age-specific health spending was assumed. ^c An inflation rate of 2.5 per cent per year was assumed.

Source: PC calculations.

Partial methods fail an adding up condition

A second drawback in {3} – {9} is that the sum of the partial impacts (for example, V_1+V_3 or V_2+V_4) does not equal the total change in expenditures. The sum of the partials with a present base year (V_1+V_3) underestimates the total change in expenditure by $\Delta C \Delta S$, while the sum of the partials with a future base year (V_2+V_4) overestimates the total expenditure by $\Delta C \Delta S$:

$$V_1 + V_3 = \sum_{j=0}^{85} \{\Delta S_{j,t} \times C_{j,t-1} + \Delta C_{j,t} \times S_{j,t-1}\} = \Delta E - \Delta S_{j,t} \times \Delta C_{j,t} \quad \{10\}$$

$$V_2 + V_4 = \sum_{j=0}^{85} \{\Delta S_{j,t} \times C_{j,t} + \Delta C_{j,t} \times S_{j,t}\} = \Delta E + \Delta S_{j,t} \times \Delta C_{j,t} \quad \{11\}$$

These biases occur because as age structure changes, so do age-specific costs — this gives rise to the ‘mix’ effect, $\Delta C \Delta S$. Only where changes in each factor are very small are the sums of the partials equal to the actual change. Over a lengthy period, the changes are not small.

In a technical sense, the fact that the partials do not add to the total change in expenditure is not a problem, but it can lead to misinterpretation of partial impacts and confusion about the sources of expenditure increases. In particular, if it is found that ageing accounts for a given percentage of ΔE , **it cannot be inferred that cost factors account for the residual percentage.**

In this context, it would be useful to have a method for fully apportioning the change in expenditure to its various constituents. One method that does this is the *linear interpolation* method. Say that we observe just two points: A (C_{t-1}, S_{t-1}) and B (C_t, S_t), but that we imagine a straight line joining these two points across the time interval from t-1 to t.³ This line can be broken into n arbitrarily small segments (figure G.1). Applying the discrete derivative method to the first segment (the move from A to a₁), the change in the value of total expenditure, given fixed age-specific costs, is $\Delta E_1 |_{\text{fixed } C} = C_{t-1} \times \Delta S_t / n$.⁴ The same method is applied in the second segment to estimate the effect from a₁ to a₂, but taking note of the fact that age-specific costs have changed by a small amount from A to a₁:

$$(E_1 - E_2) |_{\text{fixed } C} = \Delta E_2 |_{\text{fixed } C} = \Delta S_t / n \times C_{t-1+1/n} = \Delta S_t / n \times (C_{t-1} + \Delta C_t / n) \quad \{12\}$$

In the next segments the comparable measures are:

$$\Delta E_3 |_{\text{fixed } C} = \frac{\Delta S_t}{n} \times (C_{t-1} + \frac{2}{n} \Delta C_t), \quad \text{and so on until...} \quad \Delta E_n |_{\text{fixed } C} = \frac{\Delta S_t}{n} \times (C_{t-1} + \frac{(n-1)}{n} \Delta C_t)$$

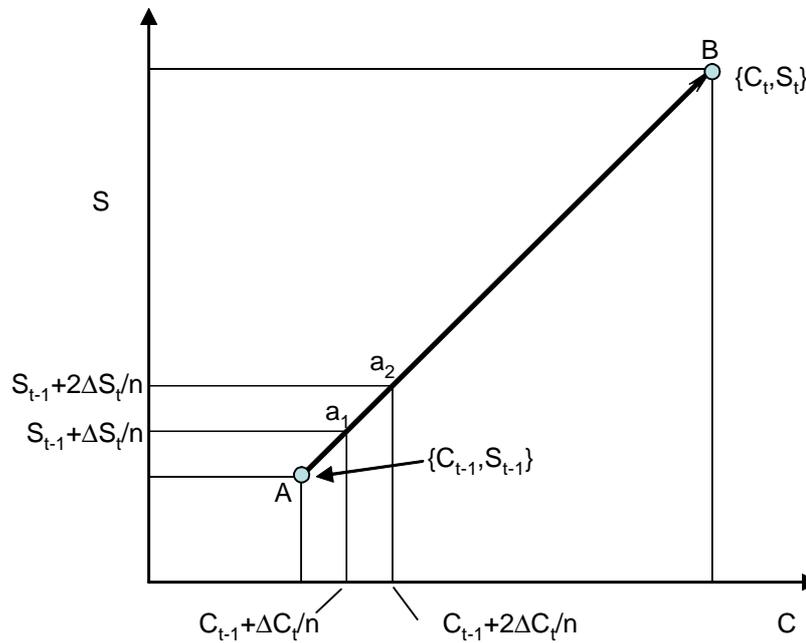
Thus, this method takes account of the fact that as ageing occurs, age-specific costs are also changing. Similar partials may be calculated for changes in E arising from changes in age-specific costs, given a fixed age structure over any given segment.

If the small changes in E are summed across all n intervals then the estimated components of ΔE are:

³ For ease of computation, the age subscripts have been dropped. These calculations are undertaken for each of the relevant age groups.

⁴ Note that if the total change over the first segment is calculated it includes a term $(\Delta S_t \times \Delta C_t) / n^2$, but this can be ignored relative to the remaining components as n gets large.

Figure E.1 The linear interpolation method



$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \Delta E_i |_{\text{fixed } C} = (\Delta S_t \times C_{t-1} + \frac{\Delta S_t \Delta C_t}{2}) = \Delta S_t (\frac{C_{t-1} + C_t}{2}) \quad \text{and} \quad \{13\}$$

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \Delta E_i |_{\text{fixed } S} = (\Delta C_t \times S_{t-1} + \frac{\Delta S_t \Delta C_t}{2}) = \Delta C_t (\frac{S_{t-1} + S_t}{2}) \quad \{14\}$$

These sum to the total change in E as in equation {2}, so that the exact percentage contribution of ageing versus age-specific costs can be calculated. To produce an estimate of the impacts of ageing or costs across more than one year, the results from the linear interpolation method are simply added — representing a piecewise linear interpolation through all successive points.

The same decomposition achieved by taking limits from the linear interpolation method can be derived in a more straightforward way by noting that there are two (symmetric) representations of ΔE :

$$\Delta E_t = S_t C_t - S_{t-1} C_{t-1} = S_t C_t - S_{t-1} C_{t-1} + (S_t C_{t-1} - S_t C_{t-1}) = S_t \Delta C_t + C_{t-1} \Delta S_t \quad \{15\}$$

and that also

$$\Delta E_t = S_t C_t - S_{t-1} C_{t-1} = S_t C_t - S_{t-1} C_{t-1} + (S_{t-1} C_t - S_{t-1} C_t) = S_{t-1} \Delta C_t + C_t \Delta S_t, \quad \{16\}$$

which on averaging gives:

$$\Delta E_t = \Delta C_t \times \left(\frac{S_t + S_{t-1}}{2} \right) + \Delta S_t \times \left(\frac{C_t + C_{t-1}}{2} \right) = \Delta C_t \times \bar{S} + \Delta S_t \times \bar{C} \quad \{17\}$$

It is possible to extend this simple approach to more complex cases, averaging over the multiple representations of ΔE . For example, suppose the variable of interest is total health expenditure (not per capita spending) and that the separate contributions of age structure, population change and age-specific costs are wanted. In that case, it can be shown that (for each age group):

$$\Delta E_t = \frac{\Delta C_t \cdot (2\bar{S} \bar{P} + \overline{SP}) + \Delta S_t \cdot (2\bar{C} \bar{P} + \overline{CP}) + \Delta P_t (2\bar{C} \bar{S} + \overline{CS})}{3} \quad \{18\}$$

where P is the total population. This gives rise to three partial effects that add to the total change in health expenditure and can also be shown to be the same solution as that found when the limits are taken of the results from the linear interpolation method applied to the three variable case. So, the linear interpolation approach provides the analytical motivation for deriving the partial effects as the average of the multiple representations of ΔE . The method can be seen as calculating the effects of each of the various factors on expenditure along a time path in which the values of the ‘fixed’ variables are updated along the adjustment path (in contrast to the discrete derivative method, which holds the value of the fixed variable at the same starting value at every point along the adjustment path).

While analytical decompositions of the form {17} can be found for any number of multiplicative terms, the expressions become increasingly elaborate. A computer intensive technique (box G.1) provides the appropriate decomposition without elaborate algebraic manipulation and can readily be extended to the use of cubic splines instead of piecewise linear interpolation.⁵

There are still major variations between results based on different definitions of expenditure, but all partial effects add to the total (table G.3).

⁵ However, results using cubic splines were found to be nearly identical to those of piecewise linear interpolation.

Table E.3 **Different decompositions of the change in health spending using the ‘full allocation’ approach^a**

2001-02 to 2041-42

		<i>Ageing</i>	<i>Real age-specific per capita costs</i>	<i>Population numbers</i>	<i>General price inflation</i>	<i>Total</i>
		Share of total change				
		%	%	%	%	
(1)	Nominal health spending ^b	8.95	45.25	8.0	37.8	100.0
(2)	Real health ^c spending	14.6	71.4	14.0	..	100.0
(3)	Real health spending per capita ^c	17.1	82.9	..	..	100.0

^aWhere a ‘full allocation’ result is shown it is based on piecewise linear interpolation using data for all years between the two endpoints. ^b Inflation is assumed to be 2.5 per cent per annum. ^c The growth rate in age-specific health costs per person is assumed to be 3 per cent per annum.

Source: PC calculations.

Using an inappropriate benchmark for significance

As is apparent in tables G.1 and G.3 Interpreting the relative extent to which ΔE can be ascribed to one effect on another can be crucially dependent on how expenditure is characterised.

For example, suppose that instead of apportioning the increase in real health care expenditure between ageing, population growth and real age-specific expenditures, an analyst decided to apportion the increase in *nominal* health care expenditure between ageing, population growth, real age-specific expenditures and inflation. In the case where inflation is running at 2.5 per cent per annum, the contribution of ageing to the total change in expenditure is only 2.1 per cent when a partial approach with an initial base year is used (table G.1), and still only around 9 per cent with a full allocation method (table G.3). If inflation were higher, then the share of the increase explained by the remaining factors would be even smaller, and over the long run, nearly zero, though clearly nothing real would have changed in the economy.

Box E.1 Computer intensive methods for linear interpolation

Suppose that there are m variables denoted $\{x_1, x_2, \dots, x_m\}$ such that for any given age:

$$E = \prod_{j=1}^m x_m$$

In this case, the impact of the k th variable on ΔE is:

$$\Delta E | \text{due to } x_k = \sum_{i=1}^n \frac{\Delta x_k}{n} \prod_{j=1, j \neq k}^m \left\{ x_{j,t-1} + i \times \frac{\Delta x_{j,t}}{n} \right\}$$

For example, in a three variable case, where $E = \text{C.S.P}$ (as in the main text) a computer algorithm would be:

Step 1: $\text{sum}_1=0, \text{sum}_2=0, \text{sum}_3=0$; initialise the partial effects to zero

Step 2: For $j = 1$ to n ; set up a loop

Step 3:

$$\text{sum}_1 = \text{sum}_1 + \frac{\Delta C_t}{n} (S_{t-1} + i \times \frac{\Delta S_t}{n}) (P_{t-1} + i \times \frac{\Delta P_t}{n})$$
 ; the effect due to C

$$\text{sum}_2 = \text{sum}_2 + \frac{\Delta S_t}{n} (C_{t-1} + i \times \frac{\Delta C_t}{n}) (P_{t-1} + i \times \frac{\Delta P_t}{n})$$
 ; the effect due to S

$$\text{sum}_3 = \text{sum}_3 + \frac{\Delta P_t}{n} (S_{t-1} + i \times \frac{\Delta S_t}{n}) (C_{t-1} + i \times \frac{\Delta C_t}{n})$$
 ; the effect due to P

Step 4: Next j ; iterate loop

Step 5: $\text{Partial}_1 = \text{sum}_1, \text{Partial}_2 = \text{sum}_2, \text{Partial}_3 = \text{sum}_3$; solutions are the cumulative sums

In that case, a statement to the effect that ageing does not matter much to rises in health care expenditure would be misleading, merely reflecting the extraneous influences of inflation. The nominal rise in expenditure is not interesting for policymakers since the purely inflationary component does not represent a burden to government. As shown in table G.4, inflation would push up the tax revenue needed to finance nominal health care spending by around the same amount as the inflationary component of health care.

Table E.4 Putting the different contributors to health expenditure change into context^a

<i>Effect</i>	<i>Contribution to change in health spending</i>	<i>Contribution to change in government revenue to finance health spending</i>	<i>Net budget position</i>
Population	α	α	0
General inflation	π	π	0
Population age structure	β	$-\phi$	$-\phi-\beta$
Increases in real age-specific spending per capita	$\Delta(\text{GDP/POP})+\gamma$	$\Delta(\text{GDP/POP})$	$-\gamma$
Total	$\alpha+\pi+\beta+\lambda+\Delta(\text{GDP/POP})$	$\alpha+\pi-\phi+\Delta(\text{GDP/POP})$	$-\phi-\beta-\gamma$

^a The results here are illustrative rather than precise, and would apply only for small changes and short intervals of time. An accurate decomposition is derived below.

Two other approaches to measuring impacts on expenditure have similar deficiencies:

- Analysing total real expenditure (as was undertaken in the Intergenerational Report) instead of real expenditure per capita is also problematic. Governments would not generally be concerned about a rise in total health spending that arose only from population growth so long as per capita income levels were maintained. As with the inflation example, the government's revenue would also grow with population, so that the net position for government (for a given age structure) would not deteriorate (row 1 of table G.1).
- More subtly, analysing the full impact of rises in age-specific expenditure rates can be misleading since much of the increase in such rates stems from economic growth, which also enhances governments' capacity to finance such increases. It is only the premium on the growth rate of age-specific health expenditures above GDP per capita growth rates (λ in table G.4) that presents a potential funding problem for government.

In contrast ageing has a double effect. It both increases expenditure in a way that is not automatically compensated by revenue benefits and reduces GDP growth by depressing labour participation rates.

This suggests that the significance of various factors on expenditure should abstract from changes that have no effective policy significance. A way to do this is to ask what level of revenue governments would collect in the future were they to maintain the implicit tax rate needed to fund current value health spending in current dollars. Clearly, this represents the status quo in that no change in tax or funding policy is

required by that stance. With nominal total health expenditure of (\tilde{E}), the implicit tax rate (τ) is:

$$\tau = \frac{\tilde{E}_{t-1}}{POP_{t-1} \times P_{t-1} \times GDP_{t-1}} \quad \text{or} \quad \frac{\sum_{j=0}^{85} (S_{jt-1} \times C_{jt-1})}{GDP_{t-1}} \quad \{19\}$$

the revenue it would collect with such a tax rate in subsequent years would be:

$$REVENUE_t = \sum_{j=0}^{85} (S_{jt-1} \times C_{jt-1}) \times POP_t \times P_t \times \frac{GDP_t}{GDP_{t-1}} = \sum_{j=0}^{85} (S_{jt-1} \times C_{jt-1}) \times POP_t \times P_t \times IGDP_t \quad \{20\}$$

where IGDP is an index of real GDP per capita (with a value of one at time t-1). The actual cost of health expenditure at time t is:

$$COSTS_t = \sum_{j=0}^{85} (S_{jt} \times C_{jt}) \times POP_t \times P_t = \sum_{j=0}^{85} (S_{jt} \times C_{jt-1} \times IGP_t \times IGDP_t) \times POP_t \times P_t \quad \{21\}$$

where IPG is an index of the *premium* real per capita age-specific health spending, set such that $IPG \times IGDP = IH$ where IH is an index of age-specific per capita real health spending (with IPG equalling one at t-1).⁶ The revenue shortfall between costs and revenue — which is the policy-relevant issue — is:

$$(COSTS_t - REVENUE_t) = \sum_{j=0}^{85} \{C_{jt-1} \times IGDP_t \times POP_t \times P_t\} \times (S_{jt} \times IGP_t - S_{jt-1}) \quad \{22\}$$

In per capita real GDP growth-adjusted terms, this shortfall is:

$$BURDEN_t = \sum_{j=0}^{85} \{C_{jt-1} S_{jt} \times IGP_t - C_{jt-1} S_{jt-1}\} = \sum_{j=0}^{85} \{\hat{C}_{jt} S_{jt} - C_{jt-1} S_{jt-1}\} \quad \{23\}$$

where \hat{C}_{jt} is real per capita age-specific expenditure adjusted for the effects of GDP growth. This which can be decomposed into ageing and cost factors using the approaches described above (box G.2 provides another insight into this decomposition).

⁶ That is, if GDP growth is g per cent per annum and total per capita real health spending is h per cent per annum, then the premium growth rate is $\lambda = (h-g)/(1+g)$.

Box E.2 Conceptualising GDP-adjusted spending

Another way of conceptualising the GDP-adjusted measure is to note that adjusting for effects such as prices or population is equivalent to normalising their values to unity for all periods:

$$\text{Thus: } \underbrace{\sum_{j=0}^{85} (S_{jt} \times C_{jt} \times POP_t \times P_t)}_{\text{total nominal spending}} \Rightarrow \underbrace{\sum_{j=0}^{85} (S_{jt} \times C_{jt})}_{\text{real per capita spending}} \quad \text{if } POP_t = P_t = 1$$

Accordingly, GDP-adjusted spending merely extends this principle:

$$\underbrace{\sum_{j=0}^{85} (S_{jt} \times C_{jt-1} \times IPG_t \times IGDP_t \times POP_t \times P_t)}_{\text{total nominal spending}} \Rightarrow \underbrace{\sum_{j=0}^{85} (S_{jt} \times C_{jt-1}) \times IPG_t}_{\text{real per capita spending adjusted for GDP growth}} \quad \text{if } POP_t = P_t = IGDP_t = 1$$

This implies, as in the main text, that:

$$\begin{aligned} V_5 = (E_t - E_{t-1}) \Big|_{\substack{IGDP_t = IGDP_{t-1} = 1 \\ POP_t = POP_{t-1} = 1 \\ P_t = P_{t-1} = 1}} &= \sum_{j=0}^{85} (S_{jt} \times IPG_t \times C_{jt-1} - S_{jt-1} \times C_{jt-1}) \\ &= \sum_{j=0}^{85} (S_{jt} \hat{C}_{jt} - S_{jt-1} C_{jt-1}) \end{aligned}$$

It is possible, with assumptions about γ (the premium rate of health expenditure growth), to determine how much of the change in this adjusted measure of health expenditure can be attributed to ‘unbalanced’ health expenditure growth and how much to changes in the age structure.

With the assumption that yearly growth in (age-adjusted) per capita real health spending exceeds GDP growth by 1 percentage point, ageing accounts for just under 40 per cent of the increase in real health expenditure that could be expected to concern policymakers. This is much more than is sometimes suggested by more simple, policy-naïve, decomposition methods.

Table E.5 Policy relevant decomposition of the change in health spending
2001-02 to 2041-42^a

	<i>Ageing</i>	<i>Real age-specific per capita costs</i>	<i>Total</i>
	Share of total change		
	%	%	%
Real health spending per capita ^c GDP adjusted	39.1	60.9	100.0

^aBased on piecewise linear interpolation using data for all years between the two endpoints. It is assumed that the difference between annual real GDP growth and total age-specific real health expenditure growth is 1 percentage point. This implies that the premium growth rate is 1.03/1.02-1.

Source: PC calculations.

In conclusion, there are a plethora of methods for decomposing expenditure, but only several answer interesting questions or are of real value in understanding the dynamics of spending over time. In our view, these are:

- using a ‘percentage effect’ approach (table G2). This assesses the percentage impact of ageing on spending were all other factors to remain fixed; and
- the ‘revenue shortfall’ approach (table G5), where policymakers want an estimate of the contribution of aging to the *change* in spending over some period.

F Voluntary work

Older people make a valuable contribution economically and socially through participating in a range of unpaid activities including volunteering, informal caring of children and the aged and providing help to families and communities. Informal caring of the aged was examined in chapter 7. This appendix looks at volunteering. It explores the relationship between volunteering and age and examines the likely trends in volunteering over the next 40 years.

F.1 Volunteers

Volunteers work across many sectors of the community including health and welfare, emergency services, community services, conservation, sport and recreation, education, overseas aid, religion, animal welfare, and early childhood development. Volunteering includes formal unpaid work through an organisation or program, as well as informal volunteering such as doing favours for family, friends, or neighbours.

Volunteering through organisations

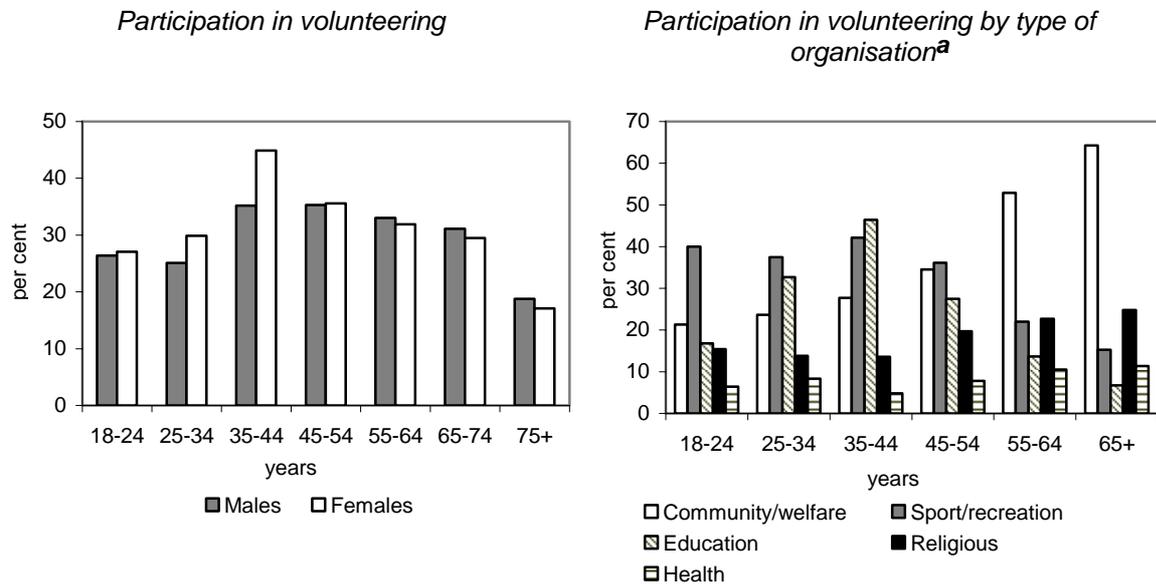
In 2000, 32 per cent of Australians aged 18 years and over were engaged in voluntary work through an organisation, contributing over 700 million hours of unpaid work (ABS 2000, cat. 4441.0).

Formal volunteering is increasing. In 1995, participation in voluntary work and time spent volunteering was lower at 24 per cent and 512 million hours respectively.

Rates of volunteering are highest for the middle aged and in particular, for women aged 35 to 44 years (figure F.1). Age is also a determining factor of the type of voluntary work undertaken:

- young age groups volunteer predominantly in the area of sport and recreation.
- the 35 to 44 year age group participates mainly in education; and
- older age groups (above 55) volunteer predominantly in the areas of community and welfare and religion (figure F.1).

Figure F.1 Voluntary work through organisations
2000, by age group



^a Education comprises education, training and youth development; data does not sum to 100 because some volunteers participate in more than one sector.

Data source: ABS (2000) Voluntary Work, cat. 4441.0.

Participation in volunteering is highest in South Australia and the ACT. In all States and Territories participation is higher in regional areas than metropolitan areas, peaking at 45.8 per cent for females in Western Australia (table F.1).

Table F.1 Participation in voluntary work through organisations
By State and Territory, 2000, per cent

	<i>Males</i>		<i>Females</i>		<i>Total</i>	
	<i>Metropolitan</i>	<i>Regional</i>	<i>Metropolitan</i>	<i>Regional</i>	<i>Metropolitan</i>	<i>Regional</i>
New South Wales	22.3	35.7	27.0	39.4	24.7	37.6
Victoria	29.3	42.1	28.5	45.5	28.9	43.8
Queensland	28.2	29.4	32.2	34.8	30.2	32.1
South Australia	33.8	43.7	37.6	45.2	35.8	44.5
Western Australia	29.0	43.4	27.4	45.8	28.2	44.6
Tasmania	35.0	33.6	28.3	37.8	31.5	35.7
Northern Territory	32.7	31.3	30.3	32.7	31.6	32.0
ACT	36.2	-	36.3	-	36.2	-
Australia	27.5	36.1	29.4	40.0	28.4	38.1

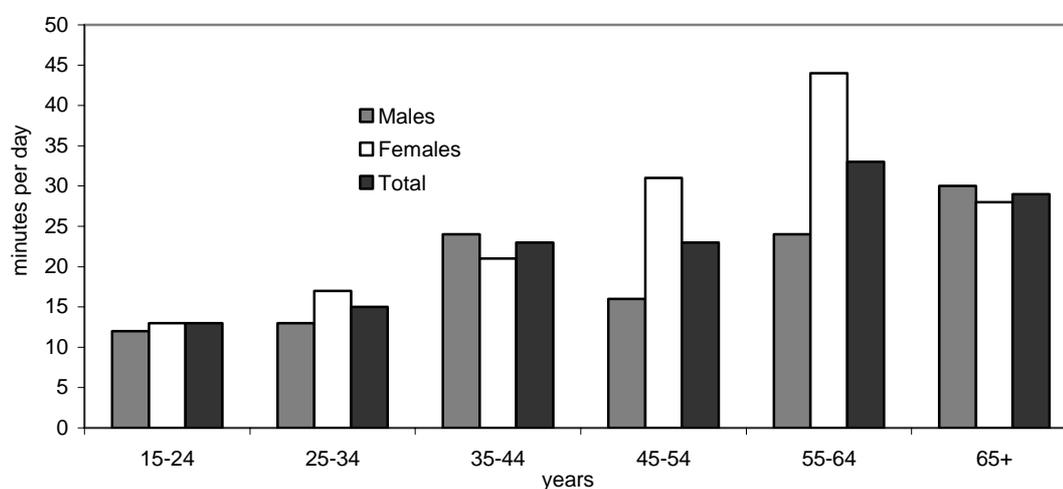
Source: ABS (2000) Voluntary Work, cat. 4441.0.

Informal volunteering

Volunteering also exists outside formal organisations. The ABS time use survey measures voluntary work as unpaid work for community organisations as well as caring for an adult and doing favours for family and friends outside the home. The last survey (1997) was conducted over four, 13 day periods using a diary approach.

In 1997, 23 per cent of women and 16 per cent of men spent time volunteering or caring for an adult. Women aged 55 to 64 years and men over 60 years figured particularly prominently (figure F.2).

Figure F.2 Average time spent volunteering or caring for an adult, 1997



Data source: ABS (1997) *How Australians Use Their Time*, Cat. 4153.0.

The value of volunteering

Volunteering — while not counted as part of Gross Domestic Product — produces substantial gains for Australian society. Estimates of the economic value of volunteering range from \$11 billion to \$42 billion annually. The differences can be attributed to the definition of volunteering and the method of estimation employed. For example:

- the ABS (1997, cat. 5240.0) define volunteering as formal volunteering through an organisation, doing favours for family and friends outside the home and caring for an adult. Using alternative approaches, the ABS estimate that the economic value of volunteering is between \$21 billion and \$30 billion annually; and
- Ironmonger (2000) broadens the definition of volunteering to include support for other children and estimates that the value of volunteering is \$42 billion a year.

The Australian Institute of Family studies (sub. 10) use ABS time use survey data and ABS estimates of unpaid work (cat. 5240.0) to estimate the value of volunteering and other forms of unpaid work by age group and gender.

Based on these estimates, the annual value of volunteering (which excludes adult care and child care), is \$11.5 billion. As a group, the total value of volunteering is highest for the 25-44 years age group (table F.2). However, the maximum average value of volunteering occurs at 45-54 years for females (\$1 114 per person) and 65-74 years for males (\$1 394 per person).

Table F.2 The value of volunteer work by age group
1997 (2002-03 dollars)

Age	Females		Males	
	Average \$ per annum, per person	Total value \$000	Average \$ per annum, per person	Total value \$000
15-24	423	540 345	422	556 274
25-44	697	1 963 697	754	2 090 323
45-54	1 114	1 307 898	644	750 787
55-64	1 073	854 975	965	825 769
65-74	912	873 679	1 394	1 113 613
75+	766	425 855	639	246 609
Total	783	5 966 450	746	5 583 373

Source: Australian Institute of Family Studies, sub. 10, p. 14, data converted to 2002-03 prices using GDP implicit price deflator, estimates of total value of volunteering based on ABS population data for 1997.

F.2 Volunteering in an ageing population

Participants in this study were generally optimistic about the impact of population ageing on volunteering. For example, the ACT Government (sub. 21, p. 18) commented:

Volunteering is likely to be one of several areas in the community that will benefit from an ageing population in the ACT. The Territory currently has one of the highest rates of volunteering among the States and Territories, and the rates of volunteering among the growing number of retirees are expected to continue to grow over the next two decades.

This section examines the implications of an ageing population on the pool of volunteers and the value of volunteering over the next 40 years.

The pool of volunteers

Data on participation rates in volunteering were applied to demographic projections to project the number of volunteers by age and gender over the next 40 years. While conceptually the most appropriate measure of volunteering includes volunteering through informal routes, as well as through organisations, information on this basis is very dated. Accordingly, the Commission used more recent (and better measured) ABS data on voluntary work through organisations only (cat. 4441.0) as the basis for estimation of the number of future volunteers (box F.1).

Box F.1 **Some limitations**

Voluntary work survey data

ABS data on voluntary work through organisations does not include data on informal volunteering. However, the data are more recent than the time use survey (2000 rather than 1997) and have information on the type of volunteering work undertaken by age group.

The Commission used participation rates in volunteering rather than time spent volunteering as a basis for projections. Time spent volunteering would be a more accurate measure of the total contribution each age group makes to volunteering. However, survey data on participation rates are a more reliable measure of volunteering than survey data on time spent volunteering.

Age-specific participation rates may not be stable

One of the drawbacks of the method used by the Commission in undertaking these projections is that it fixes age-specific volunteering rates at their year 2000 values. However, it is uncertain how rates of volunteerism will change with an ageing population or with other social and economic factors. The Victorian Government (sub. 29, p. 51) and the Western Australian Government (sub. 39, p. 32) suggested that different cohorts may behave differently. For example:

The high participation rates of those currently aged 35-44 and 45-54 years suggest that as these cohorts age, volunteerism among older age groups (65+) may be higher than that today, as the healthier, more active older people of the future continue their volunteer activity (Victorian Government, sub. 29, p. 51).

Changes in the need for volunteers might also be expected to influence people's willingness to volunteer. For example, the large projected increase in the number of lone old people may prompt other adults to volunteer for their (part) care.

Were age-specific participation rates to rise as a result of these effects, then the Commission's estimates of the number of volunteers would be underestimated.

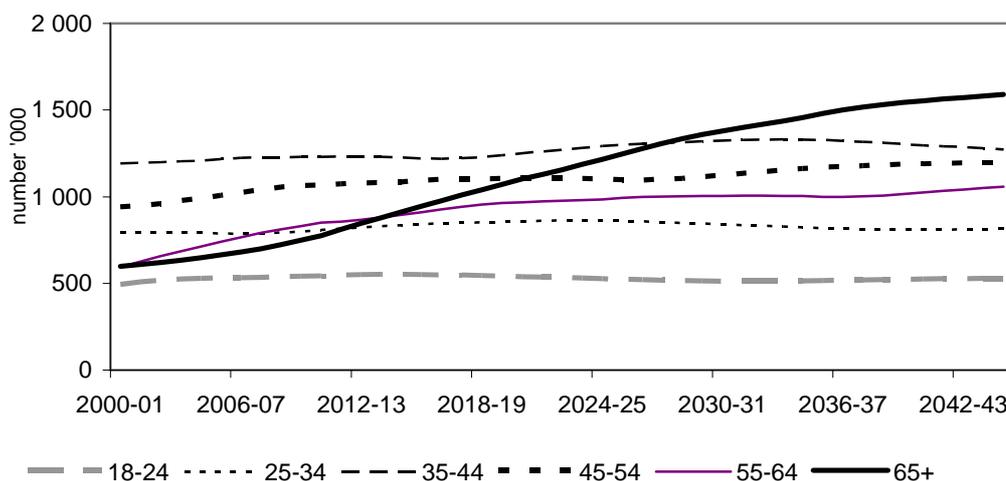
The Commission projects that the number of volunteers over time will increase from 4.7 million in 2002-03 to almost 6.5 million in 2044-45, an increase of

36 per cent. If the population were not to experience ageing the number of volunteers would be lower, growing to about 6.2 million in 2044-45.

Growth in volunteers will primarily occur in the 60-65 years age group, reflecting their greater share in the population:

- The number of volunteers in the 60-65 group is projected to more than double, from 598 000 volunteers in 2000-01 to 1.6 million in 2044-45.
- The number of volunteers in the 45-54 years and 55-64 years age groups are also expected to increase — by 27 per cent and 78 per cent respectively.
- In contrast, no growth is expected in the number of volunteers for younger age groups (figure F.3).

Figure F.3 Projected number of volunteers working for organisations
2000-01 to 2044-45



Data source: Commission estimates.

These trends result in shifts in the shares of volunteers by age group. Over the next 40 years, the share of volunteers aged over 45 is projected to increase from 46 per cent in 2001-02 to 60 per cent in 2044-45. Over the same period, the share of volunteers aged less than 45 years is projected to fall from 54 per cent in 2001-02 to 41 per cent in 2044-45.

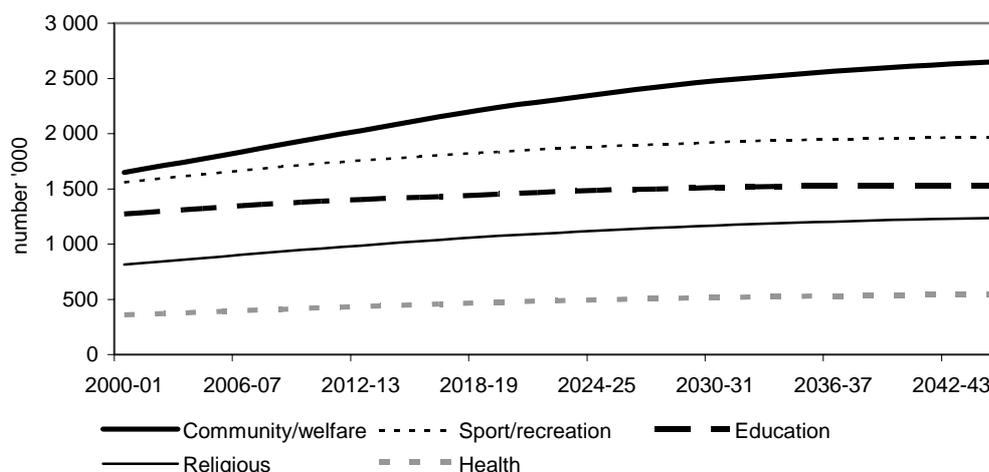
This will have implications for organisations that rely on younger volunteers. For example, Volunteering Australia (sub. 28, p. 6) commented:

Some of the challenges of an ageing population for volunteering may be associated with particular types of organisations. The 65 and over age groups are strongly represented in the community/welfare, religious and health areas of volunteer work. Conversely, this age cohort is underrepresented in the areas of sport and recreation and

education/training/youth development. These types of organisations may experience difficulty in attracting volunteers as the population ages.

The Commission’s projections also suggest that, over the next 40 years, growth in the number of volunteers is expected to be significantly lower in the areas of sport and recreation and education (figure F.4).

Figure F.4 Projected number of volunteers by type of organisation^a
2000-01 to 2044-45



^a Projections assume that the participation rates by organisation will remain constant over time. However, in the future older people may increase volunteer participation in non-traditional areas to prevent any shortfalls that may occur in particular organisations.

Data source: Commission estimates.

Further, the Victorian Government (sub. 29, p. 52) cite emergency services, which rely on a relatively ‘young’ volunteer base (capable of meeting the physical demands of service provision), as an area where shortfalls in volunteering may occur.

In addition, several participants commented that maintaining a volunteer base will be a challenge in rural and regional areas, which are ageing faster than the total population. For example, Volunteering Australia (sub. 28, p. 9) said:

Volunteering is more common in rural and regional areas, with the rate of volunteering around 10 per cent higher in the rural and regional areas of Australia than the capital cities. However, the types of volunteering that are most common are also those dominated by the young and middle age cohorts. In rural and regional areas, 39.2 per cent of involvements are in sport/recreation, and 24.5 per cent are in education/training and youth development. Any decline in these areas raises concerns for the recreational and developmental opportunities for younger people in these

communities and the social capital that these areas of volunteering accrue for the entire community.

The value of volunteering

The Commission used the Australian Institute of Family Studies' (sub. 10, p. 14) estimates of the average value of volunteer work by age group as a basis for projections on the value of voluntary work. The AIFS estimates include both the value of volunteering through an organisation and informal volunteering.¹ It was assumed that the value of voluntary work increased in line with average weekly earnings (assumed 1.75 per cent annually). ABS series B population estimates were used as demographic projections.

Over the next 40 years, the value of volunteering is expected to rise from 1.8 to around 2.2 per cent of GDP (table F.3).

Table F.3 **The value of volunteering by age group, projections**
per cent of GDP

Age (years)	2002-03	2008-09	2014-15	2024-25	2034-35	2044-45
15-24	0.17	0.16	0.16	0.14	0.14	0.14
25-44	0.63	0.58	0.57	0.57	0.56	0.54
45-54	0.35	0.35	0.35	0.34	0.35	0.36
55-64	0.30	0.34	0.36	0.38	0.38	0.40
65-74	0.23	0.25	0.31	0.37	0.41	0.41
75+	0.13	0.13	0.15	0.21	0.28	0.33
Total	1.80	1.83	1.89	2.01	2.12	2.18

Source: Commission estimates

¹ The Commission also considered including estimates of unpaid work for adult care and projecting the value of volunteering and caring for adults (as the ABS does). However, estimates of adult care for non-family outside the household (\$11 per person each year for females and \$9 for males, sub. 10, p. 15) are small relative to the value of volunteer work and therefore would not have any significant effect on projections.

G Conveyancing revenue

This appendix examines the nexus between population ageing and property market activity, and the implications for conveyancing duty — a transaction based property tax. Conveyancing duty receipts are an important component of States' own revenue.

G.1 Introduction

What is conveyancing duty and when does it apply?

Conveyancing duty is a stamp duty levied on the value of property purchased. It is a transactions based tax — duty is only payable when a transfer of ownership occurs. State and Territory Governments levy conveyancing duty in a broadly similar fashion. All transfers of property are subject to conveyancing duty, with few exemptions.¹ There are no tax free thresholds but some concessional arrangements exist for certain home buyers. Each jurisdiction operates a tiered rate structure, with increasing marginal rates. The number of tiers vary between States and Territories ranging from nine tiers in South Australia to two tiers in the Northern Territory. The top marginal rates of duty vary between the jurisdictions, as does the transfer value at which it applies. The Northern Territory applies its top marginal rate to the entire transfer. All other jurisdictions apply the top marginal rate to the value in excess of the top tier, together with a fixed fee reflecting the cumulative effects of previous tiers (table G.8).

The importance of conveyancing duty as a source of revenue for States and Territories

Collectively, conveyancing duty raised approximately \$8.79 billion in revenue in 2002-03, around 24 per cent of States' own revenue. The overall importance of conveyancing duties varies considerably between the States and Territories, reflecting both differing rates (table G.8) as well as underlying property values.

¹ For example, exemptions apply to transfers relating to charitable, benevolent, religious recreational and social purposes in some jurisdictions.

Conveyancing duty receipts accounted for around 27 per cent of States' own revenue for Western Australia. In contrast, duties only made up 16 per cent of States' own revenue in Tasmania (table G.1).

Table G.1 Conveyancing duty, State and Territory Governments
2002-03

<i>Jurisdiction</i>	<i>Stamp duty on conveyances (\$m)</i>	<i>Stamp duty on conveyances as a proportion of total receipts</i>	<i>Per capita stamp duty on conveyances (\$)</i>
NSW	3 623	25.58	541.41
Vic	2 116	22.87	429.23
Qld	1 382	24.69	366.16
SA	428	17.61	280.08
WA	929	27.42	476.08
Tas	91	16.13	191.10
NT	43	17.48	218.15
ACT	176	25.73	543.56
Total	8 788	24.19	442.16

Source: ABS (*Taxation, State and Territory Governments*, 2002-03, Cat. No. 5506.0 table 13).

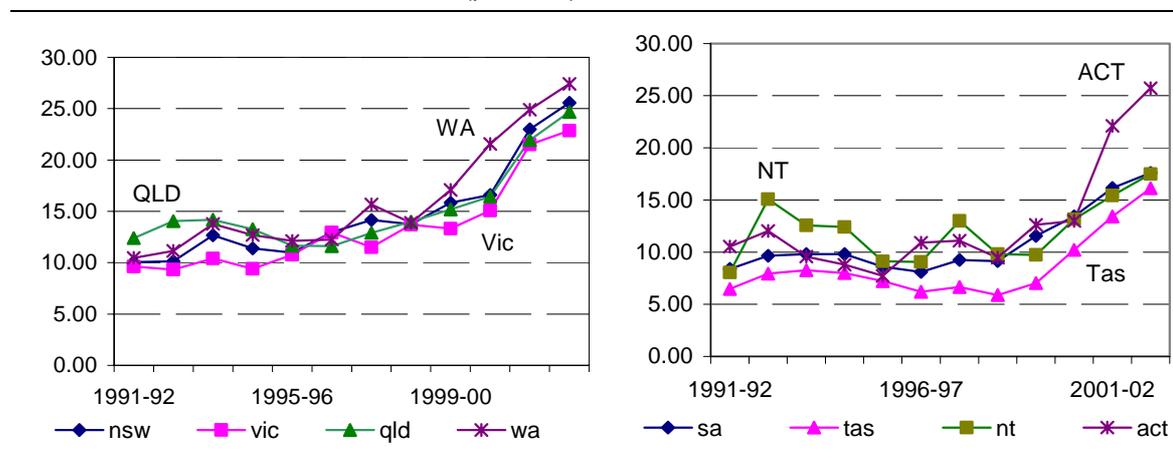
Historical movements in conveyancing duty receipts

Conveyancing duty receipts have moved in a cyclical pattern, in line with swings in property market values, especially in the residential market.

Revenue increased with the booming property market of the 1980s, before declining with the downturn that followed. As activity in the commercial property market picked up in the early 1990s, so did the revenue from conveyancing duty. The steady growth in housing prices from 1996 to present, particularly in the last three years, and increases in housing turnover, has seen strong growth in conveyancing duty revenues in recent years (figure G.1).

Increases in conveyancing duty receipts also reflect changes in the rate structure applied to the underlying land values. Scheduled rates of duty in Western Australia, South Australia and the Australian Capital Territory have all increased in the last five years (PC 2004a).

Figure G.1 Conveyancing duty as a proportion of States' own revenue
Actual and estimates (per cent)^a



^a Data on conveyancing duty receipts were available for New South Wales, Victoria, South Australia and Tasmania for the entire period depicted above. Estimates were used for Queensland (1991-92 to 1997-98), Western Australia (1991-92 to 1997-98), Northern Territory (1991-92) and the Australian Capital Territory (1991-92 to 1997-98). Estimates assume that conveyancing duty receipts were approximately 75 per cent of stamp duty on properties.

Data source: ABS (*Taxation Revenue, Australia*, Cat. No. 5006.0) various years.

G.2 Housing stock – the projected number of households

Houses are occupied by households. Therefore, allowing for unoccupied dwellings, the projected stock of housing is equivalent to the projected number of future households.

Commission projections of household formation

The Commission projected the number of households for each jurisdiction to 2044-45 using the 'propensity' methodology developed by McDonald and Kippen (1998). This method is also employed by the ABS (in its more short-run projections). The methodology, based on data collected from the Census of Population and Housing, identifies the propensity of people to belong to different living arrangement types. Trends observed in the propensities over the last four censuses for each five-year age group are then projected forward and applied to the projected population (ABS 2004b). Numbers of households are then derived from the projected living arrangements of the population.

The Commission's projections of households are based on the assumption that there is a 'low rate of change' in propensities over time. Specifically, it is assumed that

the trends observed over the period 1986 to 2001 continue at the full rate of change to 2006, half the rate of change to 2011, one quarter the rate of change to 2016 and then remains constant to 2045.²

Changes in the housing stock over time

During the 1990s and into the 2000s, growth in the number of dwellings (1.8 per cent per annum) exceeded population growth (1.2 per cent per annum) resulting in a decline in the average number of residents per household. During this period, average household size has declined from 2.8 to 2.6 people.

This pattern is expected to continue into the future. The Commission estimates that the number of households will increase from 7.4 million in 2001 to around 11.7 million in 2045, an increase of around 57 per cent. This growth is faster than Australia's projected population growth of 33 per cent for the same period. As a result, average household size will continue to fall to around 2.2 persons per household by 2045.

This pattern is attributable in part to growth in the number of lone person households. Such households are projected to double over the 40 year projection period. This is related to the ageing of the population and the fact that older women, in particular, are more likely to live alone than others. Most older people remain living in separate houses as their children leave home or their spouse dies (McDonald 2003).

Changes in the housing stock by jurisdiction

Trend growth rates in the number of households over the period 2004-05 to 2044-45 for each jurisdiction are given in table G.2. Growth in household numbers is projected to taper in most jurisdictions, commensurate with reductions in population growth. In both Tasmania and South Australia household numbers are projected to fall from around 2026 and 2034 respectively reflecting, in part, declining population in those jurisdictions.

² These assumptions are based on the assumptions underlying the ABS Series II projections of households, with the exception that the ABS estimates only cover the period to 2026.

Table G.2 Projected growth in households

Annual trend growth rates, by jurisdiction, various periods^a

State	2003-04 to 2014-15	2014-15 to 2024-25	2024-25 to 2034-35	2034-35 to 2044-45	2003-04 to 2044-45
	%	%	%	%	%
NSW	1.37	1.02	0.66	0.34	0.86
Vic	1.43	1.05	0.67	0.34	0.88
QLD	2.31	1.72	1.21	0.85	1.52
SA	0.95	0.51	0.12	-0.25	0.35
WA	1.99	1.43	0.98	0.62	1.26
Tas	0.87	0.28	-0.21	-0.68	0.08
NT	1.29	1.01	0.74	0.58	0.91
ACT	1.41	0.92	0.52	0.23	0.77
Australia	1.59	1.16	0.76	0.43	1.00

^a Trend growth rates were estimated by fitting a regression of the natural log of the household numbers against a time trend.

Source: Commission estimates.

G.3 Housing turnover

In the three years spanning 1999-2001, around 1.1 million households purchased a home, representing around 15 per cent of households (ABS 2001). This equates to an average of around 5 per cent of households per annum. Housing turnover varied by jurisdiction, ranging from 4.5 per cent of households in Tasmania to 5.8 per cent in Western Australia (figure G.2).

Housing turnover by age of the household reference person

As noted by the Queensland Government, population ageing might slow the level of activity within the property market:

Population ageing could slow property market activity, particularly turnover of properties. Younger and middle aged adults have a greater propensity to form new households and upgrade accommodation as they leave home, marry and have families. The decline of this age group as a proportion of the population ... is likely to lead to a reduced rate of property turnover. Moreover, older people are generally not inclined to adjust their housing and may continue to live in their pre-retirement homes (Kendig and Neutze). This trend would reinforce any slowdown in property turnover. (sub. 17, p. 43).

Figure G.2 Recent home buyer households

Proportion of households who purchased a home (per annum)



Data source: Commission estimates based on ABS unpublished data from the Surveys of Income and Housing Costs 2001 (Cat. No. 6541.0).

This view is supported by the ‘purchase’ rate profiles by age of the household reference person. The purchase rate defines the number of households who purchased a dwelling expressed as a proportion of total households (figure 11.10).

Those aged 25-29 years recorded the highest rate of dwelling purchase (9.9 per cent of households), followed by the 30-34 years age group (8.2 per cent of households). In contrast, purchase rates for older households were very low (for example, 1.5 per cent for the 70-74 age group).

Methodology for projecting dwelling sales

In order to project the total number of residential transactions per annum a series of ‘purchase’ rate indices were developed. Data were collected on the number of purchasers as a proportion of households:

- for each of the six States plus a combined category incorporating both the Northern Territory and the Australian Capital Territory;
- by age of the household reference person, incorporating 13 different age cohorts; and
- by type of purchase (whether it was a first home purchase or ‘change over’ purchase and a summary category incorporating all recent purchasers).

This yielded a total of 273 purchase rate indices. Due to the small number of observations for some of the categories, the national purchase rate index for a particular age cohort scaled by the ratio of total state to national purchasers replaced any spurious indices. Six such replacements were made.³ Purchase rate indices were then multiplied by the projected number of households in the relevant category in order to obtain projections of dwelling sales.

The approach adopted assumes that the patterns of home purchase exhibited over the period 1999 to 2001 will continue into the future. Implicit in this is that current levels of (relatively high) home ownership will also continue. Some question this. For example, Yates (1997), Yates (1999) and Beer (1999) point to a number of factors that may curtail home ownership rates in the future, including: increasing income polarisation; reduced job security for many low income earners; high real estate prices in metropolitan areas; and changes in family size and consumption preferences. On the other hand, the expected growth in average income per person is likely to lead to a higher level of home ownership. On balance, we assume that the current pattern of tenure by age group will remain unchanged.

Finally, it was not possible to construct individual indices for the NT and the ACT due to lack of available data — results for these jurisdictions should be treated with caution.⁴

Projected number of dwelling sales

Given the lower rate of dwelling purchase recorded for those in the 60 plus age cohorts, there is a reduction in the growth rate of dwelling sales over time as the population ages (table G.3).

The projected trend growth rate of dwelling sales reduces over time in all jurisdictions and indeed, Victoria, South Australia, Tasmania and the Australian Capital Territory are all projected to experience negative growth after a period.

³ Replacements were made for change over buyers aged 40-44 years and 60-64 years in South Australia, first home buyers aged 15-19 and change over buyers aged 55-59 in Victoria, change over buyers aged 65-69 years in Tasmania and change over buyers aged 40-44 years in Queensland. The proportions of all buyers (first home buyers plus change over buyers) were then updated to reflect these replacements.

⁴ What data there are suggests that actual dwelling sales in the ACT are likely to be somewhat higher than projected, and those in the NT correspondingly lower. But in the absence of sufficiently good data, it was not possible to determine by how much.

Table G.3 Projected growth in dwelling sales

Annual trend growth rates, by jurisdiction, various periods

<i>State</i>	<i>2003-04 to 2014-15</i>	<i>2014-15 to 2024-25</i>	<i>2024-25 to 2034-35</i>	<i>2034-35 to 2044-45</i>	<i>2003-04 to 2044-45</i>
	%	%	%	%	%
NSW	1.00	0.58	0.16	0.05	0.44
Vic	0.80	0.44	0.00	-0.08	0.28
QLD	1.81	1.40	0.89	0.59	1.17
SA	0.38	0.03	-0.28	-0.45	-0.10
WA	1.66	1.08	0.59	0.44	0.92
Tas	0.23	-0.41	-0.77	-0.97	-0.49
NT	0.58	0.77	0.46	0.27	0.58
ACT	0.78	0.59	0.20	-0.06	0.40
Australia	1.00	0.58	0.16	0.05	0.44

Source: Commission estimates.

G.4 Projections of conveyancing duty receipts

Modelling assumptions

In order to project conveyancing duty receipts it was necessary to make assumptions about the rate of conveyancing duty over time and real house price growth.

Rate of house price growth

Since 1970, real prices for (detached) houses in Australia have grown at around 2.3 per cent per annum (PC 2004a). For the purposes of projecting conveyancing duty it is assumed that, in the main, this long-run trend will continue into the future for all jurisdictions. As noted in chapter 11, a trend of this magnitude is probably better able to pick up the fundamental determinants of house prices over the longer run than recent trends.

One obvious limitation of applying a national growth rate at a state level is the (partial) independence of the state housing markets, as evidenced by the variation in the rates of price increase between capital cities (table G.4).⁵ In particular, two jurisdictions, Tasmania and South Australia, have exhibited considerably lower house price growth than others. Moreover, these two States are projected to face

⁵ It is important to note that part of the variation evidenced in the growth rates presented in table G.4 might be explained by differences in the time periods assessed.

declining household numbers at some point in the next 40 years (after 2026 for Tasmania and after 2034 for South Australia). Accordingly, a lower trend growth rate is assumed for these two States (of 1.2 per cent per annum).

Table G.4 Trend growth in Australian house ^a prices

	<i>Period ^c</i>	<i>Real annual growth rate ^b</i>
Sydney	1970 to 2003	2.7
Melbourne	1970 to 2003	2.1
Brisbane	1980 to 2003	3.2
Adelaide	1974 to 2003	1.2
Perth	1980 to 2003	2.8
Canberra	1980 to 2003	2.0
Hobart	1991 to 2003	1.5
Darwin	1987 to 2003	3.4
Australia	1970 to 2003	2.3

^a Detached dwellings only. ^b Based on a regression of (log) real prices on a constant and a time trend, with prices deflated by the consumer price indexes for the respective capital cities. ^c Growth rates are sensitive to changes in the time period selected. For example, the Australian growth rate over the period 1959 to 2004 was around 2.5 per cent.

Source: PC 2004a, table 2.1.

Rates of conveyancing duty to apply for estimation purposes

The assumption of real house price growth and the fact that States and Territories apply progressive rate structures (table G.8) implies an increasing proportion of transactions would be taxed at the highest marginal rate over time. As noted in chapter 11, this is not an appropriate assumption. To address bracket creep, total conveyancing duty receipts in the base year (2002-03) were expressed as a percentage of median house prices in order to obtain an average rate of duty for each jurisdiction. These average rates were held constant over the projection period.

Total conveyancing duty receipts (which include receipts from the sale of land and commercial property) rather than conveyancing duty receipts from dwelling sales alone, were used to calculate average rates of duty. This approach assumes that, over the long run, conveyancing duty receipts from the sales of dwellings remain constant as a share of total conveyancing receipts.

A further limitation of the methodology adopted relates to the proportion of buyers eligible for concessions. Calculations of average duty take account of concessions (including first home owner concessions) granted in the base year and project these out over the forty year period. However, Commission projections suggest that the proportion of first home buyers declines over the projection period in all

jurisdictions. This suggests that Commission projections might slightly underestimate conveyancing duty receipts as a share of GSP.

Modelling results

Commission projections suggest that an ageing population will dampen property market sales over the next forty years. However, growth in the number of households and real long-run property prices mean that conveyancing duty receipts are likely to increase marginally as a proportion of GSP in all jurisdictions. However, as noted in section three, Commission projections of dwelling sales in the NT may be overstated. Hence, projections of conveyancing duty receipts as a share of GSP for the NT should be regarded as ‘upper end’ estimates.

Table G.5 Projected conveyancing duty receipts

Trend growth rates of duties as a share of GSP

<i>Jurisdiction</i>	<i>Stamp duty on conveyances as a proportion GSP 2002-03 (per cent)</i>	<i>Projected stamp duty on conveyances as a proportion of GSP 2044-45 (per cent)</i>	<i>Projected trend growth rate of stamp duty on conveyances as a share of GSP (per cent per annum)</i>
NSW	1.37	1.79	0.72
Vic	1.10	1.38	0.62
Qld	1.08	1.48	0.81
SA	0.88	1.13	0.68
WA	1.12	1.62	0.95
Tas	0.72	0.86	0.48
NT	0.48	0.68	0.88
ACT	1.18	1.55	0.74

Source: Commission estimates.

G.5 The effects of ageing on conveyancing duty receipts

Population ageing impacts on conveyancing duty receipts in two ways.

First is via household formation. An increase in the proportion of people aged 65 years and over will see a corresponding increase in the number of people living alone and in couple only families (as baby boomers become ‘empty nesters’).⁶ This

⁶ Declining fertility among younger couples will also contribute to growth in the number of couple-only families.

will contribute to a reduction in average household size and, for a given population, higher rates of growth in the number of dwellings.

In order to examine the extent to which population ageing is likely to result in higher levels of growth in the number of dwellings, projections of dwellings were calculated under a ‘without-ageing scenario’. In this case, the without-ageing scenario assumes that population growth occurs as forecast, but that the age structure of the population (the shares of the population of each age) remains at current levels (table G.6).

Table G.6 Projected growth in households ‘without ageing’ scenario
Annual trend growth rates, by jurisdiction, various periods

<i>State</i>	<i>2003-04 to 2014-15</i>	<i>2014-15 to 2024-25</i>	<i>2024-25 to 2034-35</i>	<i>2034-35 to 2044-45</i>	<i>2003-04 to 2044-45</i>
	%	%	%	%	%
NSW	0.89	0.63	0.42	0.19	0.54
Vic	0.94	0.64	0.44	0.20	0.56
QLD	1.81	1.32	1.00	0.70	1.20
SA	0.50	0.13	-0.10	-0.38	0.04
WA	1.43	1.01	0.73	0.46	0.91
Tas	0.33	-0.15	-0.48	-0.85	-0.28
NT	0.73	0.66	0.51	0.36	0.58
ACT	0.88	0.53	0.33	0.12	0.46
Australia	1.09	0.76	0.53	0.29	0.67

Source: Commission estimates.

The second means through which population ageing impacts on conveyancing duty receipts is via lower rates of dwelling purchase by older households (figure 11.10). Again, in order to assess the extent to which population ageing is likely to dampen housing turnover, projections of dwelling sales were calculated under a without-ageing scenario. In this case, the without-ageing scenario assumes that household growth occurs as forecast, but that the age structure of households (the shares of households of each age) remains at current levels (table G.7).

Table G.7 Projected growth in dwelling sales ‘without-ageing’ scenario

Annual trend growth rates, by jurisdiction, various periods

<i>State</i>	<i>2003-04 to 2014-15</i>	<i>2014-15 to 2024-25</i>	<i>2024-25 to 2034-35</i>	<i>2034-35 to 2044-45</i>	<i>2003-04 to 2044-45</i>
	%	%	%	%	%
NSW	1.37	1.02	0.66	0.34	0.86
VIC	1.43	1.05	0.67	0.34	0.88
QLD	2.31	1.72	1.21	0.85	1.52
SA	0.95	0.51	0.12	-0.25	0.35
WA	1.99	1.43	0.98	0.62	1.26
TAS	0.87	0.28	-0.21	-0.68	0.08
NT	1.29	1.01	0.74	0.58	0.91
ACT	1.41	0.92	0.52	0.23	0.77
Australia	1.37	1.02	0.66	0.34	0.86

Source: Commission estimates.

These two ageing effects are partially offsetting — increases in household formation are counterbalanced by a decrease in the number of transactions for a given number of dwellings. That said, conveyancing duty is likely to increase slightly as a share of GSP by 2044-45. This result is driven by the assumption that average house prices rise at rates higher than real per capita GSP (as they have done over the long run). Were house prices to rise by only around 1.75 per cent per annum then conveyancing duty would be roughly fixed as a share of GSP for most jurisdictions. Lower growth rates would result in contraction of the conveyancing revenue to GSP ratio.

Table G.8 Summary of conveyancing duty arrangements, by State and Territory, as at 1 January 2004

	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>
Number of brackets	6	4	6	5	9	7	6	2
Marginal rate:								
• at lowest threshold	1.25%	1.40%	1.50%	2.30%	1.00%	1.50% ^a	2.00% ^b	Up to 5.35% ^c
• value up to which minimum rate applies	\$14 000	\$20 000	\$20 000	\$80 000	\$12 000	\$10 000	\$100 000	\$500 000
• on highest value	5.50%	5.50%	3.75%	6.30%	5.50%	4.00%	6.75%	5.40 %
• threshold for maximum rate	\$1 000 000	\$870 000	\$500 000	\$500 000	\$500 000	\$225 000	\$1 000 000	\$500 000
Marginal rate applies to excess above lower limit of the range	yes	yes	yes	yes	yes	yes	yes	No, applies to total value of transaction
Concessions applying to home buyers generally ^d	No	Pensioners full exemption for properties up to \$150 000, partial exemption for properties between \$150 000 and \$200 000	Concessional rate of 1% for property up to \$250 000 plus scheduled conveyancing duty on the excess	Concessional rate of 1.5% applies for principal places of residence valued up to \$100 000	Rebate of up to \$1 500 for home units in the City of Adelaide meeting relevant criteria	No	Flat duty of \$20 for eligible buyers of property up to \$180 000, concessional rate of 14.30% for property between \$80 000 and \$93 000	Duty reduced by a maximum of \$1 500 for principal place of residence

^a A flat duty of \$20 applies to transactions up to \$1 300. ^b A minimum duty of \$20 applies. ^c Duty (D) calculated by the formula $D=(0.065V^2)+21V$ where V denotes the (total value/1000). ^d Does not include concessions available to first home buyers.



H Gambling revenue

The gambling industry is subject to the Australian Government's GST, as well as a wide range of State and Territory taxes, license fees and levies. This appendix focuses on State and Territory Government own-revenue from gambling (revenue from the GST is discussed in appendix I and chapter 11). It explores the relationship between gambling and age and examines the likely trends in gambling revenue over the next 40 years.

H.1 Gambling revenue and taxation

Gambling taxation represents a significant share of State and Territory Governments' own-tax revenue. In 2002-03, State and Territory Governments collected nearly \$4 billion in revenue from gambling, representing 11 per cent of State and Territory taxation revenue (ABS 2004, cat. 5506.0)¹ and 0.55 per cent of GDP.

Revenue from electronic gaming machines in pubs and clubs accounts for over half of gambling revenue collected by State and Territory Governments. Revenue from lotteries is also significant, representing 25 per cent of total gambling revenue. The remaining revenue is generated mainly from casino gaming and racing.

Over 60 per cent of State and Territory gambling revenue is collected in two jurisdictions — New South Wales and Victoria. However, in per capita terms Victoria (over \$350 per adult) and South Australia (\$300 per adult) collect the most gambling revenue (compared with the Australian average of \$260 per adult).

There are wide disparities in taxation rates (government revenue as share of expenditure) for gambling across jurisdictions as well as between different forms of gambling. The highest taxation rates are in South Australia, Western Australia and Victoria, where revenue from gambling is over 30 per cent of expenditure. In contrast, the Northern Territory, ACT and New South Wales have the lowest taxation rates with revenue from gambling representing less than 20 per cent of expenditure. By form of gambling, taxation rates vary from 65 per cent on lottery

¹ When GST is not included as a State tax.

products, 25 per cent on gaming machines, 18 per cent on racing and 12 per cent on casino table games.

H.2 Gambling and age

To assess the impact of an ageing population on gambling revenue information is needed on which age groups contribute the most to gambling revenue. The ABS collects data on household gambling expenditure, through the Household Expenditure Survey. The strength of the survey is that it is a national survey, conducted every five years and has a large sample size. However, gambling expenditure, is severely underestimated in the survey. Survey respondents are typically unwilling to report actual expenditure (losses) or may not know how much money they spent on gambling during the reporting period. For example, the most recent Household Expenditure Survey (HES) in 1998-99 found that the average household spends \$302 each year on gambling (ABS 2000, cat. 6535.0). This corresponds to an estimated expenditure of \$2.2 billion for Australia — significantly less than the \$12 billion expenditure estimate by the Tasmanian Gaming Commission for 1998-99 (based on reliable industry-based data). Given these problems, the HES does not constitute a reliable basis for estimating spending by age groups.

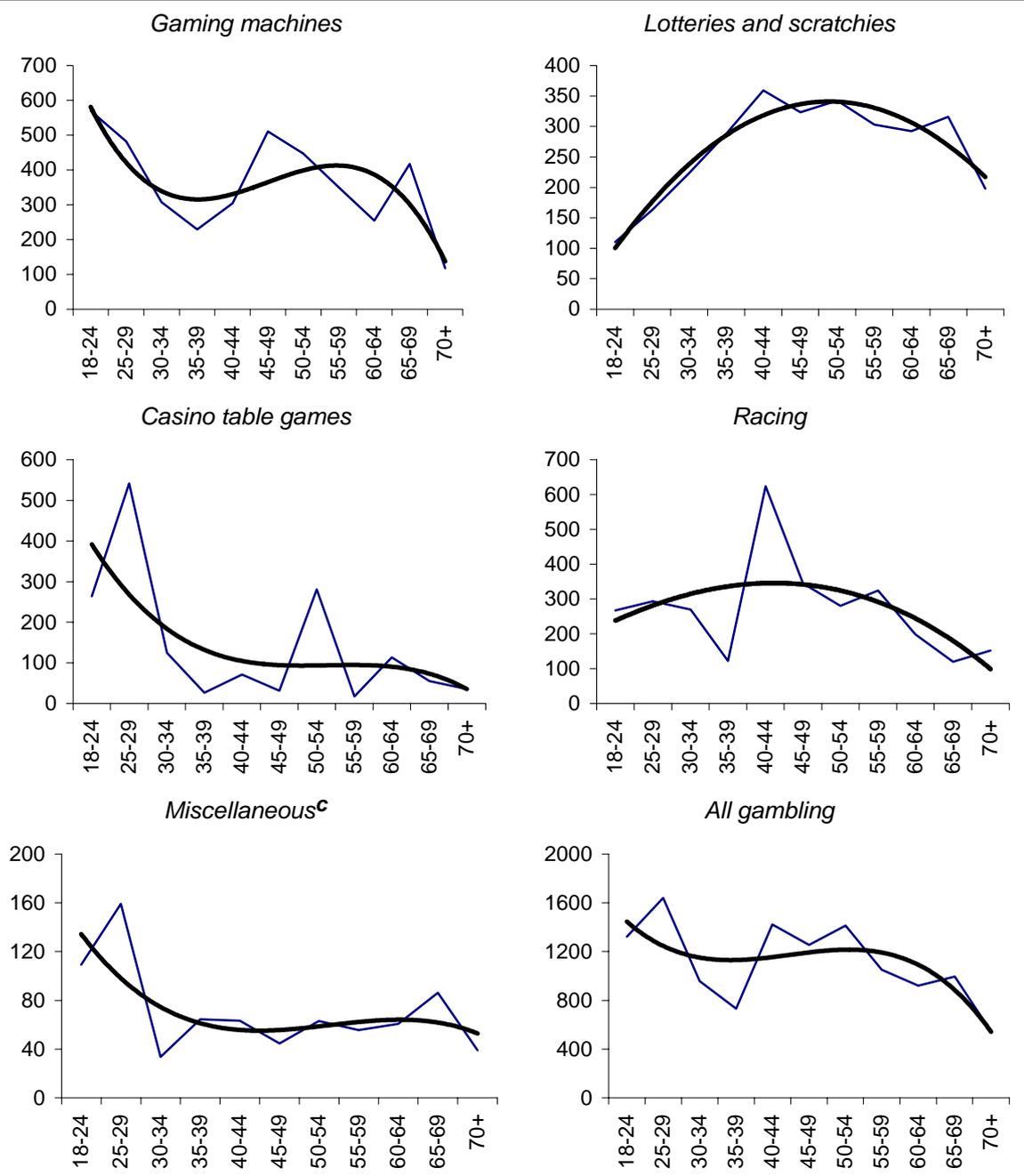
Recognising this problem, the Commission's national gambling survey conducted in 1999 as part of the inquiry into Australia's Gambling Industries asked questions on outlays (the amount of money a gambler takes to a gambling venue and uses to gamble) as well as expenditure (PC 1999a). An analysis of the Commission's survey data found that outlays by age group offered a smoother and more preferred series for examining patterns of spending on gambling by age groups (essentially, because outlays are always positive). However, a number of outliers are present in the data, an inherent problem of many surveys. To overcome this the Commission estimated trimmed means, but these did not significantly improve the estimates.

Despite outliers, the trends depicted in the data are credible.

- 18 to 24 year olds outlay the most on gaming machines; after the age of 60-65 years outlays on gaming machines fall rapidly.
- Outlays on lotteries increase progressively up to the 50-54 age group, after which they decrease with age.
- As age increases, outlays on casino table games fall.
- Outlays on racing increase up to the 44-45 age group and then progressively decrease with age.

- 18 to 34 year olds outlay the most on miscellaneous gambling (which comprises mainly sportsbetting, keno and minor gaming such as bingo).
- Overall, 18 to 30 year olds spend the most on gambling. Between the ages of 30-34 years and 55-59 years, outlays by age are similar. However, after 55-59 years outlays on gambling fall considerably (figure H.1).

Figure H.1 **Gambling outlays per person^a, survey data and trends^b**

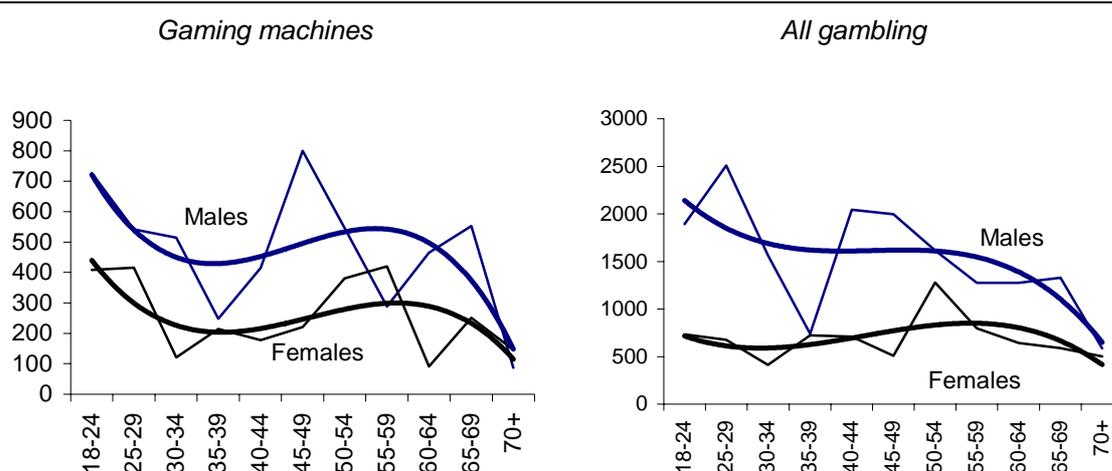


^a Per person over the age of 18; ^b trends are based on third degree polynomials; ^c miscellaneous includes keno, sportsbetting, bingo, internet casino and other.

Data source: PC national gambling survey, see PC 1999a

The Commission also considered outlays on gambling by males and females. Males, on average outlay more on gambling than females. However, the trends between age groups are consistent. The only exception was casino gaming, where the male and female trends were driven by a few outliers. Figure H.2 shows the similar age-based trends for males and females for gaming machines, and gambling as a whole.

Figure H.2 Gambling outlays per person^a, survey data and trends^b
Males and females, gaming machines and all gambling



^a Per person over the age of 18; ^b trends are based on third degree polynomials.

Data source: PC national gambling survey, see PC 1999a.

The Commission consulted a number of researchers about evidence from recent State and Territory surveys relating to gambling by age. Researchers indicated that while survey data on expenditure is understated, there is a clear relationship between gambling and age, with young males spending the most and older age groups the least.

For example, the 2001 Queensland Household Gambling Survey found:

Non-gamblers are quite distinct from the general population. This group are more likely to be over 55, and less likely to be in their middle working years (35-54) (p.8)....

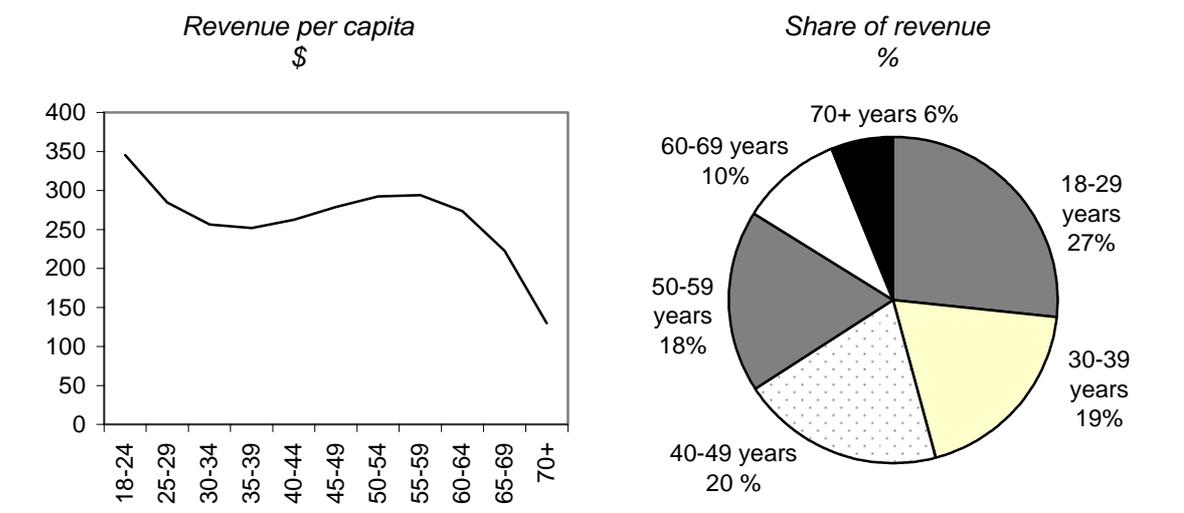
A major concern in the Problem Gambling group is the disproportionate representation of men. The 18-34 age bracket predominates... Also significant is the smaller number of problem gamblers in the 55+ age cohort (Queensland Government Treasury 2002, p. 12).

This is consistent with the trends depicted in the Commission's survey data.

There is a consistent relationship between outlays on gambling by age group and revenue by age group. Therefore, aged based trends in outlays can be applied to aggregate revenue to provide estimates of revenue by age group.

Of the \$4 billion in gambling revenue collected by State and Territory Governments in 2002-03 the majority, 27 per cent, was from those aged 18 to 29 years. In comparison, 60-69 year olds accounted for 10 per cent and the over 70 years age group accounted for less than 6 per cent of gambling revenue. In per capita terms, each person aged 18 to 24 on average paid \$345 in gambling taxes in 2002-03, compared with \$130 paid by each person aged over 70 years (figure H.3).

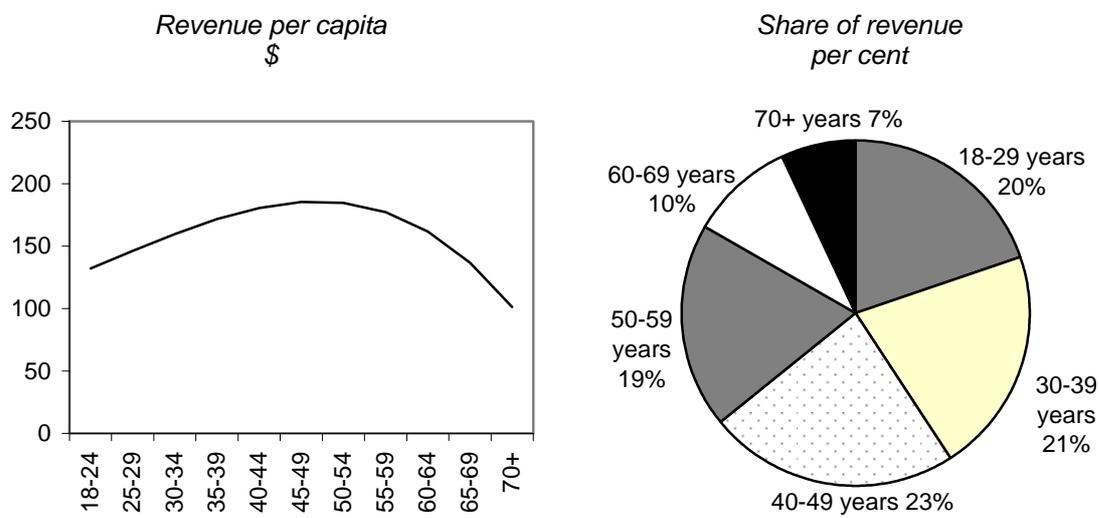
Figure H.3 Revenue collected from gambling by age group, 2002-03



Data source: Commission estimates.

The trends depicted in figure H.3 are similar for most States and Territories. The exception is Western Australia, which does not have gaming machines. Unlike the other States and Territories (where the majority of gambling revenue is from gaming machines) over 60 per cent of revenue in Western Australia from gambling is from lotteries. As a consequence, in Western Australia the share of government revenue for those aged 18-29 years is significantly lower than the national average. However, for those over 50 revenue shares are consistent with the national average (figure H.4).

Figure H.4 Gambling by age group, Western Australia, 2002-03



Data source: Commission estimates.

H.3 Revenue is increasing over time

State and Territory revenue from gambling has risen rapidly over the last two decades. The exception was in 2000-01 when revenue decreased 17 per cent from the previous year with the introduction of the GST (box H.1).

- Between 1988-89 and 1999-00 revenue from gambling more than doubled, increasing from \$1.5 billion in 1988-89 to \$4.4 billion in 1999-00.
- Since the introduction of the GST revenue from gambling has continued to rise, increasing from \$3.6 billion in 2000-01 to \$3.9 billion in 2002-03.

Gambling taxation as a share of State and Territory Governments' own-tax revenue has also been increasing. In 1991-92 the States and Territories raised about 9 per cent of taxation revenue from gambling. Prior to the introduction of the GST in 1999-00 this had increased to almost 12 per cent. Currently, gambling forms 11 per cent of State and Territory Governments' own-tax revenue.

Much of this growth has come from gaming machines. Government revenue from lotteries, casinos and racing has remained relatively stable over the period (figure H.5).

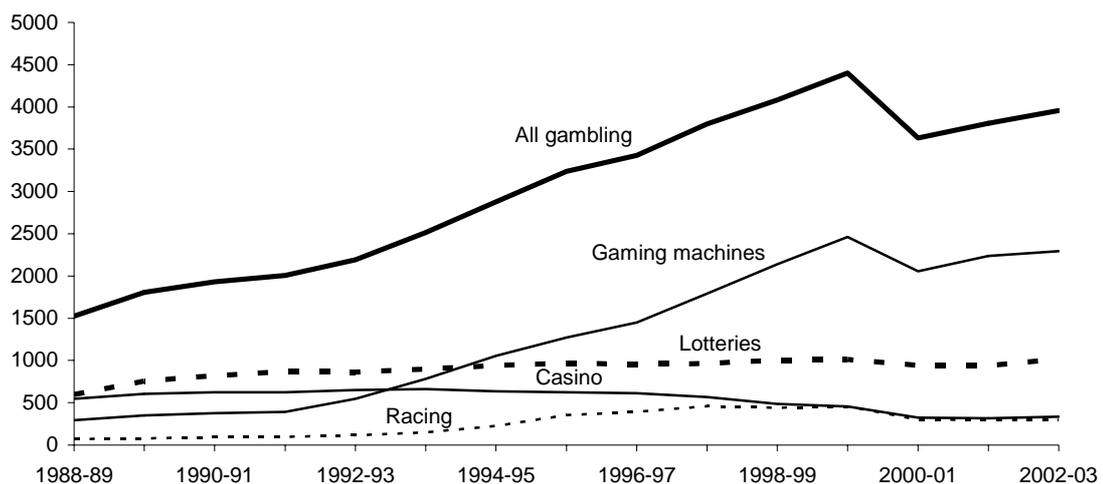
Box H.1 A note on the introduction of the GST

Gambling tax rates were effectively reduced from 1 July 2000 with the introduction of the GST.

Under the Intergovernmental Agreement on the Reform of Commonwealth – State Financial Relations it was agreed that GST revenue would be distributed to the States and Territories and in return, the States and Territories would forego revenue and accept additional expenditure responsibilities. Essentially, the reduction in State and Territory gambling tax rates were to 'make room' for the Commonwealth's 10 per cent GST on gambling.

As a consequence, gambling revenue data in 2000-01 are not directly comparable with those of preceding years.

Figure H.5 State and Territory Government revenue from gambling
1988-89 to 2002-03^a



^a Does not include GST, The decline in revenue between 1999-00 and 2000-01 is associated with the introduction of the GST and Intergovernmental Agreement on the Reform of Commonwealth – State Financial Relations.

Data source: TGC (2004).

Future trends in gambling revenue

Growth in State and Territory gambling revenue over the last two decades has been driven by increased consumer expenditure, which has resulted from much greater access to gambling opportunities. For example;

- an expansion in the number of gaming machine licences has resulted in gaming machines being available in hotels and clubs throughout Australia (other than Western Australia); and

-
- The advent of interactive gambling products such as internet sportsbetting and telephone betting mean that consumers now no longer have to leave home to gamble.

Over the next 40 years technological change is likely to lead to the introduction of new forms of gambling and even greater access to gambling products. It is not known how governments will respond to these new gambling products. However, the Interactive Gambling Act 2001, which prohibits the provision of some interactive gambling services, signals the intention of the Australian Government to stop some forms of internet gambling.

Even if new products are introduced to the market, it is not clear that these will have a significant impact on government revenue. Since 1998-99, gambling expenditure as a share of household expenditure has remained relatively constant at about 3.4 per cent (TGC 2004). Unless completely novel forms of gambling are introduced that capture new market niches, it is likely that any increased expenditure on new products will be offset by a fall in the market share of existing forms of gambling. Accordingly, the Commission has not projected a significant increase in expenditure on gambling as a share of household income. Assuming that new gambling products are likely to be taxed at similar rates to existing products, this in turn means that new products are unlikely to have a significant effect on aggregate gambling revenue.

Future revenue from gambling will also be determined by taxation policy. Average taxation rates on gambling fell from 38 per cent in 1988-89 to 33 per cent in 1999-00, but since the introduction of the GST have remained constant at about 25 per cent. The Commission assumes that current taxation rates are maintained to 2044-45.

H.4 Methodology for projections

The Commission used State and Territory estimates of gambling tax rates, combined with age-based trends on gambling outlays from the Commission's national gambling survey, to project the likely trends in gambling revenue.

- Estimates of gambling outlays per capita (from the Commission's national gambling survey conducted in 1999) were smoothed by fitting trendlines based on third degree polynomials to remove the effects of outliers (see figure H.1).
- These trends were applied to State and Territory estimates of government revenue from gambling (published by the Tasmanian Gaming Commission) to produce estimates of government revenue per person by age group in 2002-03 (for example, see figures H.3 and H.4).

-
- Estimates of future revenue per capita were based on the projected annual percentage increase in household disposable income. Projections of gross product were used as a proxy for household income.
 - Projections of total revenue were made by combining projected revenue per capita with demographic projections.

The Commission used this approach to project the trends in gambling revenues by age group and type of gambling (including gaming machines in hotels and clubs, racing, sportsbetting, lotteries, minor gaming, and casino gaming) for each State and Territory. Although males spend more on average than females, it was not necessary to project gambling revenue separately for males and females because (as discussed in section H.2) their relative outlays by age are consistent.

The methodology assumes constant shares of revenue by age group over time in any given gambling form. Increases in gaming opportunities in the last decade may result in expenditure patterns by age group being different in the future. However, in the absence of panel data, it is not possible to allow for any age cohort effects.

H.5 Results

Two major demographic factors will influence spending on gambling in the future.

- Firstly, the adult share of the population is expected to increase over the next 40 years for all jurisdictions. This will increase the proportion of the population that gamble and (all else equal) result in an increase in gambling expenditure.
- Secondly, the share of population in older age groups, is projected to increase. This will offset increasing gambling expenditure as older age groups have a relatively lower propensity to gamble.

If the ageing effect outweighs the effect of a growing adult population gambling expenditure and revenue is projected to fall over time. This occurs in Tasmania and South Australia (table H.1). In some States the pattern is reversed — such as the Northern Territory. In all other jurisdictions, the factors offset each other, with a negligible change in the ratio of gambling revenue to GSP.

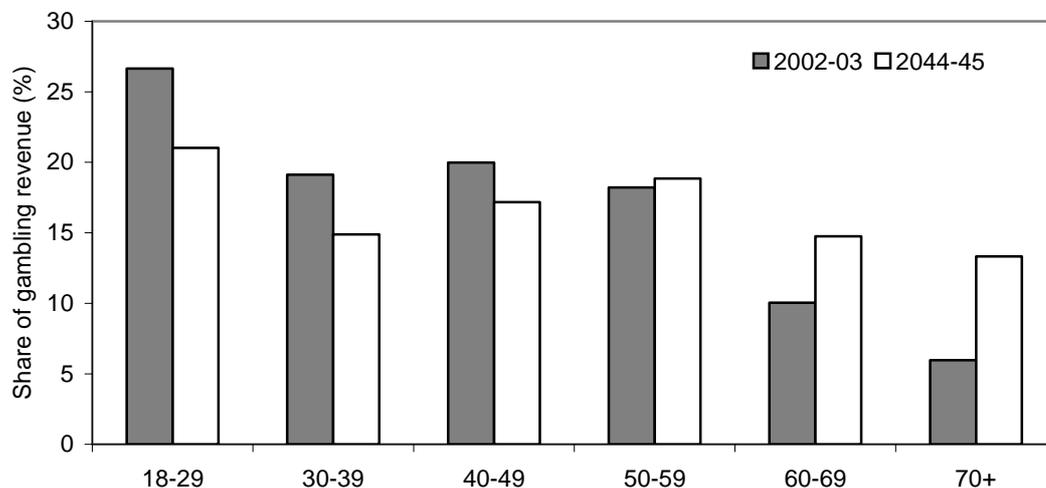
Table H.1 State and Territory revenue from gambling, projections
Per cent of gross product

	2002-03	2008-09	2014-15	2024-25	2034-35	2044-45
New South Wales	0.478	0.483	0.488	0.483	0.475	0.473
Victoria	0.690	0.704	0.712	0.704	0.690	0.688
Queensland	0.492	0.500	0.507	0.502	0.493	0.492
South Australia	0.725	0.733	0.740	0.725	0.707	0.705
Western Australia	0.277	0.285	0.289	0.289	0.287	0.287
Tasmania	0.599	0.607	0.610	0.594	0.578	0.575
Northern Territory	0.395	0.405	0.413	0.416	0.418	0.423
ACT	0.322	0.320	0.322	0.319	0.315	0.315
All jurisdictions (sum)	0.525	0.533	0.537	0.528	0.516	0.512

Source: Commission estimates.

Demographic change is also expected to have a significant effect on the share of gambling revenue attributed to older age groups. For example, in 2002-03 the Commission estimates that 6 per cent of revenue from gambling was collected from the over 70 years age group. In 2044-45 this share is projected to increase to 13 per cent (figure H.6). This trend is consistent for all States and Territories.

Figure H.6 Revenue shares by age group, 2002-03 and 2044-45

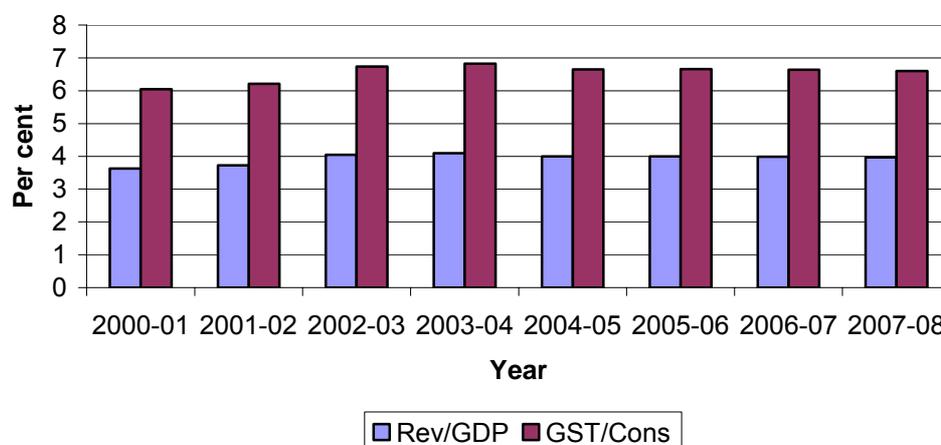


Data source: Commission estimates.

I Goods and Services Tax

Australia's Goods and Services Tax (GST) is a broad based tax on the supply of most goods and services in Australia. A tax of 10 per cent is charged on the final sale of all taxable goods and services. Revenues are collected by the Australian government, but are returned directly to the State and Territory governments from which they were collected (subject to an equalisation process). Since the introduction of the GST in 2001, GST revenues as a share of both GDP and of household consumption have been rising steadily (figure I.1). The 2004-05 Budget papers predict GST revenues to account for 3.99 per cent of GDP and 6.65 per cent of consumption expenditure.

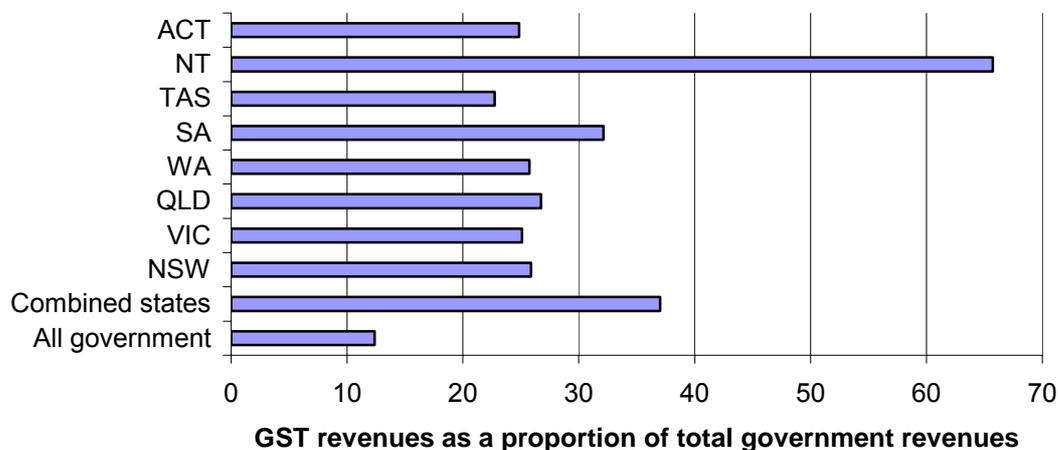
Figure I.1 **GST revenue**



Data source: Richardson (2004).

Relatively, the GST provides only a small amount of the total funding for government spending. Combined State, Territory and Federal revenues in 2003-04 amounted to \$268.1 billion. GST revenues contributed to 12.4 per cent of this figure, around \$33.3 billion. For the States and Territories, however, the revenue earned through the GST amounts to a significant component of their respective budgets. For most State and Territory governments, the GST accounts for about one quarter of total revenues (figure I.2) — with only the Northern Territory substantially higher.

Figure I.2 **GST revenues**
2004-05 estimated



Data source: Treasury and State and Territory budget papers. Revenues include non-tax revenues, such as Australian Government Specific Purpose Payments.

There are several ways in which GST revenues may be affected by ageing (box I.1):

- Some consumption items are exempt from taxation (indeed, GST-free items accounted for an estimated 31.3 per cent of household consumption in 2003-04, and about 19 per cent of GDP).¹ If the old spend more or less proportionately on these exempt items than others, then ageing will shift expenditure towards or away from tax exempt goods and services, with implications for the revenue base. Since the GST is a flat rate tax, other changes in the patterns of consumption that may occur with ageing make no difference to the revenue base.
- The share of income used for households' consumption spending (or its inverse, the saving ratio) may change over time as a result of ageing, affecting the overall level of consumption in the economy and the revenue base for the GST.
- As noted in chapter 5, ageing affects overall economic growth and thereby the income from which consumption is funded. However, by itself, this factor does not change the ratio of GST revenue *to GDP*, and is ignored in this section.

¹ GST-free items include fresh foods; many educationally-related expenditures (such as education courses, materials, administrative fees and student accommodation); most health care (such as hospital treatment, medicines, many professional health services); childcare; some utility services (such as water and sewerage); residential rents; acquisition of residential properties (including investment properties and mortgage repayments); and some financial services.

Box I.1 Modelling the impact of ageing on GST revenues

Empirically, the ratio of disposable household income (HY) to GDP has been stable over time (at around 0.6). It is assumed that this pattern continues so that:

$$HY_t = 0.6 \text{ GDP}_t$$

HY is directed by households to three things: consumption later (savings — S, which are not taxable through the GST), GST-exempt consumption (TEC) and consumption that is taxable through the GST (the consumption revenue base — CRB). TEC has two components.

The first includes tax exempt items whose consumption levels per capita are age-related (TECAR). These are health care, education spending and housing costs.

The value of TECAR is modelled as:

$$TECAR_t = \sum_i \sum_x \frac{C_{i,x,t}}{POP_{x,t}} \frac{POP_{x,t}}{POP_t}$$

where $C(i,x,t)$ is consumption of the i^{th} tax exempt good by the x^{th} age group at time t . Profiles of $C(i,x)/POP(i,x)$ by different age group (x) were obtained from current data. It was assumed that *relative* spending on tax-exempt items per capita between different age groups would remain constant over time. Further, it has been assumed that $C(i,x)/POP(i,x)$ would grow by the same rate as GDP per capita, with the exception of health care, where the same assumptions as those used in chapter 6 were used.

The second component of TEC are items whose consumption is not age-related (TECNAR). These include fresh food and a residual group encompassing a large range of miscellaneous items. It is assumed that TECNAR comprises a fixed share of household income.

In our baseline case, we have adopted the assumption that there is no change in the ratio of savings to HY, though we explore scenarios in which this assumption is relaxed (chapter 11).

Accordingly, the consumption revenue base can be projected as:

$$CRB_t = (1-\beta-\lambda) HY_t - TECAR_t$$

Where β is the savings ratio and λ is the ratio to household income of tax-exempt consumption items that are not age-related.

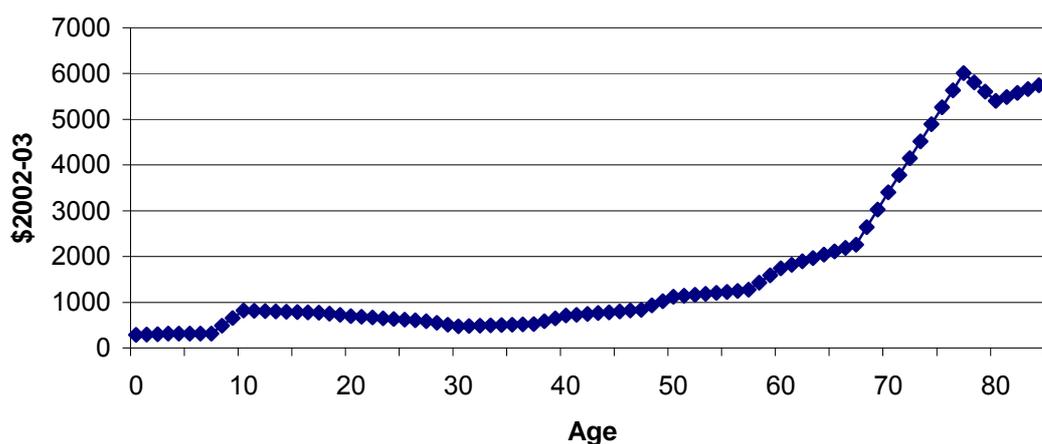
Finally, GST revenue as a share of GDP is calculated as 10 per cent of CRB/GDP.

Is there an ageing dimension to consumption of tax exempt items?

Per capita consumption of GST-exempt items increases with age (figure 11.6). Approximately 25 per cent of consumption by people aged under 60 years is untaxed — most of this is expenditure on housing and fresh food. In contrast, around one third of the consumption of those aged over 75 years is untaxed. This suggests that an ageing population will shift a greater share of consumption spending to tax exempt items, reducing State and Territory revenue bases below what they would be otherwise.

Three tax-exempt consumption items have particularly noticeable age-related consumption patterns: health, education and housing (figure I.3 to figure I.5 and table I.1).²

Figure I.3 Private health expenditures^a

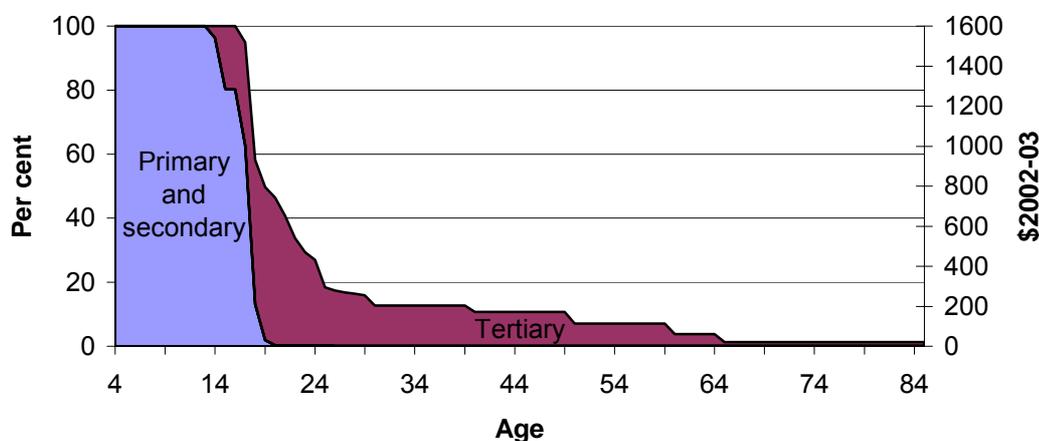


^a The private health expenditure profile is calculated by subtracting the public health expenditure profile in chapter 6 from the total health expenditure profile in appendix A.

Data source: Commission calculations

² To give a brief idea of the magnitude of spending: \$2.01 billion was spent on private health care in 2001-02 accounting for 31 per cent of total health expenditures; around 5 billion of private spending occurred on primary and secondary tuition in 1999 and a further \$4.18 billion on tertiary education fees.

Figure I.4 **Participation in education**
2003^a



^a Direct data on private spending on education by the age of the recipient is not readily available. However, for the purposes of GST calculations, a reasonable proxy for such spending was developed from data on participation rates in education and aggregate information on private education costs. For any age group, x , private education spending (E) was estimated as:

$$E_x = PR(x, SP)C(SP) + PR(x, T)C(T)$$

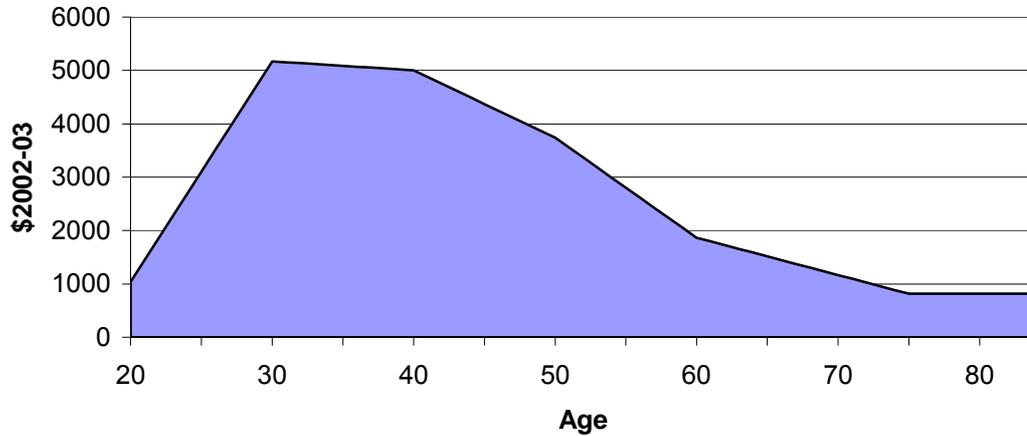
where $C(SP)$ is the average private cost per student of secondary and primary tuition (approximately \$1402 per student in 1999 from the Household Expenditure Survey), $PR(x, SP)$ is the participation rate in such schooling by a person aged x years, $C(T)$ is the average private cost per student of tertiary education (approximately \$1175 per student in 1999). And $PR(x, T)$ is the participation rate of someone aged x in tertiary education.

Data source: DEST (2004), ABS 2004, *Schools Australia, 2003*, (Cat. 4221.0); ABS 1999, *Education and Training in Australia, 1998* (Cat. 4224.0); ABS 2000, *Household Expenditure Survey, Australia: Detailed Expenditure Items, 1998-99*, (Cat. 6535.0), NCVET (2003) and Commission calculations.

Forecasting future GST revenues

Initial estimates of GST as a share of GDP were produced using the methodology outlined in box I.1 and the age profiles of consumption noted above. Non-taxable expenditure will account for more than 36 per cent of total household consumption (21.7 per cent of GDP) by 2044-45 (Commission estimates), up from its current share of 31.3 per cent of household spending (18.7 per cent of GDP). The main source of this change is increased expenditure on private health services, which will increase by just above 3 percentage points as a share of GDP. The surge in private health expenditures, however, is partly offset by a reduction in tax-exempt consumption of education and housing. This reflects relatively fewer children in education and an increase in homeownership that reduces tax-exempt housing consumption (figure 11.7).

Figure I.5 Housing costs
Per capita, 2004



^a This was estimated by applying a linear piecewise transformation to the profile of housing expenditures by age. Housing expenditures are quite high until the mid 40s, as the degree of outright homeownership is relatively low, with those in the market both renting and servicing mortgage debt.

Data source: ABS 1999, *Housing Occupancy and Costs, Australia, 1997-98*, (Cat. 4130.0) and ABS 2000, *Household Expenditure Survey, Australia: Detailed Expenditure Items, 1998-99*, (Cat. 6535.0), and Commission calculations.

Table I.1 Housing expenditure^a
2003-04

Age	Households by tenure type, thousands			Housing costs by tenure type			Total	Pop, millions	Per capita
	Outright	Mortgage	Rent	Outright	Mortgage	Rent			
15-24	6.7	46.1	257.5	2 992	12 700	8 523	2 800	2.61	1 074
25-34	99.3	600.7	647.9	1 750	15 240	9 483	15 472	2.89	5 351
35-44	277.9	844.6	478.7	1 750	12 644	9 031	15 488	2.99	5 178
45-54	586.8	612.0	287.7	1 524	11 289	8 692	10 304	2.66	3 869
55-64	631.8	194.3	145.2	1 298	8 523	6 999	3 493	1.81	1 932
65+	1 194.4	52.8	184.4	1 072	3 895	4 403	2 298	2.72	846

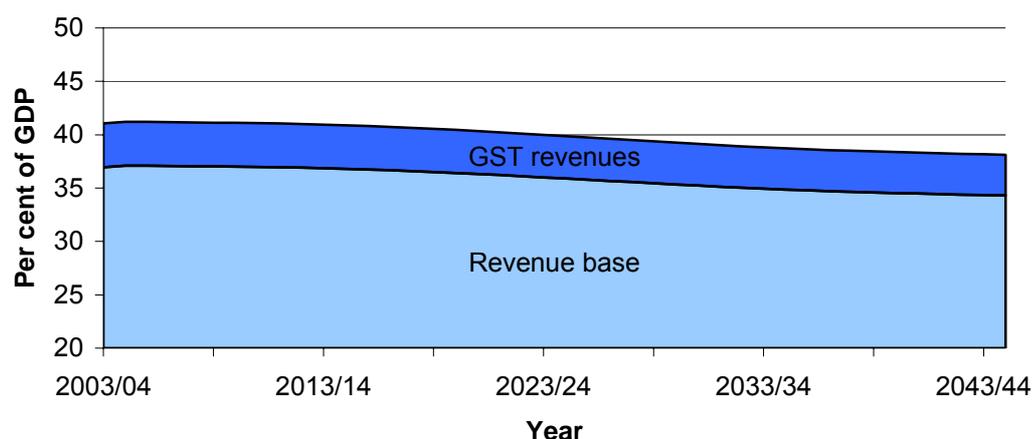
^a The ABS reports household mean weekly housing costs by age and tenure type. Individual housing expenses were estimated by dividing aggregate housing expenditure by the number of persons in each age category. For example, given the tenure characteristics of 55-64 year olds, and the mean tenure-specific housing costs, this cohort spent some \$3.5 billion dollars on housing in 2001. Per capita, the average 55-64 year old will have spent approximately \$1932 on housing in 2004.

Source: ABS 1999, *Housing Occupancy and Costs, Australia, 1997-98*, (Cat. 4130.0) and ABS 2000, *Household Expenditure Survey, Australia: Detailed Expenditure Items, 1998-99*, (Cat. 6535.0), and Commission calculations.

Consequently, the GST revenue base will decline over the next 40 years. Consumers today spend some 41.1 per cent of GDP on GST-eligible goods and services (which realises GST revenue of 4.11 per cent of GDP given the flat

10 per cent tax rate). Changes in Australia’s demographic composition and growth in health spending will result in net substitution away from taxed consumption items towards tax exempt classes. This will reduce the Government’s GST revenue to 3.81 per cent by 2044-45 (figure I.6) — or a reduction in available GST revenues of 7.2 per cent.

Figure I.6 The GST revenue base
2003-04 to 2044-45



Data source: figure 11.7 , figure I.3, figure I.4, figure I.5 and Commission calculations

These estimates assume that current age spending profiles remain constant over the medium term. This assumption has been made largely because of the uncertainty about age-adjusted trends in the housing, education and health sectors.

J Fiscal risks for Governments

J.1 The vertical fiscal imbalance and fiscal pressure

The evidence on revenue and spending suggests that all jurisdictions will face fiscal pressures and risks as a result of an ageing population in Australia. However, the incidence of these risks and pressures is complicated by the financial dependence of States¹ on the Australian Government. Changes in the payments made by the Australian Government to the States as a result of ageing pressures can shift budget pressures between the different tiers of government. For example, Access Economics (2002) identified this as a risk of contagion from Federal to State finances.

A brief picture of Federal financial relations is needed in order to analyse the likelihood and size of any such shifts in fiscal pressure.

The Australian Government raises more revenue than it directly spends, reflecting its role as the principal tax collector within Australia's federal system. Its major tax revenue sources are income taxes, the Goods and Service tax (explicitly collected on behalf of State Governments), and excises.²

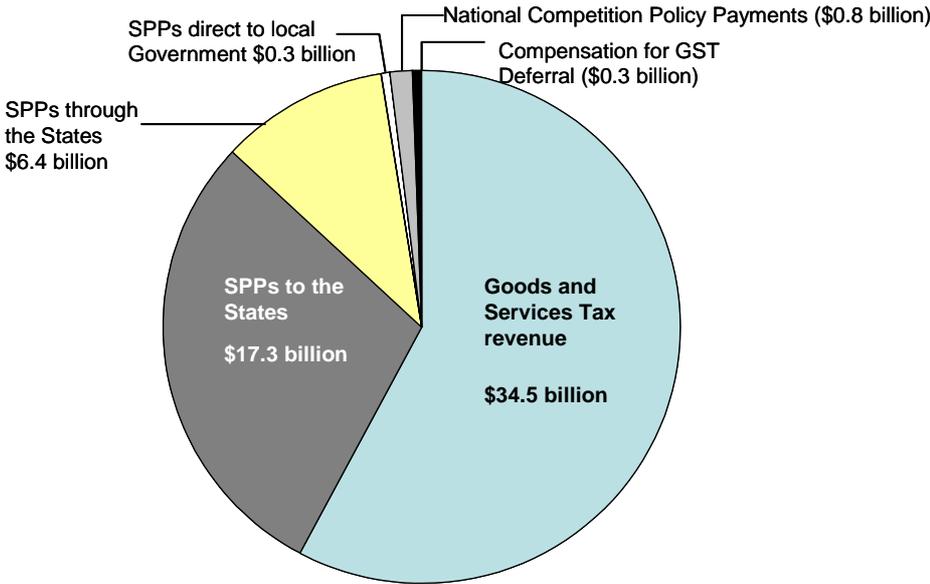
The GST revenue is distributed to the States. The Australian Government also makes several other payments to State and Local Governments (figure J.1). The most important of these are special purpose payments (SPPs), which are tied grants covering a broad range of areas, such as health, education and housing. The bulk are paid to the States for their own spending purposes, though some are also paid *through* the States for local government and other purposes. A small share is paid directly to local government.

¹ In this appendix, 'States' refers to the States of Australia, the Northern Territory and the Australian Capital Territory.

² Income taxes levied on businesses and individuals comprise the biggest single source of taxation revenue in Australia, amounting to \$131.3 billion in 2002-03, or 55 per cent of total taxation revenue collected by all tiers of Australian governments. In comparison, the GST amounted to \$31.3 billion and Australian Government excise tax was \$20.8 billion (ABS, 2004, *Taxation Revenue, Australia*, Cat. No. 5506.0).

When supplemented by their own-source revenue, these grants and payments are the means by which the States fund expenditure, such as hospitals and schools. The transfers are large as a share of the total revenue available to State and Local Governments (panel A of table J.1).

Figure J.1 Payments by the Australian Governments to State and Local Government
2004-05 estimated



Data source: Australian Government, 2004, *Federal Financial Relations 2004-05*, 2004-05 Budget Paper No. 3, Canberra.

J.2 What payments are at risk?

The GST is effectively a state tax that is collected by the Australian Government. Accordingly, while population ageing erodes GST revenues as a share of GDP (and therefore produces fiscal pressures for the States — chapter 11), there are no risks that the revenue will be withheld by the Australian Government.

SPPs, on the other hand, are discretionary and partly conditional transfers to the States.³ The Queensland Government (sub. 17, p. 44) emphasised that SPPs are not within the control of State Governments and so present budget risks:

³ For example, they may require dollar for dollar matching for eligibility and that certain performance criteria be met for continued funding. At various times, the Australian Government has discontinued its funding of programs established as SPPs.

Special purpose payments are largely at the discretion of the Commonwealth Government such that there is significant uncertainty surrounding the growth of SPPs relative to GDP.

SPPs represent a significant source of revenue for all States, but, relative to own-source tax revenue, they figure particularly prominently for Tasmania, the Northern Territory and Western Australia (table J.1). As a consequence of the large relative magnitude of SPPs to States' own-source tax revenues, divergent assumptions about the future size of these payments can make a sizeable difference to fiscal risks and pressures associated with ageing faced by the different tiers of government.

Table J.1 **State and Local Government dependence on payments from the Australian Government**
2002-03

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
<i>Revenue of States and Local Governments^a</i>									
A Share of total revenue (%)									
Own-taxation revenue	38.1	36.3	28.6	29.8	31.5	21.6	11.8	29.0	33.5
Other own-source income	23.4	25.7	29.7	24.8	26.7	25.7	15.9	29.4	25.5
Current grants and subsidies	38.5	38.0	41.7	45.4	41.8	52.7	72.3	41.6	41.0
Total revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<i>Payments to State Governments^b</i>									
B Ratio to own-source taxation revenue									
SPPs	0.37	0.41	0.52	0.53	0.59	0.72	1.20	0.39	0.45
GST revenue	0.64	0.69	1.05	1.18	0.86	2.21	6.15	0.90	0.84
Other payments	0.06	0.04	0.02	0.06	0.03	0.09	0.03	0.03	0.05
All payments	1.07	1.14	1.60	1.77	1.48	3.01	7.38	1.32	1.33

^a This relates to the consolidated finances of States and Local Government. Current grants and subsidies are mainly SPPs from the Australian Government and GST revenue, paid to State and Local Governments, either directly or indirectly. For example, it includes SPPs paid *through* States for local government and other uses (such as private schools). ^b This excludes SPPs paid through State Governments and SPPs paid directly to local government. Other payments includes Budget Balancing Assistance and National Competition payments. Own-source taxation revenue used in panel B is only for States, thus excluding local government (cf. panel A).

Source: ABS (2004), *Government Finance Statistics, Australia*, Cat. No. 5512.0, April (for consolidated data in panel A); Australian Government (2003), *2003-04 Budget*, Budget Paper No. 3 (for data on payments to States only) and ABS (2004), *2002-03 Taxation Revenue, Australia*, Cat. No. 5506.0, April (for own-source State taxation revenue used as the denominator for data in panel B).

J.3 Fiscal pressures for the ‘Combined States’ compared with the Australian Government

How SPPs are viewed shapes how they are projected. There are two broad perspectives on their role:

- SPPs may be seen as hypothecated payments made by the Australian Government — payments dedicated to produce certain social and economic outcomes. From this perspective, they will respond to changing service needs.
- SPPs may be seen as a revenue source to help meet various service expenses, but one that is not guaranteed to grow at the same rate as those services.

SPPs as *hypothecated* payments

To the extent that SPPs are viewed as hypothecated payments, they are not mere discretionary income transfers, but payments that are tied to certain objectives, such as a well functioning hospital system. From this perspective, the payments are not constrained by thresholds in GDP shares or real per capita amounts, but by service needs.

The appropriate projection method in this context is to establish a constant price funding amount in a base year for those expenditures that are age-related — health, education and aged care — and to project future trends in these on the basis of population, ageing effects and non-demographic factors. This was the way in which the Intergenerational Report projected all age-related Australian Government spending, including those that are funded through SPPs. The Governments of Victoria (sub. 29, p. 16) and South Australia (sub. 23, p. 24) considered this as one possibility among several, when exploring the fiscal pressures for States.

The most important single expenditure item in SPPs are the health care grants (around \$7.5 billion in 2003-04). Aside from the short term deviations introduced by Health Care Agreements,⁴ it can be expected that ageing, population and non-demographic factors⁵ will significantly increase this base value over time. Overall,

⁴ Health Care Agreements provide a contingent level of funding from the Australian Government to the States for public hospitals. The AIHW (2004, p. 246) notes that in the first year of any agreement, the Australian Government’s share of total funding tends to increase, while over the remainder of the agreement’s period the States increase their funding share. Accordingly, the ‘trend’ over the life of any particular health agreement is misleading.

⁵ It is assumed that the values of these factors are the same regardless of the funding source. In theory, it would be possible to use a different non-demographic rate for different funding sources were the funding shares to be changing. The long run evidence suggests that, if anything, the Australian Government has accounted for a rising share of the total costs of public hospitals. This

it is expected that public hospital funding contributed by both State Governments and the Australian Government will rise relative to GDP. Implicit in this projection methodology is that there is no shift in the *share* of total funding given by either level of government after the base year. In the case of health care grants given by the Australian Government to the States for public hospitals, it could be expected that the ratio of grant values to GDP will nearly double from 2002-03 to 2044-45.

Of course, other SPPs are expected to fall relative to GDP — such as those paid to education. However, all other things being equal, SPP to GDP ratios could be expected to rise overall, because ageing pressures on services are likely to increase the Australian Government's health SPPs by more than they decrease their education SPPs. The point to emphasise is that using this methodology, the relevant SPP to GDP ratios are the *outcome* of the projections, rather than a financing constraint imposed by the Australian Government on the States.

It is also worth noting that under this approach not all sub-components of the SPPs are modelled. As in the rest of this study, the focus of projections is on those expenditure items that are affected by population ageing. For example, the Commission has not modelled defence spending at the Australian Government level. Similarly, this suggests that SPPs on land care and other environmental projects are not projected. The purpose of the projections is not to give measures of fiscal pressure that might arise from any source — but those that result from ageing. The assumption underlying this is that there are no direct feedbacks from ageing fiscal pressures on environmental, defence and other non-ageing government expenditures. Of course, it is possible that one method by which governments may fund the rising costs of ageing is to cut back on these other spending items, but this should not be modelled implicitly as a forgone conclusion.

SPPs as an uncertain revenue source

The alternative view is that SPPs do not need to rise with service needs. Rather, they are like other government transfer payments, and are constrained by similar conditions, such as dependency on tax revenues.

There is a floor to the risks borne by the combined States as a result of variations in SPP revenue. As part of the 1999 *Intergovernmental Agreement on the Reform of*

would suggest a higher non-demographic growth rate for health care grants from the Australian Government than public hospital funding from State Governments. However, given the recent stability of the funding share, the Commission's projections are based on the assumption of a fixed future funding share, and consequently on the same non-demographic rate for both funding sources.

Commonwealth-State Financial Relations (Clause 5(v)), the Commonwealth indicated that it:

- will continue to provide SPPs to the States; and
- has no intention of cutting aggregate SPPs as part of the ongoing process of tax reform.

This commitment is seen as, at least, requiring that the Australian Government maintain *real SPPs per capita* over time. But it does not require SPPs to be maintained as a share of GDP or to meet the growing service needs for which they are provided. This was a source of potential concern to the States:

... State budgets will be heavily influenced by the level of Commonwealth funding for Specific Purpose Payments (SPPs). If SPPs are only maintained in real terms (the only position the Commonwealth has agreed to), and not adjusted for growth in demand for services, State budgets will have significantly higher deficits. (ACT Government sub. 21, p. 18)

Historical precedent suggests that Commonwealth funding to States, whether in the form of general or specific purpose funding, will struggle to keep up with, let alone outpace, economic growth. (Queensland Government, sub. 17, p. 44)

Accordingly, some States' baseline projections for future fiscal pressures assumed no real growth in per capita SPPs (such as the ACT and South Australian Governments).⁶ However, the ACT Government also observed that 'in all likelihood, this scenario will not hold', while the South Australian Government also considered an alternative scenario, in which SPPs grow more rapidly than this. For example, if it were assumed that the Australian Government maintains SPPs at their current shares of State spending in each portfolio, then the South Australian Government estimated that combined States' SPP revenue improves by \$30 billion in 2041-42, while the Australian Government balance worsens by \$30 billion. (The Commission estimates that this is around 1.7 per cent of GDP in 2041-42).

Another perspective is that Australian taxation revenue will generally rise with GDP — and that this will allow SPPs to rise in per capita real terms. Accordingly, some State Governments modelled SPPs as a fixed share of GDP. For example, the Queensland Government explored ten long term fiscal scenarios, in which nine pre-supposed that SPPs grew at the same rate as gross state product (GSP when cumulated across States is equal to GDP), while one assumed that SPPs grew slower than GSP.

⁶ Sub. 21, p. 12 and sub. 23, p. 24 respectively. The Victorian Government (sub. 29, p. 28) also considered this scenario, but not as their base case.

These various projection scenarios for SPPs are consistent with the usual ways of projecting income payments more generally in the economy. For example, welfare transfers are often projected as growing with population numbers and prices, while taxation revenue is often modelled as a roughly fixed share of nominal GDP.

Historical trends in intergovernmental payments

Accordingly, there are three broad approaches for projecting SPPs. They could grow with:

- prices and population;
- GDP; or
- service needs.

A starting point for the assessment of which of the three broad approaches above is most credible is the historical pattern of transfers from the Australian Government to the States.

Gauging this historical pattern is bedevilled by changes in intergovernmental spending and taxing policies. But a broad view can be obtained by looking at various measures of grants made by the Australian Government to other levels of government (figures J.2, J.3 and J.4):

- While volatile from year to year, current grants to all levels of government⁷ and SPPs ‘to and through’ the States have generally increased in real per capita terms (figure J.2). This suggests that the assumption of maintenance of real per capita SPPs over the next 40 years — while reasonable over short periods — would represent a break from past long run trends.
- Over the post-WWII period, current grants increased as a share of GDP — broadly in line with the greater role of Australian governments in the economy generally (figure J.3). However, after rising steeply when new spending initiatives were instituted by the Whitlam Government in the early 1970s⁸, the grant share has no longer climbed steadily. Indeed, from 1983-84 to 1997-98 the grant share fell steadily from around 7.4 to 5.2 per cent of GDP. This reflected severe pressures on the Australian Government’s budget and the capacity to reduce payments while States could successfully increase their own-source

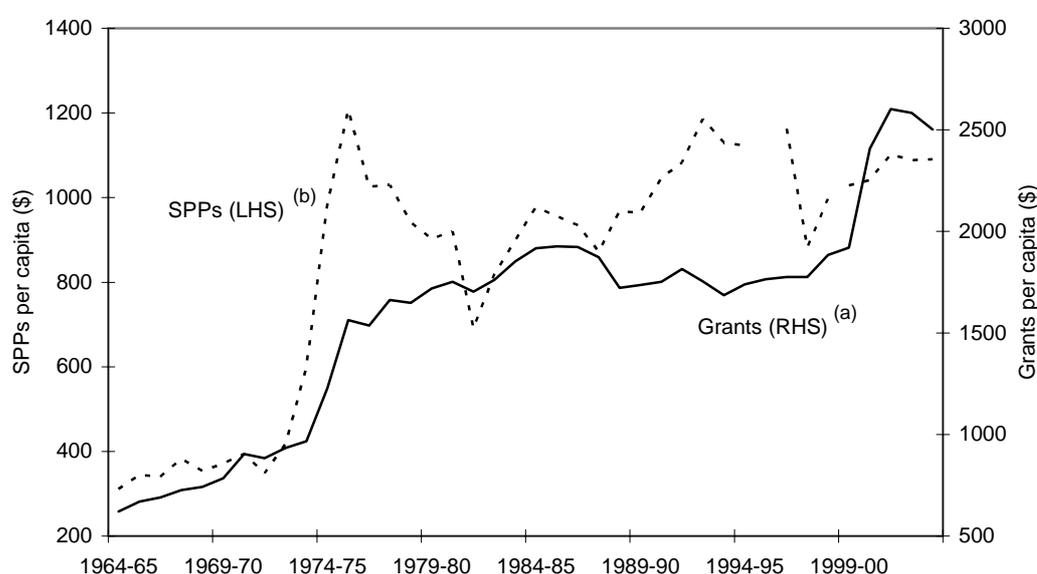
⁷ That is, including grants made directly to Local Government or through States to Local Government and other parties. However, these exclude capital grants, which have generally decreased in importance from the 1970s (Mathews and Grewal 1995). It is important to look at total grants as well as SPPs since funding can shift between them.

⁸ Mathews and Grewal 1995; James 2001.

revenue (such as conveyancing and gambling revenue). With the introduction of the GST, and the replacement of a range of State taxes, the grant share of GDP again increased significantly and has been roughly stable since. SPPs have also faced large swings, but have exhibited a slow decline as a share of GDP since the early 1980s.

- Current grants fell slowly as a share of State spending over the past 30 years, until the introduction of the GST (figure J.3). SPPs, on the other hand, have been roughly stable as a share of States' spending from the early 1980s, after large swings in the prior decade.

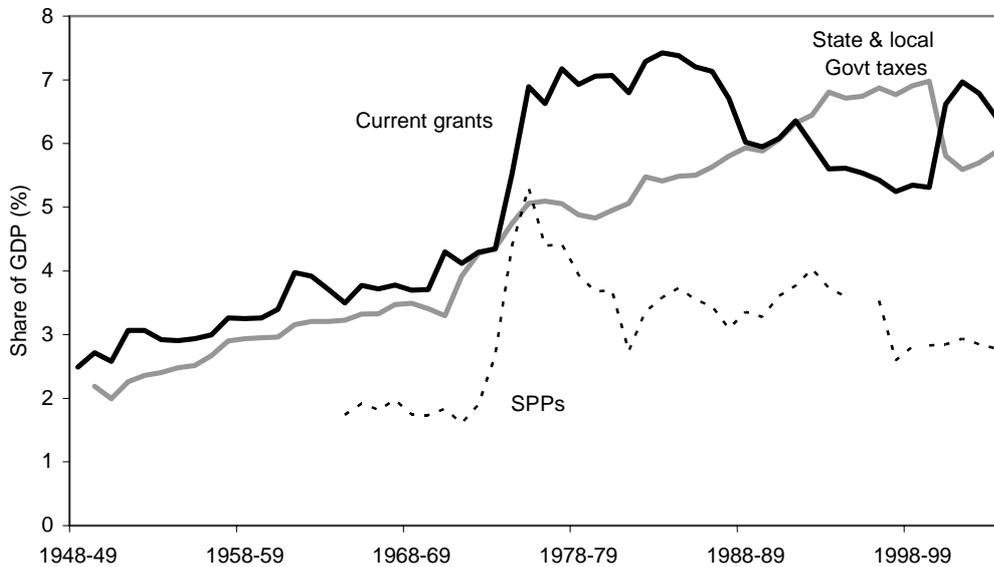
Figure J.2 What has happened to real per capita grants to the States?
Per capita real value (2002-03 prices)



a Grants comprise Commonwealth current grants to State and Local General Government. They include untied grants that are recommended by the Grants Commission and SPPs (they do not include capital grants). Data are from the National Accounts (ABS Cat. No. 5206 for 1972-73 to 2003-04) and from Foster and Stewart (1991, for 1961-62 to 1971-72). Data for the period from 1948-49 to 1960-61 are estimated as a fixed proportion of total Commonwealth capital and current grants to States and Local Government (from Foster and Stewart). There are some significant changes in the series. Australian Government grants to the States fell in 1971-72 when the Australian Government transferred payroll taxes to the States. The increase in the late 1990s reflects the introduction of the GST. The grants were converted to real values using the GDP implicit price deflator (from ABS National Accounts) and to per capita terms by dividing by a moving average of End of fiscal year populations. **b** Special purpose payments are those 'to and through' the States, but exclude payments made directly to local government and advances. Over the period covered by the data, the NT and ACT have been included and there have been major policy shifts involving universities and public hospitals, amongst others, that will have affected the magnitude of the payments. Data from 1999-00 are based on accrual accounting and are not directly comparable with past data.

Data source: ABS National Accounts (Cat. No. 5204.0 and 5206.0) and Foster and Stewart (1991) and data supplied by the Department of Finance.

Figure J.3 Have grants kept pace with GDP?^a

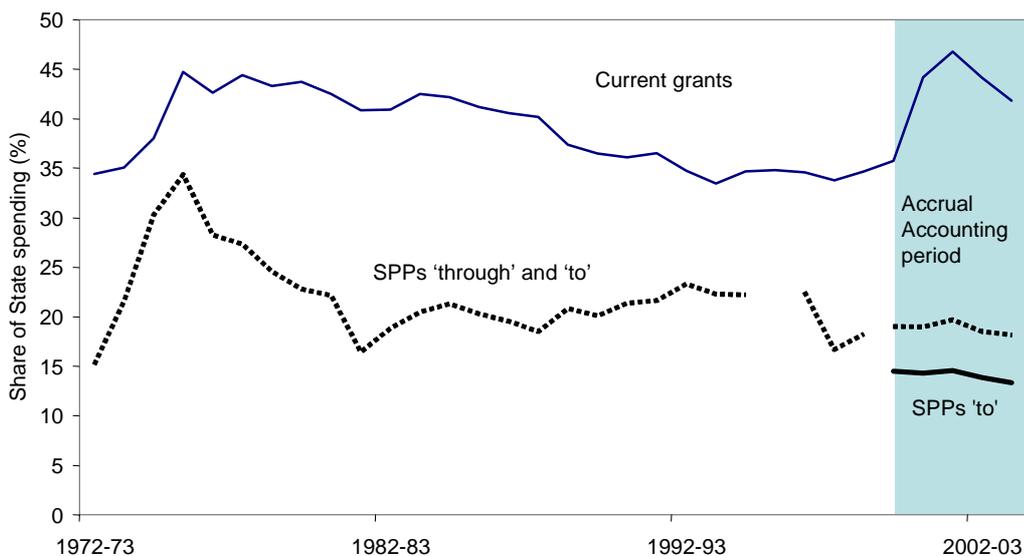


^a The derivation and definition of SPPs and current grants is described in figure J.2. All items are expressed as a share of GDP in current prices. The GDP data are from the Australian National Accounts (ABS Cat. No. 5204.0 and 5206.0) for 1959-60 to 2003-04. GDP data for previous years were estimated from the relationship between the present GDP measure and the old GDP(I) measure published in the National Accounts. State & Local Government taxes include all taxes, fees and fines for these two tiers of government (from ABS Cat. No. 5206.0 for 1972-73 to 2003-04 and spliced from Foster and Stewart for past data). ^b

Data sources: As in figure J.2.

Figure J.4 Have grants kept pace with State spending?^a

1964-65 to 2003-04 (share of State spending)



^a State and Local Government spending is measured as 'Total use of gross income' less Net savings from the National Accounts (Cat. 5206.0). SPPs and current grants are defined in figure J.2.

Data source: As in figure J.2.

While the historical trends do not support the view that SPPs are likely to only keep pace with population and price movements, it is hard to distinguish either of the other two possibilities raised previously. Either way, the trends confirm that the States can face fiscal risks associated with flagging Commonwealth payments over a span of years.

In any case, it should be emphasised that the projection methodology used by the Commission is based on maintaining broad policy settings. However, many of the changing past trends in total current grants or its sub-component, SPPs, reflect significant policy shifts or different social/economic circumstances to those of the present or likely future:

- Relatively little population ageing has occurred, so there is little scope to explicitly identify the impacts of ageing on SPPs in past data.
- The role of SPPs have changed. In 1964-65, around 40 per cent of SPPs were applied to transport and communication, while in 2003-04 this had fallen to below 5 per cent. In contrast, education and health have grown strongly (for example, health from 3.7 per cent in 1964-65 to 36.4 per cent in 2003-04).⁹
- Until the introduction of the GST, there was a tendency over time for the Australian Government to shift payments between recurrent spending and untied grants to SPPs (which are tied grants).¹⁰ This would have had the effect of maintaining the SPP to GDP (and State spending) ratios, even while overall payments fell relative to GDP. In the future, this trade-off will not be possible.

As a consequence, the historical trends may not be a reliable indicator of future growth patterns in SPPs.

Judging the different funding scenarios by their likely outcomes

Another way of assessing the most appropriate projection methodology for SPPs is to weigh up their likely outcomes against each other. Figure J.4 represents the range of outcomes that lie between three broad scenarios:

- Case C assumes that special purpose payments by the Federal Governments for public hospitals, home and community services, government schools and vocational education increase (or decrease) with the associated service needs in the States (box J.1). This is the approach used by the Commission in its projections throughout this report. Case C is represented as a zero line in the diagram because our interest is not in total fiscal pressure associated with each

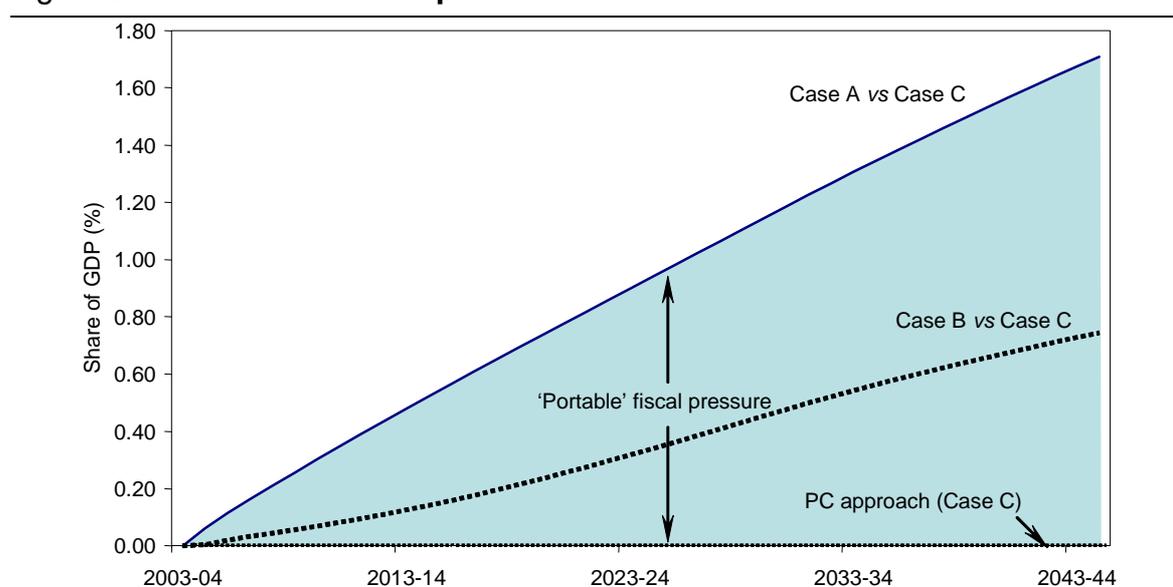
¹⁰ Thus, using the data from Mathews and Grewal (1995), the share of recurrent payments accounted for by untied grants fell from 81 per cent in 1972-73 to 51 per cent in 1993-94.

scenario, but the *difference* in fiscal pressure between them. To reveal that difference, the common fiscal pressure associated with the three cases has been netted out.

- In case A, the Australian Government fixes SPPs in real per capita terms, while States have to fund *all* of the spending on the age-related areas under their operational control (public hospitals, home and community services, government schools and vocational education) in line with service needs. Since GDP still grows in per capita real terms, such a scenario implies that SPPs fall as a share of GDP. By 2044-45, SPPs would only constitute 1.1 per cent of GDP, compared with a current level of around 2 per cent (and a projected level of 2.8 per cent were SPPs to keep up with service pressures, as under case C). And, given continuation of trends, SPPs would account for only a little more than 0.4 per cent of GDP by 2100-01. This case produces bigger fiscal pressures for State Governments because they have to meet the age-related costs associated with the entire public hospital system, without a compensating increase in SPPs from the Australian Government.
- Case B is the same as case A, except that the revenue constraint posed by SPPs is relaxed somewhat. It is assumed that the Australian Government fixes the ratio of nominal SPPs to GDP at just over 2 per cent (the estimated ratio in 2003-04).

Any alternative outcome between this range would be somewhere in the shaded area of figure J.5.

Figure J.5 **Portable fiscal pressure**^a



^a SPP data for the base year (2003-04) is from the 2004-05 Budget Papers. The three lines shown are the differences in fiscal outcomes associated with the three alternative assumptions for SPPs — and are derived by subtracting the net spending outcomes E1-E3, E2-E3 and (as the base case) E3-E3 — as described in box S.1. The GDP share was calculated for two scenarios.

Data sources: PC estimates; Australian Government (2004), *2004-05 Budget*, Budget Paper No. 3 and data from the Australian Government Department of Finance.

Box J.1 Different models of state spending

This is a simplified picture of the budget circumstances of the States, which helps to illustrate the different ways of modelling federal fiscal relations and ageing.

Suppose that there is only one age-related expenditure (say, public hospitals). Public hospital spending (A) is partly funded directly by the States and partly by public hospital SPPs from the Australian Government (PHSPP). All terms are in constant prices. States also spend on non-age related services (N) and again these are partly funded directly by the State Governments and partly through non-age related SPPs (NASPP) made by the Australian Government. States receive revenue from own-state revenue (R), GST payments and SPPs (comprising PHSPP and NASPP).

So net expenditure by State Governments is: $E_t = A_t + N_t - R_t - \text{GST}_t - \text{PHSPP}_t - \text{NASPP}_t$

The three different views of how PHSPP and NASPP may change after the base year are:

In case A, SPPs are maintained in real per capita terms at their 2003-04 values so that $(\text{PHSPP}_t + \text{NASPP}_t) = (\text{PHSPP}_{2003-04} + \text{NASPP}_{2003-04}) / \text{POP}_{2003-04} \times \text{POP}_t = \lambda \text{POP}_t$.

In case B, SPPs comprise a fixed share of GDP, so that: $(\text{PHSPP}_t + \text{NASPP}_t) = (\text{PHSPP}_{2003-04} + \text{NASPP}_{2003-04}) / \text{GDP}_{2003-04} \times \text{GDP}_t = \phi \text{GDP}_t$

In case C, SPPs are set so that they maintain the base year share of total State spending on age and non age-related items, so that: $\text{PHSPP}_t = (\text{PHSPP}_{2003-04} / A_{2003-04}) \times A_t = \alpha A_t$ and $\text{NASPP}_t = (\text{NASPP}_{2003-04} / N_{2003-04}) \times N_t = \beta N_t$. Under Case C, SPPs by the Australian Government keep up with service pressures. Indeed, if case C holds, State net spending can be re-written as: $E_t = (1-\alpha)A_t + (1-\beta)N_t - R_t - \text{GST}_t$. In this instance, forecasts of fiscal pressure for the States require projections of State-funded spending only (not including SPPs).

Values of net spending corresponding to these three cases can then be calculated (E1 to E3). The effect of the three alternative assumptions on fiscal pressure can be appraised by taking the difference between the net spending measures (noting that most terms cancel). Accordingly, the effect on fiscal pressure of case A relative to case C is $E1-E3 = \alpha A_t + \beta N_t - \lambda \text{POP}_t$, while the effect of case B relative to C is: $E2-E3 = \alpha A_t + \beta N_t - \phi \text{GDP}_t$. It is clear that E1-E3 will get large over time because A and (to a lesser extent) N grow faster than the population over time. Similarly, E2-E3 will also grow over time (albeit less rapidly) because A grows as a share of GDP over time. Thus the fiscal pressure measures will be much larger for case A versus C and modestly greater for case B versus case C.

In the data shown in figure J.5, the above model is elaborated to take account of the four most important age-related areas of spending by States.

The economic and policy implications of case A (vis a vis case C) would be:

- by 2044-45, an additional deficit to the States of about 1.7 per cent of GDP. The shortfall in 2044-45 would be \$33 billion or around \$1 250 per capita (in 2002-03 prices). The *accumulated* shortfall in State finances from 2004-05 to 2044-45 would be \$570 billion in 2002-03 prices.
- These transfers would provide relief of fiscal pressure for the Australian Government. In effect, tax receipts would rise in line with GDP, while outlays to the States would fall. There would be a corresponding need for States to find other revenue sources, cut spending or to borrow. These financing methods all face some limitations:
 - Borrowing to meet the deficit would not be sustainable in the long run.
 - Were the deficit to be tax-financed, it would require that the States increase their tax share of GDP by around 1.7 per cent above the counterfactual. Since currently their taxes are around 4.5 per cent of GDP, this would imply significant increases in State tax *rates*. States do not have the same degree of tax policy flexibility as the Australian Government (which is the reason for the vertical fiscal imbalance that leads to Commonwealth payments to the States in the first place). Accordingly, tax financing by the States might lead to economically inefficient taxes, a point also noted by Access Economics (2002) in its analysis of fiscal concerns for the States.
 - Were the overall demand for services to only stay fixed in real per capita terms, then this would imply that State spending would fall relative to GDP. This would still permit States to run surpluses, despite falling SPP to GDP ratios. However, real per capita demand for some key services operated by the States, such as public hospitals, home and community services and disability services, will increase with population ageing. Moreover, many of the services provided by the States — health care, education and law and order — are ones for which public expectations of increased quality and quantity rise as our national income grows.¹¹ Consequently, failure to provide increased services per capita would probably be perceived unfavourably as progressively more severe rationing.
 - More private funding for services could be sought. However, for the most important service for which States are funded by the Australian Government,

¹¹ And in any State services where productivity growth is less than the assumed 1.75 per cent per annum, real costs per capita would rise as real wages rose. This implies that the supply of such services would have to contract were there a requirement for State costs to stay constant in real per capita terms.

public hospitals, pricing is outside the control of the States.¹² Australian Government policy is for free access by Australians to public hospitals.

- Other than the case where State Governments reduce the funding of services relative to GSP, the first scenario pre-supposes an increased role for the States in funding social services, such as hospitals and home and community care. By extension, this would also represent a substantial diminution of the role of the Australian Government, and, therefore, a transformation in the historical responsibilities of these different tiers of government.

Implications

Overall, while case A is possible, it pre-supposes a complete shift in long run fiscal relations, and significant — quite possibly inefficient — policy initiatives to deal with the resulting deficits. For that reason, it is probably not a realistic depiction of the likely fiscal pressures that will be borne by State Governments.

But what of the counterfactual — case C? It recognises that the Australian Government has wider tax and other policy options to meet the fiscal pressures of ageing. It also seems broadly consistent with the long run pattern of federal fiscal relations.

However, its realism also depends on the capacity for the Australian Government to increase SPPs from around 2 to 2.8 per cent of GDP over the next forty years — a time when population ageing will have also increased spending in other areas, such as pharmaceuticals, Medicare and Age Pensions. Under case C, the degree of fiscal burdens associated with ageing experienced by State Governments are relatively modest compared with the Commonwealth. Accordingly, if the Australian Government attempts to share the fiscal burdens more widely, State Governments do face a risk that SPPs may not grow as fast as under case C. Nevertheless, the Commission has interpreted such an Australian Government response as a shift in long run policy settings. The point of the modelling exercise is to consider fiscal outcomes associated with no change in long run policy settings, and in that context, the preferred base case for modelling is case C.

That said, it may be useful to distinguish fiscal *risks* for the States from fiscal *pressures*. Such risks pick up the possibility that case C will not hold — or that growth in SPPs are moderated in response to the fiscal pressures borne by the Australian Government under case C. While case A is probably too extreme a measure of that risk over the long run, the intermediate assumption — case B —

¹² Health care grants from the Australian Government to the States accounted for nearly half of Australian Government funding 'to' States in 2003-04.

appears more plausible. The implications for State finances are significant. The economic implications of case B (vis a vis case C) would be an additional deficit to the States of about 0.7 per cent of GDP by 2044-45. The shortfall in 2044-45 would be \$14 billion or around \$540 per capita (in 2002-03 prices). The *accumulated* shortfall in State finances from 2004-05 to 2044-45 would be \$224 billion in 2002-03 prices.

It is also important to note that even were case C to characterise the ‘average’ policy setting, States still might be exposed to fiscal risks associated with the ebbs and flows of Australian Government payments over the short run. It is clear, for example, that the recent health agreements did not increase Australian Government spending in line with GDP over the life of the agreement. However, this should be seen as a short term phenomenon, and should be placed in the context that this was a period in which State gains from GST revenue exceeded expectations. In the short run, case A is probably a reasonable scenario for evaluating fiscal risks to the States.

Finally, as shown above, the fiscal position of different tiers of government is sensitive to varying assumptions about the rate of growth of SPPs, whereas the fiscal position of combined governments is not. The immediate implication of this is that *aggregate* fiscal pressure borne by collective Australian governments is the best single measure of the fiscal consequences of ageing.

J.4 Relative fiscal risks for individual States compared with each other

The bulk of the fiscal risks to States occur for the States as a group. Nevertheless, chapter 2 indicates that population ageing is stronger in some States than others. In the absence of mechanisms that took account of these variations, States that face more population ageing, such as Tasmania and South Australia, would be disadvantaged in the distribution of SPPs and GST revenue. In fact, Australian Governments have developed a complex mechanism administered by the Grants Commission — horizontal fiscal equalisation (HFE) — which takes accounts of factors that advantage and disadvantage States, including differing age structures.

The Grants Commission estimates socio-demographic composition (SDC) disabilities for each State. These reflect differences in the characteristics of State populations on the use of services and/or the cost of each unit of service. States with greater SDC disabilities are the recipients of greater payments. SDC disabilities are highly disaggregated by factors, including age, that create cost differences. Of 23 State services, only two (public housing maintenance and public housing user

charges) did not have ‘use weights’ that varied with age. While there remain differences between State Governments about how to fully measure and account for disadvantage in different populations, in the latest review of the SDC disabilities, these related to factors like indigeneity, location and cultural and linguistic diversity, not ageing (CGC 2003).

Horizontal fiscal equalisation limits the likely fiscal risks associated with ageing for individual States. Accordingly, the South Australian Government argued that:

Since HFE equalises the capacity of State Governments to deal with differing demographic budget trends, there is little value in ... exploring the fiscal impacts of population ageing between individual State Governments (sub. 23, p. 19).

Overall, the Commission’s judgment is that the ageing-related risks posed by any defects associated with HFE were likely to be small. Since the Grants Commission also takes account of SPPs to individual States in its recommendations for allocating GST revenue, HFE is also likely to deal with most ageing related risks posed by individual State SPPs.

K Submissions and consultations

K.1 Submissions received

The following table lists the 41 submissions received prior to publication of this draft report. These submissions are available on the Commission's website (www.pc.gov.au/study/ageing/subs/sublist.html#list).

<i>Participant</i>	<i>Submission number.</i>
ACOSS	27
ACT Government	21
Alzheimer's Australia	3
Australian Local Government Association	18
Australian Nursing Federation	36
Australians for an Ecologically Sustainable Population Inc.	7
Brian and Veronica Spillane	41
Brotherhood of St Laurence	11
Carers Australia	26
Catholic Health Australia	20
CPA Australia	13
Department of Industry, Tourism and Resources	33
Dr Mathew Gray	10
GlaxoSmithKline	35
Malabam Health Board	4
Medicines Australia	32
Jeff Richardson — Monash University	16
Murdoch Children's Research Institute	6
National Centre for Vocational Education Research Ltd	19
National Rural Health Alliance Inc.	12
Nigel Fitzpatrick	30, 31, 34, 37 & 38
Northern Territory Government	8
Northern Territory Government	15
Queensland Government	17
Real Estate Institute of Australia Ltd	5
Richard Van Wyk	2
Securities Institute	22
Shire of Campaspe	14

Social Market Economy Institute of Australia	25
South Australian Government	23
Tasmanian Government	40
The Australasian Centre on Ageing	9
Victorian Government	29
Volunteering Australia	28
Western Australian Government	39

K.2 Consultations

The Commission hosted a workshop, attended by officials from the Australian, State and Territory governments, on 29 July 2004 in Canberra, to discuss approaches to estimating the economic and budgetary impacts of population ageing and work-in-progress.

In addition to continued liaison with workshop attendees, including visits to different jurisdictions, discussions were also held with the following parties:

Access Economics

Australian Local Government Association

Australian Bureau of Statistics

Australian Institute of Health and Welfare

Centre for Burden of Disease and Cost-Effectiveness (School of Population Health, Queensland University)

Department of Health and Aged Care

Department of Family and Community Services

Epidemiology Services Unit (Queensland Health)

GlaxoSmithKline

Heather Booth (Demography and Social Program, Australian National University)

Jan McMillen (Australian National University)

Jeff Richardson (Centre for Health Economics, Monash University)

Medicines Australia

Peter Sheehan (Centre for Strategic Economic Studies, Victoria University of Technology)

Rebecca Kippen (Demography and Social Program, Australian National University)

Steve Dowrick (Faculty of Economics and Commerce, Australian National University)

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- 2003b, *Population Projections Australia, 2002-2101*, Cat. no. 3222.0.
- 2003c, Demography Working Paper 2003/5, *Net Overseas Migration: Adjusting for Actual Duration of Stay or Absence*.
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— 2004a, *Australia's Health 2004*, AIHW Cat. no. AUS 44, Canberra.

— 2004b, *Health Expenditure Australia: 2002-03*, AIHW Cat. no. HWE 27 (Health and welfare expenditure series no. 20), Canberra, September.

— 2004c, *Health system expenditure on disease and injury in Australia, 2000-01*, AIHW Cat. no. HWE 26 Canberra: AIHW (Health and Welfare Expenditure Series no. 19).

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