

Submission to the Productivity Commission Inquiry into Infrastructure provision and funding in Australia

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This submission is in response to the draft report of the Productivity Commission's Public Infrastructure report. With respect to the inquiry's **Scope**, it addresses particularly:
"The rationale, role and objectives of alternative funding and financing mechanisms, including: (a) the full range of costs and benefits of different models."

Key Points:

This submission finds that the main source of increased fiscal stress of infrastructure provision is due to the acceleration of Australia's population growth rate since 2004.

I recommend that the Productivity Commission include reducing immigration quotas among the options examined for meeting the fiscal challenge of adequate infrastructure provision.

I provide evidence to inform such an evaluation, including costs and benefits of population growth.

I argue that 'capital widening' to accommodate more people is a recurrent cost, not an investment, and therefore no model of debt-financing, including private investment, is rational for this component of new infrastructure requirement.

I identify the loss of productivity and amenity from crowding of existing infrastructure as the main missing element in analysis of the investment value of additional infrastructure. The result is that 'capital widening' yields no net benefit per capita, and hence can't justify new user charges.

I advocate that funding is primarily provided from taxation, since all other options require the public to pay more and distribute the cost less fairly, and that this burden is minimised by minimising further population growth.

Accelerated population growth has caused a current account blow-out

Based on long-term expenditure on Gross Fixed Capital Formation (GFCF) from 1964 to 2004 (prior to the population growth surge), expanding the capacity of Gross Fixed Capital has required around 6.5% of GDP per 1% population growth rate. Public expenditure represented approximately a quarter of this, and government expenditure about one seventh. Around 53% of GFCF was attributable to population growth (see next section for more detail).

Since the recent elevation of immigration quotas and temporary migration programs, the actual increase in government expenditure on GFCF was elevated considerably, belying

claims that current infrastructure deficits are due to government neglect. This spending has contributed to government deficits and austerity in other areas such as welfare and support for community services.

Although government spending increases were more than proportional to the population growth, they were evidently insufficient to avoid infrastructure congestion. This suggests that other factors have also been involved in increasing the cost of infrastructure provision. Most, but not all, of these factors are due to population density or growth rate. Hence costs of population growth are not linearly proportional to the number of people added, but escalate with both growth rate and population density.

This perspective is crucial for the rationale of infrastructure funding, because providing for population growth is not *investment* under any meaningful economic definition. It is a *recurrent cost*, required in order simply to maintain existing productivity and standards of living. This distinction is often referred to in terms of ‘capital widening’ (providing more of the same to support more people) in contrast with ‘capital deepening’ (providing better standards of infrastructure per capita, enabling greater productivity or amenity).

What is missing from the political discourse about infrastructure funding is the *loss of productivity due to crowding* of our existing infrastructure and services. Providing additional capacity to restore lost productivity gives no net benefit to the position of the average Australian business or citizen. Asking them to pay a user-charge for this new capacity, to replace what was taken from them by population growth, obviously leaves them worse off. Normally, when someone takes away something you own, and then demands payment to have it restored to you, this is called *extortion*.

I don’t need to explain that debt-funding of recurrent costs is a recipe for spiralling into bankruptcy. There is no prospect whatever for the infrastructure currently planned by government to increase per capita productivity sufficiently more than that lost through crowding, in order to repay the debt with interest. Our current high need for additional infrastructure is not a one-off situation, it is recurrent as long as population growth is sustained. No model for funding other than fitting our needs to our current budget can be sustainable.

I hasten to add that not all new infrastructure is merely accommodating population growth. Some is genuine improvement (capital deepening), and may be treated as investment. The National Broadband Network and an intercity fast-train would qualify as technological improvements. I do not make any judgement as to whether these particular projects are cost-effective investments, only that, if found to be so, debt financing would be rational.

Most projects incorporate some technological improvement along with capacity expansion, so the distinction between investment and recurrent cost is hard to make. We must be careful to distinguish between technological improvement that genuinely improves utility to users, and that which is only required to manage the higher density of users. For example, the upgrade of a port to handle larger vessels and more rapid transfers is only of benefit to the community if the cost of the upgrade, including its financing, is fully incorporated into the handling charges and still delivers goods at a lower cost to consumers. Any lesser outcome is purely capacity expansion, spending money to recover the productivity lost due to crowding.

A rapidly growing population requires inefficiently flexible design, and inefficient provision of overcapacity for some time, followed by inefficient crowding of the infrastructure until new capacity comes on line. A population stabilisation plan enables infrastructure to be designed to operate at optimal capacity for a sustained period of time. This is a major advantage enjoyed by European nations compared with Australia.

What is the cost of capacity expansion for population growth?

A more thorough explanation, with an example calculation of Australian figures for 2010, is given in O’Sullivan (2012).¹ The validation of costs over long time series, allowing evaluation of over- or under-spending, is discussed using UK figures in O’Sullivan (2013).² This section gives preliminary results of time series data for Australia.

I acknowledge that the Productivity Commission is currently limiting its attention to public engineering works. The following analyses are inclusive of all forms of infrastructure, as I do not have data to delineate public engineering works. They serve nevertheless to illustrate methodology and logic relevant to the inquiry.

Based on historical spending on Gross Fixed Capital Formation (GFCF) over the four decades from 1964 to 2004, and assuming a 50-year average lifespan of fixed capital, the value of the national stock of fixed capital is estimated in Table 1. These figures represent replacement value, not depreciated value, as this is pertinent to the cost of capacity expansion.

Table 1. Estimated average value of total fixed capital in Australia, 1964 - 2004.

Jurisdiction	Value in 2013 \$Trillion	Multiple of GDP	Per capita cost \$
National	9.89	6.48	431,000
Public	2.56	1.68	112,000
General Government	1.35	0.89	59,000

It should be emphasised that each additional person requires well over \$100,000 of public infrastructure, to enjoy the same standard of living provided to existing residents. In addition, the private expenditure to equip new households represents a diversion of consumption away from consumption contributing to quality of life. To a considerable extent, it also represents an increase in personal debt levels, and the proportion of national product which goes to service foreign debt, diminishing net national income.

Maintaining the level of service and amenity that the Australian population derives from fixed infrastructure requires that this stock is renewed at the end of its lifespan, and expanded in proportion to additional population. This analysis assumes that the cost of expansion is proportional to the number of persons added, ignoring for the moment the escalation of costs discussed above.

¹ O’Sullivan JN (2012) The burden of durable asset acquisition in growing populations. *Economic Affairs* 32(1): 31–37. <http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0270.2011.02125.x/abstract;jsessionid=9079E4E881757354969065CEA605CD52.d04t04>

² O’Sullivan, J.N. (2013) The cost of population growth in the UK. Population Matters, UK. <http://www.populationmatters.org/resources/papers-reports/>

In the forty years preceding the recent surge in population growth, the annual replacement rate averaged 1.29% of the existing stock per year. This is the proportion of the stock which reaches the end of its lifespan in each year, and is smaller than the steady-state turnover rate (2% for a 50 year lifespan) due to growth diluting the oldest cohorts. The required expansion rate (i.e. average population growth rate) was 1.44% per year. Consequently 2.73% of the existing infrastructure stock was required to be created each year. The cost was 2.73% of 6.48 x GDP, equal to 17.7% of GDP annually.

A considerable increase in GFCF followed the doubling of population growth between 2004 and 2007. From 2007 to 2013, GFCF averaged 26.3% of GDP, a 48% rise over the four decades prior to 2004. Government expenditure rose to 3.4% of GDP, a 35% rise. Table 2 summarises these changes, and highlights the expenditure directly attributable to total population growth, and to the extra population growth due to changes in government policy, which has increased population growth around 0.9% p.a. above previously projected levels.

Table 2. Average annual expenditure on GFCF over the period 2007 – 2013: per cent of GDP (Billion \$)

Jurisdiction	Annual Expenditure on GFCF	Increase over previous 4 decades	Attributable to population growth	Attributable to policies boosting population growth
National	26.26 (371)	8.51 (120)	11.53 (163)	5.84 (82)
Public	4.95 (70)	0.36 (5)	2.98 (42)	1.59 (21)
General Government	3.27 (46)	0.85 (12)	1.51 (22)	0.80 (11)

Thus, based on the assumption that added people now require a similar expenditure as in the past, the actual increase in private and government expenditure on Gross Fixed Capital Formation should have been more than enough to accommodate the population growth. The much smaller increase in ‘public’ expenditure may reflect the privatisation of previously public utilities, so the deficit in this category may be responsible for part of the excess in private spending.

The data refute the claims that the infrastructure deficits felt today are due to government neglect of investment. However, despite the large increases, government spending was evidently insufficient to avoid infrastructure congestion. This suggests that other factors have also been involved in increasing the cost of infrastructure provision, and hence the cost of adding people.

Likely factors include:

1. The increase in global oil price, disproportionately impacting the construction sector, and engineering construction in particular, due to the energy intensity of both its operations and inputs, and directly impacting bitumen price.
2. Economic stimulus expenditure, particularly on the school building program, which was additional to normal allocations for infrastructure development. Whether this represented ‘catch-up’, advance on future capacity needs, or wastefully unneeded facilities or upgrades (apparently a mixture of the three existed in the program), it nevertheless contributed to a discontinuity in spending levels.

3. The inflation of land values, driven by population growth and government policies perversely encouraging speculative investment in property at the expense of productive investment (such as domestic capital available for infrastructure).
4. The need to substitute natural resource capacity with technological capacity, as the former is overused. The natural endowment was previously ample to service the population, but cannot service a much larger population. Desalination to supplement limited freshwater catchment is the most visible example. Waste disposal facilities, enclosure of irrigation canals and all measures taken to reduce greenhouse gas emissions, are other examples.
5. The need for increasingly highly engineered solutions to deliver the same individual utility at increased population density. The progression from simple roads to traffic lights, divided highways with slip roads, overpasses, sound barriers and tunnels illustrate this progression. For the same utility of a 20 minute commute, the average commuter in 2014 uses far more infrastructure than that of 1960. If the average commute has lengthened from 20 to 40 minutes, the commuter has not only lost utility in time and vehicle running costs, but in taxes and tolls for the additional infrastructure.
6. The increasing complexity, disruption and wastefulness of retrofitting already built-up areas with higher-capacity infrastructure. Such upgrades necessarily remove existing infrastructure which is not worn out, either because it has become congested or because it is in the way of higher priority land use. Shortening the average working life of infrastructure greatly increases the societal cost per unit of utility it provides.

Four out of six of these factors are direct consequences of accelerated population growth, showing that the cost of added people is not linearly proportional to the number of people added but escalates with both growth rate and population density.

Does population growth pay its way?

If the economic benefits of population growth outweighed the cost of the additional infrastructure and other negative impacts, it might be argued that the increase in immigration quotas was prudent and should be sustained. Is there any evidence for such benefits?

The Productivity Commission (2006)³ concluded that elevated immigration rates are likely to have very little effect on GDP per capita, and a probable negative effect on existing Australians. The main beneficiaries were found to be large employers (through the suppression of wages and greater workforce flexibility) and the migrants themselves. This analysis acknowledged but did not quantify negative non-monetary impacts on general amenity and environment. It did not include the elevated cost of infrastructure provision discussed above. The diversion of over 11% of GDP (and a similar or greater proportion of government revenue) to this treadmill of running-to-stand-still clearly shifts the net benefit strongly into negative territory.

While the Productivity Commission has repeatedly affirmed that population growth is no solution to demographic ageing,⁴ ageing is still presented as a structural challenge to future

³ Productivity Commission (2006) *Economic Impacts of Migration and Population Growth*, Research Report, Canberra.

⁴ Productivity Commission (2011) *Annual Report 2010-11*. <http://www.pc.gov.au/annual-reports/annual-report-2010-11>

economic growth.⁵ It is high time for the Productivity Commission to test its own assumption, that employment is governed by the supply and age profile of working age people (i.e. job seekers create jobs) rather than by the demand from employers. The possibility that Australia's relatively low and declining workforce participation rate is due to crowding of the job market has not been assessed by the Productivity Commission.

As presented in Figure 1, there already exist countries with nearly twice Australia's 'old-age dependency ratio' yet they show no decline in proportion of the population who are actually employed. My analysis of comparisons across OECD countries concludes that ageing does not increase the proportion of economically inactive people nor the burden of social transfers, but population growth does. It shifts the balance of people without jobs from active, well-capitalised retirees to excluded and marginalised working-age people. This shift represents a myriad of negative social impacts. A significant correlation exists between demographic youthfulness (a legacy of past population growth) and income inequality (Figure 1 C).

Nor are skilled immigrants qualitatively better able to meet Australia's skills needs. Certainly, individuals can be found whose contribution is unique and highly valued, but Birrell and Healy (2013)⁶ has shown that immigrants, *en mass*, are more likely to be unemployed or to be employed at levels below their qualification. Around 60% of immigrants entering under the skilled migration program are family members of the primary applicant, generally lacking needed skills. Family reunion immigrants further dilute the importation of skills. Each immigrant increases demand for skills, through their consumption of housing, health care, education and all other services. From their employment profile, it seems more likely that they exacerbate rather than resolve skills shortages.

The idea that a skills shortage is best solved by importing trained people lacks circumspection. If training were truly a factor limiting productivity of Australian businesses, one would expect to see greater investment by them in training their personnel and providing support for tertiary programs. The opposite is evident – businesses have progressively shed responsibility for staff training, expecting employees to come ready-trained at their own expense. This shift is fostered by the shift in government attitude toward tertiary training, from viewing graduates as valued assets in which the State rightly invests, to consumers of higher education for no-one's benefit but their own. The retreat from higher education funding has been a false economy of enormous scale, when compared with the increased expenditure on infrastructure to accommodate imported graduates. As we have seen above, the fiscal cost is over \$100,000 per person added.

The **draft report** (p.29) highlights that "*The intermittency of construction projects has been one of the most important drivers of skill shortages in infrastructure construction.*" They are, then, a consequence of the ideological pursuit of outsourcing as a means of maximising productivity. If construction workers were in permanent government employment, government would schedule projects in order to best use the crews available, and would ensure adequate apprenticeships and graduate recruitment activities were in place to sustain this workforce. While outsourcing may still have advantages outweighing this inefficiency of labour use, I have not seen any attempt to quantify them.

⁵ Productivity Commission (2013) *An Ageing Australia: Preparing for the Future*. Research Paper, Canberra.

⁶ Birrell R. and Healy E. (2013) *The Impact of Recent Immigration on the Australian Workforce*. Centre for Population and Urban Research – February 2013.

http://artsonline.monash.edu.au/cpur/files/2013/02/Immigration_review_Feb-2013.pdf

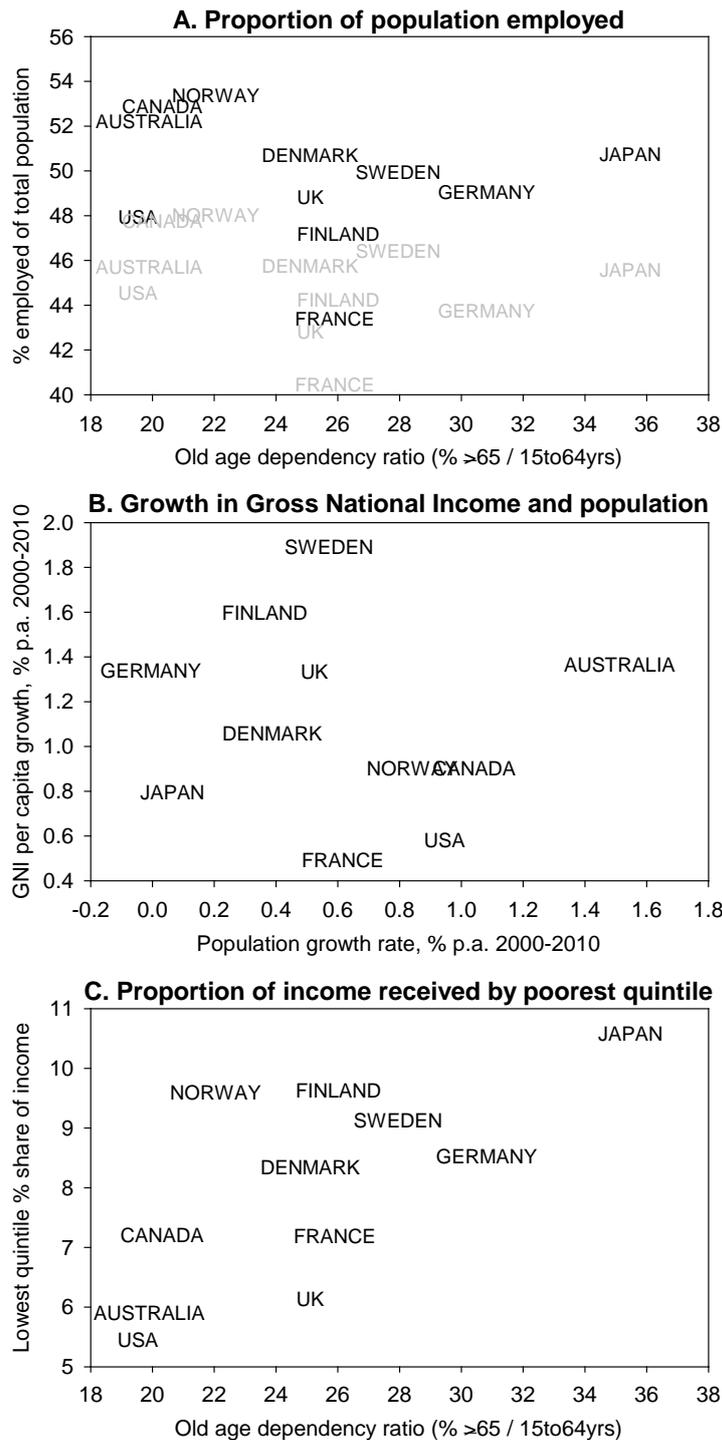


Figure 1. The Real World experiment: A. The proportion of total population employed (black), and the proportion of full-time-equivalent employment (grey), compared with the old-age dependency ratio for a range of wealthy countries. B. The relationship between growth in gross national income per capita and population growth rate, for the same nations. C. The relationship between old-age dependency and income share of the poorest quintile of the population. Data from World Bank (2013)⁷.

⁷ World Bank (2013) Databank. <http://data.worldbank.org/indicator>

Public or private funding?

Private funding will always result in greater cost to Australian beneficiaries of infrastructure. One way or other, the public must ultimately pay.

The least cost option is to reduce our need for additional infrastructure, by reducing immigration and ending the encouragement of higher birth rates. This option must be included in any genuine attempt to identify maximum national interest. We must cut our coat to fit the cloth, and it appears that there simply isn't cloth for a large portion of our population growth, with its requirement for capital-widening.

The next least cost option is to pay for current construction through current taxes. If this requires an increase in taxation, so be it. This is by far the most honest way of leveraging the funds from the public, since all other options must ultimately leverage more funds. Australia is a low-tax country with a high cost of living, compared with other OECD countries. The extent of causation between these factors should be examined: can higher taxation reduce overall cost of living, and hence more than repay the average citizen's tax outlay?

In descending order of public benefit are government borrowing, public-private partnerships and privatisations. If government borrows to fund infrastructure, the public ultimately pays the cost of construction plus the interest on the loan, either through deferred tax rises or eroded government services and welfare – the opportunity cost of diverting government revenue to debt-servicing. If private investors fund the infrastructure, the public pays a far higher interest rate, or pure rent, to provide the investors with a commercially competitive return on their investment.

State governments are keen on selling public assets to provide funds for infrastructure. Remembering that most of the infrastructure is recurrent cost, merely attempting to stem the loss of productivity and amenity due to crowding, such sales clearly represent impoverishment of the population. Since only profitable assets have privatisation potential, the revenue raised by asset sales always represents a poor deal in the long term. Government borrowing will always be preferable to asset sales, on purely economic terms. Adding considerations of equitable access and the factor

Taxation or User Charges?

The draft report states (p. 13) “*Ultimately infrastructure can only be funded through taxation, borrowings or direct user charges.*” I would add that borrowings must ultimately be paid through taxation or direct user charges.

I disagree with the draft report's conclusion (Overview Key Points, p. 2) that “*Well-designed user charges should be used to the fullest extent that can be justified.*”

Taxation is by far the most equitable way to fund essential infrastructure. Benefits from facilities like roads, power grids and ports flow throughout the economy, benefiting everyone. Hence everyone should pay, not only the direct users. Concentrating the cost on the direct users, through tolls or service charges, causes perverse price signals discouraging the most efficient use of infrastructure. Furthermore, in many cases users may be forced to use the new infrastructure because other options have been taken from them, although they

receive no net benefit from the change. The cost of collecting such charges must also be factored in.

Privatisation locks in the inefficient option of direct user charges.

The **draft report's** support for road use charging is particularly concerning. While the data collection may have its uses for better planning of additional infrastructure, such data can be collected at least as easily without charging. A shift from fuel tax to road pricing would be perverse in terms of climate change and energy resilience. The opposite shift would provide a far better and fairer financing of roads: if fuel taxes were elevated to a sufficient level to fund roads, it would efficiently distribute costs to the highest users, while maximising the price signal for beneficial behavioural change.

The Government has been bold in telling the public that belts must be tightened and sacrifices made. Yet the form of belt-tightening best able to maximise public benefit – income tax – is ideologically ruled out. Just now, the government is preparing the electorate for a rise in the GST, and even the idea of charging it on health services. This would be a regressive option, disproportionately burdening the poorest and most vulnerable people.

Specific responses to the draft report

The **Terms of Reference** refer to Costs, Competitiveness and Productivity. The report's analysis has failed to identify costs of population growth, and the loss of productivity attributable to infrastructure crowding. These omissions generate a false assessment of national interest.

Background: the report's statement "*Ultimately infrastructure can only be funded through taxation, borrowings or direct user charges.*" (p.13) directly contradicts its statement that "*the use of financing options involving the private sector can reduce the call on government resources, allowing scarce public funds to be targeted in a more effective manner.*"

p. 31 – achievable savings: The 10% saving could be achieved simply by reducing immigration quotas by around 20%. Halving of the annual fiscal burden of infrastructure is achievable a few within decades by stabilising Australia's population. In contrast, the savings identified by the report require incremental and consistent improvement in many aspects of complex systems.

INFORMATION REQUEST 6.1

The Commission seeks views on the costs and benefits of governments issuing project-specific infrastructure bonds, with the interest rates reflecting the risks of the project and which explicitly do not have a government guarantee.

This would increase the cost to government (i.e. to future Australian tax payers), since individual investors are necessarily more risk averse than governments due to more limited capacity to spread risk, so the risk will be priced more highly than its actual cost to government. Government reaps indirect and intangible benefits from infrastructure that doesn't meet its financial return goals (through its contribution to national productivity and welfare) which offset government risk, but not private risk. Privatising of risk can only work for government by exploiting market failure (the capacity of government to dupe investors into under-pricing their risk – such as the finance industry has widely done through derivatives).

INFORMATION REQUEST 6.2

The Commission seeks views on the costs and benefits of governments issuing converting infrastructure bonds to finance greenfields infrastructure investments.

Greenfield developments are clear examples of recurrent costs of population growth (capital widening). They may be financed through debt if the lifetime payback is assured within the development, but this makes the development more expensive than if it is financed from current account. There is no basis for benefit from payment deferral, since population growth ensures greenfield development is an ongoing need, so there is never a future time in which today's fiscal gap is lessened, making repayment easier for future people than current people.

DRAFT RECOMMENDATION 2.1

There is no continuing case for retention of certain infrastructure in public hands.

Accordingly, State and Territory Governments should privatise their government-owned:

- *electricity generation, network and retail businesses*
- *major ports*

subject to appropriate processes to ensure value for money.

On the contrary, the case for retention is very strong. Sale does not increase national wealth, it merely sells the most profitable assets in order to blow the money on a zero-sum-game of population growth.

Ironically, privatising assets increases the pressure on government to ensure their profitability. Electricity generation is a prime example. Unrefutable facts of climate change and peak oil and coal supply present a very strong case in the public interest for accelerated transition of the electricity sector away from fossil fuels. 'Accelerated' means with some sacrifice of potential economic return on existing installations. This is easy enough for governments to do, when they own the infrastructure and the long-term public interest case is clear. It is exceedingly difficult for governments to do if they have just sold the generators, priced on the basis of unchanging revenue circumstances.

Ports are facilities with extraordinary leverage over supply chains. Placing them in private hands may have many impacts on the resilience and fairness of economic activities in Australia. It would remove the independence of ports from the goods being transferred. It could allow ports to preference the handling of certain goods over others, in ways that may be very hard to police.

INFORMATION REQUEST 7.2

The Commission seeks further information from participants on the costs and benefits of land corridor and site preservation strategies.

A further inherent inefficiency of population growth is the need to purchase and maintain land to ensure adequacy of future infrastructure.

INFORMATION REQUEST 8.1

The Commission seeks more detailed information from participants about techniques used in other countries to deal with the issue of land reservation.

Other developed countries don't have our level of population growth!

DRAFT RECOMMENDATION 11.7

Australian, State and Territory Governments should remove the requirement for local content plans, such as the Australian Industry Participation plans, from tenders for all projects.

Nothing has been said about multipliers of income received by Australian providers in contrast to foreign providers. Australia ranks poorly among OECD countries in the ratio of gross national income (GNI) to GDP, and the steady deterioration of this ratio has meant that headline figures for GDP growth exaggerate growth in Australian wealth – quite apart from ignoring the huge gap between aggregate and per capita economic activity.

The draft report (p. 20-21) affirms that Australian construction is efficient, competent and innovative, by international standards. No justification has been given for arguing that greater foreign access is needed to improve infrastructure provision in Australia.

DRAFT RECOMMENDATION 14.1

The current Review of the Australian Government Building and Construction OHS Accreditation Scheme should examine options such as ‘recognition’ and ‘provisional accreditation’, with a view to the implementation of measures to improve access to Commonwealth-funded projects for firms not presently operating in Australia.

It is disturbing to see the Productivity Commission advocate lowering OHS requirements to facilitate more non-Australian content.

p. 45 Introduction – Key points

Historically, governments have taken responsibility for most aspects of infrastructure provision. But over recent decades there has been increasing recognition of the benefits that can come from greater private sector involvement.

“Recognition” implies a case in evidence has been upheld. I contest that this is not the case. I have seen only empty hypothesising and selective accounting by vested interests. At best, the word “recognition” should be replaced with the word “belief”.

What benefits? To whom? Do the benefits to banks, major construction firms and property developers justify the substantial increase in costs to the public?

It is gratifying to see the Productivity Commission recognise that *“These issues need to be carefully evaluated to ensure that long-term outcomes are not undermined in order to achieve perceived short-term benefits.”*