Productivity Gains: Importance of ICTs

Dean Parham

Australia’s growth performance since the early 1990s has been remarkable. For nine years, annual growth averaged just under four per cent — a performance not seen since the 1960s and early 1970s. Strong growth even persisted in the midst of the 1997 Asian financial crisis and the 2001 global downturn.

A surge in productivity growth has underpinned Australia’s good performance. After showing its weakest rate in the 1980s, Australia’s productivity growth accelerated to record highs in the 1990s. The rate of growth in labour productivity from 1993-94 to 1999-2000 was 3.0 per cent a year (up from a previous average from the early 1980s of 1.7 per cent a year) and the rate of multifactor productivity (MFP) growth was 1.8 per cent a year (up from 0.7 per cent a year).

The 1990s productivity surge was also strong by international standards. Australia was one of three countries to show a strong productivity acceleration in the 1990s (OECD, 2001a). It was a period, unlike the post-war ‘golden age’, when there was no worldwide productivity boom. Australia’s rate of productivity growth outclipped the OECD average for the first time and outpointed the resurgent US rate.

Australia’s surge started around 1993, or possibly earlier, although an uplift in underlying productivity growth prior to 1993 is difficult to disentangle from the effects of recovery from the 1990-91 recession (Parham, 1999, 2002a). In any case, Australia’s surge predated the US productivity acceleration from 1995, which has been linked to an information and communication technology (ICT) boom.

The timing, strength and largely isolated nature of Australia’s productivity surge point to the likelihood of some peculiarly Australian explanations. However, there is no single factor. Some credit should be given to deft macroeconomic policy settings, especially in the face of the Asian financial crisis. Education levels in the workforce have also risen markedly over the past two decades (Dowrick, 2002).

However, there is general agreement that microeconomic policy reforms have played a central role in Australia’s productivity surge (see, for example, Productivity Commission, 1999; Bean, 2000; Dowrick, 2000; Forsyth, 2000; OECD, 2001b). Policy reforms, which have been introduced progressively since the mid-1980s, have included: deregulation of access to finance; marked reductions in barriers to trade and foreign direct investment; commercialisation.

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Reforms have fostered productivity growth through three main avenues:

• sharpening incentives to be more productive, chiefly by strengthening competition;
• opening the economy to trade, investment and technologies developed overseas; and
• providing greater flexibility (for example, less regulatory restriction, more flexible labour markets) to adjust production processes and firm organisation to improve productivity.

The tendency to link Australia’s productivity surge to policy reforms and not to an ICT boom has reinforced a view in some quarters that Australia has not accessed ‘new economy’ gains. Furthermore, the US evidence has been read to suggest that ICT production is needed to tap ‘new economy’ productivity gains. According to this view, the lack of a sizeable ICT production industry in Australia has been seen as a preventive barrier to ongoing higher productivity growth.

This paper examines the issue of whether Australia has accessed ‘new economy’ productivity gains associated with ICTs. The US experience is used as a benchmark to determine upper bounds on the productivity gains that can attributed to ICT production and use. The paper also draws out policy and statistical implications.

The Role of ICTs in Australia’s Productivity Surge

This section reports on a conventional productivity growth accounting exercise, updated from Parham, Roberts and Sun (2001), which investigates the importance of ICTs in Australia’s productivity surge.

The nature of the links between ICTs and productivity gains

Computers, telecommunication systems and the Internet have brought revolutionary changes to businesses, consumers, education, health, entertainment and many other aspects of life. A defining characteristic is that the costs of storing, accessing and exchanging information have been greatly reduced. In so doing, ICTs have reduced the costs of coordination, communications and information processing. But, increasingly, they have also facilitated changes in what businesses do and how they do it.

A particular analytical interest has centred on the links between ICTs and productivity growth. Many studies of these links have employed a growth accounting framework, based on national accounts approaches to productivity estimation. This framework provides three avenues for ICTs to influence labour productivity:
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- **Increases in capital deepening.** Labour productivity can rise as a result of higher capital use per unit of labour, as firms invest in more ICTs. Many analysts have noted this mechanism accords no special qualities to ICTs. As they have become cheaper, firms have substituted ICTs for labour and other forms of capital — as could happen for many other inputs.

- **Productivity gains in ICT production.** Producers’ ability to manufacture much more powerful ICT equipment, with little increase in inputs, generates substantial MFP gains. If the gains are of sufficient magnitude and production is on sufficient scale, they can show up as contributions to aggregate MFP growth and labour productivity.

- **Productivity gains in ICT-using industries.** This is the most controversial source of ICT-related productivity gains. It requires that use of ICTs generates MFP gains. On the one hand, ‘new economy’ enthusiasts have pointed to MFP gains from such sources as increasing returns from ICT use and spillovers from network economies. On the other hand, sceptics have either denied or found little evidence to support the existence of MFP gains from use.

On the last point, there is, perhaps, some middle ground. For example, US Federal Reserve Board Chairman, Alan Greenspan, pointed to gains that he believes come from greater and cheaper access to information — greater certainty, through the availability of real-time information about customers’ demands and the location of inventories and materials flowing through complex production systems, which leads to less wastage from extra production, inventories and staff; more efficient and compressed distribution processes; the development of financial instruments to manage risks; and lower search and transactions costs in business-to-business transactions (Greenspan, 2000a, 2000b).

**Australia is an advanced ICT user, not producer**

The measurement of ICTs has an important bearing on the source and extent of estimated productivity gains associated with ICTs. The measurement of the volume of ICTs produced affects estimates of output and productivity growth in ICT production. The measurement of the volume of ICT investment affects estimates of growth in capital inputs and therefore the productivity residual in ICT-using industries.

In keeping with modern practice, the Australian Bureau of Statistics (ABS) uses hedonic (or constant-quality) price deflators to estimate real volumes of ICTs produced and purchased. Hedonic prices take into account changes in a number of characteristics of ICTs — processing speed, memory capacity and so on.

The quality-constant prices of ICT characteristics have declined markedly. This stems from the fact that while there have been rapid technological advances
(especially in the capacity of microprocessors), there has been relatively little
movement in the nominal prices of equipment.

Hedonic prices have not been specifically generated for ICTs in Australia. The ABS uses the US price deflator for hardware, adjusted for exchange rate movements and a time lag, and a Canadian price deflator for software. The US and Australian deflators are shown in Figure 1.

Figure 1: ICT Hardware and Software Price Indexes, USA and Australia

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
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<tbody>
<tr>
<td>USA</td>
<td>Aust</td>
</tr>
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</table>

Source: Unpublished ABS data and BLS data.

Investment in ICTs became a sizeable proportion of total investment in Australia from the mid-1980s. Since then, the growth of investment has been very strong, especially in the 1990s, when investment in hardware grew by 35 per cent a year and software investment grew by 20 per cent a year in real terms.

Australia became a high user by international standards, ranking fourth in 1999 among OECD countries in expenditure on ICTs as a proportion of GDP. Australia’s rate of expenditure at 8.7 per cent of GDP came in ahead of the US rate at 8.0 per cent (OECD, 2001c).

In contrast, Australia ranks at the very low end of OECD countries in terms of size of its ICT equipment production industries. Australia imports most of its ICT equipment requirements.
The contributions of ICTs to Australia’s productivity growth are now assessed and compared with the US experience. Comparison with the USA helps to sort out the sources of Australia’s productivity gains.

There have been a number of US studies of ICT contributions to productivity growth (for example, Oliner and Sichel, 2000; Jorgenson and Stiroh, 2000; and Gordon, 2000). For brevity, however, this paper focuses on comparisons with the USA based on Bureau of Labor Statistics (BLS) data.

There was a big step up in contributions from ICT capital deepening (increases in the use of ICTs per unit of labour) from 1995 in the USA and Australia (Figure 2). The timing and strength of the ICT capital deepening contributions in the USA and Australia are remarkably close.

**Figure 2: Contributions of ICT Capital Deepening to Labour Productivity Growth in the USA and Australia, 1961 to 2001**

![Figure 2: Contributions of ICT Capital Deepening to Labour Productivity Growth in the USA and Australia, 1961 to 2001](source: Productivity Commission estimates based on unpublished ABS data and BLS data)

Most studies of the USA have compared productivity growth and ICT contributions before and after this 1995 takeoff. But 1995 was a trough year in US labour productivity, at a point below trend. Estimates from 1995 to the end of the 1990s are from a trough to a peak and therefore overstate the underlying rate of labour productivity growth.
The ABS method of estimating productivity growth over productivity cycles — from productivity peak to productivity peak — is one way of measuring underlying rates of growth. Adopting this method puts the prime focus on accelerations in underlying rates of productivity growth, rather than on the ICT takeoff and its effects.

The 1990s peak-to-peak cycle for the USA is from 1992 to 2000 and for Australia from 1993-94 to 1999-2000. Contributions to the labour productivity accelerations in the 1990s cycle (compared with the previous cycle) in both countries are presented in table 1.

Table 1: Contributions to Labour Productivity Accelerations in the 1990s Cycle in the USA and Australia

<table>
<thead>
<tr>
<th>Per cent per year</th>
<th>USA(^a)</th>
<th>Australia(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour productivity growth</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Capital deepening</td>
<td>0.2</td>
<td>-0.1</td>
</tr>
<tr>
<td>- ICT capital</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>- Other capital</td>
<td>-0.2</td>
<td>-0.5</td>
</tr>
<tr>
<td>MFP contribution(^c)</td>
<td>0.3</td>
<td>1.1</td>
</tr>
</tbody>
</table>

\(^b\) Growth in 1993-94 to 1999-00 less growth in 1988-89 to 1993-94.  
\(^c\) MFP growth for the USA includes the contribution to labour productivity growth from labour quality.

Source: Updated from Parham, Roberts and Sun (2001).

There are several similarities in the US and Australian results:

- ICTs have made strong capital deepening contributions to acceleration in productivity in both countries. The contribution is of a similar order of magnitude (around 0.3 to 0.4 of a percentage point) in both cases.
- However, much or all of the increased use of ICTs (per hour worked) in the 1990s has been offset by slower growth in the use of other forms of capital (per hour worked). There has been little or no increase in the overall rate of capital deepening in either country, especially in Australia (Table 1). This contrasts with most other studies of the USA, which have found that ICTs have contributed to a marked increase in the rate of substitution of capital for labour.
Faster MFP growth accounts for most of the 1990s labour productivity accelerations in both countries, and entirely so in Australia.

The main difference between the US and Australian results lies in the strength of the productivity accelerations. The acceleration in underlying labour productivity growth in Australia, at 1 percentage point, is twice that in the USA. With similar capital deepening contributions, the chief explanation for the difference lies in the much stronger MFP acceleration in Australia (1.1 percentage point) than in the USA (0.3 of a percentage point).

The stronger productivity acceleration in Australia suggests that Australian firms benefited from one or both of two factors: bigger gains from the use of ICTs and more gains from non-ICT factors.

The first possibility is unlikely. It seems reasonable to assume, consistent with the US leadership in productivity and ICTs, that the US estimates establish the upper limit on productivity gains that can be associated specifically with ICT production and use. The more likely explanation is that Australian industries have had more scope to improve from a lower base and have caught up on at least some of the superior US levels (Parham, 2002a, 2000b). This catch-up is not specifically related to ICTs.

While the US estimates set the upper limit on ICT-related gains, some of the 0.3 of a percentage point MFP acceleration must be attributed to production of ICTs. Studies, such as Oliner and Sichel (2000), have attributed around 0.3 of a percentage point of aggregate MFP growth to ICT production, although the acceleration was calculated pre- and post-1995. The acceleration over productivity cycles would be less — perhaps half.

This leaves a contribution of perhaps 1 or 2 tenths of a percentage point from ICT use to the acceleration in underlying aggregate MFP growth in the USA. Even if the more favourable pre- and post-1995 figures are used, the most that can be attributed to ICT use is 0.3 of a percentage point (Parham, 2002a).

Applying these US benchmarks to the Australian case suggests that non-ICT factors have contributed the bulk (0.8 of a percentage point or more) to the acceleration in Australia’s productivity growth. This part of the acceleration can be attributed largely to international catch-up and microeconomic policy reforms (Parham, 2002a). Creating a more competitive, open and flexible environment has encouraged and enabled Australian business to move toward established best practice. The remaining gains (up to 0.3 of a percentage point) would represent ICT-related gains associated with new products and new dimensions of best practice.

An Industry Perspective

While the evidence suggests that the aggregate MFP gains to date from ICT use are significant, but not spectacular, there is evidence of strong links in certain industries.
Several studies of the USA have found evidence of productivity acceleration in the 1990s in Wholesale trade; Retail trade; Finance, insurance and real estate (especially in financial intermediation); and Business services. These industries have also been characterised as intensive users of ICTs (Stiroh, 2001; Nordhaus, 2001; Centre for the Study of Living Standards, 2000; Council Of Economic Advisors, 2001; Pilat and Lee, 2001).

Figure 3: Industry MFP growth over the last two productivity cycles in Australia, 1988-89 to 1993-94 and 1993-94 to 1999-2000

Source: PC estimates based on unpublished ABS data.

A similar set of industries emerged in the 1990s as major contributors to Australia’s productivity surge. Figure 3 presents MFP growth rates in industry sectors over the past two productivity cycles. In the first cycle (1988-89 to 1993-94), the relatively strong productivity growth in the ‘traditional’ contributors to aggregate productivity growth — Agriculture, Mining, and Manufacturing — is
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evident. These traditional sectors were joined in the 1980s and early 1990s by two other strong performers — Communication services and Electricity, gas and water. Their improved performance stemmed from major reform-induced efficiencies in government enterprises, which have dominated production in these two sectors, as well as technological advances in some activities. While productivity growth remained relatively strong in all five industry sectors in the 1990s cycle (except for Manufacturing), they all experienced a deceleration compared with the previous cycle. On these estimates, none made a contribution to the productivity surge from 1993-94. A new set of service industries made the positive contribution. The stand-out performer was Wholesale trade, suggesting that there have been major changes in traditional wholesaling activities of receiving and storing goods and disbursing them through resale to businesses. Other service industries — for example, Construction and Finance and insurance — also increased their rate of productivity growth.

There is no strong, positive relationship between ICT use and MFP across all Australian industries. There is a strong (above-average) positive relationship between increased ICT use and MFP acceleration in Finance and insurance and a weaker relationship in Wholesale trade. While the ICT link appears largely confined to these sectors, they are major parts of the economy, accounting for 6.6 per cent and 4.7 per cent respectively of Australia’s GDP in 2000-01.

The lack of systematic relationship across all industries undoubtedly reflects the fact that ICT use is not the only factor affecting industry MFP growth. It also signals that the productivity gains from ICT use appear — for the moment at least — concentrated in distribution and financial intermediation. (There may also be ICT-productivity links at the firm level in other industries that, because of inter-firm differences in these and other factors, do not translate as readily into industry or aggregate trends — see Brynjolfsson and Hitt, 2000). The lack of a relationship across all industries also tends to support the view that the gains to date cannot be attributed to network economies, which could be expected to be more widespread.

The relationships between ICT use and productivity growth are complex. ICTs are often viewed as general-purpose technologies that require time to bring to their full potential and that provide a platform for other innovations in products and processes (see, for example, Brynjolfsson and Hitt, 2000; and Bresnahan, Brynjolfsson and Hitt, 2002).

The Australian evidence supports the view that it is the changes in products and processes that generate the productivity gains. The Finance and insurance industry has been restructured to operate much more through ICTs (for example, ATMs, Internet and phone banking) than through traditional face-to-face contacts. Many new products (for example, financial derivatives) are now on offer.

An earlier study by Productivity Commission staff (Johnston et al., 2000) also found that ICTs played a part in the restructuring of wholesaling activities. Wholesalers were able to use bar-code and scanning technology and inventory management systems as part of the process of transforming wholesaling from a storage-based to a fast flow-through operation that reduces storage and handling.
But, importantly, reforms were acting as the underlying drivers and facilitators of productivity gains and ICTs were just one component of change. It was not so much that wholesaling became much more ICT intensive or that new ‘breakthrough’ technologies became available. It was more that the competitive incentives to be productive became stronger and that new flexibilities became open to businesses to use ICTs as part of a more general process of restructuring and transformation.

For example, the motor vehicle industry was looking for efficiencies all along the ‘value chain’, including in distribution, to meet the increased competition from cheaper imports entering under lower border protection. Another contributor in some areas was the reform of industrial relations processes that allowed greater labour flexibility through the introduction of split shifts and reduced the rigidity of job demarcations.

Policy Implications

A major implication of the evidence in this and related Productivity Commission papers is that, from a productivity and policy perspective, a prime focus on ICTs and the ‘new economy’ is somewhat misplaced. There are three potential pitfalls:

- too much attention on ICT production as a source of productivity growth;
- insufficient attention on the factors that drive ICT use; and
- insufficient attention on other factors that are potentially the source of greater productivity gains.

On the first point, there have been calls for policy action to foster the development of ICT production in order to access ‘new economy’ productivity gains. However, the Australian (and the US) experience clearly demonstrates that there are also productivity gains associated with ICT use. ICT production is not necessary to access productivity gains. The US estimates suggest there have been roughly equal productivity gains at the aggregate level from ICT production and use. If anything, the gains from use may well accelerate further in the future. Further product and process innovation is possible and larger and more widespread network effects (associated, for example, with e-commerce) may start to show up.

It also needs to be remembered that the scope for productivity gains in production in the USA does not translate as readily to other countries as does the productivity gains from use. The US production gains come from a very large scale of operations and a degree of technological leadership that cannot be readily established in other countries. Aside from some niche areas (particularly in software), ICT production requires not only large scale operation but also sales in highly competitive international markets. This makes it tough going for a relatively small economy like Australia’s.

Other advantages also come from focussing on use. By being open to imports of ICTs, Australia has been able to gain quickly from advances in ICT
manufacture and has been able to capture a sizeable terms of trade gain from the rapidly declining international prices in ICTs. The Treasury (2002) stated that ICT prices have fallen in domestic currency terms by 9.5 per cent a year and raised the terms of trade by 0.3 per cent a year between 1985 and 2001. Since 1995, ICT prices have fallen by nearly 15 per cent a year and raised the terms of trade by 0.75 per cent a year. Taking the benefits of productivity gains generated by foreign producers through lower prices is a real income gain to Australians.

The second point is that a direct focus on ICTs (and in particular on production) masks the importance of the pre-conditions required to drive the uptake of ICTs. This paper has emphasised the importance of the incentives provided by competition. Sharper competitive incentives to be productive help to explain why Australia moved from being a technology laggard in previous decades to being at the forefront of new technology uptake in the 1990s. Taking full advantage of declining prices and advances in technologies and not restricting them through trade or other barriers is also conducive to ICT uptake. The development of skills in the workforce can also be important in identifying and developing applications for ICTs.

Strong competition also affects the distribution of productivity gains. A competitive environment means that more of the gains are likely to be passed on in lower prices and thereby assist in dampening inflationary pressures. While the productivity gains appear to be concentrated in a few industries, competition means the benefits are enjoyed by a wider range of industries. Many services, including distribution and financial intermediation, are used extensively by manufacturing and other industries (Simon and Wardrop, 2001). The productivity gains in Wholesaling, even though very large, were passed on, with profit margins declining in the 1990s (Parham et al., 2000).

ICT-related or other productivity gains do not in themselves dampen inflation, as some new economy advocates claim. Healthy competition is a necessary pre-condition.

The third and related point is that, especially since ICTs appear (at least thus far) to have generated limited productivity gains in their own right, it is important to foster the factors that are the source of more substantial productivity gains. The USA has enjoyed an MFP acceleration of around 0.3 of a percentage point associated with ICT production and use and other factors. Australia has enjoyed an MFP acceleration of around 1.1 percentage points associated with ICT use — not production — and other factors. To state the obvious, it would be a mistake to focus on chasing a gain of (at most) 0.3 of a percentage point associated with ICTs — especially by concentrating on encouraging ICT production — if that came at the cost of realising a 1.1 percentage point gain from catch-up and ‘smart’ use of ICTs (where ‘smart’ implies combining ICTs with complementary product and process innovations, including firm reorganisation).

The Australian experience suggests that the policy priority should be to enhance competition and flexibility in the business environment, rather than focus too strongly or directly on ICTs and the ‘new economy’. A focus on the right
environmental conditions for business means that the ‘smart’ productive use of ICTs, and substantial gains unrelated to ICTs, can then follow.

The Australian economy became more focused on productivity and more flexible at just the right time to take advantage of the advances in ICTs that came on stream in the second half of the 1990s. It was not that policymakers deliberately set out with an ICT strategy. Without many predicting or perhaps even realising it, Australia became ‘ICT-ready’ (and ready for any other technological development that could be usefully employed). Given a history of lagging in the uptake of technology and of relatively poor productivity performance, it is unlikely that Australia would have been as quick on the uptake of ICTs, or as able to use them in productivity-enhancing ways, had it not been for the sea-change that reforms brought.

This is a call for a shift in policy emphasis, rather than a view that few policy implications flow from ICTs and the ‘new economy’. Very briefly, ICT-related policy implications include:

- the optimal development of complementary innovations, based on ICTs;
- the optimal development of communications infrastructure;
- the implications of ICT networks for the strength of competition in markets;
- the development of appropriate ICT-related skills;
- adjustment issues concerning job flexibility for those with specific skills displaced by ICTs;
- appropriate protection of intellectual property rights in distribution via the Internet;
- access to networks, including the issue of the ‘digital divide’;
- regulation of network content; and
- security of tax bases through use of Internet and other networks.

Statistical Needs

Policymakers have a vital interest in productivity growth, as productivity growth is the most important source of improvement in standards of living over the long term.

However, there are no immediate direct productivity ‘levers’. Policymakers have to operate indirectly. Understanding the sources and mechanisms of productivity growth helps to set and confirm policy directions.

This paper has pointed to the importance of a number of statistical issues. Accurate measurement of hedonic prices is undoubtedly difficult in an environment in which characteristics are changing rapidly and in ways that make comparisons over time difficult. But accurate measurement is important in determining the extent of output and productivity growth in ICT production industries and the extent of input growth (and the productivity residual) in ICT-using industries.

There is a related and particularly thorny measurement issue that has not been drawn out in this paper. This concerns the view that MFP gains specifically
associated with advances in ICTs and captured by investors in ICTs (due to product and process innovations contingent upon those advances in ICTs) are mismeasurements and should be factored into the income stream attributable to ICTs. The increased ‘usefulness’ of ICTs due to technological advances in them should be captured as embodied quality improvements in ICTs. This raises again the issue of the accuracy of allowances for quality changes in forming price deflators.

More information on the sources of productivity improvement at the micro level is needed. There are complexities in the importance of lags in ICT use and interactions with other factors that suggest the need for extensive and reliable longitudinal micro datasets. Data are also needed to investigate the existence and importance of network economies — savings from increasing use of ICT-based networks.

There also needs to be more accurate measurement of output and therefore productivity in service industries, particularly as service industries appear to be the new source of productivity gains. Issues such as convenience, timeliness, accuracy, product range and customisation, as well as new and improved products in a more conventional sense, are looming as even more important measurement issues, in part because of the increased use of ICTs.

The apparent evidence of ‘disintermediation’ also raises possible measurement issues. For example, some traditional wholesaling activities may have been shifted forward to retailers and backward to manufacturers. Some of the productivity gains, though real, may be misallocated to wholesaling.

In closing, it is worth noting that these statistical issues impinge on the ability of analysts and policymakers to provide some element of detail on the industry sources and mechanisms of productivity growth. However, absence of fully reliable detail does not have to prevent the setting of broad policy directions that centre on competition, openness and flexibility.

**Conclusion**

Australia has accessed so-called ‘new economy’ productivity gains associated with ICTs. The gains have been associated with the use of ICTs and not their production. ICT production is not a necessary condition. The lack of a large-scale production sector in Australia, therefore, has not been a barrier to benefiting from ICT-related productivity gains.

Importantly, however, ICT use on its own is not sufficient to generate productivity gains. These come from complementary innovations in products and processes, enabled by the platform that ICTs provide.

The US benchmark suggests that productivity gains associated with ‘smart’ ICT use are important, but not spectacular, to date — accounting for a few tenths of a percentage point in annual average productivity growth. This may, however, increase in the future. Productivity gains associated with the production of ICTs in the USA have been of a similar order of magnitude. But, while other countries
may be able to aspire to similar gains from ICT use as the USA, their ability to
generate similar gains from ICT production is much more limited.

For most countries, including Australia, it is better to focus on the strength of
competition as an incentive to be more productive, openness to technology
transfer and the flexibility of businesses to transform their operations in ways that
raise productivity. The Australian experience suggests that the smart use of ICTs,
with productivity payoffs (and much larger productivity gains unrelated to ICTs)
will then follow. There are also terms of trade gains to be had from importing ICT
goods that are declining rapidly in price.

From a policy and productivity point of view, a direct focus on ICTs and the
‘new economy’ to the exclusion of fostering a competitive, open and flexible
business environment would be ‘putting the cart before the horse’ and would miss
a major source of improvement in living standards.

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New Directions in Environmental Policy

Peter Bardsley, Vivek Chaudhri, Gary Stoneham and Loris Strappazzon

Commonwealth and state governments allocate significant resources to natural resource and environmental management. In Australia, the Natural Heritage Trust annual report for 2000-01 shows that this federal program will have committed approximately $2.5 billion to environmental works by June 2007. State and Federal Governments have allocated a further $1.4 billion to The National Action Plan for Salinity and Water Quality over a seven-year period. These and other environmental and natural resource management programs employ a combination of intervention mechanisms including community and catchment-based planning, voluntary programs, fixed-price subsidies and grants, education programs and capital works programs.

Although there is general acknowledgment that these programs have altered community awareness about environmental issues, there is not a widespread belief that these programs have cost-effectively achieved significant on-ground outcomes. For example, the Australian National Audit Office (2001) commented on the Natural Heritage Trust by saying that the program has been successful in ‘raising awareness and empowering communities, fostering integrated planning…but few projects have the potential to lead to broad scale long term landscape outcomes…and is…poor in monitoring, administration and cost shifting’. Thus, while achieving an attitudinal shift, these programs have been less effective at delivering and demonstrating improvements in the environment.

This paper addresses the incumbent policy failures and seeks to posit some possible additions to the environmental policy toolkit. We proceed by first delineating the nature and existence of an ‘environmental problem’. Second, a discussion of the existing policy approaches is undertaken. The third section of the paper, on a new policy framework, necessitates an investigation of the role of markets in the environmental landscape. Finally, we conclude with some observations on the importance of future research, both in terms of policy mechanisms and institutional design.

How Environmental Problems Arise

In order to assess the state of environmental policy, and to posit changes in that policy, we must start with an understanding of the genesis of environmental problems.

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problems themselves. At a macro level, economic growth and population growth lead to an increase in demand for most resources. Furthermore, environmental goods appear to be mostly normal goods (the value that people place on them rises with income and education), which are in fixed or limited supply. As such, it is likely that the social value of environmental resources will continue to increase rapidly.

Many goods are effectively priced and marketed in the economy, but many are not. The economic (or social) value of marketed goods is generally reflected in their market value, and with some exceptions that are well understood by economists, market mechanisms allocate resources efficiently. Of course this does not apply to non-marketed resources. There are many environmental resources that are not adequately valued through the market system. Further complexity arises when it is acknowledged that environmental resources often yield multiple outputs, some of which are valued by the market while others are not. For example, land can be used to produce crop and livestock commodities, which have readily observable prices, but this same land could be used to sustain populations of native plants and animals which are not valued in markets.

It is generally acknowledged that existing markets and institutions misallocate resources to environmental goods and services. Markets are generally efficient in allocating resources to ‘exploitation activities’ but may be ineffective with respect to investment in environmental conservation. Commodity markets, for example, provide clear signals to individual landholders about the value of clearing land for agricultural production, yet markets for conservation actions are missing or inefficient. The social value of the non-marketed outputs may be rising (or falling, in the case of bads like greenhouse emissions) even more rapidly, but these values do not have a voice in the marketed part of the economy. In particular, when making tradeoffs across different activities, people only observe those underlying values that are priced through the market. It is this incompleteness of markets that results in a distortion of resource allocation from the ‘efficient’, or value maximising, outcome. The result is a squeeze on environmental resources.

There are two broad policy approaches to dealing with this problem. One is to delineate a clear boundary around the marketed part of the economy. This serves to protect the environment by mitigating the risks of exploitation. This is a natural reaction, and it is the basis for a great deal of existing policy. The other is to change the boundary between the marketed and non-marketed part of the economy, curing the problem at its root. A combination of both approaches will probably always be optimal. The thesis of this paper is that new developments in science, technology and in economic theory allow us to shift the mix of policy instruments that define this boundary in ways that were not possible before. Some examples of new policy approaches to environmental problems that demonstrate this proposition are briefly discussed later in the paper.
Existing Policy Approaches and their Limitations

Environmental policy makers have relied on a mix of policy mechanisms including command and control, market-based approaches, education and attitude change. In Australia, emphasis has been placed on policy mechanisms that foster voluntarism (for example, Landcare, Clean up Australia) and legislation (for example, the Planning and Environment Act 1987). Concerns about the effectiveness of the environmental policy mechanisms employed by governments in Australia are beginning to be raised. Despite significant progress made overseas, relatively little attention has been given in Australia to the application of changing market institutions to address environmental and natural resource management. In effect, Australia’s approach to environmental policy has been to ‘fence-off’ the environment from the remainder of the economy, and hence, limit its exposure to the organising influences of market processes.

Governments around the world are wrestling with the changing issues associated with the use and degradation of natural resources and the environment. The broad gambit of concerns includes, current and future viability of natural resources (sustainability), appropriate valuation methodologies for environmental assets, and transboundary degradation. An important common thread across these is that of opportunity cost. The environmental and natural resource issues associated with land illustrate this problem. Land can be used to supply agricultural commodities, biodiversity, carbon sequestration and other water and air quality services. When land is used to grow crops and livestock, it has an associated opportunity cost in terms of the viability of the future use of that land in. There is much debate about the monetisation of these costs, as they require some weighting of current versus future use (in economics parlance there is no agreement on the appropriate ‘discount rate’). Where land is cleared of native vegetation there is also a loss of biodiversity that involves an implicit opportunity cost. Finally, the transboundary concerns (where environmental impacts cross over different geographic boundaries), and the associated international trade policy discussions through the medium of bodies such as the WTO, highlight the fact that the opportunity cost of degradation is probably not internalised by nations, let alone firms.

Policy makers have long recognised the economic and political constraints in executing ‘good’ environmental policy. In short, the critical components are the definition of ‘good’ and the efficient implementation of the policy. The environment represents a complex area of public policy. Evaluation of what ought to be considered ‘good’ policy benefits from recourse to the fundamentals of economics. In particular, value creation, as defined by the boundaries of the customers’ willingness-to-pay and the suppliers’ opportunity cost, is an important lens by which to view the efficiency component of policy objectives. Difficulties arise because of changing consumer preferences over environmental goods with consequential implications for the willingness-to-pay for environmental assets vis-à-vis other assets. Difficulties also arise because the complex spatial and temporal biophysical interactions associated with the environment that renders the other
side of the value equation — the opportunity cost — ill-defined. Moreover, the
inertia of existing policy mechanisms employed in this area of the economy
hinders change.

The complexity of environmental policy reform need not, however, render
the task of developing more efficient environmental mechanisms completely
intractable. What is required is a systematic, and not merely a politically
expedient, approach to address the concerns around use of natural resources.
Much environmental policy around the world, to date, has suffered from some
common pitfalls. The approach to the environmental landscape has tended to be
incoherent, partial and piecemeal. Biodiversity, water quality, dryland salinity,
forestry, genetically modified organisms, pollution, and farming cannot be viewed
as individual concerns warranting policy directives that address the political and
economic considerations in isolation. These dimensions of the environment are
interconnected in complex ways and intervention in the landscape can generate
both environmental goods and bads.

Current environmental management policies suffer from three specific
problems. Firstly, there is insufficient information on which to make reasonable
choices, and there is often an implicit assumption that there are standard benefits
from intervention across the landscape. For example, it is tempting to suggest that
planting millions of trees can rectify dryland salinity in the Murray-Darling basin.
While trees may slowly ameliorate groundwater pressure (the cause of dryland
salinity) they quickly reduce surface water flows into streams and rivers. Reduced
surface flow raises the salinity of waterways degrading habitat and reducing
irrigation yields. Heaney et al. (2000) modelled these types of interactions that are
now being observed in some regions of Australia. Further, tree planting does not
necessarily improve biodiversity — plantations are just another form of
monoculture that does not provide the complex habitat structures and diversity
provided by native habitat.

Secondly, policy directives have often failed to take into account the
incentives of individual agents and the way that policy influences behaviour. The
introduction of legislation to limit the clearing of vegetation on private land has
often resulted in pre-emptive actions by landholders incorporating the future
impact of such legislative change in their underlying costs. Moreover,
dichotomising policy formulation from implementation has often resulted in a
failure to adequately think through the informational requirements of efficient
policy implementation. Finally, the absence of ex-post measurement and
accountability processes has limited policy learning and evolution.

There are several important attributes of the environment that need to be
considered when formulating policy responses. Each case needs to be judged on
its peculiar merits. There are non-standard benefits derived from intervention in
the environment. What is often missing from current environmental policy
mechanisms is a well-developed schematic for understanding and measuring or
estimating the multiple attributes of environmental assets. From a societal
perspective what is required from our policy makers is a methodology for
revealing site-specific information about the trade offs associated with using
natural resources and their impact on the environmental landscape. This amounts to tightening our understanding of the bounds of value creation (the willingness-to-pay and the opportunity cost) of landscape interventions that impact on the environmental assets.

Successive governments at both State and Federal levels have allocated significant funds to environmental concerns. Sadly, there has been little accountability of impacts on the public purse, both in terms of proposed change and on the effectiveness of policies that are implemented. A systematic method of ranking environmental policy directives would yield not merely more efficient outcomes, but also provide some discipline to the environmental reform agenda. This is particularly important when we recognise that one of the limitations to policy reform has been an institutional framework that rewards rent seeking behaviour. While the distortionary impact of rent seeking in the political arena is well understood, rent seeking at the institutional level may be equally important with respect to the environment.

**A New Policy Framework**

Managing the environmental landscape and its implications for policy are in some respects similar to management of any capital asset. It is widely accepted that traditional markets are insufficient institutions where they fail to adequately reflect externalities and social costs. A coherent policy framework must begin with a diagnosis of environmental problems as economic problems. Further, a clear delineation of the feasible policy objectives, which are gleaned from scientific research and market information, needs to be coupled with the design requirements of potential implementation methods. As evidenced by numerous corporate debacles around the world, the efficacy of well conceived strategy is limited by the ability to deliver, or implement the strategy. That is, some failures in the corporate realm are not due to badly conceived strategy (although, admittedly, many are), but rather a lack of understanding of the process of implementation and its associated costs. The same holds true in environmental policy. Seemingly well-conceived policies are derailed by a failure to understand the constraints to efficient implementation. A critical component, missing in the current policy domain and yet imperative for environmental reform, is the need for a transparent, open policy design process that is subject to criticism and peer review. The move towards a coherent, transparent and integrated policy framework for management of the environmental landscape would entail input from scientists, engineers, economists and other specialists.

**The Role of Markets in the Environment**

Economists have long recognised that the market process has implications for human behaviour. In redesigning the environmental policy framework we are suggesting recourse to scientific and economic theory to potentially push out the boundary between the marketed and non-marketed parts of the economy. If they
are well designed and efficiently operating, markets provide a harmonisation of values, decisions and actions. This is the oft-cited discipline of the market process. On the supply side, when dealing with environmental goods, the direct effect of the market is the ability to procure at least cost. An important indirect effect of the market process is behaviour change that occurs from involvement in the market itself. That is, price signals in a market for biodiversity conservation yield not just conservation at least cost, but an awareness of previously unpriced environmental assets that may impact on behaviour in other parts of the environmental landscape. Similarly, on the demand side, the market process forces a reallocation of conservation efforts to where the value is the greatest. A further benefit of markets in environmental goods is the possibility of cooperation and teamwork between different programs and the recognition of the opportunity costs of pursuing one program over another. Finally, from the information revelation perspective, the full social value of environmental resources becomes evident through the market process, as well as the costs of enhancing them. This is a valuable input into policy design.

It is unlikely, given the complex nature of the environment, that markets for environmental goods and services will resemble more familiar institutions such as commodity markets. Markets in the environment, no matter how well designed, will not completely correct the complex issues that underpin missing or incomplete environmental markets. Too frequently, rhetoric about the potential for developing environmental markets has been simplified and idealised, unduly raising expectations and diminishing the difficulties of the task. This point is made by Pannell (2001).

Coase (1937) identified ‘transaction cost’ as the main obstacle to the existence of markets. Today this vague concept is better understood, and it is known that information problems lie at the root of most missing markets. Once this is understood, there is the possibility of addressing the problem directly through the use of modern technology and clever institutional design. The basic reason that asymmetric information destroys markets is that it is hazardous to do business with someone who has relevant but hidden information. In general terms, environmental problems bear similarity with the market for ‘lemons’ (Akerlof, 1970). Akerlof showed that the existence of asymmetric information (that is, where one party is informed about aspects of the economic problem and the other is not) can render some seemingly competitive markets inefficient. In the limit, this phenomenon can result in the non-existence of markets. The uninformed party, in many environmental problems, is liable to be exploited and may be unwilling to participate. Because of this, the potential benefits of doing business (which may be very large) may not be realised. For example, sellers of organically grown produce may not find a market because the uninformed public is liable to be cheated by fraudulent products. The answer in this example has been to create a certifying body that corrects the information imbalance, and this is typical of the intervention that is required. Something must be done to improve the information structure in order for the market to work effectively.
Markets for environmental goods and services can be characterised as the interaction between government, on behalf of society, and individual agents in the economy. In the case of environmental policy, the uninformed party has overwhelmingly been the general public. If the contributing public does not know how the money has been spent, how much has been dissipated in administrative inefficiency, what has actually been done on the ground, and whether there is any link between the actions and environmental outcomes, then there can be no confidence in the policy agenda. This lack of confidence may be one reason why volunteerism has been important in the provision of environmental goods (for example Landcare and anti-litter clean ups). Although voluntary action may not be very efficient, the volunteer can at least monitor outcomes and has an interest in doing so. It is our thesis that public willingness to pay for environmental assets is greatly diminished by the informational asymmetries that are inherent in many environmental issues. It is for this reason that transparent and objective program evaluation is a key step in improving the management of the environmental landscape.

There are now a number of examples of environmental policies that reflect more contemporary economic ideas and that utilise improved scientific and information capabilities. Where property rights are well defined, such as with point-source pollution, there are now many examples of tradable emission schemes. Tradable pollution permits allocate the pollution control burden amongst firms or individuals by employing the market as the information exchange mechanism. In this sense, individual firms, not government, make the decision to reduce environmental damage based on the marginal cost of abatement.1 Some firms will make no change while others will be able to reduce environmental damage in very cost-effective ways and gain by selling pollution credits. These different responses by different firms simply reflect the fact that there is considerable variation in the cost of abatement between firms. The tradable emission market is constructed to allow the economy to discover these differences in abatement costs and take advantage of abatement actions that are low cost.

There is also growing interest in applying mechanisms that arise from application of the information economics literature to some environmental management problems. The design and public policy issues associated with eco-labelling is now seen as a problem of information asymmetry between producers and consumers of good where the impact of production processes on the environment has credence attributes (that is, attributes that cannot be discerned by consumers even after experiencing the good).2

Auctioning of conservation contracts is another example of the practical application of an information perspective to previously intractable environmental management problems. In Victoria, for example, a pilot auction of biodiversity

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1 See Tietenberg (1985) for a detailed discussion on emission trading.
2 See Emons (1997) for a more detailed discussion.
conservation contracts, BushTender, has proven to be an efficient and popular policy mechanism for engaging private landholders in biodiversity conservation.

Latacz-Lohmann and Van der Hamsvoort (1997) explain how there is an ‘information problem’ with respect to the market for environmental goods and services associated with private land. They note that there is a ‘clear presence of information asymmetry in that farmers know better than the program administrator about how participation (in conservation actions) would affect their production plans and profit’. The cost of supplying additional biodiversity services from private land is hidden and can be addressed through the market design (the auction). Dealing with conservation on private land as a problem of asymmetric information has improved our understanding of why related environmental markets are missing or ineffective and introduced alternative policy mechanisms to those in current use. Auctioning biodiversity conservation contracts offers many advantages over planning, command and control, voluntary approaches and fixed price policy mechanisms. This is not to suggest that auctions are always a viable replacement for these other mechanisms. It does, however, add an important new mechanism to the environmental policy tool kit.

Many important design issues have been addressed in the process of implementing the auction. Besides choices about auction format, contract design and the specification of biodiversity preferences, many practical but important choices arise concerning communication with landholders, skills required to successfully run an auction and timing of activities. These factors all influence the performance of the auction.

The success of the auction can be principally ascribed to its ability to reveal the information needed to make good biodiversity conservation decisions. The auction for biodiversity conservation was designed to reveal specific information from the agency responsible for increasing biodiversity conservation and from landholders. As part of the auction, the agency revealed information about the improvement in biodiversity associated with changes in land management (the Habitat Services Score), and the agency revealed some information about the relative conservation status of different areas of vegetation (the Biodiversity Significance Score). This information would significantly improve priority setting for biodiversity conservation, whatever the mechanism employed.

Another factor contributing to the cost-effectiveness of the auction-based approach is that it enables an agency to take advantage of heterogeneity in landholders’ opportunity costs. Many landholders participating in the auction were clearly prepared to cost-share with the Government to conserve biodiversity. Some were willing to bear nearly all of the costs of managing biodiversity while others offered bids that reflected financial opportunity costs. Hence, landholders’ bids exhibited substantial variation if they are compared purely on a cost-basis. However, the differences in the bids became even more exaggerated when they were ranked according to the biodiversity benefits index, which combines cost information with benefit information. An empirical analysis of the BushTender application is undertaken by Stoneham, Chaudhri, Ha and Strappazzon (2002).
The auctioning of conservation contracts also demonstrated the importance of the scientific disciplines in measuring and modelling expected outcomes from alternative environmental intervention strategies where the non-standard benefit problem, noted earlier, arises. New scientific innovations to old measurement problems, sometimes using remote sensing and/or on site monitoring greatly assist the prospect of developing markets for environmental goods and services. Interaction between economics and science becomes even more powerful when economists can clearly define the specific missing or hidden scientific information needed for markets to establish.

As with all auctions, attention to mechanism design and contract specification is paramount. Klemperer (2000) notes that ‘auction design is a matter of horses for courses, not one size fits all’. Efficient auction formats will reflect the objectives of the seller, the nature of the assets, and the specifics of bidder characteristics. For example, avoidance of collusion, the heterogeneity of parcels of land, and bid aggregation issues all impact on the specificity of auction design. Contract design is a particularly important aspect where agreements extend over time as is the case with contracts for environmental management. It may be unknown, for example, whether the contracted actions have been undertaken. This can be addressed through monitoring, and also through an output based component to compensation. The balance between rewarding on the basis of inputs and outcomes would depend on the relative difficulties of monitoring these, and the risk burden on the supplier. Since the causal links between actions and outcomes are probably not well understood, scientific research and monitoring may be used. Further, the environmental value of the good (value to the buyer) may not be known. This can be addressed through a tendering market on the demand side, or through Coasian bargaining between different demand interests.3 Finally, the effectiveness of the implementation package (that is, the incentive/market measures and the link between actions and outcomes) may be unclear. This can be addressed by ex-post evaluation.

Conclusions

Managing the environmental landscape is a complicated endeavour that requires a coherent integrated policy design process. A major lesson learnt from past failures is that policy design needs to be system wide, not ad hoc, and that it requires the input of scientists, economists and other specialists. Planned or regulatory approaches to management of the environmental landscape do not address information asymmetries inherent in the system. There are now a number of relevant environmental policy mechanisms that appear to offer significant improvements over those used in the past. Increased use of well-developed

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3 Coase (1960) argued that in the absence of transaction cost impediments, individual interests will exploit all opportunities for valuable trade. His claim essentially invalidated the need for Pigouvian taxes and subsidies if individuals were free to costlessly bargain with each other to exploit all gains from trade.
concepts relating to tradable emission permits seems appropriate for a range of environmental issues where property rights are currently or potentially well defined. These applications include greenhouse emissions, water quality management and air quality management.

Designing markets to reveal hidden information, particularly when coupled with new approaches to the measurement of environmental stocks and flows, also offers significant potential to improve the efficiency and effectiveness of environmental policy where property rights are not clearly defined. Developing specialised auctions for diffuse-source pollution and nature conservation associated with private land-use appears to be a theoretically sound and now practical approach to this class of problem. Dryland salinity, biodiversity conservation, some water quality issues amongst others are important and hitherto intractable environmental problems that are likely to benefit. For this class of environmental problem efficient outcomes depend on ranking of different possible uses of natural resources in the context of their impacts on the environmental landscape and on the revelation of hidden information about opportunity cost. In some dimensions this lies in the domain of scientific endeavour, while in others, information of this sort lies in the hands of individual agents in society.

Moreover, recourse to economic theory to help develop methods for constructing market institutions that efficiently reveal and aggregate information, will push out the policy frontier (that is, the fence between the marketed and non-marketed parts of the economy can be pushed further out). Finally, there are some significant obstacles to new environmental policy design and implementation. The most obvious, is that incumbent decision makers within the current institutional setting may be reluctant to adopt methods that potentially whittle away the opportunity to appropriate political or institutional rents. As important as well designed policy is the institutional support for efficient implementation. The link between policy design and institutional arrangements in environmental management is a field of applied policy research that warrants further investigation.

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Access Pricing and Asset Valuation

Kevin Davis

Access pricing regulation of activities such as gas and electricity transmission and distribution, transport, and telecommunications, is an important and difficult task. Owners and investors will only hold or create such assets on the expectation that regulated prices are consistent with an expected rate of return on their investment, which at least compensates for the risk incurred. Access seekers and end users naturally have concerns that access prices are not set too high, at levels that deliver excessive returns to access providers.

It is the role of regulators such as the Australian Competition and Consumer Commission (ACCC) and various State regulators to make judgements about access prices which balance, and (ideally) are seen to balance, these conflicting interests. Unfortunately, even if the process of access pricing regulation is transparent, the complexities of the issues involved means that it is often difficult for observers and participants to identify whether decisions are fair and reasonable.

One of many complications relates to the valuation of assets. Investors seek both a return over time of the financial capital invested to construct access facilities of a particular value and an appropriate rate of return on that investment. Unfortunately, there is a number of feasible ways (including market value, historical cost, or replacement cost) in which assets can be valued to derive the base on which a rate of return is calculated. Moreover, different assumptions made about asset depreciation (change in asset value), imply different paths for the return of capital over time involved in the price determination process.

The objective of this paper is to explain, for the non-specialist, certain aspects of the regulatory approach to asset valuation issues and their implications for access pricing. In doing so, the paper suggests hypotheses for potentially significant differences between the market valuation of access assets (as reflected in prices paid under privatisation) and the regulatory valuation of those assets. It also illustrates the link between regulatory assumptions about depreciation (changes in asset value over time) and the X factor derived in the ‘CPI–X’ regulatory price path for access prices. In particular, it demonstrates that the X factor in Australian regulation is not related to expectations of productivity increases, as often thought, but is due to regulatory assumptions about depreciation.

These results are relevant to understanding and assessing ongoing changes to the ‘building block’ approach used by Australian regulators to determine access prices. Although, ‘in Australia, access pricing is still in its infancy’ (Productivity Commission, 2001:33) there has been substantial debate and analysis of the

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methods used by Australian regulators. In 1999 the ACCC released the Draft Statement of Principles for the Regulation of Transmission Revenues (DRP) (ACCC, 1999), and provided further details and implications of its preferred approach in spreadsheet models contained in the Post Tax Revenue Handbook released in October 2001 (ACCC, 2001).

As well as attempting to set benchmarks for the determination of certain key parameters in the pricing process which are applicable across all regulatory judgements (rather than being revisited on a case by case basis), the DRP involved several apparently major changes in approach. These included use of a ‘post-tax nominal’ rather than a ‘pre-tax real’ rate of return in the building block approach and the use of a ‘competition depreciation’ approach. As will be argued below, these are more matters of style rather than substance, but are important changes in attempting to make the regulatory pricing process more transparent.

In the following section of the paper, the ‘building block’ approach favoured by Australian regulators is briefly outlined in order to highlight the crucial role of asset value and rate of return considerations. This is followed by a discussion of asset valuation concepts which provides a backdrop for the development of hypotheses explaining why market and regulatory asset valuations may differ. Then, some technical aspects of the changes involved in the DRP are considered, with a focus upon their implications for asset value and interpretation of regulatory determinations.

### Basic Model of Australian Access Regulation

Regulators in Australia have had the advantage of observing strengths and weaknesses in pre-existing overseas approaches to access pricing — notably those of the UK and the USA. A general discussion of regulatory alternatives and comments on some aspects of the Australian approach is provided by the Treasury (1999), and the strengths and weaknesses of the UK and US approaches are discussed by Crew and Kleindorfer (1996).

It is perhaps not surprising, therefore, that the Australian approach appears to contain elements of both the ‘rate of return’ approach common in the USA and the ‘price cap’ approach that evolved in the UK. The Australian approach, as implemented by the ACCC, involves setting a price (or revenue) cap of the ‘CPI–X’ variety wherein prices are constrained to grow, from an initial amount, at a rate no more than the inflation rate less X per cent per annum over the regulatory horizon (often of five years).

To derive that price path, the Australian approach uses a ‘building block’ method in which the expected size of key cost components of service provision is quantified and a revenue target sufficient to meet those costs is calculated for each year of the regulatory period. In quantifying cost components, rate of return considerations enter through the inclusion of a required rate of return to investors as one of the costs which should be covered. The other key cost components are the allowance for return of capital invested over the life of the assets involved (depreciation) and for operating and maintenance costs. Forecasts for these costs
are based on anticipated demand and expected productivity gains. Year by year variability in the revenue target can arise because of anticipated operating cost variability due to demand patterns or because of discrete jumps in depreciation amounts due to planned, lumpy, new investments. That variability gets ‘smoothed out’ by various value-neutral adjustments which lead to the CPI–X price (or revenue) cap path.

In line with overseas practice, the regulatory structure is intended to be an ‘incentive based’ one. Regulated access providers retain some part of cost savings and revenue growth from market promotion activities such that the realised rate of return can exceed that required by investors. Regulatory deliberations also include analysis of proposed investments in new capacity and resulting financing needs. For simplicity, that feature of the process is ignored in the subsequent discussion.

Alternative approaches to implementing such a model arise, *inter alia*, from different possible treatments of depreciation, inflation, and taxation. In early access determinations, such as the Victorian Gas Industry case of 1998, the approach had the following features. ‘Current cost’ depreciation was used to determine return of capital. A real pre-tax weighted average cost of capital (WACC) was used as the return on capital. The effective tax rate of the service providers was assumed equal to the statutory tax rate. In this approach, the ‘real pre-tax’ WACC needs to be derived from the more commonly estimated ‘nominal post-tax’ WACC by some adjustment to allow for inflation and tax liabilities. The ‘target revenue’ stream derived by use of the equation

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\text{Target Revenue} = \text{Operating Costs} + \text{Return of Capital} + \text{Return on Capital}
\]

has several important features:

- taxes to be paid by the entity are allowed for implicitly through the estimated (real pre-tax) return on capital rather than as an explicit item, and
- the need for nominal cash flows to compensate for the effect of inflation is achieved through the use of a ‘current cost accounting’ depreciation schedule rather than through use of a ‘nominal’ return on capital.

In implementing this approach, significant complications arose through:

- the need to model the impact of the dividend imputation tax system on the cost of capital;
- the existence of tax depreciation allowances that were quite different to (both) regulatory and ‘economic’ depreciation schedules; and
- the need to develop an appropriate ‘conversion formula’ to convert a ‘nominal post-tax’ WACC to a ‘real pre-tax’ WACC.

The approach recommended in the DRP embodies a number of significant changes reflecting concerns with the previously used method. These changes include:
use of a nominal post-tax return on capital concept;
• use of a ‘competition depreciation’ approach; and
• explicit modelling of the expected annual tax payments of the entity for explicit inclusion in the target revenue model.

These changes are not uncontroversial — although it can be shown (see Davis, 1999 or ACCC, 2001) that the different approaches are all mutually consistent (being algebraically related) and will give rise to the same outcomes, provided the correct input parameters are used in the modelling process. If incorrect parameters are used, the model can give rise to significant undesirable wealth redistribution effects affecting regulated entities, their customers, and taxpayers. In that sense, the reasons for preferring one approach over another arise from concerns over:

• accuracy of estimation of key parameters in each approach;
• transparency of the process; and
• ease of interpretation.

Since the ‘true’ values of the key parameters in the approaches are not observable, a concern for all participants in the process is whether particular approaches are more likely to generate better estimates of the true values or be more subject to ‘gaming’ behaviour and spread of misinformation.

Thus, for example, in the Victorian Gas Case, the regulators’ draft determination of access prices involved a ‘real pre-tax WACC’ of 7 per cent, which appeared very low to many market commentators inclined to benchmark it against more familiar nominal post-tax rates of return. Following the release of the draft determinations, the price of energy stocks (particularly that of the regulated electricity business, United Energy — which had recently undertaken a public share issue) was marked down significantly. Politicians, both within Victoria and from other States began to exert public pressure. During June, the Premier of Victoria and three other state premiers sent identical letters to the State Regulator (the Office of the Regulator General) and the ACCC asserting that the proposed rate of return could adversely affect investment in the gas sector. Subsequently, the Victorian Treasurer postponed the gas privatisation program and threatened to call it off if the final access determination was seen as unsatisfactory. Eventually, the final decisions of the regulators were released in October 1998, and a real pre-tax WACC of 7.75 per cent per annum was chosen. Over the next nine months the gas businesses were sold at significant premiums to asset value.

For the ‘nominal post-tax approach’ favoured in the DRP, several advantages can be identified. These include the following. First, the explicit modelling of tax payments and franking credits in the revenue equation is more transparent, and likely to be more accurate than the alternative of incorporating tax effects in the cost of capital via use of an estimated ‘effective’ tax rate. Second, the approach
avoids the problem of converting a post-tax nominal rate of return to a pre-tax real rate of return which can only be done on a case by case basis taking into account the specific tax position of the business. Third, given greater market familiarity with the former concept, use of a nominal post-tax rate of return is more easily interpreted than a real pre-tax rate of return. Fourth, as will be shown later, the use of the competition depreciation assumption should, in the absence of other distortions, align the market value of assets and the regulatory asset base valuation. Deviations of market value from regulatory valuation may then provide a clearer signal of incorrect regulatory pricing assumptions. The asset valuation approach used to determine the regulatory asset base is the Depreciated Optimised Replacement Cost (DORC) method, is one of several methods of asset valuation to which we now turn.

**Asset Valuation and Access Regulation**

There are a number of ways of measuring the value of an asset. They include:

- accounting measures such as historical cost (adjusted for depreciation);
- replacement cost; and
- market value.

In practice, these concepts give rise to different estimates of value for an asset, although competitive market conditions do suggest some tendency towards equality between at least two of the concepts. Specifically, if competition (or contestability) prevents the generation of abnormal profits (a return in excess of that required by suppliers of capital) market value should not exceed replacement cost (except in the short run until new entrants or expansion of capacity in response to the abnormal returns occurs). Conversely, if assets have alternative uses wherein normal profits can be earned (and can be easily transferred to those uses), market value should not fall below replacement cost.

It is also possible, in principle, if not always in practice, to adopt accounting conventions that cause accounting values to converge to either replacement value or market value. Use of ‘economic depreciation’ (essentially the change between reporting dates in the present value of remaining cash flows expected from the asset) would cause the accounting value to mimic market value. Use of a depreciation schedule which involves estimating the expected change between reporting dates in the replacement value of the asset (due to ageing, technological change, and price changes) would lead the accounting value to mimic replacement cost.

It is possible to think of the regulatory approach to access pricing by reference to these concepts. By attempting to provide a ‘fair’ rate of return to suppliers of financial capital, the regulator is targeting an outcome (in terms of efficiency of output, pricing and investment) that mimics that which would be observed under a hypothetical case of competition. If successful, market value of the assets (reflected in the market value of service providers) should be close to
the replacement value of assets. Of course, there are many potential sources of error, not least of which is the problem caused by the fact that many regulatory assets involve ‘sunk’ costs, and are not able to be (easily) transferred into other uses if market value in the current activity falls below replacement cost.

It is also possible to think of some aspects of the approach to the design of regulatory models in these terms. Specifically, the adoption of certain asset valuation and depreciation practices to determine the regulatory asset base may lead to closer correspondence between that and replacement (and market) value. This is relevant in assessing the DRP. The ‘competition depreciation’ approach recommended in the DRP attempts, in essence, to implement a depreciation schedule for the ‘return of capital’ component of allowable revenues that would lead to the regulatory asset base approximating the replacement value of assets. If a competitive risk-related rate of return applied to the regulatory asset base is used in access pricing determinations, the market value of the assets should equal the regulatory asset base.

Ideally, then, under the proposed regulatory framework, the market value of access providers, the regulatory asset base, and depreciated optimised replacement cost (DORC) should move closely in line. That would, if achieved, be a significant change from past experience where significant differences have been observed — prompting the question of why such differences in asset valuation may arise.

**Lessons from Past Experience**

The main case study available for examining the asset valuation effects of regulatory approaches used to date is that of the Victorian Gas Industry. The privatisation of the gas transmission company (Transmission Pipelines Australia), saw this company sold in May 1999 by the Victorian Government for just over $A 1 billion, a sum more than twice the replacement value of the underlying assets. (The stapling together for sale of gas retailers and the regulated distribution companies means that individual prices for the gas distribution businesses could not be identified — although similar multiples of price paid to regulatory asset base appear to be implied). Since the regulatory regime under which the company operates should lead to future cash flows with a present value equal to (or slightly above) the replacement value of underlying assets, the gap between market value and asset replacement value presents a conundrum warranting explanation.

One possible explanation is that the ‘winner’s curse’ has prevailed, with the successful bidder(s) simply paying too much for the company. Since similar gaps between the privatisation sale price and asset value of gas distribution companies and electricity companies (under a similar regulatory structure) appear also to have occurred, but because expected cash flows and risks are readily apparent under the regulatory regime, this seems unlikely to provide the entire (or even a large part of the) explanation.
An alternative explanation, appealing to advocates of privatisation, is that the premium paid reflects the efficiency gains (beyond those assumed in the regulatory model) that the successful bidder believed could be extracted under private ownership. However, given the nature of the industry (operating costs constitute less than half the total costs to be covered), the magnitude of likely gains in operating efficiency cannot explain the sale-price premium. Other ‘operations-side’ explanations are that there may be synergies available to successful bidders who also operate other power utilities, or that the other incentive features built into the regulatory model warrant a market value in excess of asset replacement cost.

Neither of these explanations appears able to explain much of the sale-price premium, prompting two, mutually compatible, ‘finance-side’ hypotheses. One hypothesis is that some investors are willing to accept a rate of return lower than that used in the regulatory model. This has two effects. First, an excessive rate of return on the existing asset base is achievable for those investors. Second, future additions to the asset base would represent projects with positive net present value (NPV) — since the allowable rate of return exceeds that required. Hence, a sale-price premium would be expected. A second hypothesis is that asset values were significantly overstated, magnifying the effect of an excessive rate of return. Whether replacement of depreciated assets over time would enable this effect to be perpetuated is an open question, since the allowed return of capital would exceed the true replacement value of the assets.

Both hypotheses may contribute jointly to the explanation of a sale price premium in the privatisation process and to a gap between stock market valuation of access service providers and asset replacement values. It is worth noting that the existence of a ‘back end loaded’ depreciation schedule would magnify the distorting effect of both excessive asset valuations and excessive regulatory rates of return — since the excess returns would be maintained for longer.

Table 1 illustrates how use of the real depreciation approach required by the pre-tax real WACC approach used in the Gas Industry Decision implies a significant back end loading of depreciation relative to a more common straight-line approach. To the extent that the complexities of the pre-tax real WACC approach obscured reality and enabled those interest groups arguing for a higher regulatory rate of return to mount a more vocal and persuasive case, any effect of resulting errors in the rate of return used would tend to be exaggerated by the back-end loading effect.

The Table demonstrates how a ‘real depreciation’ approach in access pricing in which depreciation is related to the inflation adjusted asset value is equivalent to ‘back end loading’ of depreciation. The example assumes a real interest rate of $r = 5$ per cent per annum; inflation of $\pi = 10$ per cent per annum; a nominal interest rate of $i = 15.5$ per cent per annum consistent with the ‘Fisher Effect’; an asset purchased for $100$ with a five-year life; and assumes (for simplicity) zero operating costs. Panel A demonstrates the cash flow series when the regulatory pricing model allows return of capital equal to straight-line depreciation ($20$ per annum) plus a nominal return of $15.5$ per cent of the start of period asset value.
Panel B demonstrates the cash flow series when return of capital (depreciation) is inflation indexed (such that the amount $D^*_t$ corresponds to $20 at date 0 prices) and where a real return of 5 per cent per annum is allowed on the inflation-adjusted start of period asset value.

Panel C calculates the implied Nominal Depreciation Schedule associated with Panel B by recursively subtracting the nominal return on start of period asset value from the cash flow of Panel B to derive an implied nominal depreciation schedule. For example, in year 1 nominal return would be $100 (0.155) which subtracted from cash flow of $27.5 gives an implied nominal depreciation amount of $12 and a date 1 asset value of $88.

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Nominal Depreciation Approach — straight line depreciation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital — $K_t$</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Depreciation — $D_t$</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Cash Flow — $C_t$</td>
<td>35.5</td>
<td>32.4</td>
<td>29.3</td>
<td>26.2</td>
<td>23.1</td>
<td></td>
</tr>
</tbody>
</table>

| **Panel B: Corresponding Real Depreciation Approach** |   |   |   |   |   |   |
| $K^*_{t-1}(1 + \pi)$ | 110.0 | 96.8 | 79.9 | 58.6 | 32.2 |   |
| $D^*_t$ | 22.0 | 24.2 | 26.6 | 29.3 | 32.2 |   |
| $K^*_t$ | 100 | 88.0 | 72.6 | 53.2 | 29.3 | 0.0 |
| $C^*_t = rK^*_{t-1}(1 + \pi) + D^*_t$ | 27.5 | 29.0 | 30.6 | 32.2 | 33.8 |   |

| **Panel C: Implied Nominal Depreciation Equivalent** |   |   |   |   |   |   |
| $iK^*_{t-1}$ | 15.5 | 13.6 | 11.3 | 8.3 | 4.5 |   |
| $D_t$ (implied) = $C^*_t - iK^*_{t-1}$ | 12.0 | 15.4 | 19.4 | 24.0 | 29.3 |   |
| $C^*_t$ | 27.5 | 29.0 | 30.6 | 32.2 | 33.8 |   |
| $K_t$ (implied) | 88.0 | 72.6 | 53.2 | 29.3 | 0.0 |   |

**Assumptions:**

\[ i = 15.5\% \]
\[ \pi = 10.0\% \]
\[ r = 5.0\% \]
Asset Values, ‘Competition Depreciation’, and Cost of Capital

The use by the ACCC of a nominal cost of capital approach brings with it a requirement that the depreciation schedule chosen should provide for the return of a sum equal to the original cost of the asset over its life. In contrast, the real cost of capital approach built inflation compensation into the depreciation schedule rather than the cost of capital, so that the return of capital over the life of the asset was an amount equal to the real value of the original cost.

It is easily shown (drawing on the analysis of Schmalensee, 1989) that any depreciation schedule that returns 100 per cent of the original cost of the asset can be used in the building block approach adopted by the ACCC. Consider an asset with an initial cost of \( K_0 \) and a life of \( N \) years. Net cash flows (revenue minus operating costs) that are based on a return of capital \( D \) and a return on capital \( rK \), and the NPV of each of those cash flows, are set out below in tabular form. It is assumed that the rate of return on capital allowed by regulators in the determination of cash flows is the same as that used by investors in discounting future cash flows. It should be noted that the analysis could be performed in either nominal or real terms and thus it is applicable to either a ‘historical cost depreciation’ (nominal rate of return) or a ‘current cost depreciation’ (real rate of return) approach.

### Table 2 Tabulation of Cash Flows

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>.....</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Flow</td>
<td>(-K_0)</td>
<td>(rK_0 + D_1)</td>
<td>(rK_1 + D_2)</td>
<td>.....</td>
<td>(rK_{N-1} + D_N)</td>
</tr>
<tr>
<td>NPV</td>
<td>(-K_0)</td>
<td>(rK_0 + D_1)</td>
<td>(rK_1 + D_2)</td>
<td>.....</td>
<td>(rK_{N-1} + D_N)</td>
</tr>
</tbody>
</table>

Substituting \( D_i = K_{i+1} - K_i \)

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>.....</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV</td>
<td>(-K_0)</td>
<td>(K_0 - \frac{K_1}{1+r})</td>
<td>(\frac{K_1 - K_2}{1+r} - \frac{K_2}{(1+r)^2})</td>
<td>.....</td>
<td>(\frac{K_{N-1} - K_N}{(1+r)^{N-1}} - \frac{K_N}{(1+r)^N})</td>
</tr>
</tbody>
</table>
chosen the correct rate of return). At the start of the regulatory process (or when the asset is first purchased) the market value will equal the replacement cost. However, it should be noted that over the life of the asset, the regulatory asset base (given by initial value minus accumulated depreciation) could diverge from the replacement value — unless the depreciation schedule chosen happens to mimic changes in replacement cost.

The choice of ‘competition depreciation’ in effect aims to achieve an outcome of the regulatory asset base tracking the replacement cost of the asset over its life. At the start of the regulatory period, a projected DORC valuation for five years hence (the end of that regulatory period) is made, and depreciation is based on the difference between the current value and the projected value using a straight-line depreciation schedule. To the extent that the projected DORC is accurate, the regulatory asset base will approximate replacement cost, and, if the correct rate of return has been chosen, market value and replacement cost will be in close proximity.

It may be thought that this approach runs into problems of dealing with inflation since a DORC projection will reflect an assumed inflation rate over the regulatory period — and compensation for inflation is already built into the nominal rate of return. However, there is no conflict. Consider, for example, the case where an asset costing $100 has a life of ten years and it is believed that its DORC value would be $50 after five years if there were no inflation. If there were 5 per cent per annum inflation projected, the DORC value will be

\[ \$50(1.05)^5 = \$50(1.276) = \$63.80. \]

Allowed depreciation over that five year period would be $27.20 (rather than $50 in the case of zero inflation). Note however, that allowed depreciation over the next five-year period would then be $63.80 (since the DORC value at the end of 10 years will be zero). The DORC projection approach simply changes the pattern of allowable depreciation over the life of the asset when different inflation rates are assumed.

One of the merits of this approach is illustrated in Table 3. There, the case referred to in the previous paragraph is set out in a spreadsheet for the alternative scenarios of a zero expected inflation rate and a five per cent inflation rate. While in the latter scenario, the allowable depreciation over the first five year period is less than in the zero inflation case, the higher nominal return on capital (of 10.25% as given by the Fisher relationship, \( i = r + \pi + r\pi \)) exactly offsets the real cash flow consequences. The competition depreciation approach thus has the advantages of:

- preserving (approximate) equality between the regulatory asset base and the replacement cost of assets, and
- making real cash flows over the life of the asset independent of the projected rate of inflation.
Table 3: ‘Competition Depreciation’ and Inflation

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Zero Inflation Case</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DORC projection</td>
<td>100</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Depreciation – $D_t$</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Return on Capital</td>
<td>5</td>
<td>4.5</td>
<td>4</td>
<td>3.5</td>
<td>3</td>
<td>2.5</td>
<td>2</td>
<td>1.5</td>
<td>1</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Cash Flow</td>
<td>15</td>
<td>14.5</td>
<td>14</td>
<td>13.5</td>
<td>13</td>
<td>12.5</td>
<td>12</td>
<td>11.5</td>
<td>11</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>Panel B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5% Inflation Case</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DORC projection</td>
<td>100</td>
<td>94.5</td>
<td>88.2</td>
<td>81.0</td>
<td>72.9</td>
<td>63.8</td>
<td>53.6</td>
<td>42.2</td>
<td>29.5</td>
<td>15.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Depreciation – $D_t$</td>
<td>5.5</td>
<td>6.3</td>
<td>7.2</td>
<td>8.1</td>
<td>9.1</td>
<td>10.2</td>
<td>11.4</td>
<td>12.7</td>
<td>14.0</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>Return on Capital</td>
<td>10.3</td>
<td>9.7</td>
<td>9.0</td>
<td>8.3</td>
<td>7.5</td>
<td>6.5</td>
<td>5.5</td>
<td>4.3</td>
<td>3.0</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Cash Flow</td>
<td>15.8</td>
<td>16.0</td>
<td>16.2</td>
<td>16.4</td>
<td>16.6</td>
<td>16.8</td>
<td>16.9</td>
<td>17.0</td>
<td>17.1</td>
<td>17.1</td>
<td></td>
</tr>
<tr>
<td>Cash Flow – Real Value</td>
<td>15.0</td>
<td>14.5</td>
<td>14.0</td>
<td>13.5</td>
<td>13.0</td>
<td>12.5</td>
<td>12.0</td>
<td>11.5</td>
<td>11.0</td>
<td>10.5</td>
<td></td>
</tr>
</tbody>
</table>

Assumptions: $i = 10.25\%$

$\pi = 5.0\%$

$r = 5.0\%$

It should be noted that the competition depreciation approach combined with CPI–X smoothing has interesting implications for the path of revenues over the regulatory period. The smoothing process operates as follows, where it is assumed for convenience that output is constant over time such that price and revenue are perfectly correlated. In the first stage, prior to smoothing a set of target revenues ($c_1$, ..., $c_5$) for years 1 to 5 of the current regulatory period are derived. Then, an allowable ‘smoothed’ set of cash flows of ($C_1$, ..., $C_5$) are obtained as $C_t = C_{t-1}(1+\pi)(1-X)$ where $\pi$ is the assumed inflation rate and X is an adjustment factor sometimes mistakenly referred to as a ‘productivity/efficiency adjustment’. The allowable cash flows are calculated by determining the X factor such that the present value of the series ($c_1$, ..., $c_5$) equals the present value of ($C_1$, ..., $C_5$), and where $c_t = C_t$. Even if different approaches to depreciation give rise to a different time path for ($c_1$, ..., $c_5$), the CPI-X smoothing largely offsets this. There may be differences between the initial year cash flow, but these will be
offset by differences in the calculated X factor such that the present value of the allowable revenue streams are equal — provided the correct parameter values are used. However, if incorrect parameter values are used, the extent of wealth redistribution may very well be affected significantly by the approach used.

In the approach adopted by the ACCC, the CPI–X smoothing in determining the allowable revenue stream is to some extent redundant (unless there is significant year to year variations in expected operating costs). Because the allocation of depreciation over the regulatory period is based on constant real amounts per year, and is a major part of the total, the resulting nominal cash flow stream already tends to exhibit a steady growth rate. The implied X factor can be calculated, but does not lead to significant adjustment to the cash flow stream. Thus for example, in the case of panel B of Table 3, the X factor can be calculated to be 3.45 per cent per annum. The close correspondence between the original cash flow stream and the smoothed cash flow stream are shown below.

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Cash Flows</td>
<td>15.75</td>
<td>15.99</td>
<td>16.21</td>
<td>16.41</td>
<td>16.59</td>
</tr>
<tr>
<td>Smoothed Cash Flows</td>
<td>15.75</td>
<td>15.97</td>
<td>16.19</td>
<td>16.41</td>
<td>16.64</td>
</tr>
</tbody>
</table>

It is worth asking what interpretation can be placed on the X adjustment factor. It can be shown that the X factor will be zero if the allocation of depreciation over the regulatory horizon is based on a ‘real annuity approach’. In such a case, the annual allocation of depreciation is back-end loaded to an amount that means that the real cash flows generated from the model are constant over the period. Since in that case, target nominal cash flows are related by $c_t = c_{r,t}(1+\pi)$, the X factor used to derive allowable cash flows ($C_1$, ..., $C_5$) will clearly be zero. If the depreciation schedule is more ‘back loaded’ than the real annuity schedule, the X factor derived will be negative. This reflects the fact that the initial period cash flow is less than for the real annuity case and that a steeper increase in future period cash flows is necessary to achieve the same NPV over the regulatory period. Conversely, if the depreciation schedule is more ‘front loaded’ than the real annuity schedule (such as in the case of a straight line allocation), the X factor will be positive. Thus, the X adjustment factor has nothing to do with efficiency or productivity issues, but is an immediate consequence of the choice of depreciation schedule over the regulatory period. The approach adopted by the ACCC of constant real allocations of depreciation over the regulatory period means that a positive X factor can be expected. Simulations suggest that a figure in the region of 3 per cent per annum can be expected, with higher values for higher real rates of return. The X factor is unaffected by the assumed rate of inflation.
Conclusion

The ‘competition depreciation’ approach advocated by the ACCC, together with the ‘building block’ approach should, if regulatory determination of initial asset values and required rates of return are correct, lead to close correspondence between the regulatory asset base, the replacement cost of assets, and the market value of those assets.

This is a desirable feature of the approach, and is enhanced by the choice of a post-tax nominal rate of return approach to the determination of revenue streams. Such an approach is more transparent than the real pre-tax WACC approach previously adopted, so that causes of discrepancies between those asset valuation concepts are, hopefully, more likely to be readily identified and corrected.

References


Based on a paper originally prepared for an Australian Competition and Consumer Commission Asset Valuation Forum held in Melbourne on 16/6/00. I am grateful to the Editor and anonymous referees for valuable comments on an earlier draft.
Rail Privatisation in Victoria

David Greig

In 1999 the previous (Liberal) Victorian government franchised its tram and passenger train services to private operators and sold its freight railway. The decision to privatise rail operations was made in 1997 as part of the government’s policy of introducing private sector disciplines and innovation into public transport. The policy followed the successful privatisation of other state-owned infrastructure operations such as the State Electricity Commission.

This article provides some background to rail privatisation in Victoria and highlights some of the unique factors that impacted on the issue. The policy issues are considered in some detail. The paper also describes some of the main features of the privatisation and draws lessons from subsequent experience with the privatisation of the rail systems.

Background

Melbourne has an extensive commuter train network and the biggest tram network outside East Europe:

- The former Met Trains, now known as M Train and Connex, operate radially from a CBD loop to many parts of greater Melbourne, using 3 and 6 car electric trains.
- The former Met Trams, now M/Tram and Yarra Trams, have a grid of CBD routes and radial extensions to (mainly) inner suburbs — out roughly as far as Melbourne had grown at the end of World War II.
- The tram and train routes overlap somewhat.

Buses, most of them privately operated for many decades and now all private, generally operate at ‘right angles’ to the railway lines, filling gaps in the rail network and feeding it with passengers. Routes are regulated to largely prevent buses from competing with trams and trains (this policy is discussed later under Unfinished Business).

Public transport takes about half of those, other than pedestrians, going to or from the CBD, but only accounts for about 9 per cent of total Melbourne travel where cars predominate. The following table shows the main train and tram data.

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David Greig was a Director in the Transport Reform Unit, Department of Treasury and Finance, Victoria, which managed the rail privatisation. He is now with ACIL Consulting, Melbourne.
Table 1: Melbourne Passenger Rail Data at Time of Privatisation

<table>
<thead>
<tr>
<th></th>
<th>Metropolitan trains</th>
<th>Trams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (fares plus subsidy) $million</td>
<td>370</td>
<td>129</td>
</tr>
<tr>
<td>Passenger journeys per year (million)</td>
<td>126</td>
<td>123</td>
</tr>
<tr>
<td>Route kilometres</td>
<td>366</td>
<td>343</td>
</tr>
<tr>
<td>Number of carriages/trams</td>
<td>907</td>
<td>476</td>
</tr>
<tr>
<td>Number of stations/tram stops</td>
<td>208</td>
<td>1600</td>
</tr>
</tbody>
</table>

There is also a country diesel rail passenger service, V/Line Passenger (revenue $110 million per annum at the time of privatisation) which connects Melbourne to a ‘crescent’ of regional towns including Geelong, Ballarat, Bendigo, Seymour/Albury and Traralgon. A smaller private operator serves Warrnambool. Again private buses, many contracted to V/Line and using its livery, feed traffic but do not compete.

A freight railway, V/Line Freight, which had annual revenue of $105 million and is now known as Freight Australia, connects the ports, especially Geelong and Portland, to country Victoria and parts of southern NSW. About half its business is grain.

In its first term (1992-96) the Liberal government in Victoria, with its focus on improving the state’s finances, cut the size of the public sector including the Public Transport Corporation (PTC), which ran all the train and tram services and some of the buses. It privatised most of the remaining public bus services, installed a new board and senior management at the PTC and reached an agreement with unions, after a showdown, which enabled a halving of PTC staff. The agreement involved not proceeding with certain mooted service cuts, and providing a redundancy package that recognised accrued entitlements.

By the mid 1990s the PTC had substantially improved the reliability of its services, and reduced its costs and subsidies. However international benchmarking showed that performance still fell well short of best practice. Government financial support for passenger rail services was still high (around $850 million per annum), and there was consensus among senior management and the then government that further improvement would be difficult to achieve in a large public sector organisation. A decision was made in 1997 to divide the system into several businesses and privatisate them — outright sale for the freight railway and 10-15 year private franchises for the passenger services. The transactions were completed in the period from April to August 1999.
Early Issues in Rail Privatisation

The 1997 decision to privatise, although triggered by the Melbourne Grand Prix tram strike that year, built on work over the previous 18 months on how the government could go about introducing private sector disciplines and innovation into public transport. This interest followed the successful privatisation of the State Electricity Commission, but from a public policy point of view transport was more complex. Unlike electricity or gas, the government expected to remain actively involved as a purchaser/subsidiser of public transport services. Without subsidies most of them would not run, even if costs were further reduced. Subsidies were considered justified by the external benefits not captured through fares such as reduced congestion and pollution, and providing service to people who cannot drive.

A second complexity was competition. Unlike electricity, where parts of the system (generation and retail) could be made competitive, public transport had monopoly characteristics. Not only was it not sensible to duplicate lines, it also was not sensible to have competing trains on the same line: at busier times the performance of one train in terms of what customers consider important (reliability, punctuality and speed) would often be determined by the performance of the train that preceded it. It was also important to preserve network benefits such as common ticketing and a single comprehensive timetable information service.

The freight railway did not present such problems. Rail and road freight was already deregulated in Victoria, and a straightforward sale was possible, as had already happened successfully in New Zealand, Chile and Argentina. Operating subsidies were not needed or justified. However with the PTC being split up, care was needed to preserve the right for freight trains to operate on passenger tracks and vice versa.

Features of Victorian Passenger Rail Privatisation

The preceding issues meant that substantial policy work was needed before the government could be confident about proceeding. The competition problem required analysis of periodic re-tendering, which in turn required analysis of vertical integration or separation and of contract length. The government’s subsidy role meant that it had to be very clear about what services it was purchasing, and what it would do if performance fell short. And as the work proceeded, it became clear that rolling stock and infrastructure issues, discussed below, would also be complex.

This section summarises how these passenger problems were addressed — freight issues are discussed in a subsequent section. The work drew on several branches of economic theory; on experience in the UK, South America and New Zealand; and on experience with other Victorian privatisations.
Objectives and approach

The government’s transport reform objectives were a progressive improvement in the quality of services, substantially increased patronage, minimisation of long term costs to the taxpayer, transfer of risk to the private sector, and high safety standards.

Whatever was done, it was clear that substantial subsidies would continue to be needed, though declining over time. This reflects unpriced external benefits, the usual justification for urban public transport subsidies, at least until the day when general electronic road pricing (varying by road and time of day) becomes feasible. The pre-privatisation subsidy level was in effect the residual between revenue and expenses; the post privatisation levels emerged from the bidding process.

Outright sale was rejected, except for the freight railway, because the government would have been supporting an entrenched operation indefinitely; without a ready performance benchmark it would have been forced into intrusive cost-plus regulation. Simple management contracts or outsourcing of rail operations were also considered, but not seen as a good basis for investment and innovation. The government decided on a franchising approach — private operators would be subsidised for defined periods, after which there would be re-tendering.

Competition

Although lower traffic congestion allows motor vehicles to be stronger competitors for public transport than in large northern hemisphere cities, Melbourne’s train and tram systems enjoy a degree of monopoly power, reflecting convenience and restrictive bus regulations (this issue will be discussed later in the ‘Unfinished Business’ section of the paper). Competitive discipline was thus necessary to ensure improved services and a reduction in subsidies.

Competition on individual lines would not have been effective because of congestion and a loss of network benefits. Periodic re-tendering, of the exclusive right to subsidy on each set of routes, was therefore chosen. In principle others may operate on the routes when there is capacity, but would not attract subsidy. In exchange for the subsidy, operators must commit to defined service standards (outlined below in subsection on ‘franchise agreement’). A major criterion in assessing bids for the businesses was minimising the net present value of subsidies.

Horizontal separation and vertical integration

The radial passenger train network and the nature of the tram network (grid in the CBD, radial outside it) allowed each to be divided in two. A study commissioned by the Transport Reform Unit showed that economies of scale flattened out well below the sizes of the divided businesses (indeed three tram companies were contemplated at one stage). Division into two reduces the prospects of a
monolithic operator extorting additional concessions from the government over time, provides backup in case of failure by any one operator, and provides yardstick competition (comparative performance data is published quarterly by the government). The smaller country passenger train business was left as one.

A separate railtrack model was considered, but so were the complaints emerging in countries where the model had been adopted. In Sweden, for example, there were concerns that investments were not aligned with operator needs. There were also concerns in the UK that train operating companies did not control enough of their costs, and that the track entity was not always responsive to operator needs such as good service standards and investment to relieve bottlenecks. Subsequent experience has shown that the UK Railtrack model was unsound on both safety and financial grounds, and has confirmed the earlier concerns about incentives for investment.

Melbourne’s radial network, with each company largely running on its own lines, lent itself to vertical integration. Competition arguments were not significant as there is little interest from unsubsidised entrants, although an access regime has been imposed which requires spare train paths to be made available if requested. (Vertical separation may however be better in other circumstances, for example, for multi-operator interstate rail freight).

It was thus decided to lease the track, signalling and other infrastructure to the operators (except for country passenger trains, which run on track leased to the freight railway). This avoided the UK problems, but created two others:

- One was shared railway infrastructure in the CBD (for example, the city loop and the main Melbourne stations) and the difficulty in splitting train control and electricity supply and control. Joint leasing was considered, but the commercial strains common in long term joint ventures counted against it. With trains, it was decided to lease some parts of the infrastructure (electrical, and three shared stations) to one operator and some (CBD track, train control, other CBD stations) to the other. Each became a client of the other, with an incentive to cooperate. A similar arrangement with trams was straightforward as the infrastructure is simpler.

- The other problem, of potential opportunism over maintenance, is discussed below (see subsection on ‘infrastructure’).

Franchise length

A trade-off was needed over the amount of time that would elapse before re-tendering. A short period, such as five years, was indicated by competition considerations. A long period, such as 30 or more years, was indicated by investment considerations, as rolling stock typically lasts 30 years with a mid-life refurbishment, and infrastructure 15-60 or more years (for example, shorter for wooden sleepers, medium for electrical overhead, longer for bridges and other structures).
There is some logic in the periods chosen in different countries:

- the UK, where train operators do not own rolling stock and do not lease infrastructure, chose 7 years for basic franchises and up to 15 in cases where operators indirectly paid for substantial rolling stock replacement or track upgrading. Some of these periods have since been extended;
- Victoria chose 10 years for country passenger trains (which operate on the freight railway’s tracks), 12 for trams (simple infrastructure, some rolling stock replacement) and 15 for trains (more complex infrastructure, some rolling stock replacement);
- Argentina chose 30 years, which allows recovery of the high costs of rehabilitating run down railways; and
- the logic also seems to apply to buses, where the interface with the road is benign, vehicle investment needs are more modest than rail, and the market for used vehicles is more liquid — the re-tendering period in various countries is often 10 years (as in Victoria) or less.

**Rolling Stock**

One of the benefits of privatisation was seen as avoiding repetition of poor public sector decisions on rolling stock design. For example, new trams were bought in the 1950s using a 1920s design; the newest PTC trams had significant technical problems; the newest PTC trains had component problems that made them less reliable than older trains. The UK approach, under which the rolling stock was sold to three leasing companies (ROSCOs) and train operators had to lease from them, was considered, along with complaints from some UK train operators about rigidity and poor performance incentives in this model.

It was decided that the new franchisees would need to buy the existing rolling stock and make their own arrangements for sale and leaseback, tailored to their own circumstances (for example, financial structures, tax positions). In addition, the franchisees have to replace the oldest 40 per cent of the train and tram fleets (also to be sold and leased back) and refurbish the rest (apart from historic W class trams which heritage groups wanted retained as is and disability groups wanted scrapped).

Arrangements for the return of rolling stock to the government or transfer to a successor franchisee, raised important incentive issues. Franchisees might have been tempted to buy inferior ‘lived’ rolling stock likely to deteriorate seriously soon after the first 15 years. The government also had to avoid the possibility of being held hostage by outgoing franchisees aware that the rolling stock was essential to continuity of service. However, there was a risk to financiers in owning rolling stock with a 30-year life and a contract of only half that length.

The solution, after testing the financial markets that had evolved since UK rail privatisation, was to require that the operator arrange for a separate financial entity to buy the new rolling stock and lease it back to the operator. These leases
will expire approximately three years after the end of the franchise period. The
government will take over the leases for the remaining three years, for on-lease to
a successor franchisee, and has the option of buying the rolling stock for a pre-
determined residual value. Alternatively the government may choose to have the
rolling stock replaced — three years provides enough lead time. Financial
markets were prepared to take the residual value (equivalent to about 30 per cent
of the initial value) — new rolling stock can be designed to make it suitable for
possible sale elsewhere, but it is likely that the government or successor franchisee
will want to renew the leases.

The leases are ‘dry’; that is, the operator is responsible for maintenance. The
lessor has an interest in the government choosing to renew the lease, and so has an
interest in ensuring that the operator maintains the stock according to target
condition indices. The government in effect guarantees the lease payments, and
takes them on should an operator default, which provides a base for favourable
financing terms.

Arrangements for existing rolling stock (now being refurbished) were less
complex, as it will be near the end of its economic life by the time of re-tendering.

Infrastructure

Incentive issues also arose with the infrastructure leased to the franchisees. With
heavy, long-life rail infrastructure, an opportunistic franchisee might get away
with minimum maintenance expenditure for years before there was a significant
deterioration in performance, and even then the punctuality and reliability fines
might be less than the saving in maintenance. This was particularly a risk towards
the end of the franchise period. On the other hand, detailed government
interference in maintenance management would undermine the efficiency and
innovation advantages of privatisation.

It was decided to have a belt-and-braces regime: annual asset management
plans, an asset condition survey which is periodically updated and produces asset
condition indices by class of asset, key performance indicators, and a requirement
to maintain an escrow account from which the government will allow money to be
released when it is satisfied with maintenance standards. Although this regime
allows the government to be somewhat intrusive, it stops short of telling
franchisees how to do their maintenance or how much to spend.

Franchise agreement

The core of the arrangement is the franchise agreement between the operators and
the government, which specifies what operators must do in exchange for subsidies.
The franchise agreement specifies maximum fares, minimum levels of service,
incentives for punctuality and reliability, loading (overcrowding) standards, and
general requirements for cleanliness and station security. There was tension
between prescription and encouraging innovation.
The franchise agreements:

- retain current standard and concession fares, plus CPI, and allow special fares below the maxima (CPI–X was rejected as Melbourne’s fares are low, subsidies high, and demand is inelastic);
- require the previous frequency of service to be maintained or improved on, with minor variations allowed in service level by route provided overall service is not reduced, and require certain route extensions;
- provide bonuses (or penalties) for good (or poor) punctuality and reliability. Although operators have some natural incentives here, as good service will encourage patronage, they were not seen as strong enough to guarantee the desired standards. This operational performance regime was difficult to design because suitable data had not been kept under public ownership;
- require customer satisfaction surveys to monitor other quality aspects such as cleanliness and personal security. Operator-by-operator survey results, and punctuality and reliability are published quarterly by the Government in *Track Record*; and
- require customer charters, and compensation to customers when performance falls short.

To preserve network benefits despite having several operators, multi-modal tickets were retained (around 90 per cent of tickets sold may be used on any combination of train, tram and bus) as was a ‘one stop shop’ timetable information service covering the whole system.

The multi-modal tickets meant that a Revenue Clearing House was necessary. Revenue is allocated according to passenger numbers and passenger kilometres, measured by surveys. Fare evasion was seen as a risk bidders had to manage. They also had to live with the controversial automatic ticketing system — a source of customer dissatisfaction and a constraint on innovation — which was formally commissioned only just before privatisation.

The detailed design of the franchise and revenue arrangements, unlike some other aspects mentioned above, drew heavily from UK experience, with local variations especially for trams where road congestion had to be allowed for. The agreements’ stipulations on maximum fares and on maintaining offpeak services, expressed in a widely circulated Passengers’ Charter, helps explain the minimal level of public opposition to privatisation.

*Risk*

The franchise contracts mainly allocated risk to the party best placed to *manage* it. Thus operating, cost, financial and most revenue risk were allocated to the private sector, ownership risk was shared, and policy risk was allocated to the government. Some risks were largely allocated to the party best placed to *bear* them (the government), for example, force majeure and latent defects. This risk allocation was consistent with contract theory, and is consistent with recent
Victorian government publications on Public Private Partnerships (Department of Treasury and Finance, 2001).

Provisions were made to cover the risk of franchisee default, including government ‘step in’ to avoid interruption to operations and defined values for government buy-back of assets.

**The Initial Outcome**

Most of the bidding interest was from consortia associated with train or tram services in the UK or northern Europe. The UK rail privatisations had helped create a bidder market, and there was strong competition for the four metropolitan businesses. The winning bidders were National Express (a Melbourne train business, the country passenger train business and a tram business), Vivendi/Alstom (the other Melbourne train business) and Transdev/Transfield (the other tram business).

Collectively the bidders committed to subsidy reductions with an NPV of $1.8 billion (Transport Reform Unit estimate, compared with a ‘public sector comparator’ benchmark of what the situation would have been otherwise). This reduction was despite paying for new and refurbished trams and trains and promising various service improvements such as more evening services, upgraded stations and two line extensions. The Victoria Auditor General’s Office (2000) provides details of the franchise contracts and payments.

Behind these gains lie:

- **Improved efficiency** — an average real cost reduction estimated at 34 per cent compared with public sector provision. For example, rosters had been inefficient and 16 per cent of former staff became redundant at the time of the changeover. Fifteen per cent of the fleet had been out of use at any one time, undergoing or waiting for maintenance; best practice is about half that.

- **Forecasts of large patronage increases** of 40 per cent to 84 per cent over 12-15 years (that is, an average of 3.6 per cent per annum, compared with one per cent per annum achieved in the 1990s). If achieved, this would bring patronage to above its highest historic level of the early 1950s, before there was widespread car ownership. Much of the extra patronage was expected to be on off peak or shoulder services, provided at minimum marginal cost. The optimism on patronage was based on judgements about marketing (the PTC did very little), better integration with feeder buses (all the new franchisees are experienced bus operators), better rolling stock, more express services, better real time passenger information, and safer and more attractive stations. The case for optimism was bolstered by the experience of large patronage increases following privatisation elsewhere (for example, UK, Argentina). However, subsequent experience (discussed below) shows some of the optimism to have been misplaced.
The transition from public to private operation was smooth. The five businesses had already been separated and corporatised under public ownership, and no immediate operational changes were required on day one. There was little public opposition to the change. Public attitudes may have been affected by the tram strike during the 1997 Grand Prix; memories of a strike of several weeks duration about a decade earlier over a minor ticketing matter, with long rows of trams parked in city streets; and a government threat in the mid 1990s to close the system down for months if necessary to overcome industrial opposition to reform. Problems with new ticketing machines, ordered well before the decision to privatise, may have provided a distraction. Victoria’s electricity privatisation, which preceded that of rail transport, may have ‘prepared’ the public for change. Demonstrable improvements to bus services following earlier privatisation of ‘Met’ bus operations may also have helped. The unions, with memories of many bus drivers willingly accepting redundancy packages, acquiesced to privatisation once similar packages were agreed for rail personnel and an EBA negotiated which preserved entitlements. Finally, the Victorian government learned from poor UK handling of public communication about their rail franchising, and mounted a more professional effort.

In short the government made a financial gain, shed most of the operating, cost, and investment risk, and provided for better services. It also partly shed revenue risk (the extent to which this occurred is discussed later in the ‘Subsequent Experience’ section of the paper).

The Freight Railway

The former V/Line Freight is a small railway ($105m per annum revenue at the time of privatisation) carrying grain and other commodities between rural parts of southeast Australia and the ports, plus limited operations elsewhere. Preparation for its privatisation was able to draw on experience in New Zealand, Argentina, South Australia and Tasmania.

The main policy issue concerned the track. The government did not want to sell it, and wanted to ensure that other operators could use it. However the likely bidders, all US-linked, had a strong preference for vertical integration. They saw the ‘above rail’ and ‘below wheel’ distinction as artificial, and considered that the opportunity to manage both trains and track can reduce costs and improve performance. The synergies are easier to achieve in-house and harder to achieve across a contractual boundary between two entities. This view was reinforced by dissatisfaction with separate track arrangements in the UK and Sweden.

The government decided to lease the track to the new owner for three consecutive periods of 15 years, with an unstated presumption of renewals beyond that, and to impose an open-access regime. Satisfactory adherence to the access regime is the main criterion to be met for each 15-year renewal. There are no obligations on track maintenance other than for certain lines used by country passenger trains, and unused lines may be handed back to the government after three years (for example, for conversion to bike trails). The access regime
requires spare train paths, of which there are many, to be made available to other operators for a fee which is largely a pro-rata share of maintenance costs (past capital investment is treated as sunk).

The bidders were all US-based. The railway, now known as Freight Australia, was sold to Rail America for A$163 million. The new owner has cut staff by 30 per cent, is recapturing some freight from road operators, has developed some new business (for example, logs and NSW grain) and has replaced the previous losses with an operating profit.

Subsequent Experience

Experience from the time of privatisation in 1999 has been mostly positive apart from franchisee financial performance. The changeover was smooth and the expected improvements have been or are being made:

- improved reliability, punctuality and customer satisfaction (see Department of Infrastructure Track Record);
- refurbished and new trams and trains;
- increased frequencies, well above the contracted minimum, and better services to sports and other special events;
- some route extensions;
- upgraded stations, station carparks, tram stops and information displays
- upgraded infrastructure;
- traffic lights and other changes to speed up tram services;
- lower off-peak fares on country services
- expanded freight operations.

The contrast with the UK experience is marked — Victoria benefited from the opportunity to learn from that, and does not suffer as much from crowded lines. For recent UK assessments of their experience, see Shadow Strategic Rail Authority (2000) and Department for Transport (2002).

However, patronage increases are well below what the bidders had forecast despite favourable economic conditions, and labour productivity has improved less than some expected. In the government’s words (Department of Infrastructure, 2002):

...train and tram operators have experienced less than satisfactory financial performance and are projecting the potential for significant financial losses in coming years.

There have also been indications of dissatisfaction from Freight Australia. The Labor government elected shortly after privatisation was completed has not been happy with what it inherited.
There appear to be a number of difficulties, including:

- disputes over revenue allocation — past experience with patronage surveys has turned out to be an imperfect indicator of the future, and survey results have been surprisingly variable. There was also an inappropriate governance structure for the Revenue Clearing House. A consequence has been too much focus on shares of the pie, and not enough on increasing its size. Marketing has been unimpressive compared with what was indicated during bidding.
- overly rigid contract management and slow progress until recently in addressing contractual disputes;
- greater and more ingrained fare evasion than some had anticipated, and associated policing problems;
- continuing problems with the ticketing system — problems with the automatic machines, and a contractual dispute with the provider;
- inadequate measurement of infrastructure condition, and little incentive to improve (rather than just maintain and replace) infrastructure (and hence little incentive to participate in longer term transport planning);
- insufficient detail in quality specifications for country track used by passenger trains;
- delays in commissioning a new train control system (covering the whole urban network) by one of the franchisees, affecting the performance of the other one;
- a view that revenue risk is in effect only partly transferred to franchisees, as patronage also depends on wider policies such as road construction and pricing, car park capacity and pricing, and land use;
- a greater net GST impact than franchisees expected, after allowing for sales tax cuts and the GST effect on wages; and
- a dispute over the provisions for track access to competing freight operators.

Some of these have been addressed. In February 2002 the government announced a $110 million payment to settle contractual disputes and assist with marketing, in effect taking back some of the revenue risk it thought it had transferred. It has since settled a long standing dispute with the supplier of the ticketing system. Some of the other problems were being addressed as this paper was written: for example, a new Revenue Clearing House structure, finalisation of some rolling stock and fast train negotiations, and an appeal hearing on freight access.

A further ‘train and tram franchise review’ is under way (Department of Infrastructure, 2002) which presumably will lead to various changes including additional government payments. The review announcement implies that payments may relate to the promotion of patronage growth and to improving operational efficiency. There is a hint at what might have happened in the absence of the review in the wording
Subsequent media reports speak of possible mergers and re-tendering (The Age, August 9, 2002).

There are detailed lessons emerging from the issues in the above list. A more general lesson is that bidders may have become too excited near the end of the ‘race’ and bid too aggressively. Unlike simple privatisations, this ‘winner’s curse’ is a problem for the government which has a continuing relationship with possibly disgruntled partners. And it is a challenge for a government department, whose employees do not face commercial incentives, to manage contracts in a flexible way that protects the government’s interests, avoids undue interference, avoids bogging down over small issues, and exploits opportunities for ‘win win’ improvements.

The franchisees and the government are somewhat stuck with each other, as default and early termination would be unattractive to both. The franchisees will want to renegotiate some of the fundamentals, to see the problems overcome and to start earning better returns. The government will want to avoid a moral hazard problem — it can meet reasonable contractual claims, negotiate to improve shortcomings in the original arrangements, offer increased subsidies for additional improvements in service, and spend on wider objectives (for example, promotion of public transport generally) but, if it goes too far, it will send overly soft signals to the private sector.

### Unfinished Business

The Victorian transport reforms mainly privatised what was there already. Wider policy changes were mainly left for another day. Public transport policies have not kept pace with the changes in Melbourne’s development, so it will be difficult to achieve the government’s goal of 20 per cent of Melbourne travel being by public transport by the year 2020. Some of the changes that should to be pursued are:

- modification to train and tram services to better align them with demand — for example, more service on the busiest tram and train lines, or busiest parts of lines, and less elsewhere (including replacement of low-use services by buses), more express services and fewer stoppers, and investment to ease bottlenecks. Negotiation with franchisees on these issues should be feasible because revenue prospects would be improved;
- a change, long mooted, to the bus subsidy regime, away from cost-plus and towards incentives for passenger growth. This would also encourage better interchange/feeder arrangements with trains;
• a move to truly competitive re-tendering of Melbourne bus services (due in 2005), combined with flexibility to change the old grid route structure and to shift capacity to new outer suburbs (despite recent improvements some are poorly serviced, while some inner suburbs are relatively over serviced). Ideally a liberalisation of bus regulation would have preceded tram and train franchising, but 10-year bus contracts had been let only four years before. Also the government felt that with rail reform it was biting off enough politically;
• use of jitney type services, intermediate between taxis and buses, on thin routes, similar to ‘van’ (minibus) services in some US cities; and
• liberalisation of country and school bus services. Some routes are based on long-defunct train lines, some services are nearly empty, no competition with trains is permitted, and franchise renewal has been grandfathered rather than competitively bid.

Conclusion

The recent Victorian experience confirms the case for privatising freight railways, and shows that carefully designed passenger rail privatisation can produce positive outcomes for customers and governments (assuming the government’s subsequent payment increases are modest compared with the originally estimated gains). However the nature of railways, with passenger subsidies because of external benefits, network effects and expensive long-life assets, creates a number of economic policy problems, which should be addressed before proceeding.

A basic problem is how to harness competitive forces while preserving network benefits. Consequential problems are whether and how to divide the system (vertically and horizontally), the issues around periodic re-tendering, and how to get positive interfaces between one operator and another and between operators and their successors. Complex issues with revenue sharing, rolling stock and infrastructure arise here. The other basic problem is how to specify what the travellers and the government are to get in exchange for subsidies, in a way that maintains flexibility to adapt to changing circumstances and to innovate.

Victoria, after considering alternatives, addressed these problems by deciding to split the former PTC horizontally (5 passenger operators and one freight) but not vertically (operators lease their infrastructure); to have competition for the passenger markets (periodic re-tendering) rather than competition within; and to specify the minimum outputs it required (for example, frequency, reliability, punctuality). To support this basic framework, it developed commercial provisions covering multi-modal revenue, rolling stock leases and infrastructure maintenance.

Three years later the outcomes are in many respects pleasing (smooth transition, improved performance, more services, refurbished and new rolling stock, some other upgrades and innovations). Victoria was fortunate in being able to draw on experience in the UK and elsewhere, and then make some advances in the art. Recent difficulties and renegotiations will mean that the gains to the state
will be less than was expected in 1999, as will the degree of risk transfer, but it appears that they will still be substantial compared with the alternative of continued public sector operation. Other states, facing high subsidies and high renewal costs, would gain by following Victoria, learning from both the better and weaker aspects of its experience.

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Reform of Media Ownership Regulation

Franco Papandrea

The Broadcasting Services (Media Ownership) Amendment Bill (the Bill), introduced in the Parliament by the Government on 21 March 2002, seeks to remove existing restrictions on foreign ownership of media assets, and to introduce the issue of exemption certificates for breaches of cross-media restrictions that satisfy prescribed minimum conditions on editorial separation of jointly controlled media operations. According to the Minister for Communications, Information Technology and the Arts (Alston, 2002), the aim of the Bill is to update Australia’s outmoded media ownership regime in a way that encourages greater competition and use of new technologies while providing strict safeguards to ensure diversity of opinion and minimum levels of local news and information. How well do the proposed amendments live up to this laudable aim?

The Australian broadcasting industry, in all its forms, has been a target for extensive government regulation and control since its inception. Regulatory policy has been, and continues to be, the primary determinant of the structure and performance of the electronic media. While much of the regulation has been driven by social policy objectives and technical needs to minimise interference between users of the broadcasting spectrum, its effects have had important implications for competition, efficient use of resources and the range of services available to consumers. In addition, while the objectives of some of the regulatory instruments have consistent implications for industry performance, others are clearly in conflict with each other (for example, promotion of program diversity versus restrictions on entry). These conflicts have necessarily led policy makers to trade-off some of the objectives against others. According to the Productivity Commission (2000), this has produced ‘a history of political, technical, economic and social compromises … (whose) legacy of quid pro quos has created a policy framework that is inward looking, anti-competitive and restrictive’.

Given this complex set of compromises, reforms to rectify perceived problems with some aspect of the regulatory structure may well lead to some further distortions elsewhere in the structure. Further, because the proposals attempt to pursue multiple objectives they may be unnecessarily complicated. Although they purport to relax some of the ownership provisions of the current regulatory arrangements, they also seek to introduce prescriptive requirements in terms of diversity of opinion and local content. The desirability of the reform, therefore, would be difficult to determine without careful analysis of all its implications.

This paper seeks to examine the effects of the proposed media ownership changes. The main costs and benefits likely to be associated with the proposed

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changes will be considered and will be used to assess whether a net benefit is likely to accrue to society. To provide the appropriate context for the examination of the proposals, the paper begins with a discussion of the existing ownership regulations.

**Current Media Ownership Regulation**

The ownership and control provisions of the *Broadcasting Services Act 1992* (BSA) impose limits on media industry concentration that are much more onerous than those allowed by trade practices legislation for industry in general. The primary objective of these regulations is to ensure diversity of opinion and programming. Legislators have always been concerned about the power of the electronic media to influence public opinion. The Joint Parliamentary Committee on Wireless Broadcasting (1942), for example, was of the view that ‘no medium of entertainment, whether it be stage, cinema or literature has such a powerful influence for good or evil as broadcasting’. With respect to foreign owners, the perceived risk is one of alien influence on the domestic culture and political system.

The concern with media influence on public opinion is primarily a product of the small number of suppliers of media services. While newspaper ownership concentration largely reflects the economics of the industry, concentration in the broadcasting media is primarily determined by the application of restrictive licensing and planning rules designed to protect incumbent broadcasters from entry competition. For example, an outright ban has been imposed on the licensing of new commercial television services until 2007, datacasting services cannot transmit programs likely to compete with those of commercial television services, the planning process arbitrarily restricts allocation of spectrum for broadcasting services, and the Australian Broadcasting Authority uses its licensing powers to limit the number of services. Without these restrictions on entry into broadcasting, there would be considerably less need for special ownership rules to promote media diversity.

Three principal mechanisms are currently used to control ownership of broadcasting media:

- **First**, the BSA imposes *limits on the ownership of broadcasting media assets* that can be held by an individual. For commercial television, no more than one station per licence area may be owned or controlled by an individual. In addition, the aggregate reach of television stations under common ownership cannot exceed 75 per cent of the Australian population. For commercial radio, no more than two stations per licence area may be owned or controlled by one individual.

- **Second**, *cross-media limits* prohibit common ownership of a controlling interest in television, radio and newspaper interests in the same market. An individual may own a controlling interest (15 per cent of the shares) in only
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one of these media in any one licence area. Ownership of a controlling interest in different media in different licence areas is permitted.

- Third, the BSA prohibits direct or indirect foreign ownership of a controlling interest in a commercial television licence or aggregate interests exceeding 20 per cent by two or more foreign interests. In addition, no more than 20 per cent of the directors of a company holding a commercial television licence may be foreign persons. For subscription television, the individual and aggregate share interests in a licensee company are limited to 20 per cent and 35 per cent respectively. No limits apply to the control of subscription television licences by foreigners. Commercial radio licences are not subject to foreign ownership or control regulation under the BSA. (Newspapers are subject to the foreign investment policy guidelines, which currently limit individual and aggregate foreign ownership of national or metropolitan dailies to 25 per cent and 30 per cent respectively and foreign ownership of provincial newspapers to 50 per cent.)

Only the cross-media ownership and foreign ownership provisions are affected by the proposed reforms, and the discussion in this paper will be confined primarily to those provisions.

Effects of Current Ownership Rules

Both the cross media rules and the limits on the ownership of broadcasting media assets reject the notion that diversity of opinion can be guaranteed by standard competition rules, particularly in a market without free entry and with few operators. By imposing ownership limits stricter than those likely to ensue in a competitive market, the regulations expand the number of suppliers in the market and thus trade-off benefits of economies of scale and scope for the perceived social benefits of diverse ownership of media assets. Although diversity of ownership does not necessarily guarantee diversity of views or programming (for example, ownership limits do not preclude different owners from entering into arrangements to share programming and related resources), the Productivity Commission (2000:314) observed that:

The public interest in ensuring diversity of information and opinion, and in encouraging freedom of expression in Australian media, leads to a strong preference for more media proprietors rather than fewer.

By prohibiting the formation of multimedia groups the cross-media rules inhibit firms from taking advantage of the associated economies of scope. These include the inability to maximise administrative efficiencies and reduce commercial risk by being involved in competing activities (rises and falls in demand for advertising in different media do not necessarily coincide). Under the current rules, the only way that media firms can pursue similar efficiencies would be to enter mutually beneficial cooperative or commercial arrangements with
rivals. Examples of such co-operation include radio and newspaper groups sharing advertising personnel and parts of their premises, and radio and television stations sharing local news-gathering personnel, facilities and programs.

Cross-media regulation is inequitable in its application between powerful media. Pay television is not subject to cross-media ownership restrictions despite its steadily growing subscriber base. The Internet is also growing rapidly as a source of information but does not fall within the scope of the rules. Inequitable application is also evident in the print media — newspapers are subject to the regulation, magazines are not. While many magazines serve narrow interest groups, and thus have limited circulation, some of the more popular magazines have circulations that exceed those of some major daily newspapers. Such differential regulation of competitive activities can have a distorting effect on investment, particularly at times of rapid change, and can result in the development of inefficient industry structures.

The necessity of cross media rules is also being challenged by technological developments and the growth of new services. Digital television conversion has the potential to increase greatly the number of television services in the market. Pay television, which did not exist at the time the cross-media rules were introduced in 1987, is already a major mass medium. Although subject to the cross-media rules, the number of commercial and other radio services has grown substantially since 1987. Over 2.3 million households have access to the Internet and the number is growing rapidly (ABS, 2001). In addition to providing access to new sources of information and entertainment, the Internet also provides access to many domestic and overseas radio services. With the expansion of broadband access to the Internet, access to television services will also be possible.

Assessment of the effectiveness of, or need for, cross-media rules must also take account of other regulatory instruments and policies that impinge on diversity. For example, although historically technical considerations have had an important influence on the number of potential entrants to the industry, they are no longer a significant constraint on entry. Removal of restrictions on entry, therefore, would facilitate entry into the industry and reduce the extent to which ownership restrictions may be needed to promote diversity. Considerations of what is an adequate level of diversity, of course, need also to take account of the services provided by the Australian Broadcasting Corporation (ABC) (operating one television and several radio nationwide networks) and the Special Broadcasting Service (SBS), both of which play an important role in media diversity.

Foreign ownership restrictions seek to ensure that commercial television services are controlled by Australians with the expectation that they are more likely to espouse opinions and favour programs that reflect Australian values. Reflection of Australian values (and the difficulty of defining them) is itself a moot point, quite apart from the question of whether media ownership regulation is the best way to achieve it. The restrictions apply only to ownership (not control) of pay television services. No foreign ownership restrictions apply to commercial radio services because they are considered to be less influential than
television services. Foreign ownership restrictions affect not only foreign citizens and companies wishing to invest in Australian commercial and pay television services, but also any foreign-owned creditors of licensee companies taking equity positions in those companies or directorships on their boards. They may also prevent locally-owned investment funds (including superannuation funds) managed by the local subsidiaries of foreign-owned financial institutions from acquiring substantial interests in licensee companies.

Foreign ownership restrictions limit the capacity of commercial and pay television from gaining benefits of economy of scale and scope that may arise from being part of an international media conglomerate. By limiting the pool of potential investors in Australian media stocks the regulations may reduce the opportunities for licensees (and their shareholders) to maximise profitability and the realisable value of their licences. Other possible costs of the regulation include prevention of foreign companies from diversifying into Australian media assets and distortion of the debt/equity structure of licensee companies by favouring debt over foreign equity.

Ensuring majority Australian ownership of television does not necessarily guarantee programming that is sympathetic to Australian cultural values. Programming choices reflect commercial imperatives such as the program’s price and attractiveness to audiences. If foreign programs have a substantial advantage in these respects, the nationality of a station’s owner, or indeed its program manager, is likely to have little influence on program choice. A more effective means of ensuring Australian cultural values in television programming is to target that objective with specific regulation. To remain viable, even a fully a foreign-owned licensee would have to comply with programming regulation as well as supply programs reflecting domestic tastes and preferences.

In any event, there are doubts about the effectiveness of the current regulation. In the current main case of foreign ownership of a television licensee company, compliance seems to be more apparent than real. Although CanWest (a Canadian company) has only a 14.99 per cent shareholding of the TEN network, additional interest in the form of ‘subordinated and convertible debentures’ give it a total interest in the group of 57.5 per cent (Productivity Commission, 2000).1

**Proposed Changes**

The main features of proposed changes to the media-ownership rules are the abolition of existing restrictions on foreign ownership and control of media assets and the introduction of exemption certificates from cross-media restrictions.

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1 Although the ABA considers these arrangements to be compliant with the BSA, it did rule a 1997 attempt by CanWest to convert non-share interests to shares as being in breach of the Act.
Repeal of foreign ownership restrictions

The Bill seeks to repeal existing foreign ownership and control restrictions applying to commercial and subscription television licences under the provisions of the BSA. With the repeal of the BSA restrictions on foreign ownership of commercial and subscription television licences will be subject only to the provisions of the Foreign Acquisitions and Takeovers Act 1975 consistent with the arrangements currently applying to commercial radio licences. The provision that broadcasting licences (commercial television and radio, and subscription television) may be held only by Australian companies (i.e., formed and registered in Australia) will not change.

When announcing the reform, the Minister noted that the ‘Government is also committed to removing the current limits on the foreign ownership of newspapers’ (Alston, 2002). These limits are currently in the form of policy instruments administered by the Treasurer and their alteration or removal does not require a change to legislation.

Removal of the foreign ownership restrictions is ‘expected to broaden the scope for increased competition and improve access to capital and technology’ for Australian broadcasting media (Explanatory Memorandum). Removal would also ensure consistent treatment of foreign investment in the media sector.

Cross-Media Exemption Certificates

According to the Explanatory Memorandum the ‘cross-media reforms seek to allow increased scope for commercial opportunities while preserving a diversity of opinion and information which is of relevance to local communities’.

The Bill does not repeal the cross-media rules outright but introduces a mechanism to exempt specified non-compliant cross-media arrangements from breaches of the rules. The exemption certificates cover both ownership and control arrangements.

Essentially the exemption certificate is used to introduce a ‘public interest’ test to be satisfied by cross media-mergers. To satisfy the test, applicants are required to demonstrate that the merged entities will retain ‘separate and distinct processes of editorial decision-making’ as well as maintain a minimum (or existing if above the specified minimum) level of local television and radio news and current affairs.

Editorial separation is to be demonstrated through:

- publication of separate editorial policies for the merged entities;
- existence of accurate organisational charts in connection with editorial decision-making responsibilities at the time of the application; and
- maintenance of separate editorial news management, separate news compilation processes, and separate news gathering and interpretation capabilities.
According to the Explanatory Memorandum these requirements do ‘not preclude sharing of resources or other forms of co-operation in newsgathering between organisations’.

The Bill does not provide guidelines or objective criteria about what is needed to satisfy the editorial separation requirements of the test. Applicants are instead required to make undertakings to satisfy the Australian Broadcasting Authority (ABA) that they are sufficient to guarantee editorial separation.

How the Proposed Reforms Measure Up

As noted by the Productivity Commission (2000), media regulation has developed as a complex set of compromises and trade-offs between competing objectives. In such a situation assessments of the efficiency of proposed changes cannot be carried out in isolation from the overall regulatory structure and needs to look carefully at all the related implications. This is not an easy undertaking. Albon and Papandrea (1998:81-82) suggest an approach to the evaluation of broadcasting regulation based on the following four guiding principles:

- regulation should be retained or introduced only when correction of market failure is strictly necessary and justified or to achieve a clearly identified social goal whose benefits to society clearly outweigh all the cost associated with the regulation;
- regulation should be based on a clear, well-defined, transparent and predictable framework;
- regulation should be directed to outcomes and not to the way in which the outcomes are generated or delivered; and
- regulation should be neutral in its impact on delivery technologies and on services with substantially similar attributes.

How well do the proposed reforms measure up against those principles? The Productivity Commission’s inquiry undertook a comprehensive evaluation of all the regulations imposed under the BSA including foreign ownership and cross-media restrictions. While the Commission favoured the repeal of both instruments, it recommended that the cross-media rules should be repealed only after other important conditions were met by the current regulatory structure for broadcasting, namely:

- removal of regulatory barriers to entry that prohibit more than three commercial television licences in an area;
- removal of economic planning criteria of section 23 of the BSA used by the ABA to determine the number of services to operate in a licence area;
- making spectrum available to enable new broadcasters to enter the industry;
- repeal of the foreign investment restrictions; and
introduction of a media-specific public interest test in the Trade Practices Act to apply to mergers and acquisitions. The test would allow only mergers and acquisitions demonstrated to be in the public interest with regard to diversity of ownership and diversity of sources of opinion and information.

The Productivity Commission’s proposals provide a ‘standard’ that may be used to evaluate the efficiency of the proposed changes.

Removal of constraints on foreign ownership

The proposed repeal of the foreign investment restrictions is consistent with the Productivity Commission’s recommendations and is a positive step towards facilitation of a more efficient industry. Repeal of the instrument will lead to consistent treatment of foreign investment in media assets and improve the industry’s access to capital. It will also increase the pool of potential media proprietors and, in the longer term, it is likely to act as a constraint on media concentration. Until constraints on new entry into broadcasting are removed, repeal of the foreign investment restrictions will have little, if any effect on diversity of ownership in the media. Its immediate effect may simply be the replacement of domestic owners with foreign owners.

Removal of cross media ownership constraints

Assessment of the proposed repeal of the cross-media rules is more complex. The proposal satisfies only one of the pre-conditions recommended by the Productivity Commission (repeal of the foreign ownership restriction). It rejects the more important pre-condition of allowing and facilitating new entry in the media industry, and places considerable trust on the ability of a weak public-interest test (establishment of separate editorial policy structures for merged entities) to safeguard diversity of opinion.

Repeal of the cross-media rules under these circumstances, is almost equivalent to unqualified repeal, which according to the Productivity Commission (2000:364) ‘would not be wise’ because the Trade Practices Act, without the recommended media-specific public interest, would not be sufficient to guarantee diversity. According to the Productivity Commission ‘facilitating entry of new players … (and keeping) a careful eye on mergers between existing players’ is critical to the preservation of diversity.

Apart from imposing a small, but ongoing, cost on media mergers and acquisitions, the requirement for an undertaking to establish separate editorial policy structures for merged media entities will be easily satisfied (the separate provision in the test for minimum news and current affairs output by regional merged entities will be discussed below). Even if full compliance with the required undertaking is assumed, the establishment of separate editorial policy structures will not constitute a sufficient condition for the delivery of diversity of opinion. The separate structures can only ensure that separate administrative processes are followed. Ultimately, the merged entities are commonly owned and
it is the right of owners to ‘hire and fire’ editors and dictate to them the editorial policy to be followed. And that policy may be the same for all the entities under common ownership. The weakness of the proposed test is demonstrated by the newspaper operations of News Limited. The company owns a daily newspaper in several State capital cities each with its own separate editorial structure. Despite the separate structures, the newspapers are regularly collectively criticised for their common benign treatment of news that impacts on News Limited’s business interests.

Although separate ownership of media entities will also not necessarily guarantee a diversity of opinion, it is more likely to be encouraged by a diversity of ownership than by common ownership. Repeal of the cross-media rules as proposed without repeal of mechanisms that prevent the entry of major new players in the media industry runs a considerable risk that diversity of opinion will be greatly reduced. The number of media proprietors will be constrained only by the combined effect of standard competition rules and the restrictions on commonly-owned television (one per area) and radio (two per area) licences in the same area and on the aggregate national reach of commonly-owned television licences. The possible effects in typical markets (television licence areas) are shown in Table 1.

### Table 1: Possible Effect of Repeal of Cross-Media Restrictions

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Note: It is assumed that limits on ownership of radio and TV licences in one area (two radio; one TV) will be retained, and that the ABC and the SBS are separately controlled entities.


The Explanatory Memorandum argues that the proposed public-interest test administered by the ABA is more objective and more effective than that recommended by the Productivity Commission. The primary reason for a public-interest test to supplement consideration under the Trade Practices Act was a recognition that an economic or competition approach to defining media markets would not be sufficient to prevent concentration in diversity of information and opinion (the so called ‘market for ideas’). The proposed test narrowly confines the public interest to the establishment of separate editorial structures in the
merged entities and abandons considerations of plurality of ownership, the main criterion underlying the public interest as hereto defined. Thus, all other considerations of the desirability of media mergers will be judged only against the standard competition requirements of the Trade Practices Act. The relevant issue for consideration, therefore, is whether the undertakings for editorial separation will be sufficient to satisfy the public interest with respect to diversity of opinion. As noted above, it is doubtful that the proposed arrangements will provide an adequate guarantee that diversity will be sufficiently preserved.

The Explanatory Memorandum indicates that the proposed removal of the foreign investment limits will provide increased scope for plurality of ownership and that the growth of new sources of information such as the Internet will provide expanded choice. The first of these expectations is overly optimistic. With no new entry in the main media, removal of the foreign ownership limits can do no better than replace existing domestic owners with foreign owners. This means that exemption certificates for cross-media mergers will be the constraining factor for plurality of ownership and will almost certainly lead to a shrinking of the pool of potential assets available to foreign investor. The second expectation is only of limited validity. The regulatory concern to date has been to promote diversity of opinion among the main ‘more influential’ media. Magazines, for example, some of which have readerships larger than major daily newspapers, have never been included in the coverage of the cross-media rules. Although access to the Internet has grown rapidly in recent years, it has not yet reached the point (nor is it likely to do so in the short term) where its influence on opinion is comparable to that of main media.

Quite apart from these considerations, the proposal is bad regulation. Rather than being clear, direct and concise in its objective and application, it seeks to achieve a relatively simple outcome (separation of editorial structures in media mergers) via a cumbersome and indirect route. Notwithstanding the preceding discussion on the efficiency of the proposal, a requirement for editorial separation could be achieved easily and directly by making an independent editorial structure an eligibility condition for holding a broadcasting licence (where two radio licences in a single area are commonly owned as permitted by the current law, a single editorial structure could be permitted as an exemption). The cross-media rules could then be repealed altogether as under the proposed reform they do not appear to serve any purpose other than to provide a mechanism for the issue of exemption certificates consistent with the proposed public-interest test.

Localism issues

The proposed exemption certificates are also intended to provide a mechanism for the imposition of minimum requirements for news and current affairs on mergers involving regional broadcasting licences. This requirement is a reaction to community concerns about recent reductions in local news services by some regional television licensees, but is also related to wider localism policy issues in broadcasting.
The principle of localism in broadcasting has proved difficult to implement, particularly when it has been in conflict with other competing priorities. In commercial television the principle was largely set aside in the late 1980s by two major policy initiatives. The first replaced the then existing ownership restriction, commonly referred to as the ‘two-station rule’, with a rule allowing common ownership of any number of stations with combined audience reach of 60 per cent (extended to 75 per cent in 1992) of Australia’s population. The second, referred to as the ‘equalisation’ or ‘aggregation’ policy, provided for the aggregation of three adjacent regional monopoly licence areas into a single competitive licence area served by the three previously monopolist incumbents.

These policy changes provided strong incentives for stations in different parts of the country to combine into national networks for the distribution of programming. The strong incentives arise directly from the nature of the production costs of television programs. Virtually all of these costs are incurred in the production of the first copy of the program — the marginal cost of making additional copies is very small. Consequently, the average cost per unit of audience declines rapidly as the audience increases. Programs with limited audience appeal, therefore, have a considerable disadvantage vis-à-vis similar cost programs with larger audience appeal. Local news and current affairs would have little appeal to non-local audiences.

Initially after aggregation, the competing commercial television operators expanded their news services with local coverage in each of the pre-equalisation licence areas (that is, in most cases the number of services increasing from one per area to three per area). Limited audiences, however, meant that some of these programs were not financially attractive to television operators. As a result, recent cost-cutting measures by stations have led several to discontinue some of their local news services.

Rationalisation of local news services may be continuing and it is possible that services could be cut further. The ABA is currently conducting a public inquiry into the provision of local news services and will be reporting on what action, if any, may be required. Under the circumstances it may be wise to wait until the ABA has concluded its inquiry before action is taken via the proposed requirements for merged entities. It is difficult to speculate what the ABA may conclude from its Inquiry, but there are three broad possibilities:

- no action should be taken or is possible under current regulatory arrangements;
- specific local news output requirements are imposed on regional licensees as a condition of licence; and
- some other arrangement is proposed for the delivery of a local news service (for example, a subsidy for the production of a local news services allocated by tender to regional licensees).

In each case, all regional licensees would be equally affected by the policy initiative.
The proposed arrangements, however, do not apply equally to all licensees. In most pre-equalisation licence areas, in addition to three commercial television services, there is a local newspaper and two commonly-owned radio services. The most likely merger possibility, therefore, is for one of the three television services to merge with the radio services and the local newspaper. This pattern would also be likely to emerge at the equalised licence area. As the proposed arrangement is concerned only with local television news and applies only to merged entities, it will impose a burden only on the merged television licensee. The other licensees are not affected. Furthermore, if the merged television entity was supplying more than the minimum requirement pre-merger it will be required to maintain the higher level post-merger and thus will be penalised with a bigger burden. In other words, the impact on television licensees will differ depending on their pre-merger situation.

For the same reason, the requirement will influence investment decisions by giving licensees without a local news service an additional incentive to merge. Indeed, the measure may be counterproductive in the shorter term. Licensees with a local news service planning to take advantage of the proposed reform of cross-media rules would have an incentive to discontinue the service or reduce it to the minimum post-merger requirements in anticipation of entering into a merger.

The local news requirement also fails the test for good regulation. There is little evidence that the intervention is justified to correct market failure. In most areas there is at least one local television news service available to audiences. In addition, local news is available on radio services and possibly from a local newspaper. It may be possible that additional local news services are justified by a social goal. If so, that goal needs to be clearly defined and its benefits to society should clearly outweigh all the cost associated with the intervention. At the very least, consideration of the need for intervention should await the conclusion of the ABA inquiry.

Also, as already outlined, the proposed requirement is not neutral in its application. It applies only to television licensees that are involved in a media merger. Other competing television licensees and other services such as radio which supply local news services are not affected by the requirement. If intervention were justified, a more direct mechanism such as a licence condition applicable to all regional television operators would be more appropriate. Alternatively, if the intervention were intended to guarantee a minimum level of local television news, such a service could be more efficiently delivered via a production subsidy that could be tendered regularly by the competing operators. Such a mechanism would have the added advantage of specifying the quality requirements for the service. Under the proposed arrangement only the quantity is specified, which gives an incentive to affected licensees to minimise compliance costs by reducing the quality of the service.
Conclusion

The proposals for media ownership reforms contained in the Broadcasting Services (Media Ownership) Amendment Bill do little to achieve their stated aim. The only element of the reforms likely to produce a positive contribution to the aim is the proposal to repeal the foreign ownership restrictions. Repeal of the restriction will increase the potential pool of investors in the media market and will bring treatment of foreign investment in the media industry in line with the treatment of other industries. However, it will do little, if anything, to increase media competition or add to diversity of opinion. Competition and diversity of opinion are closely related to the number of significant suppliers in the industry and while removal of the foreign ownership restrictions may lead to changes in the identity of owners there is no scope, in the short term at least, for it to increase the number of owners (unless current media holdings are broken up into smaller holdings). The number of suppliers in the media is controlled by other elements of the BSA that are not included in the reform.

There is a considerable risk that proposed reform of the cross-media rules will result in a net loss of social welfare and consequently it is unlikely to satisfy the fundamental principle that an intervention is justified only if it leads to a net benefit to society. The primary objective of the existing cross-media rules is to ensure diversity of opinion in influential media. De facto removal of the rules by the introduction of exemption certificates based on easily satisfiable conditions will be likely to lead to substantial reduction in the number of influential media suppliers with consequential loss of diversity. The separation of editorial structures in merged media entities is unlikely to be effective in maintaining diversity of opinion. The exemption-certificate mechanism is cumbersome and will add additional costs to industry operations as well as regulatory monitoring. The objectives of the features promoted by the exemption conditions could be achieved more efficiently by direct mechanisms such as conditions of licences administered by the ABA.

While the proposed cross-media changes do not appear to be justified, it does not mean that reform of the cross-media rules is not desirable. As noted by the Productivity Commission, there would be significant benefits to society if the cross-media rules were repealed in a manner that safeguarded desirable media diversity. This was only likely to be achieved if the removal of the rules was preceded by repeal of foreign-ownership restrictions, removal of all barriers to free entry to broadcasting, and introduction of a media-specific public-interest test against which media mergers and acquisitions were to be assessed to safeguard diversity of opinion. The proposed reform satisfies only the first of these pre-conditions. In that sense it is but a small step in the right direction.

References


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REVIEWS

Work Rich, Work Poor

Jeff Borland, Bob Gregory and Peter Sheehan, eds Inequality and Economic Change in Australia, Centre for Strategic Economic Studies, Victoria University, Melbourne, 2001.

Reviewed by Phil Lewis

This book consists of a number of research papers arising from a three year project funded by the ARC’s SPIRT scheme and this is precisely what it looks like — a collection of research papers rather than a book with a logical sequence of chapters. Nevertheless, the collection of papers is extremely interesting for those who do research in labour market analysis. It brings together some of our best known labour economists, the odd geographer and Peter Sheehan’s team at the Centre for Strategic Economic Studies at Victoria University. This latter team, including Nick Pappas, are developing a reputation in Australia for their work in technological and structural change commonly known as ‘the New Economy’.

The opening chapter attempts to put the research papers in perspective and reflects the particular interests of the editors. A closing chapter putting the previous ones in context would have been good. One of the more contentious conclusions is that Australia’s response to global change ‘has not produced an employment outcome consistent with social viability’. They reach this conclusion from the observation that real weekly earnings have grown considerably since 1990, earnings inequality has widened significantly, increasing inequality has been more pronounced in particular industries and, finally, that inequality in earnings has risen with all levels of education attainment. These observations alone would not justify the conclusion reached above. Nor the more contentious conclusion:

Thus it is not surprising that Australia enters the twenty-first century in a mood of deepening social crisis’, or ‘the economy has failed to generate an adequate supply of jobs paying a living wage and hence supporting full and independent involvement in the Australian community.

This may come as something of a surprise to those economists who would consider that it is the stubborn rate of unemployment, particularly among the less educated, which remains the biggest social problem in Australia. For the unemployed the only short-run solution, given their low level of productivity, would seem to be the creation of low paid jobs. What needs to be emphasised is that the labour market has changed, many jobs for the unskilled have disappeared.
and, therefore, a program of education and training needs to be initiated aimed at increasing the skills level of those most at risk of unemployment or low paid jobs.

The first research paper by Nick Pappas (Chapter 2) examines family income inequality and shows that market income is becoming less equal across families. It also shows that to a large extent this is due to the relative demand for more highly educated workers. This again points to the importance of education not only for reducing unemployment, but also for reducing inequality for those in low skilled employment.

In Chapter 3, Peter Sheehan examines the international literature on the causes of increased earnings inequality. This is an interesting paper particularly in its conclusion that the impact of the New Economy, driven by globalisation and the IT revolution, are ‘often difficult to explain within the existing conceptual framework’ and also ‘that the literature is essentially inconclusive’. Therefore, one would have to conclude that – even if increased earnings in inequality is a problem – the lack of any useful model to explain it makes it difficult to implement any policy responses.

Deborah Cobb-Clark, with Marie Connolly, carries out her usual thorough job on longitudinal data to look at the labour market experience of immigrant wives. Their conclusions emphasise the importance of looking at the family as a unit for economic analysis and point to the important contribution of immigrant wives to the financial health of migrant families.

In Chapter 6, Yvonne Dunlop looks at characteristics of low paid employment in Australia and, interestingly, the dynamics of low pay. That is, what happens to people on low pay over time — do they move from low paid to higher paid jobs or are they trapped in low paid employment? The answer is that for about half the low paid adults this is only temporary and they move to sustained upward earnings within a short period of time. For the other half of low paid workers, low pay is persistent and they also experience greater job turnover. From a policy perspective, it is important to distinguish between groups of low paid workers – for one subset low paid jobs are an important means of getting a foot on the jobs ladder and we need more, not less, of these jobs.

The chapter by Andrew Burbidge and Peter Sheehan takes another view of the rich family/poor family dichotomy. They show that between the two census periods 1986 and 1996, there was an increase of 42 per cent in couples working less than 30 hours per week and a doubling of couples working over 90 hours per week. Clearly differences in hours worked have combined with the changes in hourly earnings to further increase inequality. Again the polarisation into rich and poor is determined to a degree by the skill of workers.

Jeff Borland compares changes in jobs stability and jobs security over time in the 1980s and 1990s. He finds little significant difference with respect to jobs tenure. However, and interestingly, workers’ perceptions of job security have changed. Not only do workers feel less secure but there seems to be less predictability about what a job is likely to entail in the future. He concludes that employers now have greater scope to determine work conditions than previously.
In Chapter 9, Sally Weller and Michael Webber use the textiles clothing and footwear industry to look at people displaced by structural change. They find that, of those workers retrenched, a third did not return to the labour force and many found jobs at lower status or pay. From this they conclude that there has been:

- a significant de-skilling of this work force ... (and) this study has provided a graphic illustration of the growing polarisation of the Australian labour force and has demonstrated how precarious and unstable careers have been the outcome of the structural changes in the economy.

The implication, which runs through a few chapters of this book, is that somehow structural change is ‘a bad thing’ and is leading to ‘social crisis’. This ignores the point that for most, surely, structural change has been beneficial.

In another thorough piece of work, Nick Pappas again examines the causes of earnings inequality. He points to the importance of the changing pattern of skills in determining the distribution in earnings and again points to the obvious policy conclusion that there is greater need for participation in education and training for the most disadvantaged in Australia.

Peter Sheehan and Alex Esposito introduce the reader to a new approach to occupational information or O*NET (The Occupational Information Network). Readers who are interested in decomposing occupations according to the new range of skills rather than those inherent in the ‘old’ economy will find this chapter extremely interesting. They use the O*NET framework to examine the extent to which the demand for new skills has affected the earnings in Australia. As with previous work of the Sheehan team, they find that on average, jobs are becoming more knowledge intensive, requiring more broadly based knowledge competencies, ability to process information, decision-making and communications. Interestingly, part time jobs, particularly for men, are becoming deskilled with respect to those required by the New Economy.

This is an interesting set of papers particularly for those who are not familiar with developments in the Australian labour market in the last two decades with respect to the New Economy. What spoils the book for me is the emphasis in certain chapters, particularly Chapter 1, on ‘Social Crisis’. It appears to me that that most of the developments in the Australian labour market have been positive for most people. The problem is how to improve the positions of those who have been left behind by structural and technological change, particularly the unemployed. Clearly short run remedies such as labour market programs, cuts in minimum wages, and social security reform will lower unemployment but the unemployed are likely to be in low paid jobs. The solution to inequality lies in a long-term program of education and training particularly for young Australians since most of the evidence suggests that it is education up to Year 12 that really makes the difference in labour market outcomes and that education and training at later years is far less successful. As I have pointed out previously, such a program would only work with considerable government expenditure and would take a
long time to produce significant results. However, considering the cost of short-
term measures to reduce unemployment, which gives no more than bandaid solutions, such a program is essential and the sooner it happens the better.

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REVIEWS

Forced Saving


Reviewed by Matt Benge

Concerns about an ageing population and a rising cost of public pensions have caused governments in many countries to consider pension reform. Policy options include tightening eligibility criteria for public pensions and measures to increase the private provision of retirement savings.

One method of increasing the private provision of retirement savings is to make savings for retirement mandatory. Under Australia's Superannuation Guarantee Surcharge, Australian employers are required to contribute 9 per cent of an employee's salary into a private superannuation scheme. This sort of policy has been advocated by a number of authors. However, Australia is one of a relatively small number of OECD countries that have adopted such a scheme.

The book contains little discussion the pros and cons of a scheme of mandatory private retirement savings (MPRS) relative to merely allowing individuals to make voluntary savings for retirement. The main focus of the book appears to be on the economics of consumption and savings decisions and on issues that need to be thought through when designing an MPRS scheme if such a scheme is to be introduced. There is, however, a short discussion in the first chapter of the pros and cons of an MPRS scheme relative to a pay-as-you go (PAYG) social security scheme. Under a PAYG system, tax payments by those who are working fund the retirement incomes of those who are retired with payments normally dependent on the employment history of retired workers.

My overall impression of the book is that it makes a very useful contribution. It provides a good and very clear discussion of the economics behind work and savings decisions. It goes on to examine a very broad-ranging set of issues that need to be considered when developing public policy on pensions. Particular emphasis is placed on issues arising with an MPRS scheme. Material is presented in a way that is accessible for the non-economist while at the same time being very helpful to economists by collating and synthesising a very broad and up-to-date academic literature on the subject. Its central focus on Australian provisions together with a good discussion of developments in other countries makes it of particular interest to Australian readers.

The first chapter provides some helpful facts and figures. Most developed countries have some PAYG retirement income provision. These schemes become much more difficult to finance when the population ages. Moreover, health costs
are likely to increase as the population ages. The chapter provides projections on population ageing around the world. These provide the main impetus for pension policy reform. It also reviews reasons why the government might wish to intervene by providing pensions in retirement and why private savings for retirement may be suboptimal. One negative aspect is that at times I was unclear about the conclusions readers were expected to reach from the discussion. For example, I was unsure whether the list of reasons why private savings decisions might be suboptimal was meant to provide a case in favour of an MPRS scheme relative to a system of voluntary savings. Of course, even if private savings decisions are suboptimal, this does not establish that an MPRS scheme would be preferable. A full evaluation of this would need to assess whether the costs of government intervention are likely to outweigh the benefits and the book does not really provide such an assessment.

The chapter also offers criteria for assessing retirement incomes policy. Not everyone will agree with these criteria. Some such as offsetting myopia (a concern that individuals are short-sighted and may save too little for retirement) are controversial. Moreover, it seems difficult for a reader without a substantial knowledge of the literature to assess whether there is a well-established case that individuals are myopic. In a subsequent chapter (on page 49) the book cites contrary evidence that people might save too much, rather than too little, for retirement.

Chapter 2 discusses work and saving over the life cycle. It provides a very good and helpful discussion of the economics of intertemporal consumption decisions. It examines the life-cycle theory of consumption and saving, the life cycle model of retirement, a buffer-stock model of consumption and saving and models where individuals suffer from lack of self-control. Overall this chapter is stimulating and provides an interesting overview of a broad literature.

Chapter 3 discusses the accumulation phase of an MPRS. The chapter considers issues of governance of the entities responsible for the management of mandatory contributions and possible regulation of assets or investment returns. Chapter 4 discusses financial risks over the life cycle. The chapter discusses the vast array of ways in which people can save for retirement. Privately managed defined contribution (DC) schemes (whether as part of an MPRS scheme or as voluntary private retirement savings) can allow individuals to have savings invested in ways that meet their preferred risk-return profiles. They can also allow for age-phasing. A theoretical proposition is that rational households will progressively lower their exposure to risk as they age. Young people can respond to poor returns on risky investments by altering labour supply decisions in ways that are not possible after retirement. The book provides some supporting empirical evidence.

Chapter 5 discusses mandatory retirement income streams in a privatised system of retirement savings. This chapter introduces the reader to a large array of annuity products that can be desirable in different circumstances. These include life annuities, variable investment annuities, allocated annuities and deferred life annuities. It discusses policy options to help make annuities less risky and
examines international practice. The chapter presents convincing evidence that adverse selection (the problem that those likely to die young are unlikely to buy annuities) may be an important problem in annuity markets. It argues for mandating annuities but leaving individuals with considerable flexibility about the types of annuity they acquire. I found this a very interesting and helpful chapter.

Chapter 6 discusses the taxation of retirement savings. Here the main focus appears to be not on the mandatory component of savings but on voluntary savings over and above the regulated minimum. It provides an interesting overview of how private pensions are taxed in a substantial number of countries together with a standard breakdown of ways in which pensions can be taxed. The chapter assumes that there is an income tax but a tax-preference for owner-occupied housing. It argues that in this context pensions should be given expenditure tax treatment (contributions to pension schemes and accumulations should be free of tax and distributions taxed at the tax rates of beneficiaries). The best way of taxing private pensions is a complex issue. I suspect that the discussion in the chapter is too brief for readers to find policy conclusions particularly convincing.

The chapter summarises a very small number of studies that have concluded that a comprehensive tax on income or wealth is likely to be less distorting than having a mixture of income tax and expenditure tax provisions. This does not provide a very robust case for arguing expenditure tax treatment for superannuation in Australia. Even if the Australian tax system were appropriately characterised as providing expenditure tax treatment for housing, the relevant comparison would be between one hybrid system with another.

Moreover, in Australia there is no deduction for mortgage interest that may mean that incentives to invest in housing for those who are required to borrow to invest may be very different from what would be afforded under expenditure taxation. It discusses other so-called problem of inter-asset distortions because super funds in Australia have incentives to invest in domestic equities ahead of foreign shares because of the Australian full imputation scheme. However, it fails to explore any reasons why the Australian government might have deliberately introduced such a policy. Issues are more complex than the brief summary treatment in this chapter can provide. The chapter does, however, raise an interesting issue of whether pension tax treatment may artificially encourage early retirement.

Chapter 7 extends the model laid out in earlier chapters to consider administrative charges. Administration charges are likely to absorb a substantial fraction of retirement savings. It provides evidence on important policy trade offs. Greater individual choice of fund tends to increase administration costs but may have benefits in providing competition between funds and in allowing for preferred product choice. Finally, chapter 8 concludes.

Pension policy design is difficult and perhaps no one book is likely to map out a completely convincing and extensive set of policy recommendations. It seems to me that the main strength of this book is not its policy recommendations, many of which are open to debate. Its main strength is in providing a very good summary of a very large set of issues that need to be thought through in
considering public policy on pensions and in introducing the reader to an extensive academic literature on the subject. As such I would strongly recommend this book to readers with an interest in this area of public policy.

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NON-AGENDA

With the view of causing an increase to take place in the mass of national wealth, or with a view to increase of the means either of subsistence or enjoyment, without some special reason, the general rule is, that nothing ought to be done or attempted by government. The motto, or watchword of government, on these occasions, ought to be — Be quiet...Whatever measures, therefore, cannot be justified as exceptions to that rule, may be considered as non-agenda on the part of government.

—Jeremy Bentham (c.1801)

Economic and Social Benefits of Universities: Policy Implications

Roger Dean

Most studies of the outputs of universities imply that the largest economic benefits of university education are captured in the enhanced salaries of graduates. This returns an enhanced tax stream to government which exceeds the investment it has provided. Almost as large an output is contributed by the direct income and employment (national and international) activities of universities, and the ‘spillover’ effect of their R&D (Cabalu, Kenyon and Koshy, 2000). Only few studies consider other economic contributions substantively.

Because of the importance of the current discussion of ‘Higher Education at the Crossroads’ (Nelson and Commonwealth Department of Education Science and Training, 2002) initiated by the Australian Commonwealth Minister for Education, Science and Training for the future of Australian universities, it is argued here that there is at least one additional important economic benefit from the maintenance and expansion of numbers of graduates in our society: their additional contribution to GDP and its growth. The neglect of this argument in most studies, makes it worthwhile to reinforce government (and possibly academic) awareness of this important output by reviewing the literature, and presenting some deductions.

The main argument in this paper is that the full value of universities has been substantially underestimated, and consequently current levels of public funding represent significant under-investment. Brief comments are first offered on some social returns beyond the purely economic, many of which may have additional economic benefits. The paper then reviews studies that estimate the economic

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benefits of university education and, in consequence, argues for the expansion of student numbers in the Australian system and for an enhanced public funding.

**Social Benefits of Universities: An Informed and Equitable Society**

A successful period of university study, combining training and education, fits us for flexibility and adaptability in work (see, for example, Chapman, 2001). It also allows us to contribute to the intellectual and cultural diversity of our communities and to enhance their equity. A key creative capacity, which universities can imprint is that of seeing simultaneously many aspects of a phenomenon like the beaming and the hidden sides of the sun. Such ‘Janusian’ perception is required for us to establish the necessarily multiple equilibria with our national stakeholders and the rest of our globe.

An educated society is capable of enhanced rates of knowledge acquisition (Lucas, 1988) and technology transfer and progress (Dowrick, 2002) as reflected, for example, in the uptake of internet facilities. In some such respects Australia still performs well (Goldsworthy, 2002). There is also an indirect economic benefit from university education in the improved health, and psychological and social well-being of graduates, which reduces government expenditure. Positive civic and political engagement, and gender and race equality are also fostered. The Productivity Commission has listed many of these social ‘spillovers’ (Productivity Commission, 1997) and a detailed UK investigation has been published (Bynner and Egerton, 2001).

Attaching a financial value to such major social benefits of education is difficult, and some commentaries argue that both the psychological and civic benefits are very small (the latter in comparison with year 12 completers). However, best estimates seem to be that it is at least comparable in value to those derived from the human capital considerations that follow in our discussion. For example, this was the conclusion of a study of the benefits of completing schooling in Australia (King, 1999), consistent with earlier US and Canadian studies discussed in that publication. The economic evaluation of these social benefits is clearly presently much less robust than those that follow.

**Economic Outputs of Universities**

The ‘Crossroads’ paper neglects the fact that the Australian university system and those of many other countries are not just profitable businesses, but also profitable for government, and vastly profitable for their host economies. The authors write as if universities were loss-making enterprises which might happily be left to wither, rather than the engines of economic development. This current lack of attention to the market drive resulting from university education is another motivation behind writing this article, so as to focus interest on these socio-economic impacts.

Studies of economic outputs of universities generally consider three components: local and overseas ‘direct’ income and employment generated through their activities, including export income (for example, Cabalu, Kenyon,
and Koshy, 2000); human capital (generated in the employable expertise of the graduates and estimated from their enhanced salaries); and ‘spillover’ of University R&D efforts into government and business commercialisation (Cabalu, Kenyon, and Koshy, 2000). Amongst the several recent pertinent publications, most (for example, Productivity Commission, 1997; Cabalu, Kenyon, and Koshy, 2000; Borland et al., 2000; Greenaway, and Haynes, 2000; Larkins, 2001; Johnson and Wilkins, 2002) do not discuss in any depth the possible additional contributions to maintenance of GDP beyond those encapsulated in ‘direct’ income and employment, human capital, and R&D ‘spillover’. Several make reference to the importance of progressively enhancing educational status for growth of GDP (and of labour force output per head).

The analysis published by the Business/Higher Education Round Table (BHERT) in Australia (Cabalu, Kenyon and Koshy, 2000) and undertaken at Curtin University, provides a convenient set of estimates of Australian university expenditure and income for the year 1998. In round numbers, universities contributed $8.7 billion (amounts quoted in this article are all in Australian dollars) on ‘staff, non-wage purchases and net capital expenditure’; students contributed $1.8 billion in expenditures ‘related to their attendance at University’ in Australia (of which $75 million was due to their associated international visitors to Australia); the total of these expenditures was approximately $10.6 billion. Staff earned $70 million in consultancy income. Export receipts (from fees and other expenditure by international students) were $1.8 billion.

The second category of output, human capital, was estimated at $9.3 billion (Cabalu, Kenyon and Koshy, 2000). Even this single component, accumulation of human capital (the present value of the private return to graduates, expressed as the increment in their income over that of their non-graduate peers), is profitable both for the graduates, but also for government through the enhanced taxes they pay. For each government dollar invested in university education it receives $1.1 in ‘additional (discounted) tax revenue from the enhanced salaries achieved as a result of university education’; correspondingly students on average receive a $2.0 ‘additional (discounted) lifetime return’ in the form of the enhanced salaries. In making these calculations, government input was appropriately not taken to include HECS (the income-contingent higher education contributions scheme, which is a government loan to students rather than a grant). Government input was $4.6 billion in 1998 and corresponded to approximately 50 per cent of universities’ income. Note that in 2000 this contribution had reduced to 31 per cent (Nelson and Commonwealth Department of Education Science and Training, 2002), with the difference made up by the progressive increases in HECS, so that even disregarding the increasing numbers of students being educated, the taxation returns to government are now at an even higher ratio. It is worth noting explicitly that the taxation increment to government from graduates themselves exceeds government investment. On average graduates make a lesser demand on the social support mechanisms provided from taxation than other members of the population. Thus, it is clear that non-graduates are not required to ‘subsidise’ the
benefits of university education obtained by graduates, in spite of the routine political representation to the contrary.

Several other authors have reached similar conclusions about the value of human capital generation by university education (for example, Maglen, 1993; Productivity Commission, 1997; Borland et al., 2000; Pincus, 2000; Greenaway and Haynes, 2000; Larkins, 2001; Chapman, 2001; Chapman and Salvage, 2001; Johnson and Wilkins, 2002). Concordant studies from several other countries have been reviewed (Psacharopoulos, 1995). The human capital model has been compared with competing models based on screening theory and public choice theory, which have been found defective, while the human capital model has been relatively resilient (Quiggin, 1999). Screening theory assumes that education has no economic value, but is effectively simply a ranking system designating suitability of individuals for particular levels of job and income. Public choice theory presumes that ‘bureaucrats will benefit from expansion of their institutions beyond the socially optimal level’. Quiggin provides both strong intellectual and empirical dismissal of screening and public choice theories in the context of higher education, though there are clearly possibilities for hybrid theories.

Human capital-based returns from different courses of study have also been compared (Larkins, 2001). More recently, the University of Canberra’s National Centre for Social and Economic Modelling developed the ‘Returns to Education Model (RED99)’, which embraces the human capital approach (Johnson and Lloyd, 2000). As the authors state: ‘RED99 … examines private and government rates of return rather than private and social rates of return’, and thus ‘the model does not include the less tangible benefits of education, such as improved employee productivity, enhanced innovation’. The first and, to some degree, the second of these factors underpin the often neglected argument developed in this paper. The most recent update of this model RED02A gives consistent results (Johnson, Beer and Lloyd, 2002).

The third component discussed by Cabalu, Kenyon and Koshy (2000) and most other studies is the flow-on action of university research into R&D exploitation in other parts of the Australian economy. Universities’ research income in 1998 was estimated at $1.2 billion, and the flow-on conservatively estimated at $2.3 billion (Cabalu, Kenyon and Koshy, 2000). These figures were used by other authors in their estimates of ‘spillover’ from individual research areas (Larkins, 2001), but seem to be significant underestimates in view of evidence that 50-60 per cent rates of return on investment are more realistic. The data in any case indicate drastic under-investment in R&D in Australia (Dowrick, 2002).

Aggregating these figures, one determines that the $10.6 billion of 1998 expenditure by universities and their students corresponded to human capital generation with net present value at the time of $9.3 billion, and spillover to industry of $2.3 billion, a total of $22.1 billion. This figure corresponded to approximately four per cent of GDP in 1998.
Difficulties in Measuring Universities’ Contribution to GDP

It is now argued that universities make broader and more substantial contributions to economic output. Some economists are, reasonably, quite resistant to (or cautious about) the idea of disentangling component contributions to GDP. They point out, for example, that the efficiency of capital equipment exploitation varies at the same time as the efficiency of labour input. Dowrick, author of some of the most committed and sophisticated investigations of this issue, was previously quite sceptical about establishing understanding on the issue. Most recently he has argued for quite clear-cut conclusions: ‘It appears … that there are… significant long-term growth effects — the more educated is the work force, the better is it able to implement technological advances’ (Dowrick, 2002).

In reaching this particular conclusion, Dowrick gives a detailed analysis of the slippages/developments in economic growth theory, such as that between neo-classical and endogenous growth ideas, and the distinction between investment in human capital and in physical entities. He points to complementarity, positive feedback and non-rivalry as key distinguishing features of the human capital investment not shared by investment in physical materials. His informative analysis will not be reiterated. Many other researchers support distinguishing between such components of growth as market output, labour input and productivity, and capital input and productivity, by multivariate analyses (for example, Quiggin, 2001).

Let us consider a reductio ad absurdum position. What if all graduates withdrew their services from the work force? For example, they might well undertake a protracted strike on behalf of improved government funding for students and universities. Would the economy suffer, and GDP drop? Obviously such a ‘perturbation’ experiment cannot be undertaken, but it is the root of deductions from multivariate analyses of time sets of data about economic outputs, educational expenditure, and educational status. Such a ‘counterfactual’ approach is also at the root of many related analyses of economic impacts, such as that in which it is postulated that the University of Western Australia might not exist (Greig, 1997), or those of the comparative study of regional universities by the Centre for International Economics (1997). Such bald arguments are used here to reassert the importance of estimating the overall contribution of university education, through its graduates, to GDP. The conclusion is that a significant portion of GDP beyond that ‘entrapped’ in human capital may be involved.

Has the R&D Spillover Been Underestimated?

A brief elaboration on the R&D spillover component mentioned above is provided here as an introduction to the issue of underestimation of R&D spillover. It is well understood that there are very high social and government rates of return on R&D in both overtly commercial and more fundamental, less predictably commercial, areas; and these are under-resourced both by public and private funds (for example, Dowrick, 2002). It is commonly believed that Australia has been very
inefficient and unsuccessful in exploiting its R&D, and this may be a reason for
government hesitation in investing optimally. In 1998, universities were
responsible for 27 per cent of Australian expenditure on R&D, and 78 per cent of
basic research expenditure (Cabalu, Kenyon and Koshy, 2000). If there were poor
exploitation, then of course the possible economic impact of the basic research
would be mostly unfulfilled. However, Clarke (2001) has mounted a spirited
defence of Australian innovation and entrepreneurship arguing that the available
data do not indicate ‘a weakness in the national scientific base or in the proclivity
of the private sector to innovate’. Clarke discusses two ‘proxies’ for the
exploitation of research outputs as used by OECD. One is patent applications per
10,000 population, which was 4.6 in 1996, making Australia fifth of the OECD
countries. The other is the ratio between technology exports and imports, for
which the Australian value of 0.62 was tenth amongst the OECD countries.
However, Clarke reveals that between 1990-1996 this ratio improved by 72 per
cent. Firm conclusions cannot be established as yet. Furthermore, even if the
estimate of R&D spillover effect quoted above is a significant underestimate, the
real value should be contained within the gross GDP output argument.

What Graduates’ Earnings Say About their Contribution to GDP

What is the reason for the increased lifetime earnings of the average graduate and
their decreased incidence of unemployment in comparison with the average non-
graduate members of our society? It is normally assumed to be that they are more
productive, and this is commonly labelled an ‘external benefit’. However, as
listed above, most publications imply that the increased productivity is measured
by the increased earnings. Yet earnings only correspond to about 2/3 of GDP.
Furthermore, if the concept of profitability applies to any degree in employment
selection, then an employer expects to leverage the increased productivity of
individuals yet further than their relative salaries. As Quiggin (1999) puts it:

These external benefits represent one of the main reasons for public
subsidies to education. However, … external benefits are hard to
capture econometrically … .

Kniest has commenced a process to capture some of the benefits, specifically
those which result from network externalities:

Network externalities arise in product markets where the utility derived
by consumption of a product increases as the number of consumers
increase. … Network externalities differ from traditional externalities
in that the benefits are internalised to participants in the network and
not the broader community (Kniest, 2001).

A corollary of this is Kniest’s proposition that ‘the value of employing
graduates rises as the number of graduates employed increases’. His preliminary
analysis of available data on ANZSIC industry divisions indeed shows a positive correlation between profit margin and university-qualified as a percentage of total employees. He also reveals positive correlations between changes in the percentage of post-school employees and both labour productivity and multi-factor productivity, based on data from the Productivity Commission.

The externalities discussed so far are the ‘traditional’ ones, while the additional externalities (the ‘networks’) that Kniest envisages clearly include employers. Thus, it is reasonable that an output ‘multiplier’ (ratio between earnings and output attributable to the efforts of an individual) should in a ‘market analysis’ increase with salary in certain ranges — certainly as far as the commercially modest salaries of university vice-chancellors, though possibly not as far as the much higher range of company CEO salaries. In some cases, of course, education may give individuals the ability to bluff their way into highly paid jobs.

What might be the increment in total GDP corresponding to the graduate human capital — the economic justification for the increased earnings of the graduate? The 1998-99 Australian Bureau of Statistics Household Expenditure Survey reveals that post-school, bachelor or higher qualified workers account for 27 per cent of earnings, and their average earnings were $894 per week compared with $479 per week for the group with no post-school qualifications (and $671 for that with other post-school qualifications). Thus 46 per cent of graduate earnings might be attributable to their graduate education. A similar argument can be made on the basis of 2001 data on ‘Education and Training Experience’ published by the Australian Bureau of Statistics (Catalogue No. 6278.0). These reveal that less than 17.1 per cent of the workforce are graduates, but they attract 34.9 per cent of total earnings, which by a similar argument would give a figure of about 63 per cent of graduate earnings being attributable to their graduate education. Comparable data are deduced by Johnson and Wilkins (2002), though expressed as a graduate ‘mark up’ (percentage increment on the non-graduate figure). Even higher figures are implied by the analysis of Greenaway and Haynes (2000), which notes ‘income differentials’ (similar to the ‘mark up’ terminology) of 70 per cent for Australian males (78 per cent for UK males) and 86 per cent for Australian females (131 per cent for UK females).

The 1998 data take account of factors such as part-time work, but might be overestimates of the return due to graduation because they partly reflect an increase due to completion of secondary schooling. This might be represented in the difference between ‘other’ and ‘no post-school’ earnings in the 1998 data since the latter group contains people who have not completed school. But the 2001 data disaggregate eleven levels of educational attainment showing that those with year 12 attainment had ‘average usual weekly earnings’ of $673, while those with bachelors degrees (and not higher) had $1,108. This gives an estimate of 40 per cent of graduate earnings attributable to their graduate education. When the same argument is used with respect to those with a postgraduate degree it suggests a

1 Equal to (894 – 479)/894 as a percentage.
figure of 51 per cent. Additionally, there are underestimates in our argument. For example, the social ‘positive spillovers’ listed by the Productivity Commission (1997) must make some contribution to economic outputs of graduates. These range from those listed in the earlier brief comments on social implications of university education, to ‘improved employability’ (Clare and Johnston, 1993; Bynner and Egerton, 2001), family and co-worker effects (benefits transmitted to other members of the families of graduates or to their colleagues), leadership, and better information transmission (facilitating competition).

The discussion, therefore, will proceed conservatively on the basis of the estimate of 46 per cent. This simple deduction presumes, as does the Productivity Commission (1997), that ‘talent’ does not impact on this estimate. This presumption deserves a little further discussion before returning to the main argument. Talent is usually reflected in an arbitrary alpha-coefficient in the relevant literature, and values used vary hugely, but are commonly around 2/3. This would mean that the attribution of 46 per cent of earnings to graduate education would instead become an attribution of roughly 31 per cent (that is, 2/3 of 46 per cent). If this were to be a realistic adjustment, then the talent in question would have to be that ‘entrepreneurship’ and ‘efficiency’ which bears on economic output, and not the broader ‘intellectual’ talent one would normally consider. Furthermore, for an adjustment to be required the ‘entrepreneurship’ would need to be distributed amongst the population in the same way as the UAI, the educational achievement entry score which determines university entrance! This proposition seems highly implausible and thus, like most authors, in the face of a virtual lack of evidence no ‘talent adjustment’ is made here. Data from twin studies (discussed in Quiggin, 1999) tend to support this conclusion and those of a recent UK study also argue for at most small adjustments (Greenaway and Haynes, 2000).

Returning to the main argument, if 46 per cent of graduates’ earnings is attributable to their university education, then 12.4 per cent (46 per cent of 27 per cent) of total earnings is attributable to graduate education. What proportion of GDP does this correspond to? Here we face the disentanglement issue directly and can find no overpowering grounds for an answer. However, the immediate translation of per cent of earnings into per cent of GDP would be an underestimate if the arguments about ‘profitability’ of choosing employees has any bearing. Thus, a minimal estimate of 12.4 per cent of GDP would correspond, for the 1998 data discussed above, to roughly $64 billion output from universities, rather than the BHERT proposition of $22.1 billion.

While it has to be admitted that such estimates of the proportion of GDP attributable to the maintenance of a graduate labour force are crude, they deserve further and more detailed attention in future research. More attention seems to have been paid to establishing links between GDP growth and advancing educational attainments in societies across the world (reviewed by Dowrick, 2002). For example, there are strong positive correlations between labor-force quality (measured as cognitive ability or as average years of education experienced by the community) and economic growth in many countries,
including Australia (for example Hanushek and Kimko, 2000). Similarly, it has been argued that 80 per cent of US growth is due to continued growth in ‘education and research intensity’ (Jones, 2001). Dowrick presents convincing arguments that contradictory studies which pool data from both the least and most developed economies should be disregarded (Dowrick, 2002). Thus, universities not only lead to the production of a significant proportion of GDP, but are also a major factor in its continuing growth.

Let us conclude this section with a brief look at the current implications of the argument. Our GDP in 2001 was $641 billion, and so the university-dependent contribution could easily have exceeded $79.5 billion (corresponding to 12.4 per cent), which from an annual Commonwealth grant of the order of $3.9 billion per year is an impressive scale of ‘return’. Note that the ‘return’ in a given year is the result of a state achieved cumulatively from previous years inputs — only in an absolute steady state would the output numbers for a particular year co-align with that year’s measured inputs. In a slowly changing system, the synchronous data nevertheless give a rough indication of inputs and returns. Such a massive return as summarised above indicates that universities are one of the best investments any government can make. Yet our government has allowed public spending on higher education as a percentage of GDP to decline by 15 per cent (Nelson and Commonwealth Department of Education Science and Training, 2002). Australia is consequently third-last of all OECD countries in relation to ‘Knowledge Investment’ as a percentage of GDP.

**Desirable Scale and Diversity of a University System**

So government investment in universities is crucial and profitable for government — present good economic growth will not be retained without it. Should its investment be enhanced, or can the market truly adjust the scale of the system to a desirable level? It has already been argued that GDP and GDP growth depend on maintaining and enhancing (respectively) the proportion of the population who receive university education, and that this implies that enhanced government investment would be beneficial to society while remaining profitable to government. A sceptic might counter that Australian government returns from its very modest investment in mining are much greater than those from education and, therefore, investment in mining should be increased in preference. However, this argument neglects exactly the issue which is core to the present discussion: that investment in universities permits individuals to gain a personal return at the same time as contributing vast spillovers to every aspect of society. In contrast, public investment in mining would simply permit mining companies to make an enhanced profit, some returned to government as tax, but without major spillovers to society, and certainly none outside the ambience of mining.

The question is, what is the optimal scale of a university system? Presently, only about 20 per cent of the work force are graduates (19 per cent in the 1998-9 ABS data discussed above). The Australian Vice-Chancellors’ Committee (2002) advocates targeting a 60 per cent participation rate in higher education by 2020;
New Zealand targets 70 per cent, while the British figure endorsed by the Blair Government is 50 per cent access for 18-30 year olds by the year 2010. In all cases current participation rates are 10 or more percentage points lower. Many politicians accept the desirability of such increases. For example, Estelle Morris (2002), the UK Minister for Education and Skills, has recently written that ‘a one percentage point increase in the number of workers with higher education qualifications raises GDP by 0.5 per cent’, which corresponds to £UK4 billion. As several authors have pointed out, the issue for government is exactly this, the marginal rate of return:

    if the additional expenditure were to enable more students to be educated it is the return from that marginal student that is the issue; if it is higher expenditure per student that is being considered it is the effect of such extra spending on those students, through any improvements in quality that is the issue (Borland et al., 2000).

There are, of course, possible counterarguments to the view that a greater number and proportion of graduates are needed in our workforce. In 1996, for example, 8.1 per cent of graduates were working as clerks, 5.2 per cent in sales, and 2.5 per cent as labourers (Andrews and Wu, 1998), which might suggest that there were more graduates than suitable jobs. However, this may be due to imbalances between graduates in certain areas and jobs in those areas, to preferences, or to the need to subsidise activities such as those in creative arts with income from other jobs. Such counterarguments do not refute the evidence on greater lifetime employability of graduates, nor of the dependence of economic outputs on the development of our graduate community.

What is the desirable balance between public and private funding of universities? It would be that which develops and then sustains an optimal level of university graduates in the community. The market has not yet produced this condition in Australia, since an increase in the proportion of graduates in our workforce could be predicted to enhance GDP growth as well as enhance society. The available full-fee paying domestic undergraduate places are modestly subscribed, and price elasticity of demand is clearly higher than in the US (where much higher fees do not significantly decrease demand). It follows that enhanced government investment is probably the only way to increase the number of graduates, and hence their proportion in our workforce. Higher expenditure per student is also needed, since Australian class sizes are uncompetitively large and university infrastructure is decaying and becoming uncompetitive internationally.

How could one make such an adjustment to the Australian system? Clearly this needs to be done gradually. A criterion of entry to universities might be that it be available, equitably, to 60 per cent of the population at the formative stage in their lives, so that its benefits have maximal application. Currently, a much smaller proportion of our eligible population is able to access universities, and the number of eligible applicants who could not be accepted in the most recent round has increased by a third. There is huge scope for improvement to our economy,
and society, through increased university investment. Lower ‘socio-economic status’ and rural groups are currently still a small minority in our university system. Targeting these groups financially and by information campaigns will be necessary to achieve maximal exploitation of our nation’s talent as well as being a crucial vehicle towards equity. Complementary analyses consistent with this recommendation have been published (for example, Pincus, 2000; Chapman and Salvage, 2001). The variety of funding models under which this could occur cannot be detailed here.

Our system must balance efforts to contribute to the education of international students with those towards Australians. We gain great social benefit from co-educating Australians with citizens of many other countries, and at the University of Canberra we celebrate the access to difference we gain from the presence of students from more than 80 countries. In March 2001, 15.5 per cent of students in the Australian system were international and government pressures are impelling the number upwards. Further, granted the high quality of our system and its low cost relative to those in the US and UK, a private commercial university system would simply permit an enhanced proportion of international students and such an escalation in charges that Australians and the government financial returns from public education would be relatively disadvantaged. Higher fees would most probably not mean more Australian students, in spite of arguments to the contrary from the Productivity Commission (1997). As noted already, the elasticity of demand in the US is probably due to the very high personal return a graduate gains there from his or her investment in education, whereas the personal returns in Australia are significantly lower. Indeed, of 17 OECD countries that provide graduate data, only Norway has a lower personal return to graduates than Australia. Thus the response of Australians to further raised fees would probably be one of decreased entry.

While diversity of students is desirable, so is flexibility of activity in universities, particularly in relation to the dialogue between teaching and research. It is also critical to retain full ranging internal competition and exchange. University academics are our main source of technical and research innovation (as reflected partly by the ‘spillover’ effect). Most academics have an intense interest in flexibility of work-style to allow them to invest huge energy (way beyond normal working hours) in teaching, research, enterprise and the community. To prevent the access of academics in any university to any of these activities would be to limit transfer pathways and competition. For example, our university is known for its creative approaches to educating professionals, yet even as a ‘post-1987 university’, it is still significantly above par in research income per staff FTE. For example, in the DEST Performance Indicators 2000 (covering 1999), we exceeded some universities from the ‘older’ and the ‘1960-1986’ group. Such diversity of achievement, and the competitive flexibility it implies, is critical for the future health of our system, and hence for its ongoing contribution to societal and economic development.
Conclusion.

Governments such as that of Australia are elected to lead society towards an increasingly equitable, reconciled, and culturally fulfilled condition, at the same time enhancing the economic prosperity of their nations. Granted university education is an important tool towards this, it is bizarre that any responsible government could become a ‘minority shareholder’ in the process. Yet this is exactly what the Australian government is, contributing only 31 per cent of universities’ budgets in the form of the operating grants in 2000. As Dowrick (2002) has said:

... international comparisons suggest that Australia’s educational report card should be marked: ‘Started well, but slackened off. Substantial room for improvement’.

The arguments above have indicated that the present combination of public investment and market forces has as yet produced a sub-optimal size university system in Australia. Since the level of private investment in university education cannot be mandated, and banks are rarely prepared to offer loans solely on the basis of future human capital, the only option available to government is enhanced public investment. Thus, like other responsible governments, the Australian government needs to promote and evolve the strength and internal continuities of a university system, not only through competition, efficiency and globalisation, but also through enhanced public funding. Since to do so would be profitable both for government and for society and its members, there is no economic impediment to this, granted the political will.

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