

WHY DOES AUSTRALIA DO BETTER? GOOD LUCK OR GOOD MANAGEMENT?

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INTRODUCTION

In this presentation I ask if the differences between Australia's measured productivity and that of New Zealand can be thought of as simply luck or good management.

The answer to the question is not simply luck. Australia's recent economic performance has not happened by accident. Rather it is an outcome of a concerted policy effort to lift the performance of the economy.

The first section of this paper identifies some of the policy reforms and discusses some of the results including the differences with the United States productivity levels.

But New Zealand too has been through a substantial reform process. Why does the gap remain and appear to have increased in the 1990s? The second section of the paper briefly discusses some of the differences in productivity between the two countries.

Measuring differences in productivity between countries is never a simple exercise. There are many methodological and measurement issues that mean that such measures can only be thought of as rough indicators of relative performance. For this reason the focus is often on comparisons of rates of growth. Today, however, I will focus attention on relative levels of productivity and what might explain those.

There are a number of explanations for such differences that have been suggested. The third section of the paper looks at some of these.

Firstly I will look at some policy indicators. There do not appear to be substantial differences of a magnitude that could be expected to explain the differences in measured performance.

Secondly, the possible impact of labour utilisation is explored. While it may have only a small impact on the measured productivity gap between Australia and New Zealand, changes in labour utilisation may mean that New Zealand's decline in relative labour productivity may be overstated.

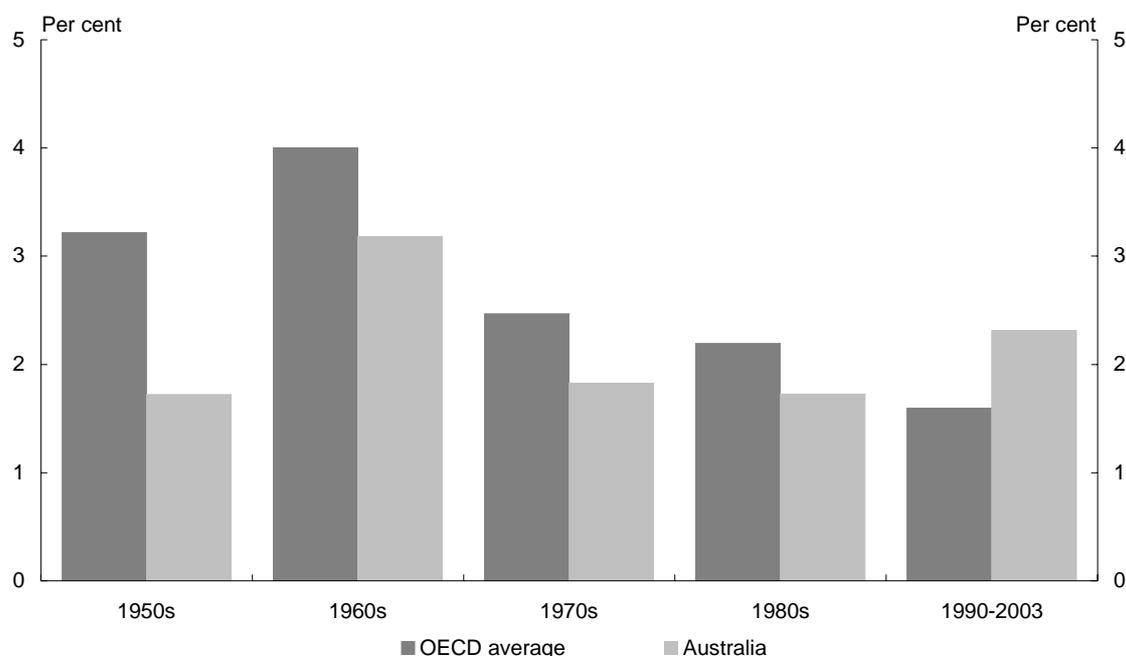
A third factor often considered important for productivity levels is the ability to generate and use knowledge. This might be reflected in differences in the stock of human capital or in the extent of innovation related activities. This may be a contributor to the productivity gap but it is unclear.

Finally, geography, location and population density have often been considered in looking at the New Zealand and Australian economies. To what extent might they explain the differences we see? By comparing productivity levels in New Zealand with those of various Australian States we can identify the potential magnitude of such effects. The productivity level differences observed are not outside reasonable expectations once these factors are taken into account.

AUSTRALIA'S PERFORMANCE IS NOT AN ACCIDENT

Australia experienced relatively poor performance compared with the OECD for the majority of the second half of the last century in terms of both incomes and productivity.

CHART 1: GDP PER CAPITA AVERAGE ANNUAL GROWTH RATE



Source: Authors calculations based on Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net>. OECD average calculated for membership pre-1994.

In the 1960s, GDP per capita increased by 3.2 per cent a year on average. In the 1970s and 1980s, GDP per capita growth was much lower than in the 1960s. The 1990s, however, were also years of relatively high growth, though not as high as the 1960s.

But this picture of strength in the 1960s is rather misleading. It turns out that the 1960s were years of exceptionally buoyant growth in most of the industrialised world.

In fact, the last decade was the only one in which Australia's rate of growth of GDP per capita exceeded the OECD average. It was against this backdrop of steadily declining relative incomes up to the start of the 1990s, and evidence of significant payoffs from reforms since then, that policy in Australia evolved.

Policy change

The 25 per cent across-the-board tariff cut in 1973, while done for macroeconomic stabilisation reasons, arguably marked the unintended beginning of microeconomic reform.

At the end of 1983 the exchange rate was floated, and capital controls were relaxed. Financial markets were liberalised and taxation arrangements began to be addressed. Both of these areas have been subject to more or less continual reform since the early to

mid 1980s including very substantial reforms in both areas in the last few years. Tariffs on all products have fallen steadily since the mid-1980s. In the late 1980s, and continuing in the 1990s, non-traded sectors of the economy such as transport, communication and utilities were targeted for reform.

From the late 1980s, and again in the late 1990s, labour markets and industrial relations, together with education and training, were also subject to considerable reform.

In 1995, the sectoral approach to microeconomic reform was complemented by National Competition Policy. National Competition Policy obliges Commonwealth and State governments to review existing legislation, and to assess proposed legislation, against a broad public interest test and to ensure competitive neutrality between public and private sector providers. It also introduced a national access regime for essential infrastructure services.

The second half of the 1990s was a period of wide-ranging microeconomic reform embracing:

- further financial sector reforms, particularly the creation of a system of prudential regulation that establishes a single regulator;
- a comprehensive program of corporate law reform, implementing a corporate governance framework, and financial reporting and disclosure regimes;
- the waterfront;
- substantial further reform of the industrial relations system and the labour market more broadly; and
- A very major program of tax reform that, in addition to its complete overhaul of the indirect tax system, targeted incentives to work and save.

In summary this represents a concerted policy program designed to improve the functioning of the Australian economy.

This program was supported by reforms to the operation of macroeconomic policy.

It has been argued that macroeconomic policy lacked clear frameworks to handle the instabilities of the 1970s and 1980s and that this contributed to the recession in 1990-1991.

It was not until 1993, building on reforms pioneered in New Zealand, that the Australian monetary policy framework was consolidated into a medium-term inflation-targeting regime. This was codified into the *Statement on the Conduct of Monetary Policy*, agreed between the Treasurer and the Governor of the Reserve Bank in August 1996, which formalised the operational independence of the Reserve Bank in implementing monetary policy to achieve the Government's inflation goals. This *Statement* included a commitment by the Reserve Bank to hold inflation between 2 and 3 per cent on average, over the course of the economic cycle.

The Government also announced its intention in 1996 to establish a new fiscal framework. The *Charter of Budget Honesty Act 1998* states that fiscal policy should be

directed at maintaining the ongoing economic prosperity and welfare of the people of Australia, and therefore should be set in a sustainable medium-term framework. The primary objective of the fiscal strategy is to maintain budget balance, on average, over the course of the economic cycle.

Moving these macroeconomic policies onto a medium-term footing improved the climate for quality investment decisions and hence the potential for productivity growth.

The benefits of Australia's policy reform program took some time to arrive. Certainly, the benefits were not much in evidence in the second half of the 1980s.

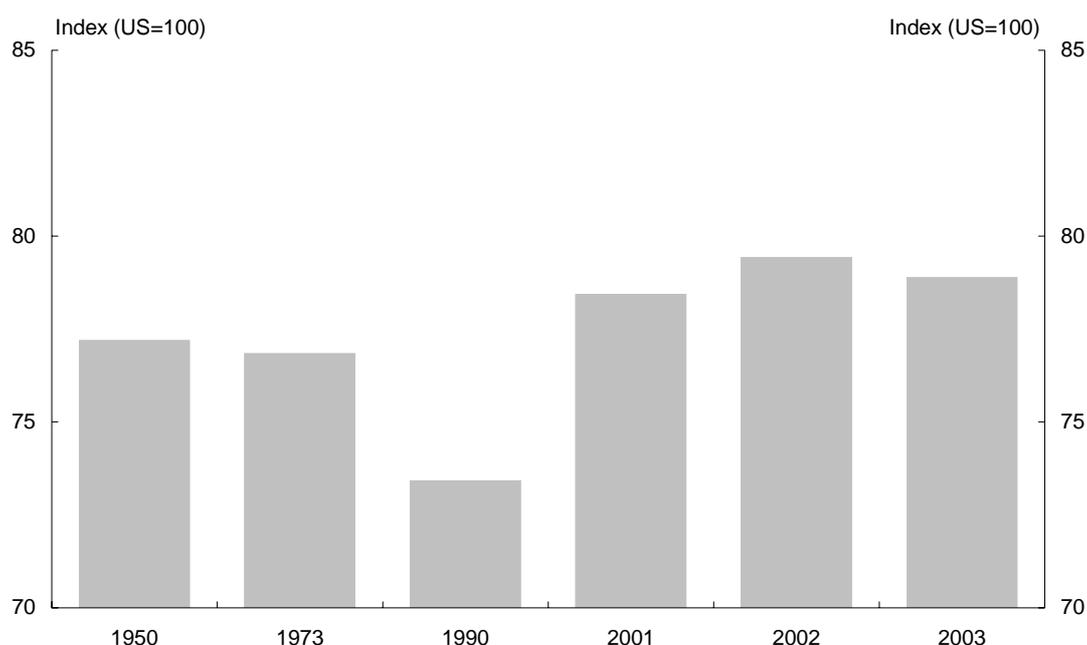
Over the 1990s, however, Australia was one of the few OECD countries to experience significant productivity improvements.

By the second half of the 1990s Australia's average annual labour productivity growth was more than double that recorded in the late 1980s and had risen to rates last seen in the 1960s. The difference was that in the 1990s Australia's productivity growth exceeded the OECD average; whereas in the 1960s, productivity growth was high everywhere and Australia's growth was below the OECD average.

But Australia's GDP per capita and productivity levels remain below the best in the world.

Chart 2 compares Australia's GDP per capita with those of the United States. Australia's performance is shown as a percentage of United States levels. In the first three years of this century, GDP per capita and productivity levels were just below 80 per cent of those in the United States – slightly above the relative performance in 1950. But the relative performance in 1990 was worse.

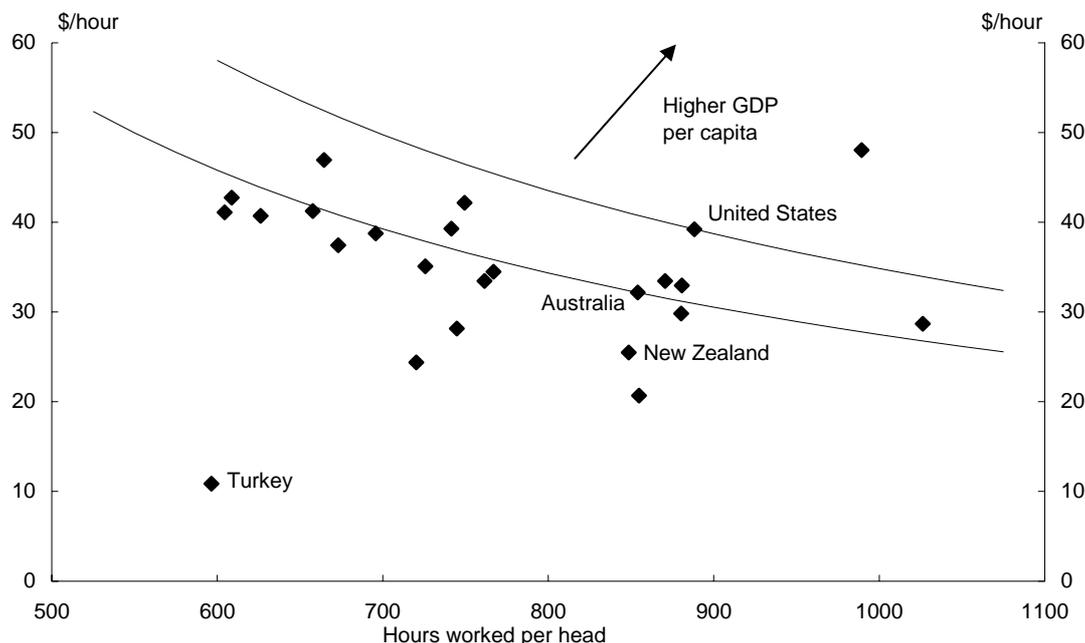
CHART 2: GDP PER CAPITA LEVEL RELATIVE TO UNITED STATES



Source: Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net>

In Australia's case, our 21 per cent level gap in per capita incomes with the United States is mostly explained by productivity (18 percentage points), and only slightly by participation and demographic factors (4 percentage points) (see Chart 3).

CHART 3: LABOUR UTILISATION AND PRODUCTIVITY LEVELS, 2003



Source: Authors calculations based on Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net>. Productivity figures are in 1999 PPP adjusted \$US.

This is very different to the situation of many of the countries with higher productivity levels than the United States in the chart above. In many of these countries, income per capita is lower than in the United States, despite higher (measured) productivity levels, reflecting population and participation factors.

In summary, Australia has experienced a significant improvement in productivity performance over the last decade at least in part due to a concerted effort to improve the operation of the economy. The hard work has paid some dividends, with hopefully more to come.

But what has really changed?

If all countries had the same attributes we could expect productivity levels over time to converge. But this is not the case. Differences in factors which normally change slowly such as location relative to global economic activity, fundamental institutions such as the rule of law, the level of education across the population, and the value of natural or historical endowments per head of population can be expected to lead to sustained differences in the levels of labour productivity.

What does this mean for Australia? On the one hand, resources will be allocated to activities where distance is not a barrier or where Australia's advantages are clear. For example, in some areas of mining and agriculture, and potentially some areas of the international trade in services. On the other hand, it also means that resources will be allocated to activities where distance confers natural protection by decreasing the

competitiveness of imported goods or services. The result is a range of goods and services produced in Australia in markets either too small to generate economies of scale or with little effective competition. As a consequence, Australia's relative levels of productivity may be behind global best practice in these areas, and hence aggregate productivity levels behind the global frontier.

Improved productivity performance might imply a more rapidly expanding global frontier, but this would not see improved relative performance. Alternatively, it might be a result of changes that mean these slowly changing factors are less of a barrier to approaching the global frontier. Equally, it might indicate a more effective use of resources within these constraints.

Policy reforms helped to reduce the gap with the frontier by encouraging competition in markets and hence more effective resource allocations.

Technology change may also have benefited Australia more than some other countries. This could have happened in a number of ways.

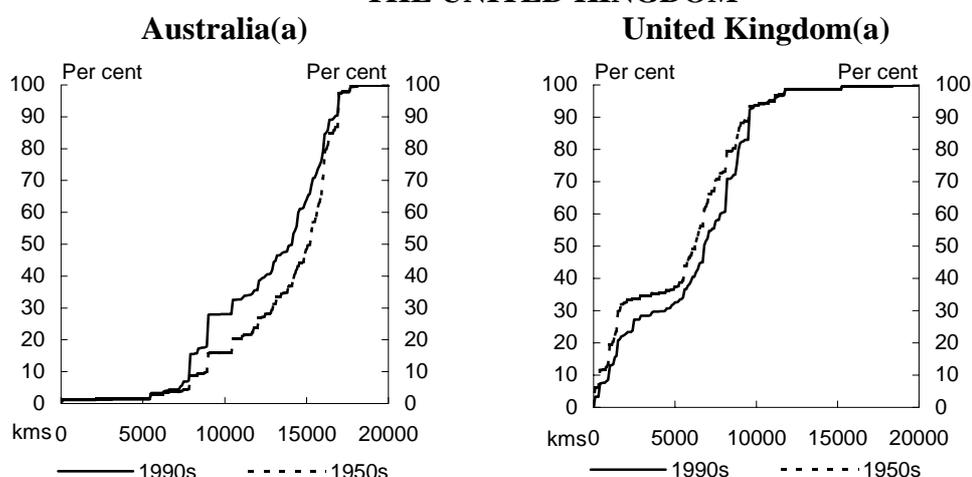
- ICT changes may have made it easier to solve some of the small market problems within the domestic economy. For example, better systems for managing stock and logistics may have reduced the cost associated with a lack of scale and density.
- Previously non-traded or hard to trade products and services became easier to trade across distance, increasing effective market size and competition.
- The effective knowledge stock available to Australian firms may have increased more than the increase for firms in other countries as the ability to communicate and access knowledge over distance has improved.

Why does the gap with the US remain?

The rapid economic growth of Asia over recent decades has helped to reduce the disadvantage of long distances from Australia's international markets. Falling international transportation costs have also played a role by helping to lower the costs of Australia's trading with the rest of the world.

Nevertheless, the costs of trading with major international markets remain a key barrier for Australia relative to other countries. For example, from the 1950s to the 1990s, the proportion of world GDP within a 10,000-kilometre circle from Sydney increased from some 16 per cent to 28 per cent. But for London, the same sized circle enclosed 94 per cent of world GDP in both the 1950s and the 1990s (Chart 4). By this measure, the only OECD country in the world more remote from the bulk of global GDP than Australia is New Zealand.

CHART 4: DISTANCE TO THE WORLD'S GDP FROM AUSTRALIA AND THE UNITED KINGDOM



(a) These charts show the percentage of world GDP (measured in purchasing power parity terms) falling within circles of different radii (from 0 to 20,000 kilometres) from either Sydney or London. Source: Treasury calculations based on data from Maddison (2001).

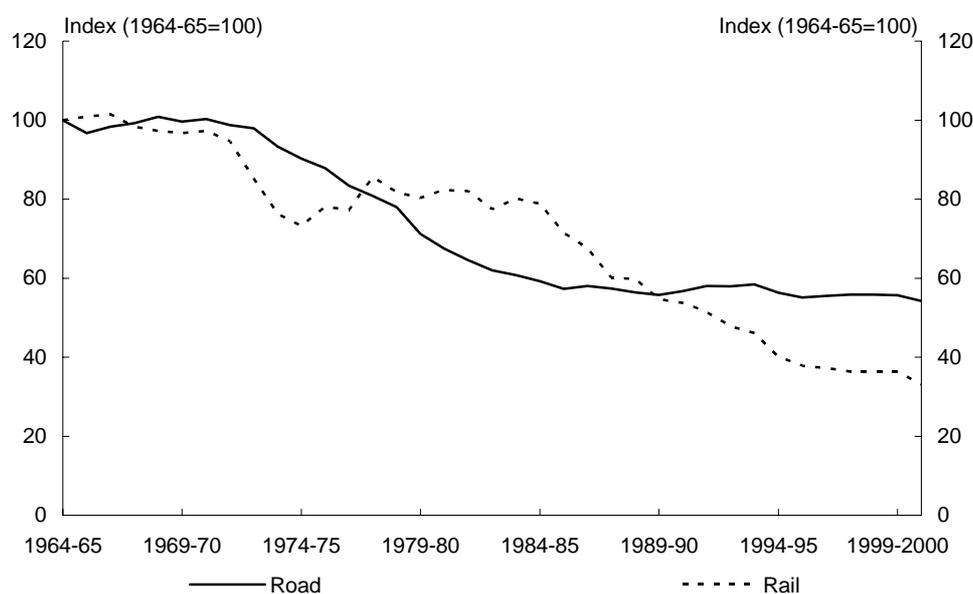
Distances among domestic markets may also constitute an economic hurdle. Australia is the world's sixth largest country in area, yet has a relatively small population of around 20 million. No two cities in Australia with a population of over one million are closer than 600 kilometres, and Perth is 2,400 kilometres from its nearest Australian regional market. In contrast, California has a population of around 34 million in an area around one-twentieth the size of Australia, with its population concentrated between San Diego and Sacramento — a distance of some 800 kilometres¹

Technological change and economic reforms have made a difference domestically. Since 1965, road freight rates have almost halved in real terms while rail freight rates have fallen by two-thirds (Chart 5). Since 1990, real coastal shipping rates to and from Perth have fallen by 40 per cent and real air rates within Australia have fallen by 25 per cent.

While neither international nor national distances among markets are as costly to Australia as they once were, geographic remoteness is still significant.

¹ McLean, I.W. and Taylor, A.M. 2001: *Australian Growth: A California Perspective*, National Bureau of Economic Research Working Paper 8408.

CHART 5: AUSTRALIAN REAL ROAD AND RAIL TRANSPORT COSTS, 1964-65 TO 2000-01



Source: Bureau of Transport and Regional Economics (2002), *Freight Rates in Australia*, BTRE Information Sheet 19.

The short story then is that policies that distorted resource allocation and reduced competitive pressures acted to move productivity increasingly below the long run level that Australia might expect to achieve relative to the United States with appropriate policy. A concerted policy reform effort has seen Australia's measured productivity level move back towards the United States benchmark. And it is possible that technological change has meant Australian productivity levels can now move closer to the United States than previously was the case.

It is likely the benefits from the technological advances we have already seen will take some time to work fully through the economy. Information and communication technologies could offer considerable medium-term contributions to productivity growth as they gradually facilitate further organisational change and new business practices. In this respect, they resemble earlier 'general purpose technologies' such as steam in the 18th and 19th centuries and electricity in the 19th and early 20th centuries. As experience with those earlier technologies has shown, applications take several decades to disperse through the economy.²

HOW BIG ARE THE DIFFERENCES WITH NEW ZEALAND

New Zealand has also seen a sustained period of economic reform. What might explain the differences we now see? Before trying to answer that question it is helpful to have an idea of the magnitude of the differences.

² Commonwealth Treasury, Budget Paper No. 1 2001, *Budget Strategy and Outlook 2001-02*, Statement 4: 'A More Productive Australia - Policy and Technology'; and DeLong, J.B. *Productivity Growth in the 2000s*, University of California, 2002 (p25)

To keep the exercise within reasonable bounds of complexity we look at differences in measured output per hour worked. In 2001 New Zealand levels of labour productivity were just under 80 per cent of Australian levels.

It has been argued³ that it is a reasonable guesstimate that measures of labour productivity levels for cross country comparisons are accurate to approximately 3 per cent of US productivity.

Given all the uncertainties perhaps we should simply say that labour productivity levels in New Zealand are around 70-85 per cent of those in Australia. Equally, labour productivity levels for Australia are likely to be around 70 and 85 per cent of the US.

Labour productivity in New Zealand grew more slowly than in Australia over the 1990s.

WHAT MIGHT EXPLAIN THESE DIFFERENCES?

In this section we attempt to get some calibration of the potential impact of a range of factors on relative productivity levels.

A number of factors have been identified as potentially explaining the differences in productivity between Australia and New Zealand. These include:

- policy differences,
- rates of employment and average hours worked,
- education levels and innovation activities, and
- geography, location and population.

Clearly there are a number of other factors that have also been identified as potentially important. These include infrastructure (a useful indicator for which is hard to identify) and the extent of capital deepening. To argue that capital deepening is the issue does, of course, invite the next question of why, which leads us back to the same set of possible explanations.

In following sections there are a number of attempts at quantification in order to calibrate potential orders of magnitude. These results clearly depend on the analytical approach taken and the data chosen. We would not claim to be experts on the New Zealand economy or recent analytical literature. As such the following discussion should be thought of simply as indicative and any conclusions drawn as tentative.

³ Bart van Ark, *The Measurement of Productivity: What do the numbers mean?* in Gelauff, Klomp, Raes and Roelandt (editors), "Fostering Productivity", 2004

Policy differences?

Policy is often looked to for an explanation of differences in performance between countries.

Institutions are central to determining the productivity level. Key institutions, such as property rights, contract enforcement and the rule of law are similar in New Zealand and Australia. This does not appear a likely candidate for explaining the productivity level differences.

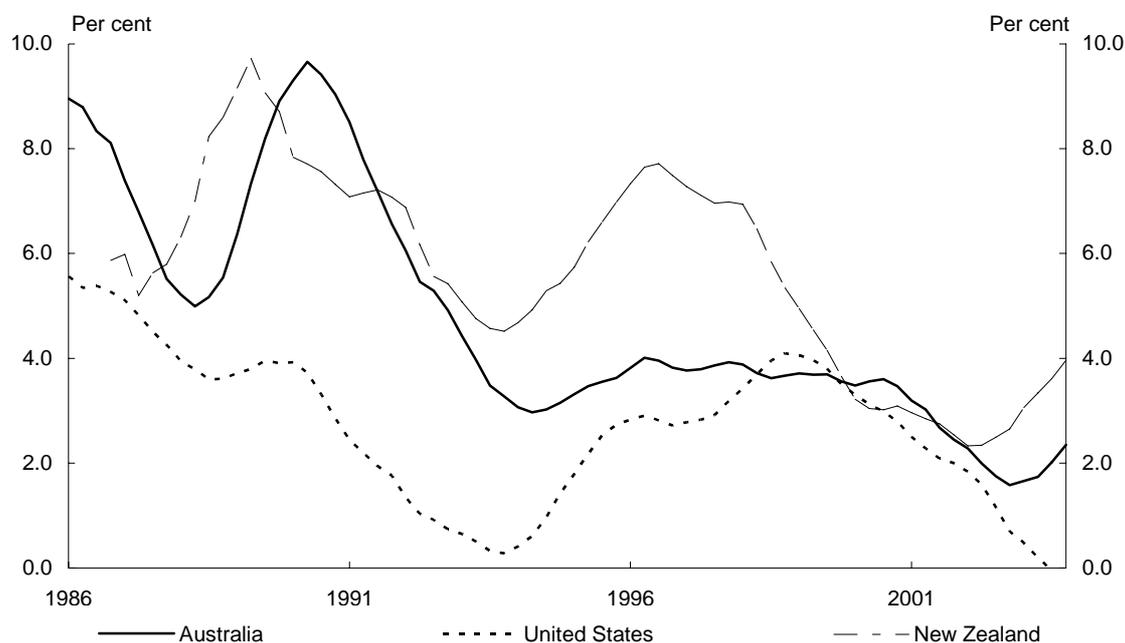
Macroeconomic policies can play an important role in the functioning of an economy. Credible monetary and fiscal policies are an important foundation on which economic activity is based. Poor macroeconomic policies will cause income and productivity to fall behind world best.

Both Australia and New Zealand have independent central banks with similar (inflation targeting) objectives. Both countries also have fiscal policies based on medium-term strategies and relatively low government net debt. While Australia's net government debt is lower than that of New Zealand it is unlikely that this explains a substantial amount of the current productivity difference.

While the frameworks for both monetary and fiscal policy are similar it has been argued that the implementation of macroeconomic policy may explain some of the differences in performance. An example that has been used is the monetary response to the Asian financial crisis where interest rates rose in New Zealand and fell in Australia. It may be that differences in implementation could temporarily influence the gap but it is unlikely that this would be sustained unless those differences persisted.

It is, however, important to observe that real interest rates in New Zealand have been quite a bit higher than Australia or the United States on average over much of the past decade. This gap opened substantially in the early 1990s as Australia's real cash rate fell from around 10 per cent on average in 1990 to below 4 per cent, while New Zealand experienced a similar fall initially, but real interest rates returned to an average 8 per cent over the two years to 1996, and didn't fall below 4 per cent until the end of the decade. It would be reasonable to expect that this could have implications for the relative levels of capital deepening and hence labour productivity. (Chart 6)

CHART 6: REAL CASH RATES, AUSTRALIA, NEW ZEALAND AND THE UNITED STATES, 1981, TWO YEAR AVERAGE



Source: Two year trailing average of nominal cash rate deflated by consumer price index (excluding Housing), adjusted for introduction of GST in Australia.

In addition to macroeconomic policies, government regulation and ownership plays an important role in determining the level of competition in markets and hence how quickly new ideas are adopted and adapted.

Indices of economy wide product market regulation consistently place both Australia and New Zealand in the least regulated half of the OECD, with regulation in New Zealand often rated as slightly less than in Australia (Chart 7).

CHART 7: RANK IN INDICATORS OF REGULATION IN SELECTED COUNTRIES

	Nicoletti et al (1999) (Rank)	Kaufman et al (1999) (Rank)	Pryor (2002) (Rank)
Australia	3	8	12
New Zealand	5	2	3
France	18	18	19
United Kingdom	1	1	5
United States	4	6	16

Source: Nicoletti & Scarpetta (2003), "Regulation, Productivity and Growth: OECD Evidence", OECD Economics Department Working Paper 2003(1). The least regulated country is ranked as 1.

The World Bank provides a snapshot of business regulation which looks at a number of indicators including Starting a Business, Hiring and Firing Workers, Enforcing Contracts, Getting Credit, and Closing a Business. The ratings of the two countries are very close (Chart 8).

CHART 8: BUSINESS ENVIRONMENT INDICATORS

	New Zealand	Australia	OECD Average	
Number of days to start a business	12	2	25	
Employment Laws Index	32	36	45	(higher = more regulation)
Procedural Complexity of Contracts Index	31	29	49	(higher = more regulation)
Creditor Rights Index	4	3	1	(higher = more creditor rights)
Goals of Insolvency Index	90	80	77	(higher = more efficient system)

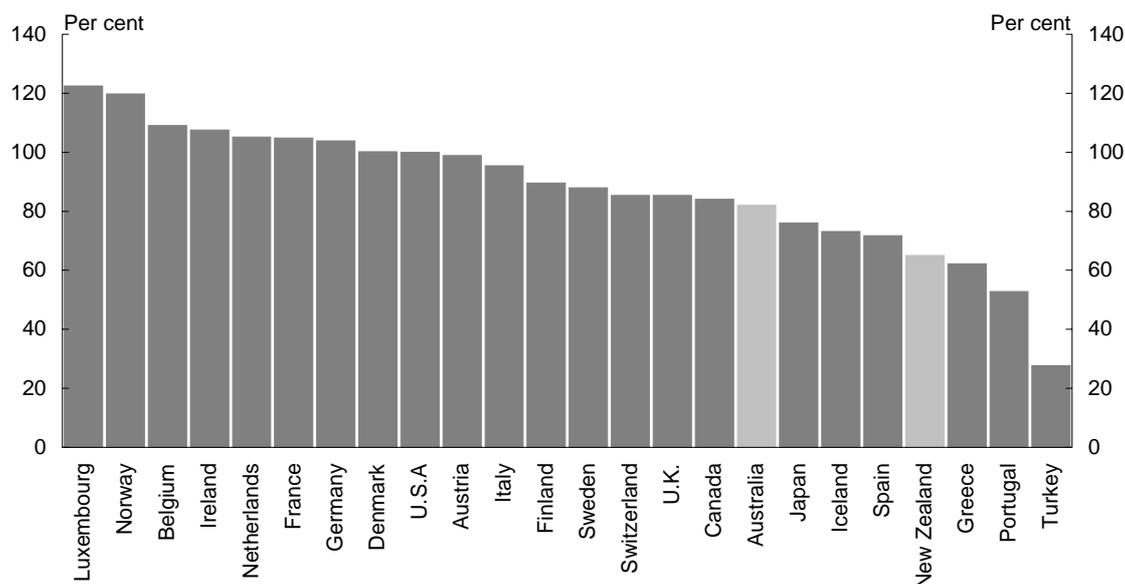
Source: *Doing Business: Benchmarking Business Regulation*, World Bank

Looking across the range of policies examined here, there does not appear to be a difference of the magnitude that would normally be seen as explaining significant differences in productivity performance. That does not mean at the more micro level there are not significant differences – just they are not large enough to show up on these aggregate indicators.

Employment and hours worked

When cross country comparisons of labour productivity levels are done both Australia and New Zealand rank in lower half of the OECD (see Chart 9).

CHART 9: GDP PER HOUR WORKED, 2003, PERCENT OF UNITED STATES



Source: Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net>

A number of European countries rank above the USA. In a recent paper Gilbert Cette (Banque de France) argues that the lower average annual hours worked and employment rates in Europe ought to be taken into account.⁴ Once these factors were taken into

⁴ Gilbert Cette, "Is hourly labour productivity structurally higher in some major European countries than it is in the United States?", Mimeo, 2004.

account what he called the ‘structural’ level of labour productivity in the United States was higher than all European Union Countries.

The basic argument is that the marginal employee or hour worked is less productive than the average. Drawing on previous studies⁵, the paper estimates the impact of changes in the level of these variables, and puts the elasticity of long term productivity per hour at -0.35 relative to hours worked and -0.5 relative to the employment rate.⁶

In addition, there appears to be a strong, robust relationship between labour force growth and productivity growth, with slower labour force growth being correlated with faster labour productivity growth. This correlation has been demonstrated over long periods of time in the United States, and is consistently observed in cross-country growth regressions across both OECD countries, and a larger sample of countries.⁷ Other things given, 1 per cent faster (slower) annual labour force growth is associated with a fall (rise) in annual labour productivity growth of about ½ per cent.⁸

Using the same methodology as Cetto’s paper, we recalculated the productivity levels across the OECD to see what impact differences in employment rates and average hours worked might have. The impacts are significant for the relativities of many countries. For example, France falls from around 107 per cent of the US to around 93 per cent. For the gap between Australia and New Zealand the impact is less dramatic. Australia moves down from 84 to 80 per cent of US productivity levels and New Zealand moves down from 66 to 64 per cent (see chart 10).

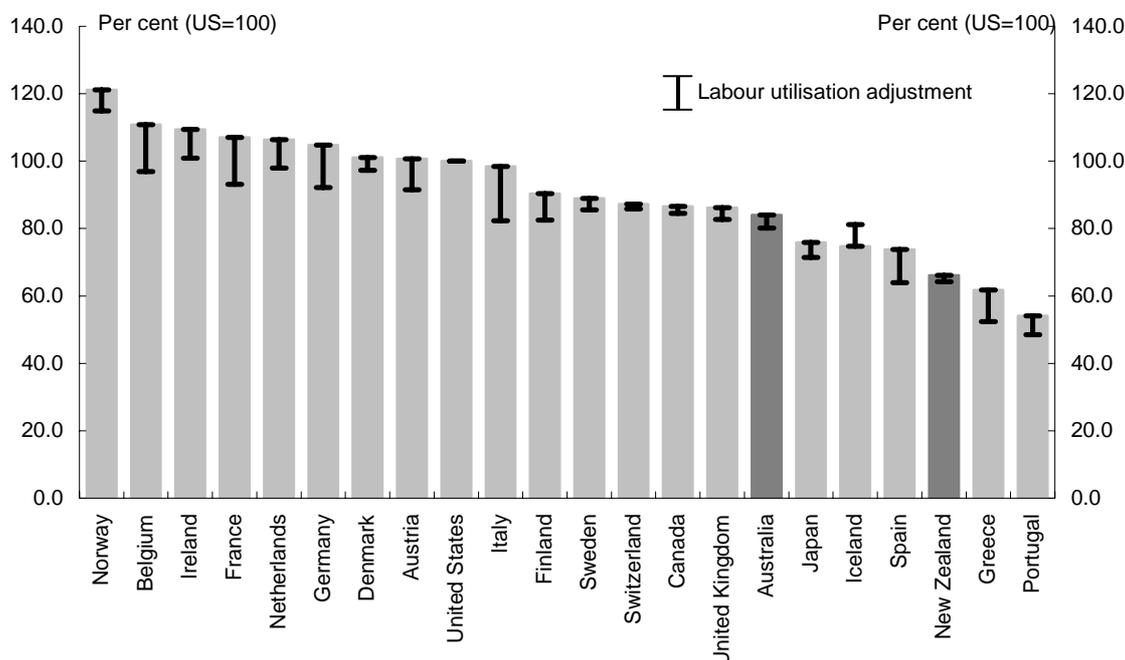
⁵ Nicolas Belorgey, Remy Lecat and Tristan-Pierre Maury, *Determinants of Productivity Per Employee: An Empirical Estimation Using Panel Data*, Banque de France Working paper 110, April 2004

⁶ The adjustment is to multiply the differences in relative employment and hours worked by the elasticity to determine the adjustment to relative productivity. The US is indexed to 100. For France for example, measured productivity is 107 per cent of US levels in 2002, average hours are 81 per cent ($19 \times -0.35 = -6.6$ percentage points) and employment rate is 86.5 per cent ($13.5 \times -0.5 = -6.7$ percentage points) hence adjust productivity levels are 93.7 per cent of US levels. This “standardises” productivity levels calculations to US employment rates and average hours worked. .

⁷ Paul Romer, *Crazy Explanations for the Productivity Slowdown*, NBER Macroeconomics Annual, 1987, A Steven Englander and A Gurney, *Medium-Term Determinants of OECD Productivity*, OECD Economic Studies No. 22, Spring, 1994, and Ben S Bernanke and R S Gürkaynak, *Is Growth Exogenous? Taking Mankiw, Romer, and Weil Seriously*, NBER Macroeconomics Annual, 2001

⁸ This estimate comes from Table 10 in Englander and Gurney (1994). Their regressions explain labour productivity growth in OECD countries over four time periods from 1960 to 1990, and control for growth in the capital-labour ratio as well as the rate of human-capital formation (proxied by secondary school enrolment rates). Across a range of specifications, the coefficient on labour force growth varies in the range, - 0.68 to - 0.42, and is always highly statistically significant. Bernanke and Gürkaynak (2001) report similar results for total-factor-productivity growth regressions using a larger sample of countries.

CHART 10: GDP PER HOUR ADJUSTED FOR LABOUR UTILISATION, PERCENT OF UNITED STATE, 2002



Source: Authors calculations based on Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net> and OECD Main Economic Indicators. The labour utilisation adjustment shows the estimated impact on productivity levels of changing the employment rate and average hours worked to United States levels. The bars show the unadjusted level of measured labour productivity, and the adjusted level is found by adding or subtracting the adjustment bar shown.

These small differences reflect the fact that average hours worked and employment rates in Australia and New Zealand are much closer to US levels than to European levels.

While Australia and New Zealand have similar rates of employment and average hours worked today, New Zealand has seen very significant changes in these variables over the 1990s. Between 1990 and 2003, the average number of hours worked per person in the total population increased by 9.7 per cent in New Zealand, compared to 2.2 per cent in Australia. The result could be to bias the measurement of the growth of labour productivity downwards over this period. Chart 11 shows the impact that adjusting labour productivity for labour utilisation might have on the productivity gap between Australia and New Zealand since 1993. Without any adjustment the gap in productivity increases by 6 percentage points over the decade. But once the adjustment is included, the gap increases by only 4 percentage points.

CHART 11: NEW ZEALAND'S PRODUCTIVITY RELATIVE TO AUSTRALIA, ORIGINAL AND ADJUSTED

Year	Labour productivity	Employment Rate (Australia = 100)	Hours worked	Adjustment(a)	Adjusted labour productivity(b)
1993	85.4	102.8	98.4	0.8	86.2
1994	84.8	103.9	98.5	1.4	86.3
1995	83.9	104.3	98.3	1.5	85.5
1996	81.6	106.1	98.4	2.5	84.1
1997	80.1	105.7	97.7	2.1	82.2
1998	78.1	103.6	98.1	1.1	79.2
1999	78.9	104.0	98.8	1.6	80.4
2000	81.7	103.7	97.8	1.1	82.8
2001	79.1	105.9	98.7	2.5	81.6
2002	78.7	106.5	99.4	3.1	81.7
2003	79.3	106.0	99.4	2.8	82.1

(a): The adjustment is calculated using the method in Cette (2004), see above footnote 6.

(b): New Zealand's structural productivity level, calculated as if New Zealand had the same labour utilisation as Australia. Source: : Authors calculations based on Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net>, *Labour Force, Australia* (ABS Cat. No. 6202.0), and *Household Labour Force Survey, New Zealand* (Stats NZ 61.900). Employment rate is calculated based on the total labour force.

Education levels and innovation activities

Human capital and the knowledge stock available to participants in an economy may well play an important role in determining level of productivity relative to world-best. Unfortunately we have imperfect measures of both of these factors.

At an aggregate level, education levels in Australia and New Zealand appear similar in terms of highest qualification. It is, however, difficult to sensibly compare education qualifications across countries. There appears about half a year difference in average years of education of the working age population. One estimate is that an extra year of education has a long run output effect of about 6 per cent.⁹ This then might explain something like 2-3 percentage points of the gap. However, this indicator can take little account of the quality aspects of education and does not capture on the job training.

At more micro levels, the quality of education and the extent to which it meets the needs of the individual country could conceivably make a difference to the levels of productivity achieved but this is hard to discern from aggregate data.

The knowledge stock available to an economy is even more difficult to measure. It depends on a range of variables. These include:

⁹ A Bassanini and S Scarpetta, *Does Human Capital Matter for Growth in OECD Countries? Evidence From Pooled Mean-Group Estimates*, OECD Economics Department Working Paper No 282. In 1998, Australia 12.3 years, New Zealand 11.8 years.

- The extent to which knowledge is generated domestically. Both Australia with R&D intensities at around 1.5 per cent of GDP and New Zealand at around 1.1 per cent of GDP are below the OECD average of 2.3 per cent GDP.¹⁰
- A country's connections with the centres of economic activity. This includes both formal and informal connections. These are difficult to measure but both countries have historical connections through migration.
- Distance from other knowledge generating activities is likely to matter. Falling transport and communications costs will have assisted both countries in this respect but it still provides challenges.

Differences in the levels of business R&D intensities appear to have persisted for some time. The OECD estimates the impact of a 0.1 per cent of GDP increase in business R&D intensity to increase output per working age person in the long run by 1.2 per cent¹¹. The difference in business R&D intensities is around 0.4%¹². The implication is that if New Zealand business R&D intensities were similar to those of Australia then New Zealand productivity could be around 5% higher. But R&D intensities are heavily influenced by industry structure and the industry structure of both Australia and New Zealand might sensibly imply a different mix of innovation activities from the OECD average. It might also imply a different mix of public and private R&D.

Expenditure on R&D is only one indicator of investment in knowledge. It is the most often used in international comparisons and cross country analysis, primarily because R&D spending has been measured in OECD countries for a number of decades. Total investment in knowledge on the other hand is difficult to measure. The New Zealand Ministry of Economic Development attempted to measure this and found New Zealand, at 3.4 per cent GDP, was only slightly below Australia.¹³

Geography, location and population

It is likely that location relative to global economic activity, internal geography and population densities play an important role, in conjunction with institutions, in determining how close to world best productivity a country can move.

One of the arguments is that there are increasing returns to spatial concentration driven by factors such as knowledge spillovers, thick labour markets and the proximity of customers and suppliers.

It seems sensible to ask if the level of productivity in New Zealand looks reasonable when compared to the distribution of Australian states.

¹⁰ Gross Expenditure on Research and Development, ABS, *Research and Experimental Development, All Sector Summary*, Australia (cat. no. 8112.0), Statistics New Zealand, *Research and Development in New Zealand, 2002*, OECD, *Main Science and Technology Indicators database*, May 2003.

¹¹ OECD, *Understanding Economic Growth*, 2004

¹² Statistics New Zealand, *Research and Development in New Zealand, 2002*, OECD, *Main Science and Technology Indicators database*, May 2003

¹³ Growth and Innovation Framework, *Benchmark Indicators Report 2003*, Ministry of Economic Development, 2003

Andrew Coleman (2001)¹⁴ used Queensland as a comparator with New Zealand. He argued that,

The parallels are obvious:

- : In population terms both are long thin countries whose three million residents are split about equally between a single large metropolitan area and a scattering of medium-to-large towns;
- : Both regions are separated by over a thousand kilometres from either Sydney or Melbourne
- : Both have large agricultural industries with specialties different from the rest of Australasia (sugar and beef in Queensland and dairy and forestry in New Zealand); and
- : In each region the service sector is three-quarters of the economy.

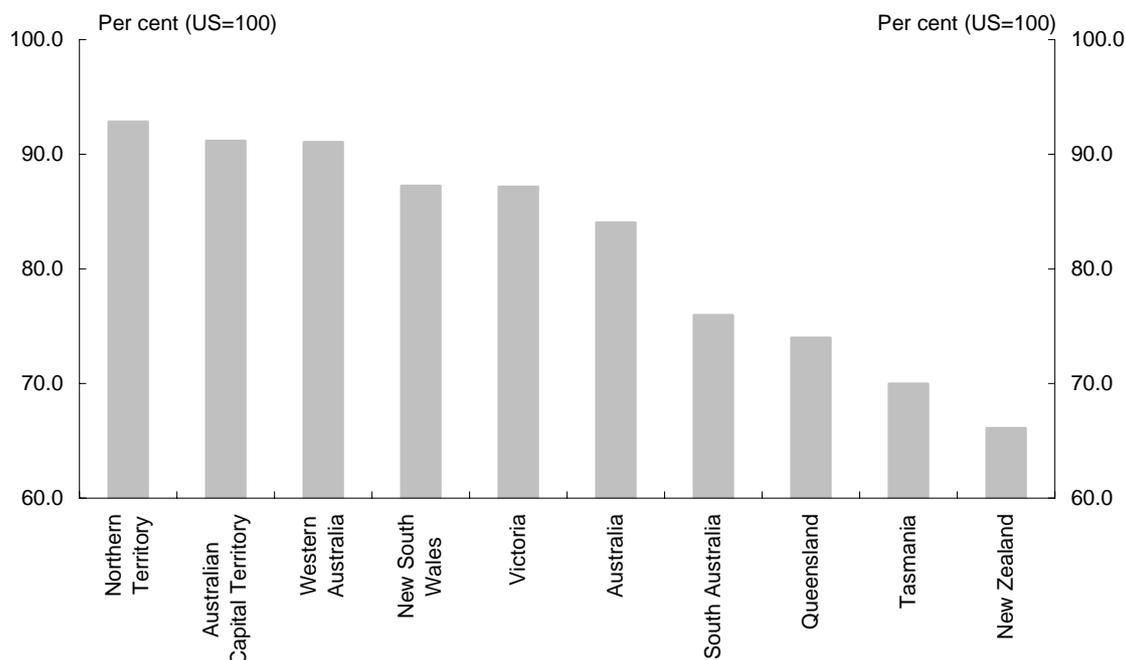
Of course, Queensland has a much larger mineral sector than New Zealand, but this is capital intensive and largely owned by non-Queenslanders.

On this basis we might expect labour productivity to be similar, with Queensland perhaps slightly higher. However, New Zealand is also significantly more remote from the bulk of world economic activity than Queensland¹⁵, so this may push productivity levels in New Zealand somewhat below Queensland's.

¹⁴ Andrew Coleman, *Three Perspectives on an Australasian Monetary Union*, Reserve Bank of Australia 2001 Conference

¹⁵ According to Robert Ewing and Bryn Battersby (2003), *Geographic Remoteness: Does The Growth Of Asia Improve Australia's Position?* (Australian Conference of Economists, 2003), New Zealand is the most remote country in the world, being effectively 12,300 km from the rest-of-the-world GDP, compared to 10,183 km for Australia (itself the 13th most remote country in the world).

CHART 12: PRODUCTIVITY LEVELS IN AUSTRALIA, 2002



Source: Author's calculations from Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net>, *Australian National Accounts: State Accounts* (ABS Cat. No. 5220.0) and *Labour Force, Australia, Detailed* (ABS Cat. No. 6291.0.55.001). State productivity levels are adjusted to 1999 \$US PPP levels using the implicit deflator for the total Australian productivity level calculated from the State Accounts data relative to the level given in the Groningen data.

As illustrated, the Northern Territory, Australian Capital Territory and Western Australia have the highest, and New Zealand the lowest, productivity levels of any of the regions examined.

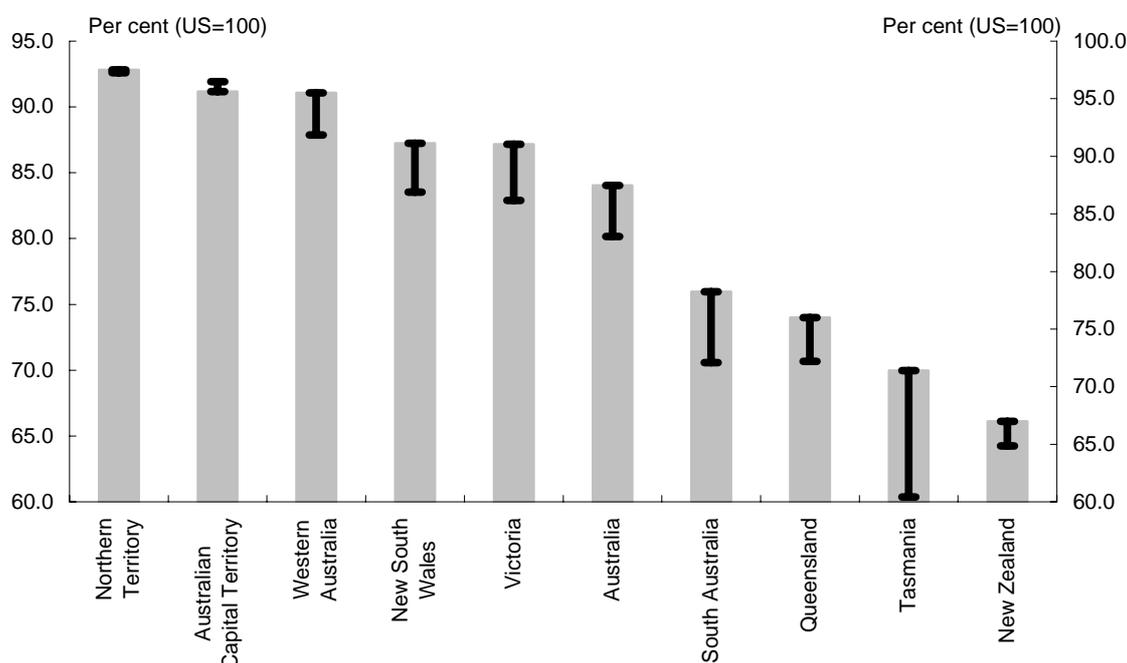
Western Australia and the Northern Territory are likely to have higher labour productivity due to the relative size of mining in their economies. The variations between Australian state productivity levels have been relatively stable over the past decade or two, except for Western Australia which has seen a significant expansion of mining. Once mining is removed, productivity growth rates across the states look very similar.¹⁶ This stability suggests that the steady state levels of relative productivity may have been reached, at least in some cases.¹⁷

However, there are considerable differences in the employment rates and average hours worked between some of the states and New Zealand. If we use the adjustments discussed earlier to account for these differences the results change significantly. New Zealand productivity levels are then found to be above those of Tasmania, and somewhat closer to the levels of South Australia and Queensland.

¹⁶ See Nguyen, Smith and Meyer-Boehm, *Variations in Economic and Labour Productivity Growth among the States of Australia: 1984-85 to 1998-99*, in *Productivity and Regional Economic Performance in Australia*, edited by Williams, Draca and Smith, 2003

¹⁷ See Bodman, Draca and Wild, *Recent Convergence Behaviour of the Australian States: A Time Series Approach*, in *Productivity and Regional Economic Performance in Australia*, edited by Williams, Draca and Smith, 2003.

CHART 13: PRODUCTIVITY LEVELS IN AUSTRALIA, ADJUSTED FOR LABOUR UTILISATION



Source: Author's calculations from Groningen Growth and Development Centre and The Conference Board, Total Economy Database, February 2004, <http://www.ggdc.net>, *Australian National Accounts: State Accounts* (ABS Cat. No. 5220.0) and *Labour Force, Australia, Detailed* (ABS Cat. No. 6291.0.55.001).

Taking the regional analogy a step further, a recent paper looking at UK regional variations¹⁸ found that there was a productivity effect associated with economic mass, suggesting that doubling the 'economic mass' to which an area has access raises its productivity by 3.5 per cent. Access was found to have the greatest impact within 40 minutes driving time and have little effect beyond 80 minutes. On this basis we could reasonably expect the average productivity levels in both Victoria and New South Wales to be higher than New Zealand, perhaps with New South Wales slightly higher than Victoria.

Conclusion

Australia's improved productivity performance over the 1990s was not an accident. It came, in significant part, as a result of an extensive economic policy reform program.

Economic reforms in both Australia and New Zealand over the last two decades or so were expected to lead to improved productivity performance in both countries. But significant differences in productivity levels between Australia and the United States and Australia and New Zealand remain.

It is likely that marked differences in geography, location and population mean that we could expect there to be a productivity difference between Australia and the United

¹⁸ Patricia Rice and Anthony J Venables, *Spatial Determinants of Productivity: Analysis for the Regions of Great Britain*, CEP Discussion Paper No 642, July 2004

States, and between Australia and New Zealand. The productivity level differences observed are not outside reasonable expectations once these factors are taken into account. However, that does not mean that these differences cannot change going forward.

Economic reforms over the last two decades or so have meant both Australia and New Zealand should be able to move closer to the global productivity frontier within the constraints identified. And it is possible that technological change over the last decade may have reduced these constraints.

Lower levels of business investment in R&D and average years of schooling in New Zealand may be a contributor to the productivity gap. However, this is not clear cut.

Finally, the significant increase in employment rates over the last decade could be a significant factor in the relative decline in New Zealand's measured labour productivity.