



# Economic Development Indicators 2007

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# Economic Development Indicators 2007

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# Foreword

*Economic Development Indicators 2007* is the third publication of its kind, and follows on from the last economic development indicators reports (published in 2005 and 2003). This time, Statistics New Zealand has joined the Ministry of Economic Development and The Treasury in producing this report.

The report draws together a broad range of indicators, providing us with a useful picture of New Zealand's economic performance. In putting together this edition, we have incorporated a wider range of indicators than in the previous two editions. The additional indicators are in areas such as well-being and prosperity, regulation and tax policy, infrastructure and Auckland's performance as an international city. Most indicators in this report are benchmarked against the Organisation for Economic Co-operation and Development (OECD). However, a selective set of indicators also compares New Zealand with the Australian states to provide a different perspective on New Zealand's recent economic performance.

This report shows that New Zealanders overall have a good quality of life and that the economy has performed well over the past few years, with per capita growth in gross domestic product (GDP) somewhat above the OECD average. However, much of New Zealand's recent economic growth can be attributed to our high levels of labour utilisation, evidenced by record low unemployment. If we are to achieve per capita incomes similar to those countries in the top half of the OECD, or in the more successful states of Australia, we need to match our high labour utilisation with high labour

productivity. Labour productivity is influenced by levels of business innovation, investment in the latest technology and equipment, and by skills, infrastructure and scientific research. This report provides indicators that show how we are doing on all these fronts.

Overall, New Zealand's ranking within the OECD for many of the indicators in this report is not high. That said, the direction of change in many areas such as investment, patenting and expenditure on research and development (R&D) is positive. Many of New Zealand's economic foundations, such as our institutional and regulatory environment, remain solid.

We will update these indicators when new data is available and changes in the indicators can be assessed. Regular publication will provide a valuable information base against which to monitor progress towards the government's key economic objectives. Ongoing work on strengthening and further improving the official statistics system will improve the coverage, quality and timeliness of statistics relevant to some key areas of this report.

Building a shared understanding of the New Zealand economy, its drivers and its performance is an important requirement for economic policy making. Like its predecessors, this report presents the strengths and weaknesses of the New Zealand economy and supports a dialogue that will contribute to the government's overall sustainable economic development objective.



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Ministry of Economic Development



**John Whitehead**  
Secretary  
The Treasury



**Geoff Bascand**  
Government Statistician  
Statistics New Zealand

# Executive Summary

This inter-departmental report provides a broad range of indicators relevant to New Zealand's economic performance. It has been prepared in order to inform economic debate and policy making in general, including the government's ongoing work on economic transformation.

Economic transformation is a key element of the government's economic, social and broader sustainability agenda. The aim of the government's economic transformation agenda is to create a strong, healthy high-income economy that will underpin much of what New Zealanders value and desire in life. Without higher economic growth, the economy will not deliver higher living standards or the quality of life to which New Zealanders aspire. As well as raising incomes, lifting economic growth increases the resources available to finance better-quality public services and to care for and maintain our environment.

Government agencies publish a number of sets of indicators covering a broad range of social, economic and environmental outcomes. The Ministry of Social Development's publication *The Social Report* (published annually) provides information on the social health and well-being of New Zealand society. The Ministry for the Environment is due to publish its latest "state of the environment" report shortly.

In this report, *Economic Development Indicators 2007*, the Ministry of Economic Development, The Treasury and Statistics New Zealand report on New Zealand's recent economic development and its contribution to well-being. The report updates and expands on two previous reports, published in 2003 and 2005.

Figure 1 depicts how the indicators covered in this report show New Zealand to be performing across a number of key areas, and the current direction of any change relative to the OECD. New Zealand's performance relative to other OECD countries is low for a number of the indicators presented. However, the direction of change has been positive across many indicators for a number of years now and continues to be so. Importantly, in many cases, improvements have been greater than those experienced in most other OECD countries, leading to an improvement in New Zealand's position on those indicators relative to the OECD average.

The indicators used in this report vary in quality, timeliness and robustness. While individual indicators need to be interpreted with care, we are comfortable that the overall picture presented in this report is robust.

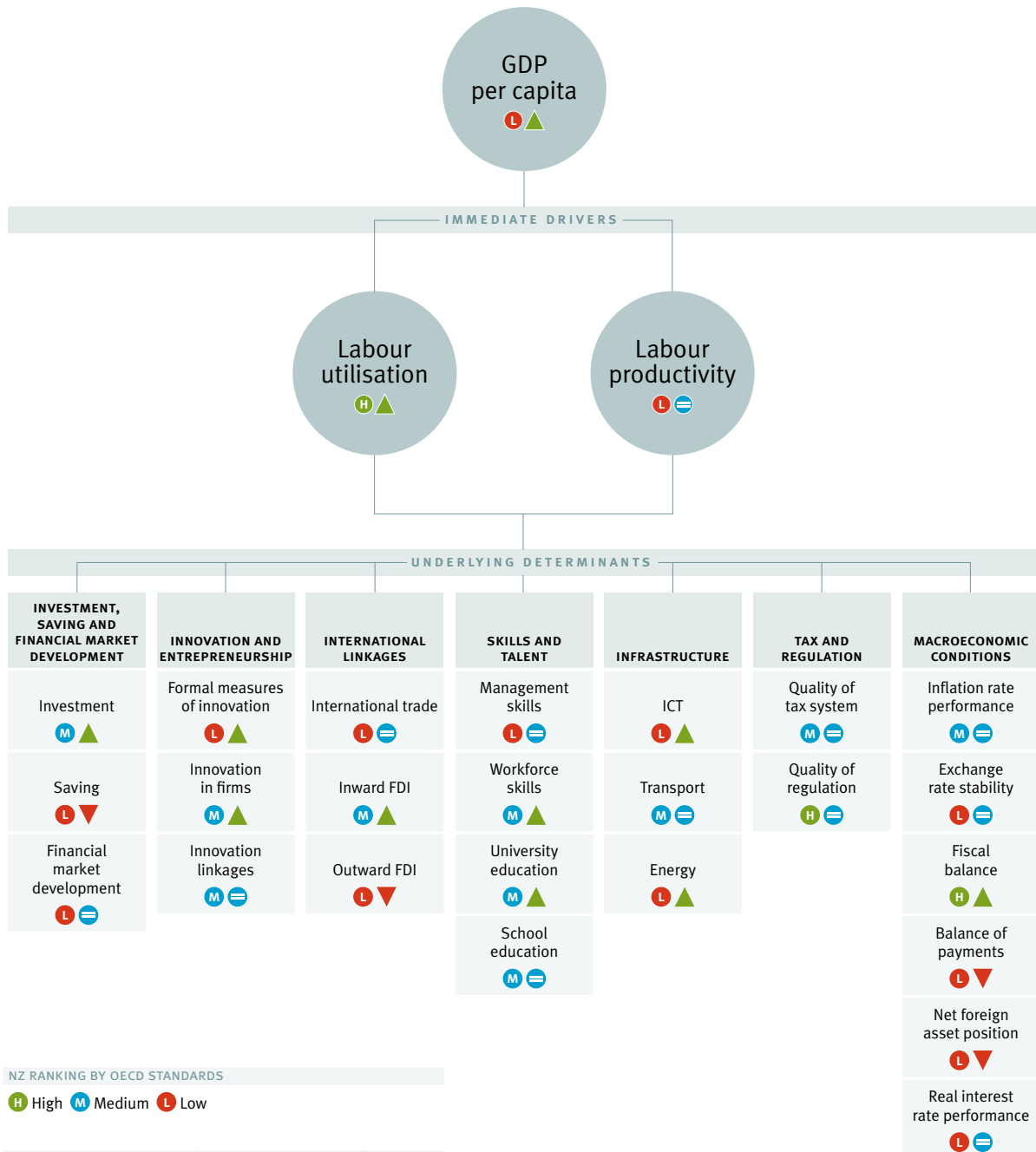
## Quality of Life

Measures of quality of life assess a range of social, economic and environmental factors. New Zealand sits in 20th place in the United Nations Human Development Index (UNHDI), with a higher score than the OECD average. This index focuses on life expectancy, education and income. Similarly, the Economist Intelligence Unit's quality of life index gives a high ranking to New Zealand, putting us in 14th place in the OECD. This index is based on a range of factors: material well-being, health, family life, community life, climate and geography, job security, political freedom and gender equality. New Zealand ranks in 9th place in the OECD in the Environmental Sustainability Index (ESI) 2005 but in 1st place in the Environmental Performance Index (EPI) 2006, giving us an overall ranking of 5th when these scores are averaged. The ESI is constructed around the concept of sustainability, tracking the environmental past, present and future. In contrast, the EPI focuses on current outcomes across a core set of environmental issues. These indicators suggest that, while New Zealand faces long-term sustainability challenges, it is managing its present circumstances well.

## Material Standards of Living

The New Zealand economy has performed well over the past decade, and in many areas, there is now a more solid platform for future growth. On the basis of GDP per capita, New Zealand is currently 22nd in the OECD (out of the 30 member countries). While this ranking is two places lower than in the 2005 indicators report, New Zealand's GDP per capita levels have continued to improve slowly relative to the OECD average. Our drop in the OECD rankings appears to reflect a combination of particularly strong growth in the two countries that have overtaken us and, in one instance, a revision to statistical methods.

FIGURE 1 – NEW ZEALAND’S PERFORMANCE RELATIVE TO THE OECD AGAINST KEY INDICATORS<sup>1</sup>



1. These ratings of performance represent only broad aggregated judgements across a number of indicators. They should be interpreted in conjunction with the fuller picture of performance described in each chapter.



The strength of the economy relative to other OECD countries is encouraging in light of the government's objective of raising New Zealand's per capita income levels. However, we have some way to go to achieve per capita incomes similar to those in countries in the top half of the OECD. The income gap between New Zealand and the top half of the OECD is reasonably large, and closing it will require a number of years of performance consistently above the OECD average.

### Labour Utilisation

Much of New Zealand's recent strong economic performance reflects high rates of growth in labour utilisation. New Zealand's labour utilisation rate is now one of the highest in the OECD, reflecting a combination of high participation rates, low unemployment and a high average number of hours worked relative to other OECD countries. It will be possible to increase labour utilisation further if the economy maintains its current performance. But there are limits to the gains that can be achieved from labour utilisation, and future growth in income per capita will need to be sourced from labour productivity.

### Labour Productivity

Estimates of New Zealand's economy-wide labour productivity *levels* are low by OECD standards. Recent OECD estimates of New Zealand's economy-wide rates of *growth* in labour productivity have also been moderate relative to OECD comparator countries, while Australia has been close to the OECD average. However, questions remain about the accuracy of economy-wide labour productivity measures. New Zealand and Australian statistical agencies report labour productivity across a narrower set of "measured sectors" of the economy. Under this narrower but more accurate measure, New Zealand's labour productivity growth has been stronger, and close to that of Australia.

New Zealand's labour productivity reflects our levels of capital per hour worked and multi-factor productivity (MFP). MFP captures a range of factors that can raise output over and above any increase in "inputs" of capital and hours worked. New Zealand's capital-labour ratio is low by OECD standards, but its growth has been strong over the past 10 to 15 years, close to that of Australia. MFP growth has been low relative to the OECD over the last 10 years.

### Investment, Saving and Financial Market Development

New Zealand's total fixed investment as a percentage of GDP is around the OECD average and has been growing in recent years. Business investment, a key component of total investment, has been close to the OECD median (as a percentage of GDP) over the last ten years. In particular, plant and machinery investment has been above the OECD median in most years since 1970. This is important to New Zealand's growth prospects, since private sector investment in capital equipment is associated with improved firm productivity and profitability. Government investment spending has increased over the past decade following a sharp decline in the mid-1980s, but still falls short of the high rates seen in the 1970s and 1980s.

New Zealand's net national saving (gross national saving minus depreciation of fixed capital) as a percentage of GDP currently lies below that of Australia, the UK and Denmark, as well as falling short of the OECD average. This is reflected in household saving data, with New Zealand's households saving a particularly low proportion of their disposable income. From the early 1990s, households have been spending more than they earn on average, or "dis-saving". In general, however, household dis-saving has been offset by higher government and business saving.

In addition to retained earnings or profits, firms can access investment capital from a number of other sources: banks, the sharemarket, the venture capital market or informal capital markets. Improving financial development in these markets can stimulate economic growth. The Milken Institute's Capital Access Index evaluates the ability of business to access capital across all sources. New Zealand ranks 12th place in the OECD on this index, above the OECD average but below countries such as the UK, the US, Denmark and Australia.

New Zealand's sharemarket capitalisation relative to GDP is smaller than for most comparator countries, and has remained broadly static for a number of years. Similarly, the size of the venture capital market in New Zealand – a relatively small but important source of finance for smaller companies – sits at the lower end of the OECD range.

Good availability of bank credit and informal capital can partially substitute for underdeveloped equity markets. New Zealand's banking sector has been growing since 1990 and is larger relative to GDP than that of the US and Australia. Informal capital markets are also larger than in most OECD countries.

## Innovation and Entrepreneurship

Innovation underpins aggregate productivity growth, and entrepreneurship drives innovation. Indicators in this report present a mixed but improving picture for entrepreneurship and innovation in New Zealand.

New Zealand firms appear to be introducing new products and marketing methods at a faster rate than firms in European Union (EU) countries. However, they exhibit a lower rate of managerial and organisational process innovation. Expenditure on R&D is low by OECD standards – particularly in the private sector. International patenting rates are also well below the OECD average. However, both measures are growing fast. Growth in both overall and private sector R&D has been particularly strong over the past 10 years, substantially greater than that in the OECD as a whole and in comparator countries such as Australia, the UK and the US. Low rates of R&D and patenting are associated with our distance from major world centres, the lack of very large firms, and an industrial structure weighted more heavily towards primary production than in other OECD countries.

Data on publication rates suggests the science base in New Zealand is delivering relatively good levels of research output. The high proportion of Crown Research Institute (CRI) research funded by the private sector suggests that linkages between these public research providers and private business are also strong.

Data on the technology content of goods exports suggests that New Zealand's industrial production remains concentrated in what the OECD classifies as “low-technology” sectors (for example, primary), but the technology intensity in these sectors is higher in New Zealand than in other countries.

## International Linkages

While New Zealand's economy has low barriers to trade, our share of external trade (relative to GDP) is below that of similar-sized, high-performing OECD countries. Our share of world trade has remained broadly constant over the past 15 years.

The stock of foreign investment in New Zealand is high (as it is for most small developed countries), and recent inflows have also been strong. In contrast, foreign direct investment (FDI) outflows have been low by world standards over a number of years.

New Zealand has been successful in attracting migrants. While outflows have also been high, New Zealand's net inflows remain higher than the OECD average. As a result, New Zealand has a high proportion of foreign-born residents. The skill levels of migrants leaving and entering New Zealand have been broadly similar. As a result, New Zealand appears to have experienced a “brain exchange” rather than a “brain drain”. However, questions remain about the speed and success with which new immigrants are integrated into the workforce.

## Skills and Talent

High skill and talent levels are crucial for economic success. The skill levels of both the current overall workforce and people entering the workforce from the education system are important.

Management and leadership skills impact substantially on organisational performance. The International Institute for Management Development (IMD) assesses availability of management skills to be lower in New Zealand than in Australia, the UK and many other OECD countries. However, these results are based on surveys of perceptions of managerial quality so must be interpreted with caution.

A skilled and educated workforce more generally is also important. The proportion of adults with a bachelor's degree in New Zealand is slightly above the OECD average. Further, the proportion of the population with a bachelor's degree or higher and the proportion of the population with a tertiary qualification or higher have both grown since 1997, while the proportion of the population with no qualification has declined. Looking at more basic skill levels, the International Adult Literacy Survey (IALS) ranked New Zealand in 1996 above the OECD median on prose literacy, but below the OECD on document and quantitative literacy. The IALS also assessed New Zealand as having the highest number of hours of continuing education and training per adult in the OECD. However, the IMD survey ranks New Zealand below many OECD countries in the emphasis given to employee training.

New Zealand's university graduation rates are high by OECD standards and increasing. Surveys suggest that our best university is similar in quality to the median leading universities in OECD countries, suggesting that the quality of our university education is likely to be comparable with the OECD average. At the secondary school level, the picture is mixed. While 15-year-olds perform above average on reading, scientific and mathematics literacy according to the Programme for International Student Assessment (PISA) measure, 13- to 14-year-olds score below average on the United States' Trends in International Mathematics and Science Studies (TIMSS) measure. The proportion of students leaving secondary school qualified to enter university is increasing, but the participation rate in education for 15- to 19-year-olds is well below the OECD average.

## Infrastructure

An appropriate level and quality of infrastructure is an important contributor to economic growth. Robust, internationally consistent data on infrastructure quality is difficult to obtain. This section, therefore, relies heavily on international surveys of business perceptions of infrastructure quality, which need to be interpreted with caution. Overall, New Zealand is perceived as having lower-quality infrastructure than most high-income countries: we ranked 34th out of the 125 countries included in the latest Global Competitiveness Report prepared by the World Economic Forum. Respondents rated an inadequate supply of infrastructure as the second most problematic factor for doing business in New Zealand.

The perception-based data suggests that the quality of New Zealand's information and communication technology (ICT) infrastructure is below that of most high-income countries. However, the harder data presents a mixed, but more positive, picture. Overall levels of current investment in ICT are above the OECD average, but not substantially so. And, while the broadband subscription rate remains below the OECD average, recent growth rates are higher than average.

The available data on transport infrastructure is more limited. Where data does exist, New Zealand's performance appears broadly in line with the OECD average. Further, we compare more favourably with developed nations that have a similarly dispersed population profile. However, the quality of energy infrastructure is perceived to be lower than in most other OECD nations.

## Tax and Regulation

New Zealand's total tax burden, as measured by our tax to GDP ratio (35 per cent), is broadly in line with the OECD median. The share of total taxes collected from labour and corporate income is similar to the OECD average when social security taxes are included. However, New Zealand's tax on income from capital (corporate income, dividends, interest, rents, etc) is relatively high compared with other OECD countries, and our tax on income from labour is relatively low. New Zealand's corporate tax rate is high relative to some small economies, particularly Singapore, Ireland and Chile, but is similar to rates in Australia and the UK. Recent policy announcements to reduce the corporate tax rate may improve our relative position. New Zealand's taxes are relatively easy to comply with.

Across the working population, New Zealand's average tax wedge on personal income is relatively low compared with other OECD countries, even when account is taken of the combined effect of income tax and goods and services tax (GST). However, incentives for individual New Zealanders to work more vary depending on their wage levels and family composition, particularly due to the effects of the Working for Families tax credits.

New Zealand has a high-quality regulatory environment. We are assessed by the World Bank as being second in the world for overall ease of doing business. However, there is still scope for New Zealand to further improve our performance on some of the sub-indicators. New Zealand's product market, competition and employment regulations are also assessed by the OECD as being high quality, with our ranking in the top seven countries on all measures. However, other top-performing countries have substantially improved their position relative to New Zealand in recent years.

## Macroeconomic Foundations

New Zealand has solid macroeconomic foundations. Fiscal and price stability are well established, and New Zealand now has relatively lower volatility for both GDP and inflation than in the past, which is conducive to investment and economic growth. Government spending as a percentage of GDP is below the OECD median, and the government has run financial surpluses since the early 1990s. New Zealand, however, still has a relatively high real interest rate and high exchange rate volatility, and has consistently run large current account deficits, which are reflected in a high level of external indebtedness.

A number of factors are likely to limit New Zealand's external vulnerability, including low public debt and a strong risk management culture in New Zealand's financial institutions.

## New Zealand's Economic Relationship with Australia and its States

There is strong international evidence to suggest that country borders typically reduce levels of economic interaction. Considerable work has been undertaken to reduce the barriers to economic flows between New Zealand and Australia, and we now appear to be more highly integrated with the Australian economy than any other country. However, New Zealand remains less integrated with Australia than the individual Australian states are with each other.

New Zealand's economic performance will, to a degree, determine its ability to compete with the Australian states for key resources, such as highly-skilled workers and investment.

New Zealand's GDP per capita is lower than that of all of the Australian states except Tasmania. Our average rate of growth in GDP per capita has been in the middle of the Australian states since 1995.

Australia is an important destination for emigrating New Zealanders, resulting in a large and growing New Zealand diaspora. However, the magnitude of the net outflows is not much larger than that experienced by some of the states to other parts of Australia.

Australia accounts for a large and growing proportion of foreign investment in New Zealand, which has led to a large negative net investment position from New Zealand's perspective.

## Auckland – an Internationally Competitive City

International evidence suggests that large, outward-facing, global cities play an increasingly important role in economic development. While Auckland is a relatively small city by international standards, it is still our largest city. We have compared Auckland's performance with those of the other regions of New Zealand and that of Brisbane, Melbourne, Adelaide, Seattle, Vancouver and Copenhagen.

Auckland's GDP per capita is lower than those of all but one of the international benchmark cities, but only slightly so in most cases. However, the difference in these measures between Auckland and New Zealand as a whole – the Auckland "premium" – is higher than the equivalent figures for all but one of the comparator cities.

Auckland is assessed as offering a high quality of life by international standards, offsetting to some degree its lower GDP per capita. Auckland's productivity levels (GDP per worker) are lower than the average of a sample of 78 metropolitan regions in the OECD and below most of the comparator cities. The difference in productivity between Auckland and New Zealand as a whole – the Auckland premium – is in the middle of the comparator cities, suggesting that in the New Zealand context, Auckland is contributing normally to economic growth. Its population growth rate is also very high by international standards.

With regard to the underlying factors that influence productivity growth, Auckland performance is more mixed. Patent applications per capita are relatively low by international standards, as is the proportion of the working age population with a tertiary education. Auckland City's share of employment in high-tech manufacturing goods and services sits broadly in the middle of the comparator cities.

# Introduction

This inter-departmental report provides a broad range of indicators relevant to New Zealand's economic performance. It has been prepared to inform economic policy making in general, and to feed into the government's work on economic transformation.

At the broadest level, democratic governments around the world aim to create a better life for their citizens by developing strategies to improve their economy, society, environment, culture and way of life. More recently, there has been a growing awareness of the need to pursue these improvements sustainably; ensuring that any improvements secured for the current generation do not limit the ability of future generations to meet their legitimate aspirations.

The New Zealand government has expressed its sustainable development challenge as being to:

- build a sustainable economy based on innovation and quality;
- sustain and improve family and community living standards in our open, competitive economy;
- sustain our unique culture, values and national identity in a world of globalised media and culture; and
- make a commitment to greater sustainability in our resource use and way of life.

Economic transformation is a key element of the government's sustainability goals. Along with families – young and old, and national identity, economic transformation is one of the government's three priorities for the next decade.

Economic transformation is aimed at creating a strong, healthy economy that will underpin much of what New Zealanders value and desire in life. Without higher economic growth, we will not be able to raise living standards or achieve the quality of life to which New Zealanders aspire. As well as raising incomes, lifting economic growth increases the resources available to finance better-quality public services and to care for and maintain our environment.

## Characteristics of the New Zealand Economy

New Zealand can be characterised as a small, open economy that is far from most of the world's markets. In common with other advanced industrialised countries, New Zealand has a high share of its economy devoted to services and manufacturing. New Zealand, however, also has a relatively large agricultural sector by Organisation for Economic Co-operation and Development (OECD) standards, and a significant proportion of exports based on primary production. A relatively small share of New Zealand's export production comes from high-technology sectors such as ICT and pharmaceuticals.

Volatility in the domestic economy has decreased in recent years. However, New Zealand's small size and dependence on foreign investment and trade, particularly in commodity markets where we are largely a price taker, mean we are strongly affected by developments in the global economy. The New Zealand economy has experienced a number of economic shocks recently due to external economic factors (e.g., the Asian financial crisis of 1997). New Zealand can also be significantly affected by changes in climatic conditions.

These features of New Zealand's economy have consequences for many of the indicators collected in this report, and their impact is noted in the text where relevant.

## Purpose of Indicators

Government agencies publish a number of sets of indicators covering a broad range of social, economic and environmental outcomes. This report focuses on the economic development dimension and its contribution to well-being, although – to recognise the interdependence of these various dimensions of well-being – it does cover a small number of key well-being and environmental sustainability indicators. The Ministry of Social Development’s annual publication *The Social Report* provides information on the social health and well-being of New Zealand society and is a useful complement to this report. The Ministry for the Environment has published a number of environmental indicators on its website and is due to publish its latest *State of the Environment* report by the end of 2007.

Economic indicators can assist with several important objectives. Economic indicators allow us to *monitor progress* towards economic goals and to *benchmark* New Zealand’s performance against that of other countries. A comprehensive set of indicators allows us to track and compare performance both in terms of high-level outcomes (such as income levels) and the underlying factors that may influence these outcomes over time (such as levels of innovation and skills).

Indicators can also help us to *evaluate* the effectiveness of economic policy. On their own they are not enough to do this, but over time the direction or pace of change in a particular indicator or set of indicators may provide us with information on whether policy is broadly on the right track.

Indicators provide information on areas of both strength and weakness within the New Zealand economy. Information on areas where New Zealand performs poorly relative to other countries may help to identify areas for *policy consideration* or *intervention*. Again, they do not alone confirm the existence or the nature of a policy problem but they can help highlight areas that may warrant deeper inquiry.

## Determinants of Income Growth

To fulfil the purpose outlined above, indicators must be chosen that are relevant to the growth process. However, despite their fundamental importance to a society’s well-being, and much research into them, the factors that collectively cause a country’s incomes to grow are not fully understood and remain controversial.<sup>2</sup> This section briefly outlines our views about the growth process based on this extensive literature and explains why the indicators included in this document are relevant.

The most important contributor to increasing incomes per capita is increasing productivity, or output per hour worked. Countries can become richer in the short term by increasing the proportion of their population that works, or encouraging those in the workforce to work longer hours or harder. But these approaches have clear limits. Over the longer term, the only sustainable way to grow income per head is to increase the level of output that each person in the workforce produces per hour – in other words, to grow productivity. Economic evidence suggests that, over the longer term, productivity growth is responsible for all but a small fraction of a country’s growth in income per capita. For example, from 1820 to 1998, income per head in the developed world grew about 19 times, after adjusting for inflation.<sup>3</sup> Most, if not all, of this growth has probably come from improvements in productivity rather than increases in hours worked per person.

The overarching challenge facing policy makers is therefore to better understand the factors that give rise to productivity growth.

Changes in productive knowledge (hereafter, called “technological change”) play a vital role in promoting productivity growth. Technological change can be embodied in new products, new processes, new organisational forms and new methods of marketing and distribution. It is also embodied in each individual’s knowledge and skills. Cumulative technological change has radically changed the productivity of developed countries’ workforces. The discovery of electricity in the 18th century, for example, has allowed a number of further inventions (such as electric lighting and computers) that have literally transformed the way that our societies function, and which were not even imagined by the natural philosophers who originally investigated electricity. Similarly, the development of the production line by Henry Ford transformed the way manufactured goods were produced. New knowledge, and the capabilities needed to exploit it, provides a higher platform for further discoveries<sup>4</sup> and a potential stepping stone to new, higher-value products and processes.<sup>5</sup>

2. Easterly, W., *The Elusive Quest for Growth: Economists’ Adventures and Misadventures in the Tropics*, 2001, Cambridge MA, The MIT Press.

3. Maddison, A., *The World Economy: A Millennium Perspective*, 2001, OECD.

4. Lipsey, R., K. Carlaw and C. Bekar, *Economic Transformations: General Purpose Technologies and Long-term Growth*, 2005, Oxford University Press.

5. Hausmann, R. and B. Klinger, *Structural Transformation and Patterns of Comparative Advantage in the Product Space*, 2006, CID Working Paper.

However, technological change does not always, or immediately, lead to improvements in productivity. Its full impacts take time to eventuate and often require waiting for existing equipment to depreciate and further adaptation of related managerial capability, products and processes. One implication of this is that technological change can take some time to show up in the productivity statistics. Further, the immediate impact of technological change on measured productivity may even be negative. For example, an increase in business R&D, such as has recently occurred in New Zealand, diverts resources from current production (so reducing measured value added), even though its real purpose is to create new and better products and processes in the future.

While the benefits of technological change typically disperse beyond the country where they were first developed, they can only be adopted by other countries that find out about their existence and that have the skills and resources needed to absorb and exploit them.

As a result, the full benefits of technological change have not been equally captured by countries around the world. Some countries, such as Japan and Korea, have been able to rapidly develop their economies, and increase their incomes to developed world levels, through a strategy of adoption and adaptation of existing technologies. However, many less well-developed countries have so far failed to successfully emulate this strategy.

Thus, while technological change lies at the heart of productivity growth, it is only one of a broad range of complementary factors that must be present for growth to occur. While significant uncertainties remain, there is growing recognition of the importance of a number of key supporting conditions being present for productivity growth, and therefore economic growth, to occur. These key conditions span most aspects of an economy and involve entrepreneurs and firms, the government and the workforce. Many aspects of a country's broader environment are also important, such as its geographical location and natural resources.

### **Role of firms and entrepreneurs**

The role of firms and entrepreneurs is central to this process of developing and applying new technologies and taking the resulting goods and services to market. The effort required is inherently risky and uncertain, the process can be complex, time-consuming and resource-intensive, and there can never be a guarantee of success.

The development and application of new knowledge and technologies therefore require significant potential financial rewards, both to provide incentives to pursue these new opportunities and to finance the growth of successful firms. They also require a complex mix of skills in the research and business communities, and strong innovation systems. High-quality financial markets are also needed: from angel investors and venture capitalists at one end of the spectrum, to healthy sharemarkets and debt markets at the other. Similarly, a dynamic business environment is required, with the flexibility for new firms to enter and grow, and less successful firms to decline and exit.

### **Role of government**

Governments play a vital role in creating an environment that is suitable for businesses to succeed and grow.

One of the key roles governments play is to establish an appropriate set of incentives to encourage entrepreneurs to focus on the right things (e.g., developing new products) and discourage activity on the wrong things (e.g., misleading consumers).<sup>6</sup> This requires modern, high-quality policy settings and regulation across a wide range of areas. Key examples include tax policies, intellectual property rights law, company law, competition policy, consumer law, public sector and corporate governance, and international trade and investment policies. The quality of these institutional arrangements and policies impacts on the potential rewards for firms undertaking risky activity, the pressures they face to adapt and improve, and their ability to access offshore markets, capital and skills.

By creating a stable macroeconomic environment, governments can help to reduce the level of risk and uncertainty firms face. A low-inflation environment, low interest rates and a relatively stable exchange rate help firms prosper and grow.

Governments play a pivotal role in the provision of infrastructure. Modern economies require high-quality communications, transport and energy infrastructures. In all OECD countries, central and local governments take the lead in funding or regulating the maintenance and development of this infrastructure.

6. North, D., *Understanding the Process of Economic Change*, 2005, Princeton University Press, p76.

Most governments play a major role in the funding and provision of education, training and R&D. The quality of effort in these areas can have a major long-term impact on the skills and ability of a country's workforce (see below) and the capacity of the business sector to absorb and use new technological knowledge.

Further, most governments have an industry policy designed to help firms grow and internationalise, to encourage the development of future competitive advantage and to exploit the synergies among firms' activities and between their activities and those organisations such as universities.

### **Role of the workforce**

To grow and succeed, businesses need access to adequate numbers of suitably skilled workers. Managerial and professional skills are important. The successful management of large, internationally focused firms requires specialised skills in a wide range of areas.

Skill levels across the workforce as a whole are also vital. Over recent decades, new technology has required increasing skill levels to exploit it, with the result that the income of skilled people has risen, notwithstanding increasing skill levels in the economy. Companies increasingly need staff with strong literacy and numeracy skills to undertake increasingly sophisticated tasks, learn new tasks when faced with technological change, and operate complex machinery and computing equipment.

Further, workplace practices are important. Changes in working practices (such as more flexible forms of work organisation, employee involvement and strategic human resource performance management) can help to increase returns on investment in capital and innovation.

### **Other factors**

Lastly, a number of broader environmental factors have a strong impact on a country's economic performance. Some of these factors, such as geographical location and natural resources, are outside a country's control.

The geographical proximity and wealth of a country's trading partners is key. Australia's strategic and economic importance to New Zealand is in no small part due to its proximity. Its economic success provides many benefits for New Zealand – for example, creating a higher demand for our exports. But New Zealand also competes with Australia and its constituent states to some degree, such as for skilled workers and as a business investment location.

Large urban areas are also known to be especially important for innovation and specialisation. They provide easy access to deep and broad markets, which create the spur of competition and enable ready access to inputs to production. Auckland's performance is important to the performance of the New Zealand economy as a whole. However, the management of large and growing cities is often difficult. And, with a metropolitan population of less than 1.5 million, Auckland is quite small compared with most successful, high human capital cities.

### **Choice of Indicators**

This report builds and expands on two earlier economic indicator publications in 2003 and 2005.<sup>7</sup> It includes a larger number of indicators than in the previous reports and, in following the conceptual framework discussed above, is organised slightly differently. In addition, this report provides indicators in two new areas: New Zealand's economic relationship with Australia and its states and Auckland – an internationally competitive city.

The indicators used in this report were chosen according to their relevance to economic development and their availability. The relevance of an indicator was determined by the extent that it is clearly linked to productivity growth. We have chosen indicators that are informative, up to date, comparable over time and between countries, reliable and complete. Suitable indicators could not be found for all areas of interest. For example, it has proven difficult to find broad, objective and consistent indicators of the quality of countries' infrastructure, especially energy infrastructure.

For some of the indicators we could not find recent internationally comparable data. In these cases we have chosen to incorporate the older indicators that are available.

7. The 2005 and 2003 reports can be found on MED's website <http://www.med.govt.nz>.

## Benchmarking

We have used OECD countries, together with an OECD average or median measure, as the comparison group for the majority of the indicators in this report. The OECD, which includes the significant majority of the world's high-income countries, is a logical benchmark for New Zealand, given the government's objective of increasing New Zealand's average per capita incomes. Where a ranking is meaningful, we have ranked New Zealand with the 24 countries that compose the OECD prior to the most recent accessions,<sup>8</sup> to allow comparisons between the various indicators and with previous economic development indicator reports. When we say we are, for example, "14th out of the OECD", we normally mean 14th compared with this group of 24 countries.

In comparing growth rates across time, we have focused on Australia, the UK, the US and Denmark, together with an OECD average or median measure. We have very close connections with Australia, while Denmark is a European country of similar size and industrial structure to New Zealand. The UK is also a common reference point for New Zealand, while the US is obviously a much larger economy but – as a world leader in many aspects of growth and innovation – provides a useful reference.

## The Indicators

The 2007 economic indicators have been split into six core chapters:

- well-being and prosperity;
- immediate drivers of income growth;
- underlying determinants of productivity growth – firm and market performance;
- underlying determinants of productivity growth – business environment;
- New Zealand's economic relationship with Australia and its states; and
- Auckland – an internationally competitive city.

As with the previous two sets of economic development indicators, some qualifications need to be made regarding the indicators in the 2007 report.

### A comprehensive approach is needed

As a set, these indicators provide a comprehensive picture of the factors influencing economic growth in New Zealand. Viewed together and over time, they provide useful information about trends, New Zealand's future direction, and how different parts of the growth and innovation system relate to each other. Individually they provide, at best, only an indication of change in a particular area.

It should also be noted that the most recent available international data for some of the indicators provided in this report were earlier than 2006. Therefore, a number of the government's recent policy changes (such as the tax treatment of R&D) are not reflected in the indicators.

### Visible change takes time

Although this year's report updates many of the indicators in the 2003 and 2005 reports, two to four years is a very short timeframe in economic terms. It is not possible to draw definite conclusions on whether any changes observed since 2003 and 2005 reflect real underlying trends as opposed to cyclical or temporary influences. Many of the efforts of government and businesses to improve New Zealand's economic performance will deliver results only over much longer periods.

8. These 24 OECD countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Poland, Spain, Sweden, Switzerland, Turkey, the UK and the US.

### **Links between overall performance and indicators are complex**

We have based our selection of indicators on what theory and empirical evidence tell us about the likely determinants of economic growth. However, the relationship between these underlying factors and overall economic performance is not straightforward. There is not necessarily a simple causal relationship between performance on a particular indicator and aggregate performance. Further, indicators are generally only a proxy for the underlying factor we are interested in (for example, educational attainment is a proxy for, but not a perfect measure of, human capital).

This means it is important to be cautious about drawing policy conclusions from the indicators: while poor performance on a particular indicator may signal the existence of a problem to be addressed through policy, this is not necessarily the case. Policy interventions to lift performance against any particular indicator(s) will not necessarily have a positive effect on growth.

### **Attributing changes in indicators to specific policies is difficult**

It is difficult to attribute changes in indicators to specific policies, as a variety of government initiatives will act on each indicator. In addition, government policy is only one of a number of factors that influence the behaviour of the indicators and the economy. However, we hope that these indicators will help businesses and government identify areas of policy interest, and stimulate further analysis where appropriate. This should enable a greater understanding of how policy action can impact on New Zealand's growth and innovation performance.

### **Issues around measurement and comparability**

When data is expressed in a common currency in this report, it normally means that the data has been adjusted to the common currency (usually the \$US) using purchasing power parity exchange rates. There are measurement issues associated with many of the indicators used in this report. Some of the data is based on surveys of various people's opinions. Since opinions are not necessarily factual, this data must be interpreted with some caution. We have commented on issues around specific data sources throughout the report. Issues also arise when comparing New Zealand's performance with that of other countries, as different countries' data will reflect the unique characteristics of each country and the nature of the survey undertaken in each country, and there may be some methodological differences in the way that data is collected.

In spite of this, we are comfortable that the overall picture presented by this report is robust.

# Well-being and Prosperity

## Key Points

- A country's well-being is determined by a wide range of factors, from its material living standards to the nature and quality of its social and environmental situation.
- New Zealand ranks more highly in the OECD on quality of life indicators (which depend on a range of factors, including income) than it does on the two narrower economic measures: what New Zealand earns – gross national income (GNI) per capita – and what New Zealand produces – gross domestic product (GDP) per capita.
- The recent growth rate in GDP per capita has been somewhat higher than the OECD average but the level of GDP per capita remains lower.
- The difference between GDP and GNI is greater in New Zealand than in most other economies in the sample. This is because income accruing to foreign investments in New Zealand greatly exceeds that accruing from New Zealanders' overseas investments.
- Household wealth in New Zealand has grown strongly since 1995, the biggest increase being in housing wealth.
- Income inequality among households increased between the 1980s and 1990s, giving us a higher degree of income inequality than the OECD average and countries such as Denmark, Australia and the UK, but has stabilised more recently.

## Introduction

There are a number of ways to gauge the overall well-being of New Zealanders, but a key indicator is real income per capita, or *material* standards of living. Improvement in material standards of living is underpinned by economic development. It increases the resources available to generate better-quality public services and helps sustain our environment. However, measuring our material standards of living, though important, does not give a complete picture of well-being. Assessing well-being calls for a set of indicators that account for both financial and non-financial aspects of quality of life.

This section of the report sets out indicators of material living standards, as well as broader quality of life and environmental indicators to benchmark New Zealand's performance against other OECD economies. It also examines changes in household wealth and the distribution of incomes across households.

## 1.1 Quality of Life

FIG. 1.1 TO FIG. 1.3

Measures of quality of life assess both social and economic well-being and look more broadly than just at material standards of living. Clearly, what constitutes good quality of life is subjective and will differ between individuals, but New Zealand ranks highly in both of the indices used in this report. In the United Nations Human Development Index (UNHDI), New Zealand sits in 20th place out of a total of 177 countries and is 20th in the OECD. The UNHDI focuses on three aspects of human development: life expectancy, education (measured by adult literacy and enrolment at the primary, secondary and tertiary levels) and purchasing power parity (PPP) income. The Economist Intelligence Unit's quality of life index also gives a high ranking to New Zealand, putting us in 14th place in the OECD. This index is based on the following factors: material well-being, health, family life, community life, climate and geography, job security, political freedom and gender equality.

The Environmental Sustainability Index (ESI) 2005 and Environmental Performance Index (EPI) 2006, produced by Yale and Columbia universities in the United States, provide a measure of environmental quality and sustainability based on 16 indicators. The two scores are aggregated for our report since each index provides different information for policy makers. The ESI is constructed around the concept of sustainability, tracking the environmental past, present and future.<sup>9</sup> In contrast, the EPI focuses on current outcomes across a core set of environmental issues. New Zealand ranks in 9th place in the OECD in the ESI but in 1st place in the EPI, giving it an overall ranking of 5th when these scores are averaged. These indicators suggest that, while New Zealand faces long-term sustainability challenges, it is managing its present circumstances well.

The OECD also reviews New Zealand's environmental performance and has stated that, while New Zealand has implemented improved

9. It includes data relating to underlying natural resource endowments, past pollution control and the existing degree of ecosystem degradation, as well as current environmental policy results and forecasts of a society's ability to change negative trends. Measuring sustainability using these two indicators is imperfect, and results should be treated with caution. Statistics New Zealand is working with the International Working Group on Statistics for Sustainable Development to develop a conceptual and statistical framework to better measure and compare sustainable development internationally.

environmental policies over the past 10 or so years, we still face some major environmental pressures. It recommends strengthening our national policy guidance and further integrating environmental concerns into economic and sectoral decisions.<sup>10</sup>

## 1.2 Income and Production

FIG. 1.4 TO FIG. 1.8

A key component of most quality of life measures is income per head. Income is important because it provides individuals with consumption choices and also because it is necessary to buy services such as health care, education, welfare, environmental protection and security.

Other aspects of well-being are also important, not only in their own right but also because they contribute to sustainable economic development. There are other government agencies that report these other aspects of well-being<sup>11</sup> so they are not repeated here. Instead, the remainder of this report focuses on income per head and the factors underpinning this.

New Zealand's ranking based on quality of life indicators differs from New Zealand's position in the OECD based on the two income measures: GNI per capita and GDP per capita.

GNI is a measure of the total income that accrues to New Zealand residents from domestic and foreign sources. In comparison, GDP is a measure of the total income earned from goods and services produced in New Zealand, including that produced by foreign-owned firms operating domestically.

On both measures, New Zealand is ranked 22nd in the OECD. However, New Zealand's GNI per capita is around 7 per cent below our GDP per capita. This difference between GDP and GNI reflects the fact that income accruing to foreign investments in New Zealand exceeds the income accruing from our own overseas investments. New Zealand's investment balance and external position are discussed further in Chapter 3.

10. *OECD Environmental Performance Reviews: New Zealand*, 2007, OECD.

11. The government reports on a range of aspects that contribute to overall well-being, and these are not covered here. For example, the Ministry of Social Development publishes *The Social Report* annually, while the Ministry for the Environment will shortly be publishing a comprehensive "state of the environment" report, *Environment New Zealand 2007*.

### Growth performance

In terms of growth performance, New Zealand's five-year average annual growth in GDP per capita increased between the mid-1990s and 2003.<sup>12</sup> This reflects increased labour utilisation during the period (see Chapter 2). In the period to 2003, New Zealand achieved a growth rate in GDP per capita above our benchmark countries. Since then the growth rate has fallen, but it is still a little higher than the OECD average.

While our growth rate has been high relative to other economies, the level of GDP per capita (over time) as a proportion of the OECD average remains relatively low. New Zealand's relative GDP per capita has increased somewhat since 1992 and is about 14 per cent below the OECD average. This suggests that the growth improvements since the mid-1990s will need to be sustained over a long period if New Zealand is to significantly improve its performance relative to the other OECD economies.

### Sectoral performance

It is also useful to look at patterns of development in an economy. We can do this by looking at the three broad categories of industry: the primary industry (i.e., agriculture, forestry and fishing), the goods-producing industry and the service industry. In common with other OECD countries, New Zealand has a relatively high percentage of its economy devoted to goods-producing and service industries. The service industry has increased as a percentage of GDP since 1990, with a similar magnitude decline in the goods-producing sector. The primary industry, while forming a smaller percentage of GDP, has been relatively stable during the period and is large in comparison with other OECD economies. In short, the New Zealand economy's broad composition is changing only gradually over time.

We can also compare the gross value added by agriculture, manufacturing and service industries with our benchmark economies. Gross value added provides very similar information to GDP, but differs in that it excludes value added tax (VAT) and similar product taxes. New Zealand has a larger share of value added from agriculture than other

comparator countries and is the only economy in the sample with an increasing percentage of value added from this sector. All countries in the sample show an increase in gross value added from the service sector and a decrease in gross value added from manufacturing. The change in services share has been relatively small for New Zealand.

### 1.3 Household Wealth and Income Distribution

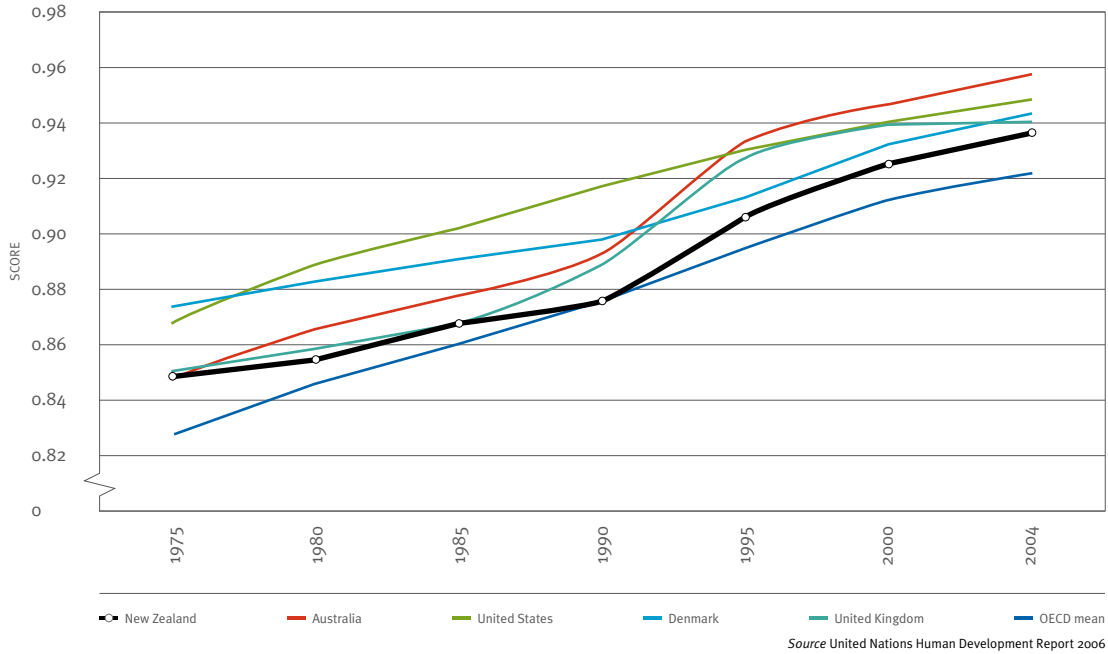
FIG. 1.9 & FIG. 1.10

New Zealanders' material standards of living are affected by our overall wealth as well as our income. Wealth not only delivers a stream of future income, but also provides a nest egg for future use and insurance against unforeseen events. Household wealth in New Zealand has grown in real terms since 1995, the biggest increase being in housing wealth (home equity). This reflects increasing house prices over the period and also a significant increase in housing investment. This is discussed in Chapter 3 in the context of broader measures of investment and New Zealanders' levels of saving.

The distribution of wealth and income is also an important factor in overall well-being. Although wealth has been on the increase, and GDP per capita growth has been above the OECD average, the data suggests that this has not been spread equally among households. New Zealand's income inequality increased between the mid-1980s and mid-1990s, and although this increase has since reversed a little, in 2000 we had a higher degree of income inequality than the OECD average, and countries such as Denmark, Australia and the UK.

12. When comparing the relative growth performance of countries, there is no ideal time horizon over which to calculate an average growth rate. If it is calculated for a short time period, GDP per capita growth rates are likely to fluctuate considerably owing to business cycle effects. If the average growth rate is calculated over a long time period, significant changes in economic performance may not be obvious for some time. We have chosen a five-year average growth rate to compare New Zealand with other OECD countries.

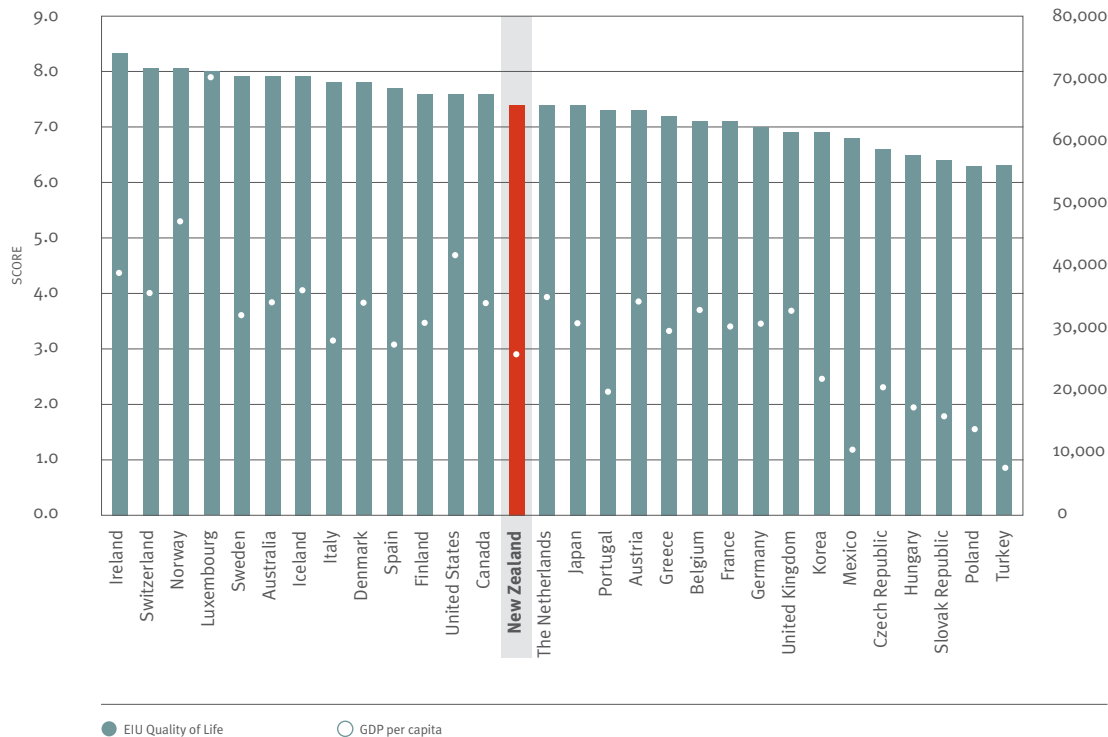
FIG. 1.1 Score in the UN's Human Development Index, 2004



1.1 Quality of Life

New Zealand's quality of life, as measured by the UNHDI, has been improving steadily in recent decades and is higher than the OECD average. New Zealand lies in 20th place out of 177 countries and is 20th in the OECD.

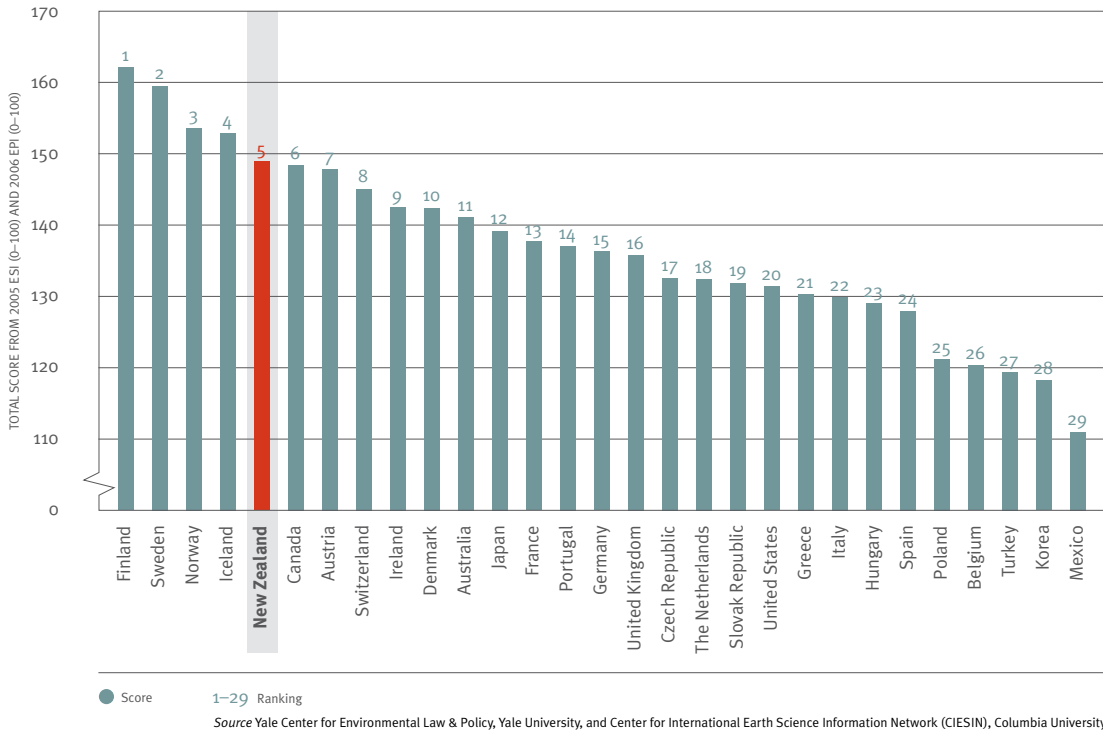
FIG. 1.2 Economist Intelligence Unit's quality of life index, 2005 (score on a scale from 1 to 10) and GDP per capita, 2005



New Zealand's quality of life also ranks highly under the Economist Intelligence Unit's quality of life index, where we are 14th in the OECD.

New Zealand ranks 9th in the OECD in an index based on our past environmental performance and future challenges, but 1st in an index based around current outcomes. This gives us an overall ranking of 5th when these scores are averaged. These indicators suggest that while New Zealand faces long-term sustainability challenges, it is managing its present circumstances well.

FIG. 1.3 Environmental Performance Index, 2006 and Environmental Sustainability Index, 2005

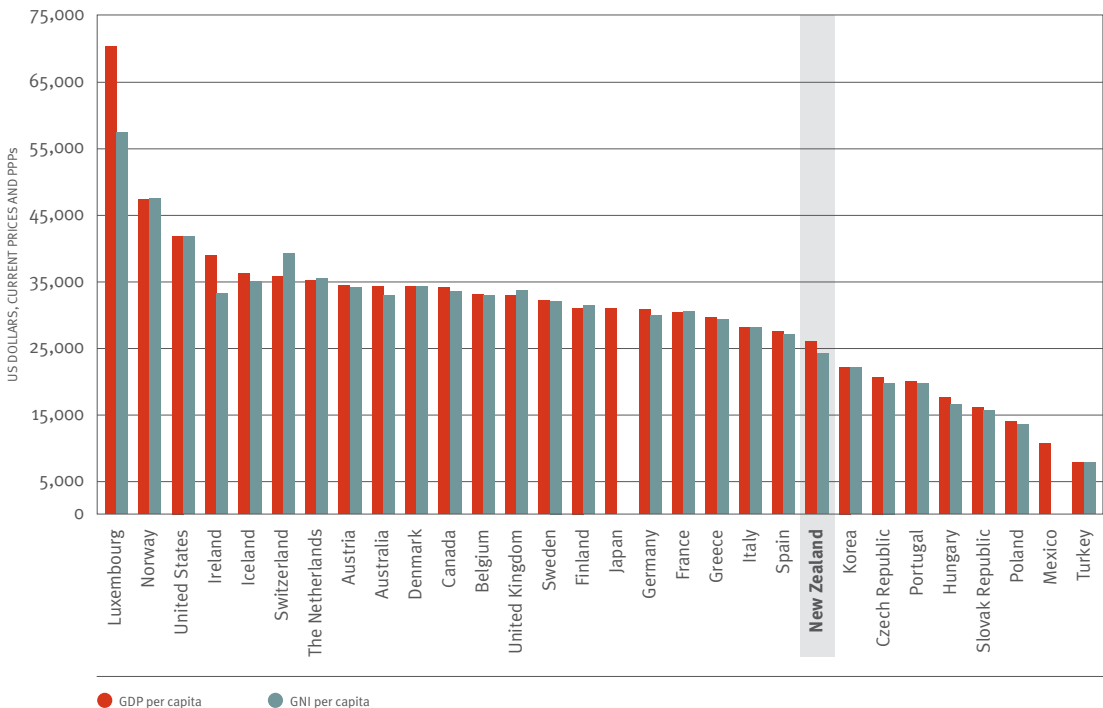


Source Yale Center for Environmental Law & Policy, Yale University, and Center for International Earth Science Information Network (CIESIN), Columbia University

1.2 Income and Production

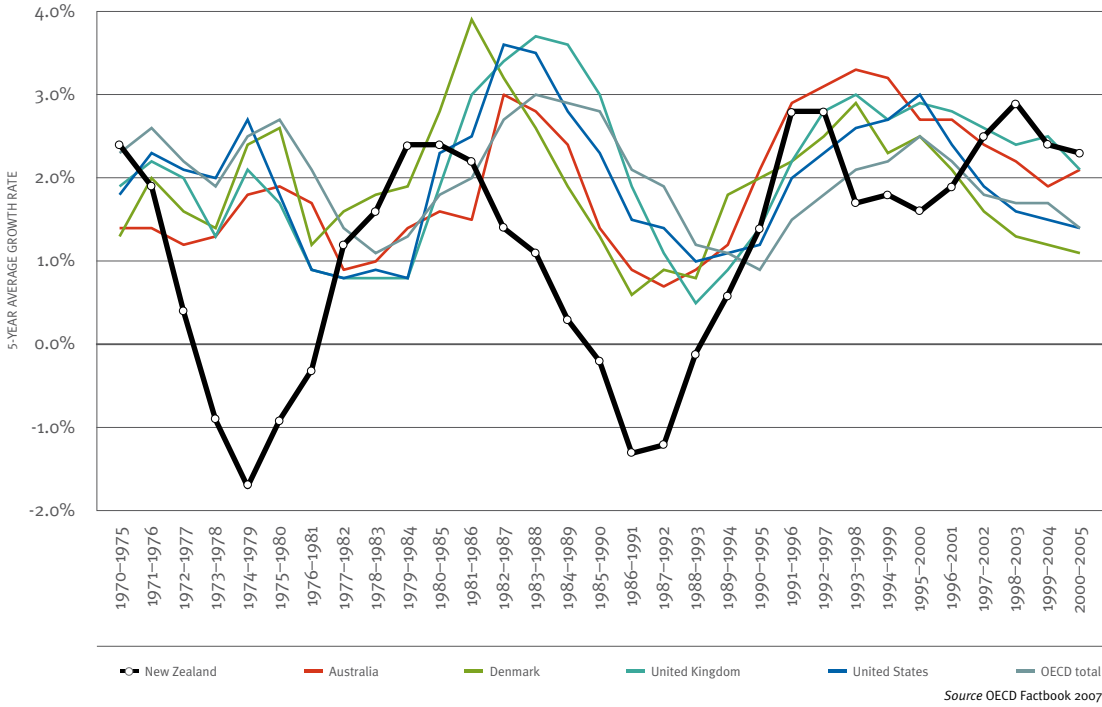
New Zealand occupies the same position in the OECD rankings (22nd) in terms of both GNI per capita and GDP per capita. New Zealand's GNI per capita is around 7 per cent below our GDP per capita, reflecting that income accruing to foreign investments in New Zealand substantially exceeds that of our own overseas investment.

FIG. 1.4 Real GDP and real GNI per capita, 2005 (US dollars, current prices and PPPs)



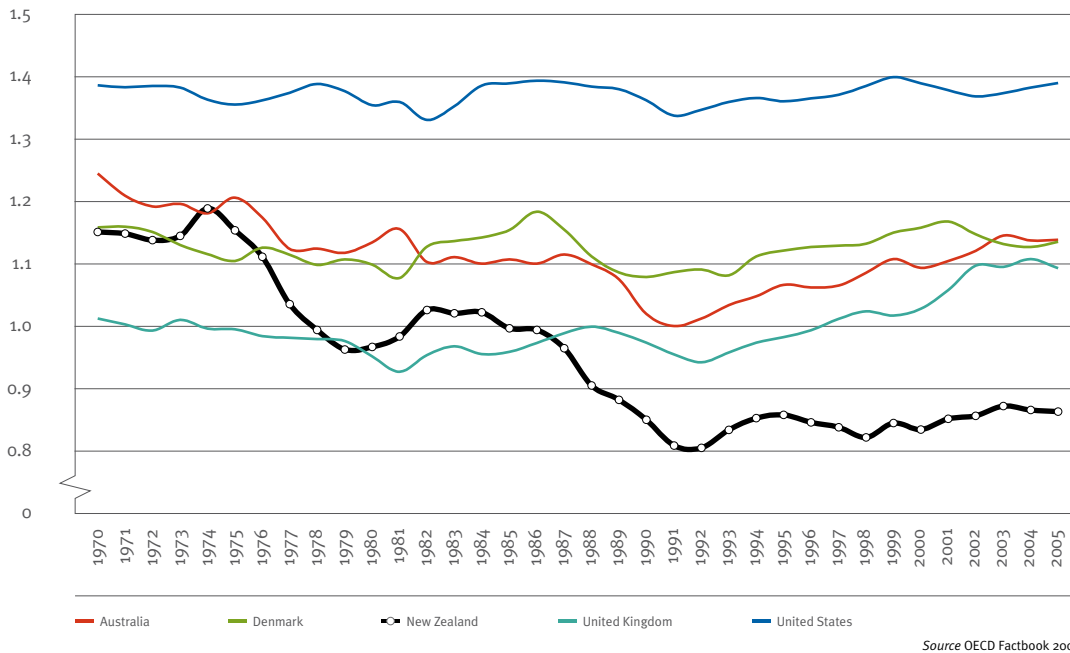
Source OECD Factbook 2007

FIG. 1.5 Real GDP per capita growth



New Zealand's five-year average annual growth in GDP per capita was mostly lower, and more volatile, than the OECD average in the 1970s and 1980s. However, it has mostly been higher than the OECD since around 2003 and now broadly matches the rates of the benchmark economies.

FIG. 1.6 Real GDP per capita as a proportion of the OECD average<sup>13</sup>

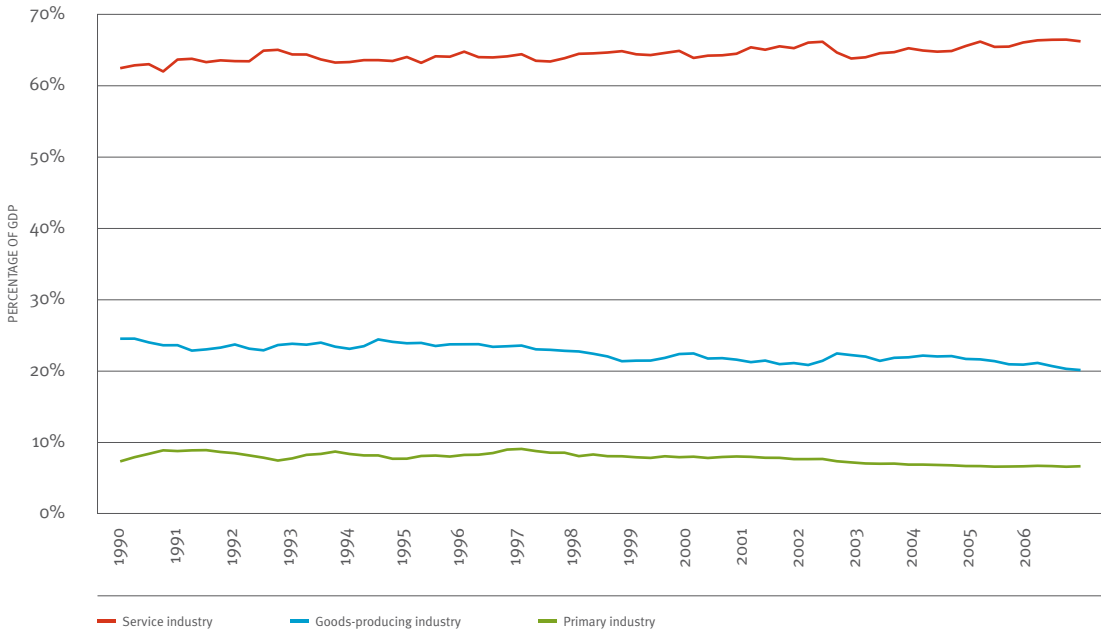


New Zealand's GDP per capita expressed as a proportion of the OECD average fell steadily until the early 1990s. It has improved somewhat since then, but remains lower than that of the benchmark economies.

13. This graph and the preceding graphs may understate New Zealand's relative performance. As a result of statistical revisions, euro area GDP levels were revised upward by 1.2 per cent on average. Revisions to GDP growth and nominal GDP have been very pronounced for Spain and The Netherlands, mainly as a result of improved source data. For Greece in particular, GDP has been revised by some 26 per cent for 2000-2005.

There has been little change in the broad sectoral composition of the New Zealand economy. New Zealand has a high share of its economy devoted to the service industry. Primary sector output is only a small proportion of GDP.

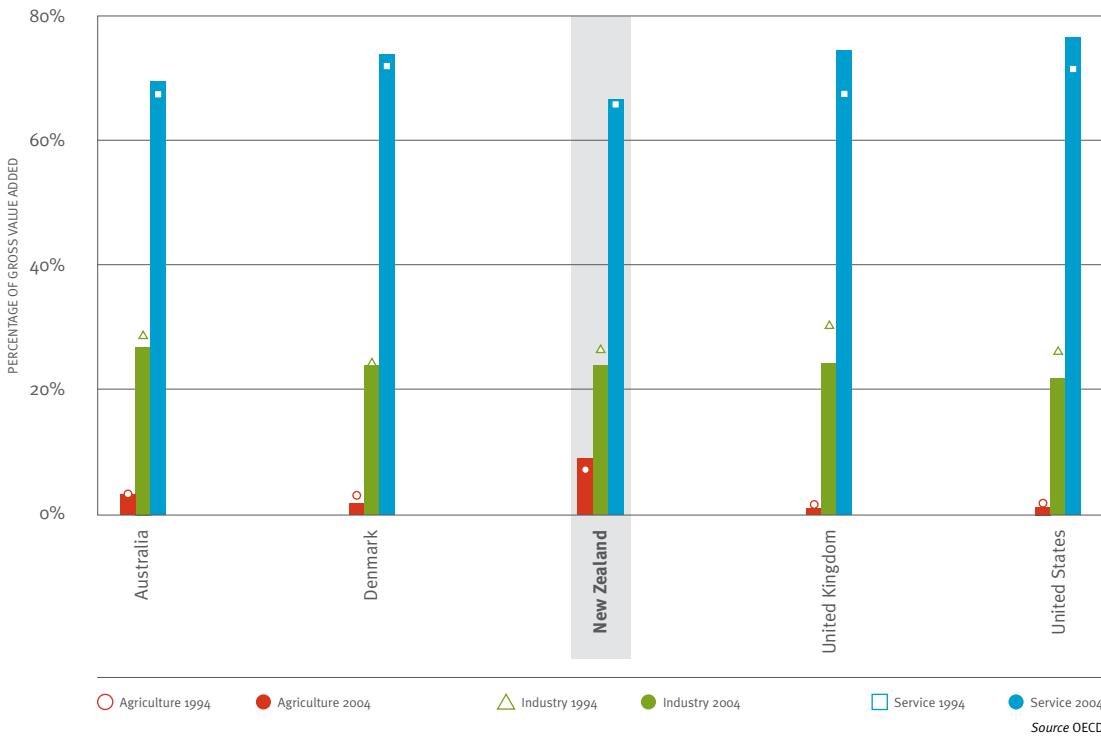
FIG. 1.7 Sectoral decomposition of New Zealand GDP



Source Statistics New Zealand

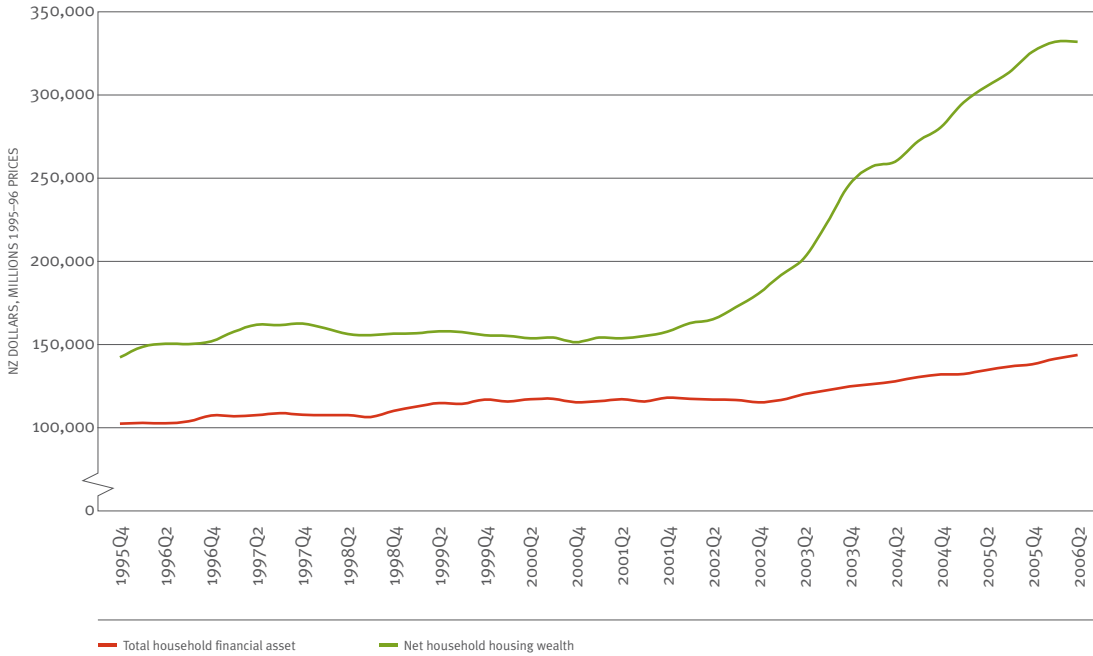
New Zealand has a larger percentage of gross value added from agriculture than other comparator countries, and is the only economy in the sample with an increasing percentage from this sector. For all countries, there has been an increase in gross value added from the service sector and a decrease in gross value added from industry.

FIG. 1.8 Sectoral contributions to gross value added – New Zealand and comparator countries



Source OECD

FIG. 1.9 A decomposition of household wealth

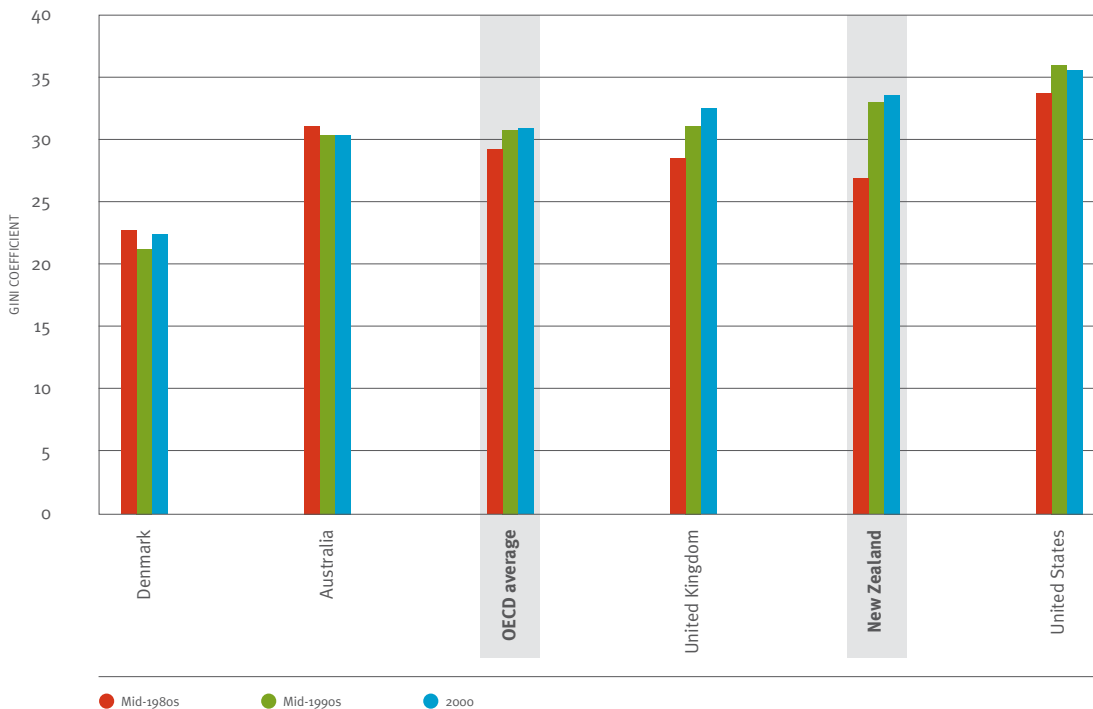


### 1.3 Household Wealth and Income Distribution

Real household wealth has increased strongly, especially over the past six years. The biggest rise has been in the housing (home equity) sector, reflecting both increasing house prices and a rise in housing investment. Total real household financial assets have increased slowly and steadily over the decade.

Source Statistics New Zealand

FIG. 1.10 Disposable income inequality (measured by Gini coefficients)



New Zealand's levels of income inequality, as measured by the Gini coefficient, increased from the mid 1980s to the mid 1990s. Since then it has been relatively stable, but in 2000 it was still higher than the OECD average. The 2004 Gini coefficient for New Zealand has shown a slight decrease since 2000.<sup>14</sup> Comparable 2004 figures for other countries are not available. The Gini coefficient is a common measure of income inequality, with a score of zero indicating perfect equality, and a score of 100 indicating perfect inequality.<sup>15</sup>

Source OECD Factbook 2007

14. The Social Report 2007, Ministry of Social Development, Wellington.  
 15. For further analysis of income inequality in New Zealand, see D. Hyslop and S. Yahanpath (2005) *Income Growth and Earnings Variations in New Zealand, 1998–2004*, New Zealand Treasury Working Paper, Wellington.

## CHAPTER

## 2

# Immediate Drivers of Income Growth

## Key Points

- Improvements in material living standards (GDP per capita) can be attributed to increases in either labour utilisation or labour productivity (total income generated per hour worked). New Zealand has a relatively high labour utilisation rate compared with its OECD counterparts, but a relatively low labour productivity.
- Given the limits to improving labour utilisation further, future improvements in material standards must come primarily from labour productivity growth.
- The measured growth rate in labour productivity for the whole economy has been at or below the level in benchmark countries since 1980.
- This measure includes sectors where it is difficult to measure productivity, so the rate might be misleading. In the measured sector, where more accurate measures are available, the average growth rate of labour productivity has exceeded that of Australia since 1988.
- The amount of capital available per hour worked has increased in recent years.
- The whole economy measure of multi-factor productivity (MFP) growth remains low by OECD standards, but measured sector MFP growth is similar to Australia's.

## Introduction

Improvements in material living standards can be attributed to increases in either labour utilisation (the number of paid hours worked per head of population, per year)<sup>16</sup> or labour productivity (the amount of output produced for each unit of paid work). Each of these can be further broken down: labour productivity into changes in the capital-labour ratio and MFP; labour utilisation into changes in the proportion of the total population of working age, the participation rate (the proportion of the working-age population in the labour market), the unemployment rate, and hours worked per person employed. This chapter assesses these immediate contributors to income growth for New Zealand, comparing them with past performance and with other benchmark economies.

16. A considerable amount of work in the economy – for example, a high proportion of childcare and domestic work – is unpaid. This unpaid work is not measured in indicators of labour utilisation and material living standards, although it makes an important contribution to welfare. Paid or unpaid work in the unofficial or “black” economy is also not captured in statistics on labour utilisation.

## 2.1 Labour Utilisation

FIG. 2.1 TO FIG. 2.4

Much of New Zealand's recent good economic growth reflects the rise in the labour utilisation rate, which is now one of the highest in the OECD (7th place using 2005 figures). Improvements in labour utilisation (i.e., the total number of *paid* hours worked per head) contribute directly to material living standards and can also have non-financial benefits such as better social inclusion.

Our high rate of labour utilisation results from a combination of a large share of the total population being of working age, high participation rates, low unemployment and a high average number of hours worked per person relative to other OECD countries.

New Zealand has a low proportion of its population aged 65 and over relative to the OECD average, and a larger proportion of people of working age. A high share of the population of working age means that more workers will be available for employment, and therefore – other things being equal – aggregate labour utilisation will be higher.<sup>17</sup>

Furthermore, the total labour force participation rate has increased over the past 15 years, largely due to the increase in the participation rate for females and for older age groups (i.e., 55 years upwards). The labour force participation rate measures the proportion of the population of working age that is actively “in the labour market” – that is, either working (employed) or without paid work and actively seeking work (unemployed). All other things being equal, the higher New Zealand's participation rate, the higher its aggregate labour utilisation.

In addition, the unemployment rate for New Zealand has been falling since the late 1990s. The unemployment rate is the proportion of labour market participants not currently employed. This is now at its lowest level since the 1980s (3.6 per cent in the June 2007 quarter) and is also one of the lowest in the OECD.

While labour utilisation has a direct influence on economic growth in New Zealand, economic growth can itself affect labour utilisation rates. In prosperous times, people are likely to find it easier to get jobs, and wages also tend to rise, attracting more people into the workforce. Given the limits to further improving labour utilisation, future improvements in material standards must come primarily from labour productivity growth.

## 2.2 Labour Productivity

FIG. 2.1 & FIG. 2.5 TO FIG. 2.10

### Whole economy

Labour productivity is a measure of how effectively labour is being used as a production input in the economy, or how much real output (goods and services) is produced per hour worked.

New Zealand's level of aggregate labour productivity is at the lower end of the OECD range (22nd place using 2005 figures). Likewise, New Zealand's five-year average annual growth rate of gross domestic product (GDP) per hour worked has been moderate relative to other OECD countries.

MFP measures the amount of output produced in relation to inputs of both capital and labour. A change in MFP therefore reflects the change in output that cannot be accounted for by increases in inputs of labour and capital.<sup>18</sup> It captures a range of other factors that may cause output to increase, such as skills (including management capability), technology, workplace organisation and culture, and economies of scale. New Zealand's average annual MFP growth has remained low but stable relative to OECD comparator countries. Consequently, issues around innovation, technology and skills are the focus of a range of government policies.

### Measured sector

The figures discussed above take into account labour productivity across the entire economy. However, it is very difficult to measure productivity in some sectors. For instance, there are no precise output measures in government non-market industries, where services such as defence, health and education are provided free or at nominal charges. For this reason, New Zealand and Australian statistical agencies report labour productivity in the “measured sector”<sup>19</sup> of the economy, which can provide a more accurate comparative picture of the two economies' productivity growth rates.

On average in the measured sector, labour productivity has grown slightly faster in New Zealand than in Australia since 1989 (although growth has slowed somewhat since 2001). This is different from the picture across the whole economy (Figure 2.5). Specifically, since on the whole economy measure, Australia has performed as well as the OECD, it raises questions about whether New Zealand's whole-of-economy performance has matched the OECD also.

17. Note that 21 per cent of the population is under 15 years old and therefore also not of working age.

18. For more information, see Lipsey R., K. Carlaw and C. Bekar, *Economic Transformations: General Purpose Technologies and Long-term Economic Growth*, 2005, Oxford University Press.

19. The measured sector includes Australia and New Zealand Standard Industrial Classification (ANZSIC) divisions A to K and P. This comprises: agriculture, forestry and fishing; mining; manufacturing; electricity, gas and water supply; construction; wholesale and retail trade; accommodation, cafés and restaurants; transport and storage; communication services; finance and insurance; and cultural and recreational services.

Likewise, measured sector MFP has grown faster than Australia's since 1988.

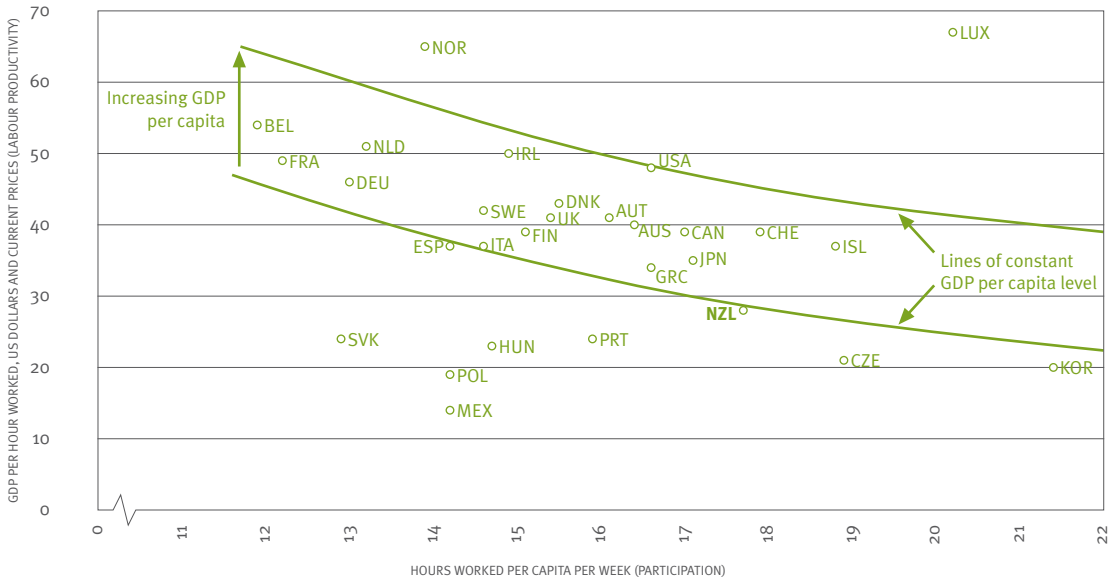
Labour productivity growth in New Zealand has not been the same across all parts of the measured sector. Significant improvements have come from: electricity, gas and water supply; finance and insurance; transport and storage; and communication services. However, inconsistencies prevent the inclusion of other important sectors, such as agriculture, in this data.

The amount of physical capital in an economy is an important influence on economic growth. Increasing the amount of capital directly influences labour productivity by increasing the quality and quantity of machinery, equipment and infrastructure available to each worker. New Zealand's capital-labour ratio is low by OECD standards<sup>20</sup> and New Zealand workers do not appear to have had as much physical capital to work with as workers in Australia. However, New Zealand's capital-labour ratio has been trending up since the late 1980s, with the rate of growth increasing since 2003. This indicates an increase in the use of capital in production processes and the chance to reap economic growth benefits in future.

20. For further reading, see Hall, J. and G. Scobie, 2005, *Capital Shallowness: A Problem for New Zealand?* New Zealand Treasury Working Paper, May 2005.

FIG. 2.1

Labour productivity and participation, 2005



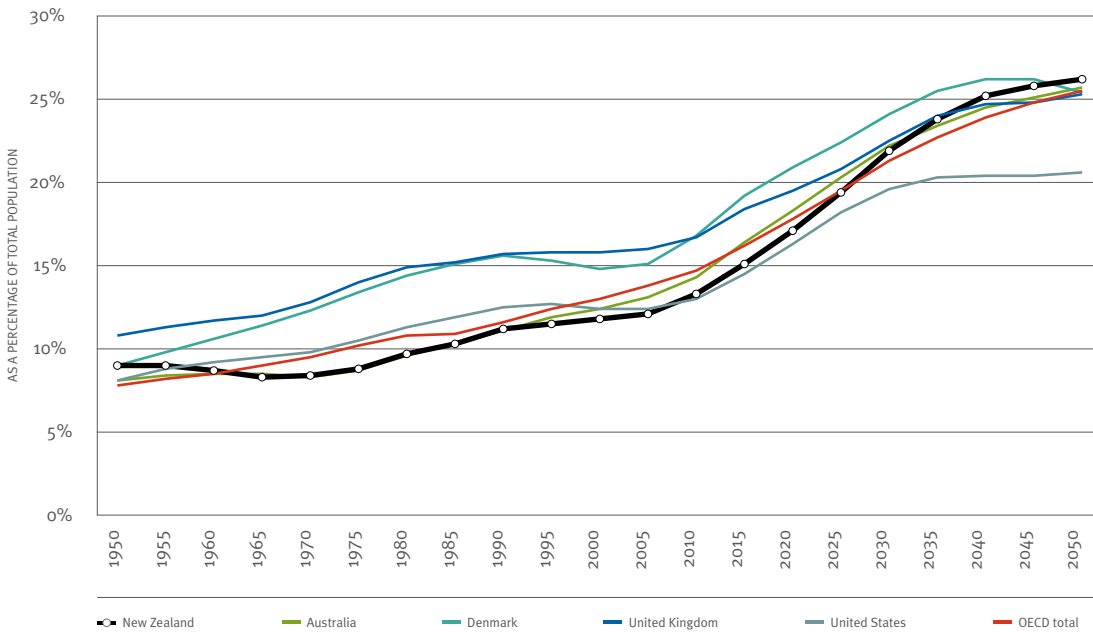
Source OECD Country Profile 2007; OECD Productivity Database

2.1 Labour Utilisation

New Zealand has achieved its current level of GDP per capita by having a high labour participation rate relative to other countries in the OECD, which offsets a relatively low level of labour productivity.

FIG. 2.2

Ratio of the population aged 65 and over to the total population (cross-country, with projections)

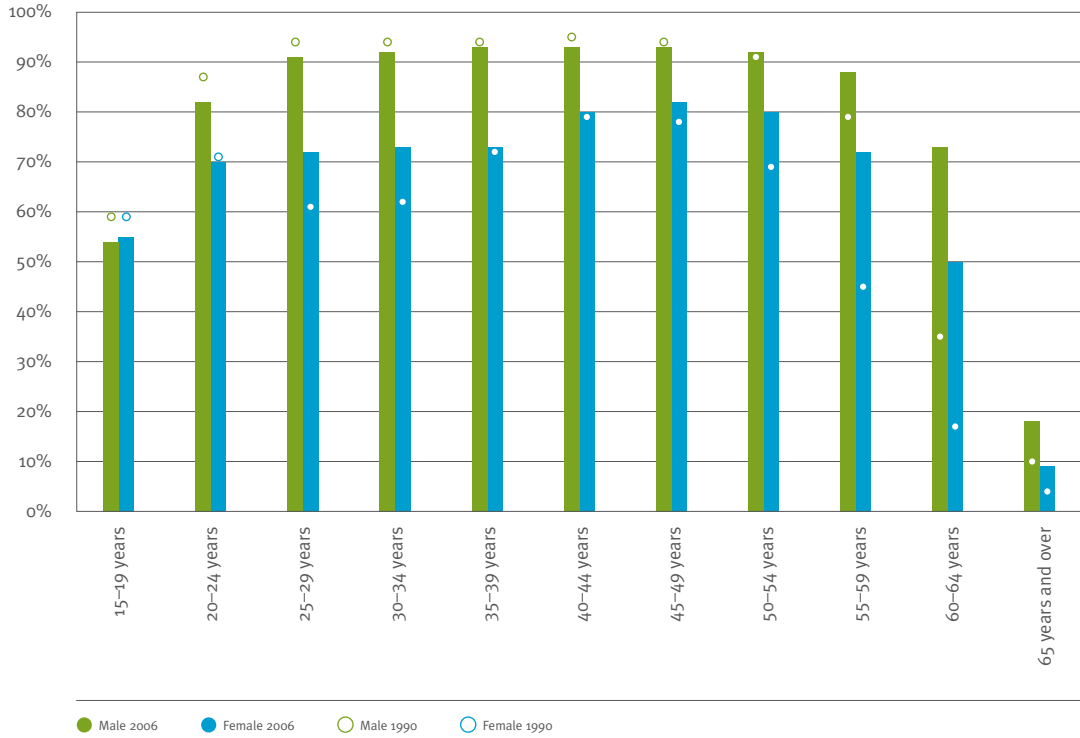


Source OECD Factbook 2007

New Zealand has a relatively small proportion of its total population aged 65 and over by OECD standards, but this is projected to increase both absolutely and relative to the OECD.

The total labour force participation rate has increased over the past 17 years, largely due to increases in the participation rate for females and for older age groups.

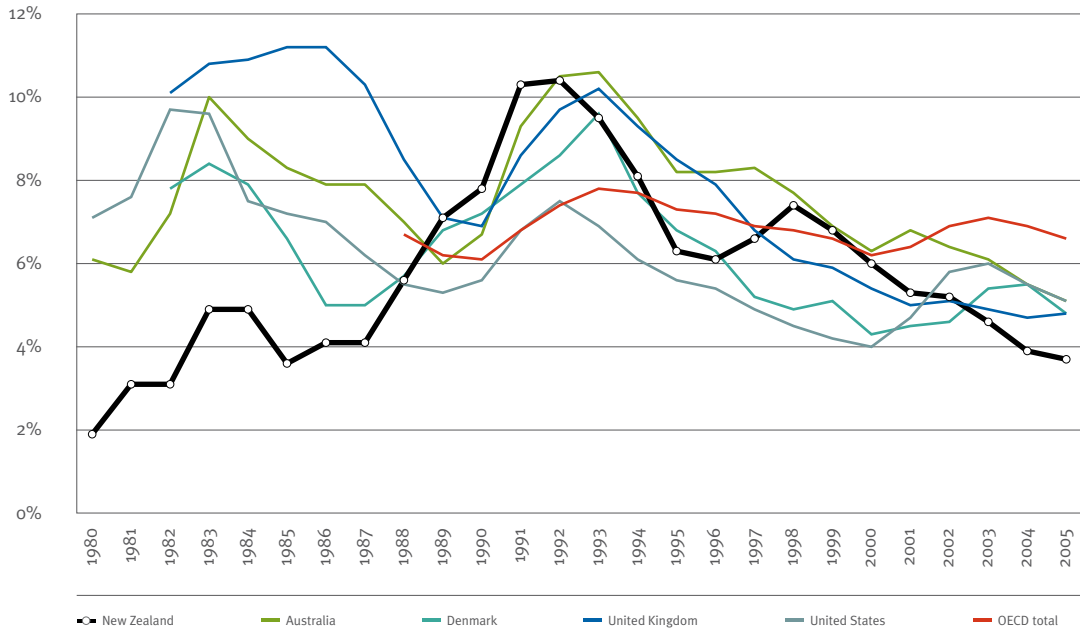
FIG. 2.3 Workforce participation rate by age group and gender for selected years



Source Statistics New Zealand

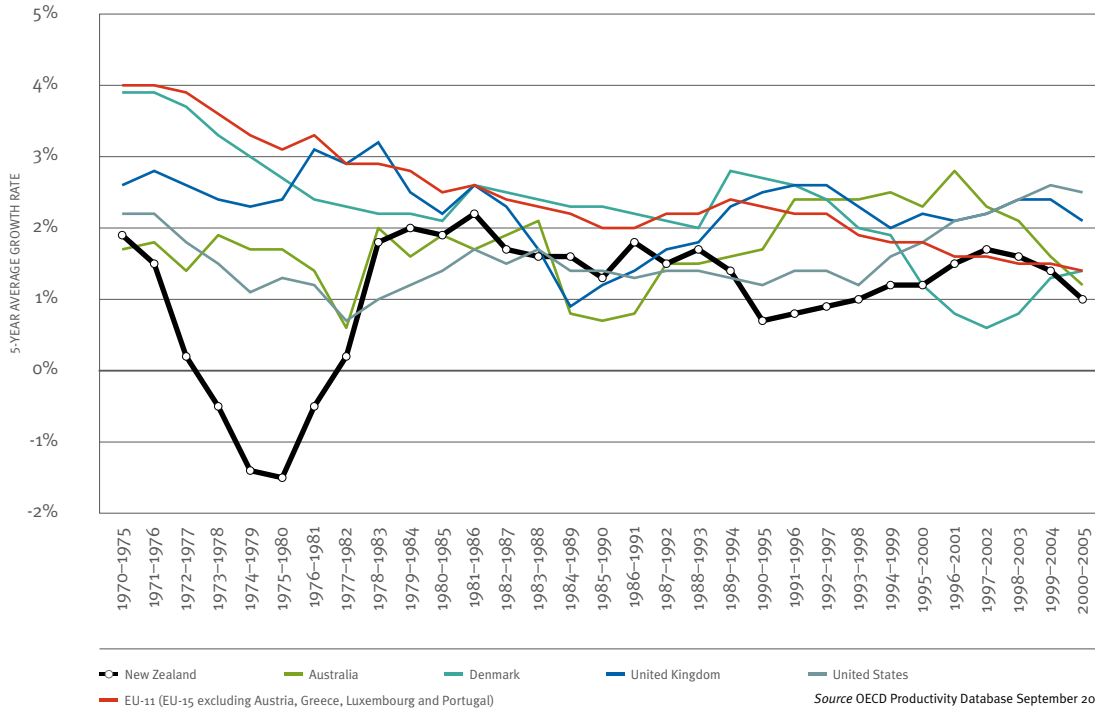
The unemployment rate for New Zealand (3.6 per cent in the June 2007 quarter) is at its lowest level in 20 years, and is one of the lowest in the OECD.

FIG. 2.4 Standardised unemployment rate (cross-country)



Source OECD Factbook 2007

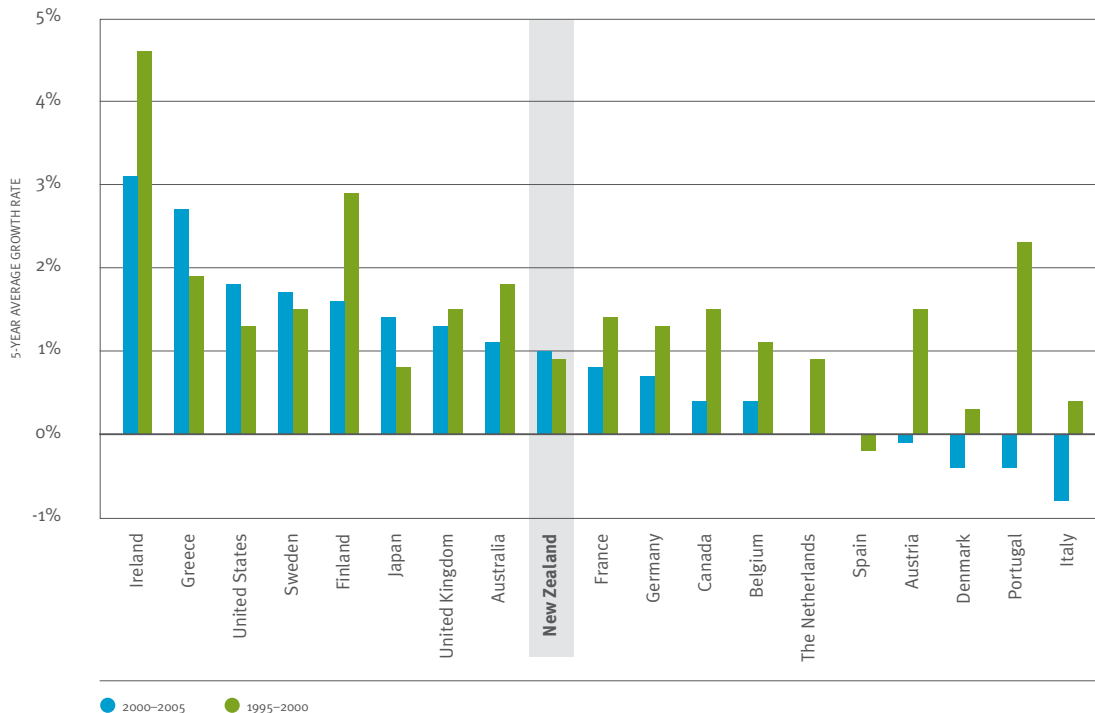
FIG. 2.5 Growth in labour productivity (cross-country)



## 2.2 Labour Productivity

New Zealand's growth in GDP per hour worked has been within the cluster of benchmark economies from the late 1970s onwards. However, New Zealand's current growth rate lies below its OECD counterparts.

FIG. 2.6 Average annual growth rate of multi-factor productivity (cross-country)

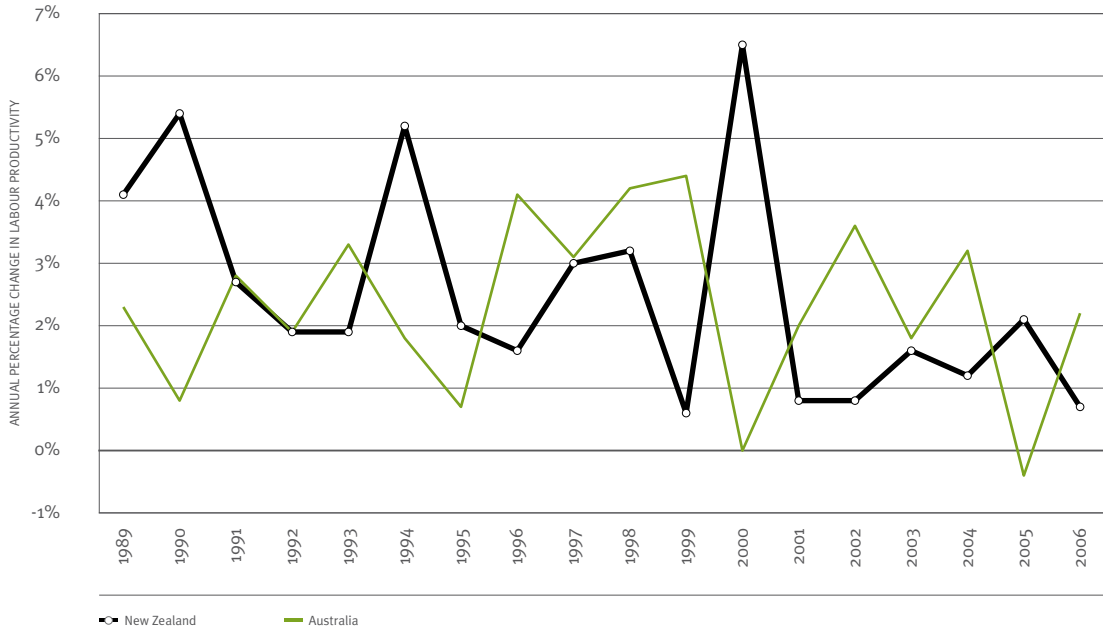


New Zealand's average annual MFP growth has remained low relative to OECD comparator countries.

Source OECD Productivity Database 2006

The annual growth rate in labour productivity in the measured sector fluctuated dramatically during the 1990s. It has been relatively stable since 2001, but hit its lowest growth rate in almost a decade in 2005–2006.

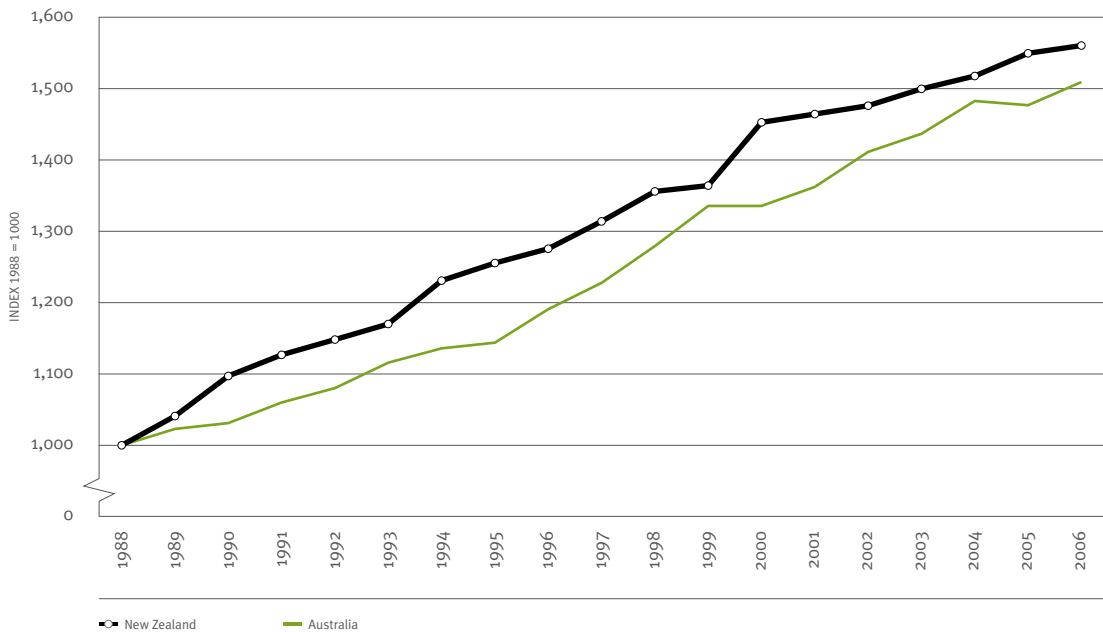
FIG. 2.7 Annual growth rate in labour productivity, measured sectors



Source Statistics New Zealand; Australian Bureau of Statistics

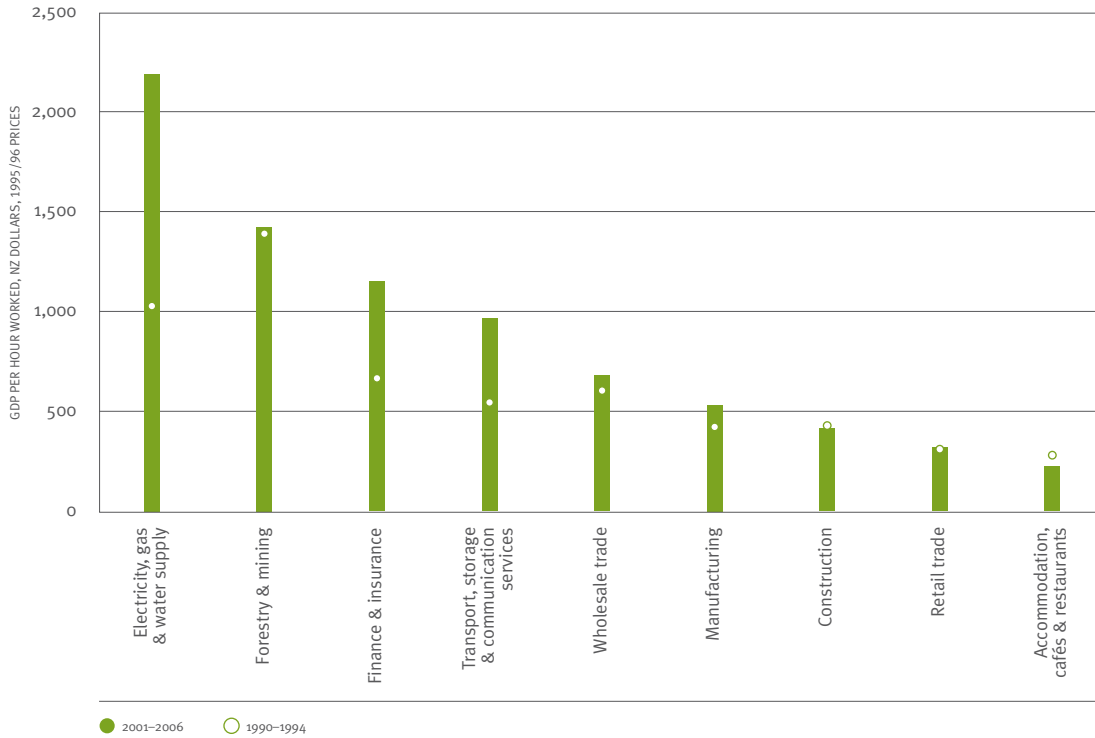
Over the past 20 years, New Zealand achieved a higher average labour productivity growth rate in the measured sector than Australia did.

FIG. 2.8 Labour productivity index, measured sectors (1988 = 1000)



Source Statistics New Zealand; Australian Bureau of Statistics

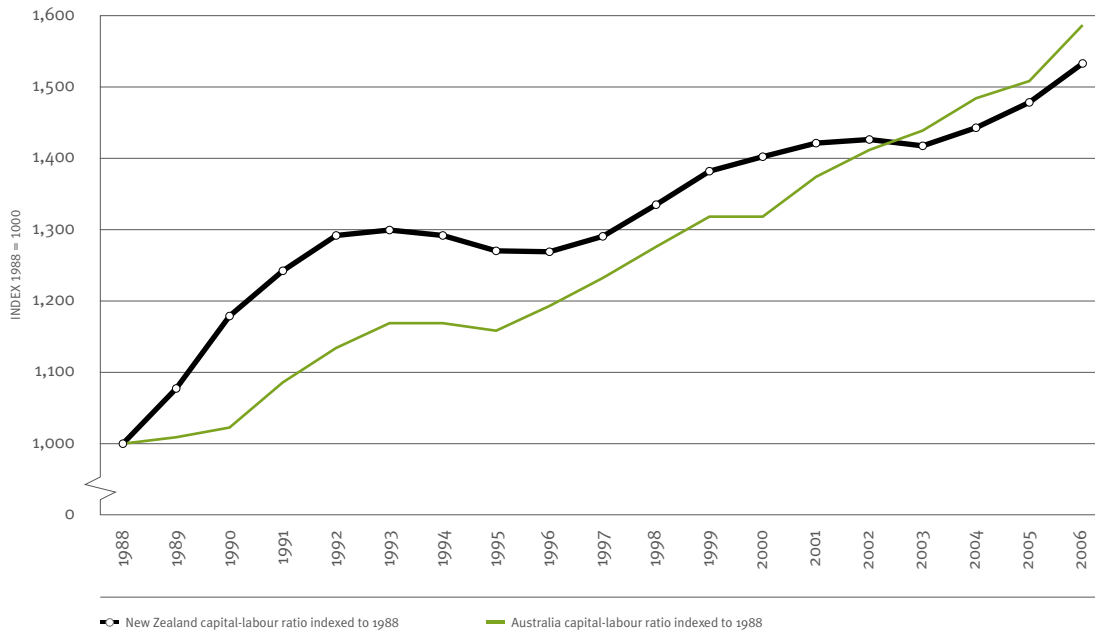
FIG. 2.9 Average annual labour productivity by sector, measured sectors



Labour productivity levels differ substantially across New Zealand's measured sectors. The biggest improvements have come from electricity, gas and water supply; finance and insurance; and transport and communication services.<sup>21</sup>

Source Statistics New Zealand

FIG. 2.10 Index of capital-labour ratio, measured sectors (1988 = 1000)



The capital-labour ratio index has trended upwards since the 1990s, and from 1988 until 2003, average growth was ahead of Australia's.

Source Statistics New Zealand; Australian Bureau of Statistics

21. Note that inconsistencies prevent the inclusion of other important sectors, such as agriculture, in this data.

## CHAPTER

## 3

# Underlying Determinants of Productivity Growth – Firm and Market Performance

## 3.1 Investment, Saving and Financial Market Development

### Key Points

- The level of New Zealand’s total fixed investment, as a percentage of gross domestic product (GDP), is around the OECD average.
- Business investment as a percentage of GDP has been around the OECD median over the last ten years.
- Plant and machinery investment, as a percentage of GDP, has been towards the top of the OECD since 1970.
- Housing investment as a percentage of GDP has been on the increase since the mid-1990s, but still falls close to the benchmark OECD economies.
- Government investment spending has increased over the past decade following a sharp decline in the mid-1980s, but still falls short of the high rates seen in the 1970s and 1980s.
- Household and national saving rates are low and have been falling more quickly in New Zealand than in benchmark economies, creating a need for overseas funds to supplement domestic savings in financing domestic investment.
- While the banking sector is very well developed, the venture capital and sharemarket are small compared with the better-performing OECD economies.

### Introduction

Economic growth is generated by high rates of labour utilisation and/or labour productivity. There are, however, a number of factors that underlie labour productivity growth. This chapter and the next examine the part some of these factors play in New Zealand’s growth performance.

### 3.1.1 Investment

FIG. 3.1 TO FIG. 3.5

Physical capital accumulation plays an important role in labour productivity growth. Investment in new capital increases the amount and quality of machinery, equipment and infrastructure available for workers to use in the production process, thus raising the capital-labour ratio and increasing labour productivity. Investment in new capital is also one way of incorporating new technology into the production process. However, investment is not an end in itself. It can only add to prosperity if it earns sufficient returns to cover its costs. This implies a need for continued attention to factors that may influence the cost of and returns to investment. For example, encouraging innovation and enterprise may increase the level of multi-factor productivity and so increase the return to investment.

New Zealand's total fixed investment as a percentage of GDP is around the OECD average, and has been growing.

Business investment as a proportion of GDP has been around the OECD median over the last ten years, but significantly less than that of Australia's.<sup>22</sup> Business investment impacts directly on labour productivity growth by increasing the amount of capital and technology available to each worker. In particular, plant and machinery investment has been above the OECD median in most years since 1970. This is important to New Zealand's growth prospects, since private sector investment in capital equipment is associated with improved firm productivity and profitability.<sup>23</sup>

As a percentage of GDP, gross housing investment has been on the increase since the mid-1990s, and now falls close to the benchmark OECD economies.

New Zealand historically had a high level of government investment as a percentage of GDP compared with the benchmark economies. However, this declined in the mid-1980s in part due to tighter fiscal constraints and a shift in the classification of activities between the public and private sectors. While it has increased over the past decade, it is far from the levels of the 1970s and 1980s.

Appropriate government investment can be important for productivity growth because it can contribute to the economy's infrastructure, and support the development of a healthy and educated population. There may also be important interactions between government investment in infrastructure and private business investment.

22. OECD Economic Outlook Number 80.

23. Fabling, R. and A. Grimes, *Practice Makes Profit: Business Practices and Firm Success*, 2006, Ministry of Economic Development Occasional Paper.

### 3.1.2 Saving

FIG. 3.6 & FIG. 3.7

New Zealand's net national saving (gross national saving minus depreciation of fixed capital) as a percentage of GDP lies below that of Australia, the UK and Denmark, as well as falling short of the OECD average. This is also reflected in household saving data, with New Zealand's households saving a low proportion of their disposable income. The negative figures since the early 1990s indicate "dis-saving", i.e., New Zealanders have been consuming more than their household income. This is likely to be associated with the increased household wealth resulting from increasing house prices. However, household dis-saving has been offset to some extent by higher government and business saving.<sup>24</sup>

### 3.1.3 Financial Market Development

FIG. 3.8 TO FIG. 3.12

In an open economy such as New Zealand's, capital is relatively mobile. If total domestic investment exceeds the amount of domestic saving, which it does in New Zealand, then the balance comes from drawing on the savings of foreigners.

However, domestic and foreign savings are not perfect substitutes, and factors such as distance, language differences and regulatory differences can affect the type and amount of capital flow from overseas. In particular, small and start-up companies, and companies with limited collateral, can be disadvantaged if there is a less-developed domestic capital market.

Apart from retained earnings or profits, firms can access investment capital from a number of other sources: banks, the sharemarket, the venture capital market, or informal capital markets (i.e., borrowing from friends and family or from angel investors). Consequently, improving financial development in all these markets (as proxied by indicators based on size, activity and efficiency) can stimulate economic growth.

The overall efficiency of the New Zealand financial system can be measured by a capital access index. The Milken Institute's Capital Access Index evaluates the ability of new and existing businesses to access capital in countries around the world. New Zealand ranks 14th out of 121 countries and 12th in terms of OECD economies, suggesting that, while New Zealand is not as financially developed as countries such as the UK, the US, Denmark or Australia, it is still above the middle of the OECD pack.

24. More information on saving in New Zealand can be found in various Treasury reports, working papers and policy perspective papers available on the Treasury website: <http://www.treasury.govt.nz>.

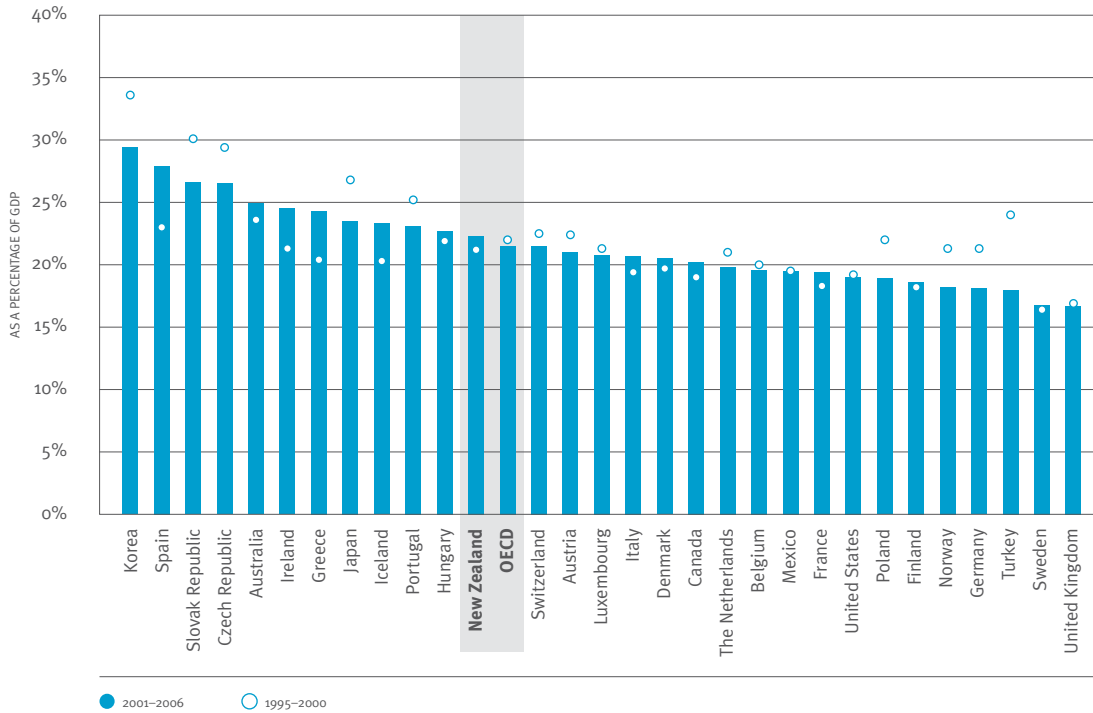
Sharemarket development can be approximated by the level and growth of market capitalisation as a percentage of GDP. New Zealand's sharemarket capitalisation is smaller than for comparator countries and is not growing. Similarly, the size of the venture capital market in New Zealand – a relatively small but important source of finance for smaller companies – sits at the lower end of the OECD range.

Good availability of bank credit and informal capital can partially but not completely substitute for underdeveloped equity markets. The data suggests that bank credit is an important source of external finance for firms in New Zealand, as reflected in the size of the banking sector relative to the sharemarket. The size of the banking sector can be measured by its bank assets as a proportion of GDP. The relative size of New Zealand's banking sector has been growing since the 1990s to become greater than that of the US and Australia.

Informal investment also appears to be an important source of funds for new firms in New Zealand. OECD countries with a strong economic performance tend not to rely on informal investment. Although measurement is uncertain, the informal investment market is larger here than the formal venture capital industry.

The presence of a strong banking sector and informal sources of capital benefits New Zealand's overall performance. However, traditionally important sources of capital like the sharemarket are underdeveloped in New Zealand by OECD standards.

FIG. 3.1 Total fixed investment as a percentage of GDP

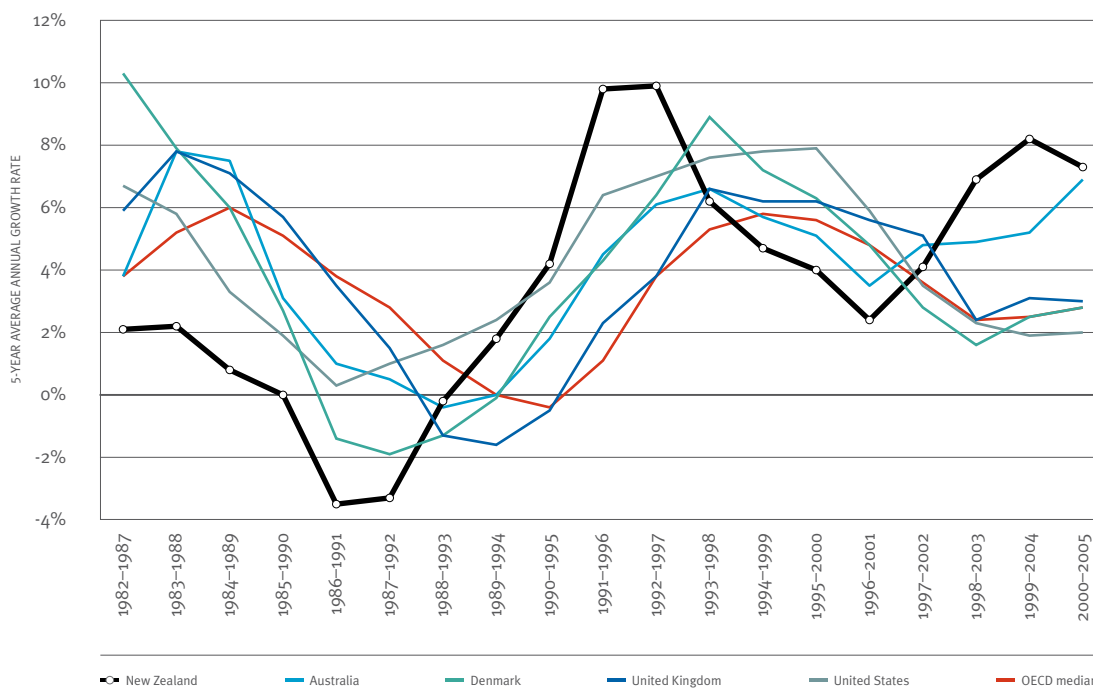


### 3.1.1 Investment

The level of New Zealand's total fixed investment as a percentage of GDP has increased from an average of 21.2 per cent in 1995–2000 to 22.3 per cent in 2001–2006. This is similar to other high-income economies and just above the OECD median.

Source OECD Economic Outlook No 80

FIG. 3.2 Five-year average annual growth rate of real total fixed investment

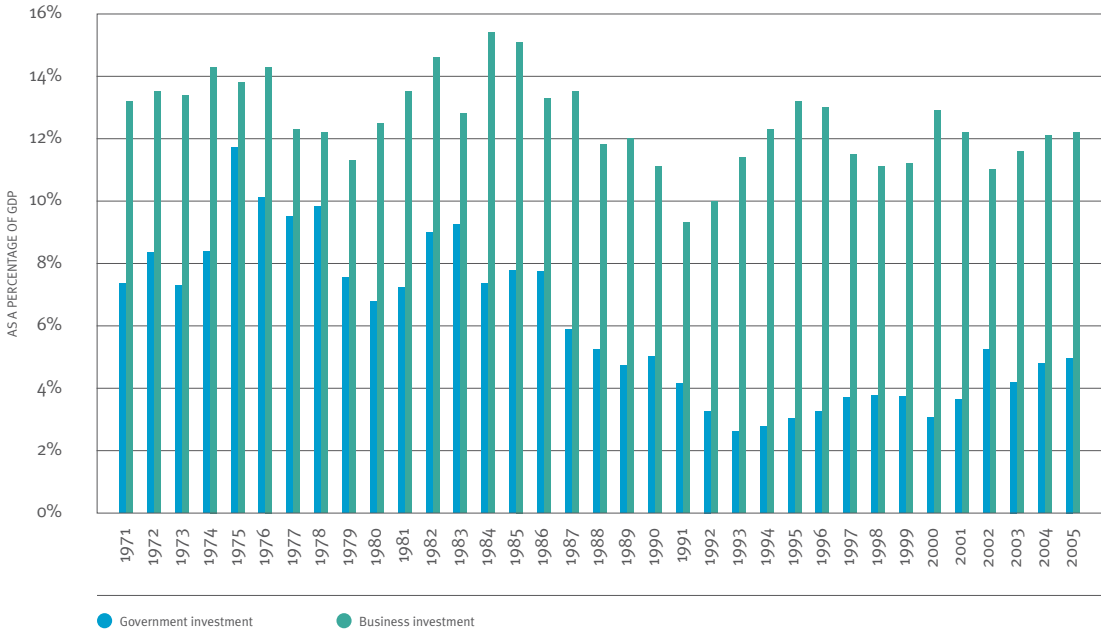


New Zealand's investment growth rate lagged behind comparator countries through to the mid-1990s. Since then, it has been close to benchmark economies.

Source OECD Economic Outlook No 80

FIG. 3.3 Investment as a percentage of nominal GDP

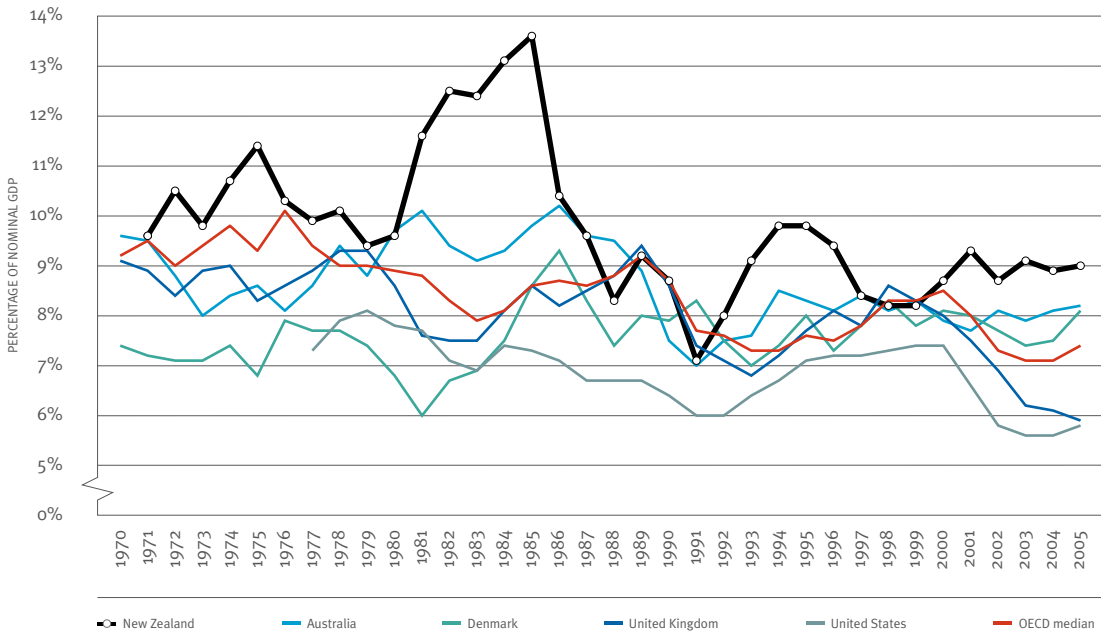
Business investment has risen since 1990 after falling as a percentage of GDP through the 1980s. Government investment was high in New Zealand through to the mid-1980s. It declined after that, in part due to tighter fiscal constraints and a shift in the classification of activities between the public and private sectors, but has since risen significantly.



Source OECD Economic Outlook No 80

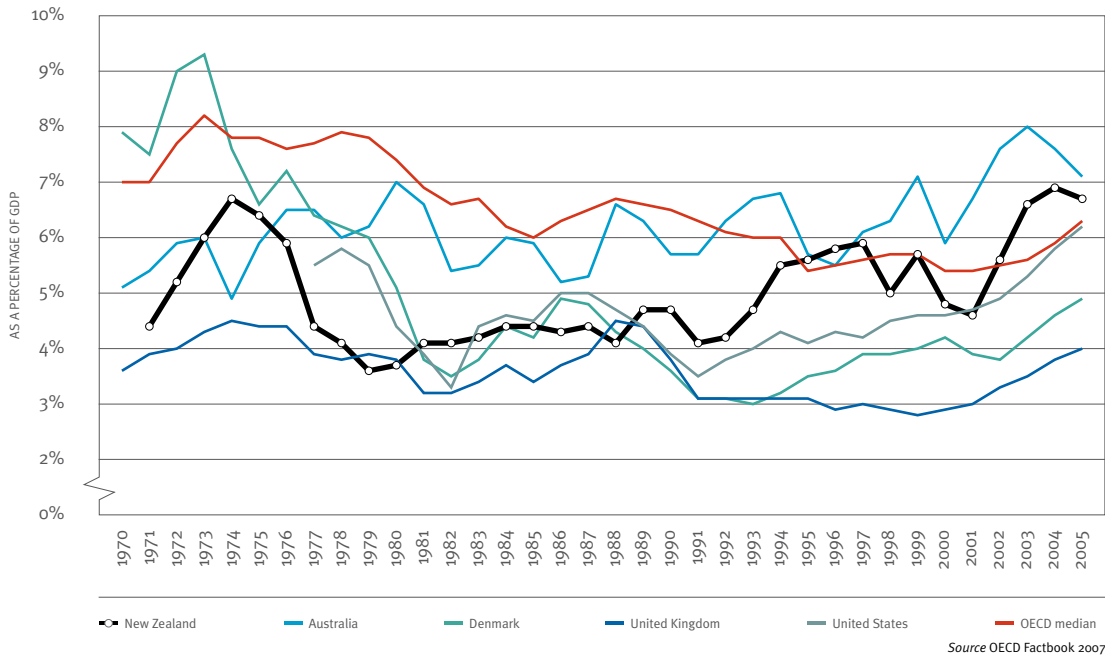
FIG. 3.4 Plant and machinery investment (current prices) as a percentage of nominal GDP

New Zealand's investment in plant and machinery as a percentage of GDP now exceeds that of all other benchmark countries. Plant and machinery investment contributes to labour productivity.



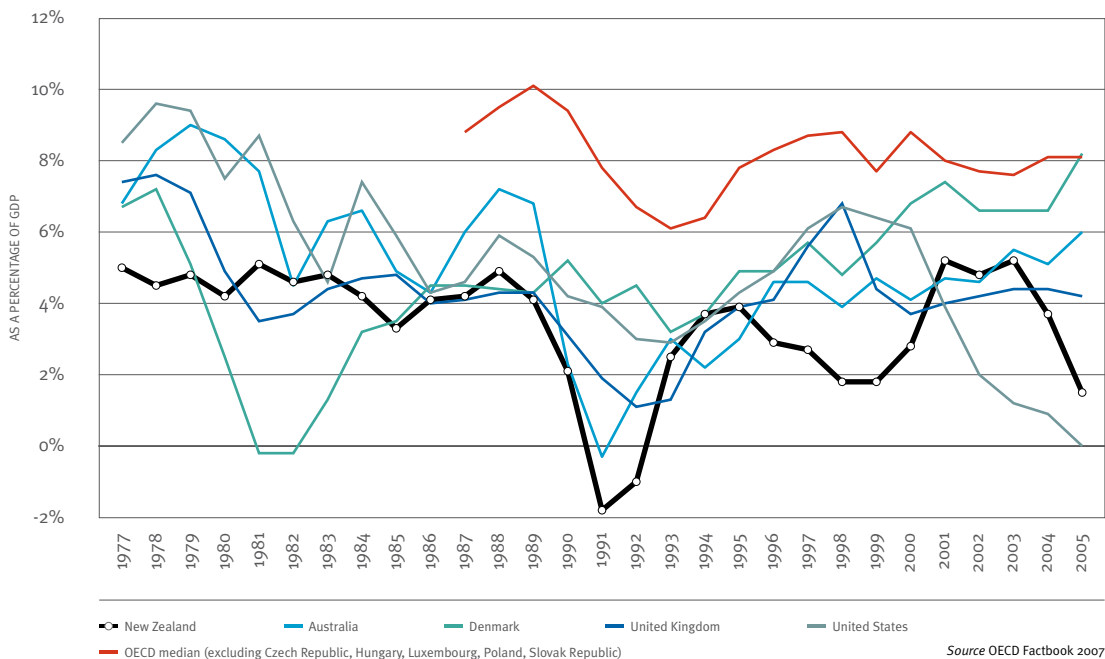
Source OECD Economic Outlook No 80

FIG. 3.5 Housing investment as a percentage of GDP



There has been an increase in housing investment as a percentage of GDP in New Zealand since the mid-1990s. However, it still falls within the OECD pack and close to the benchmark economies.

FIG. 3.6 Net national saving as a percentage of GDP

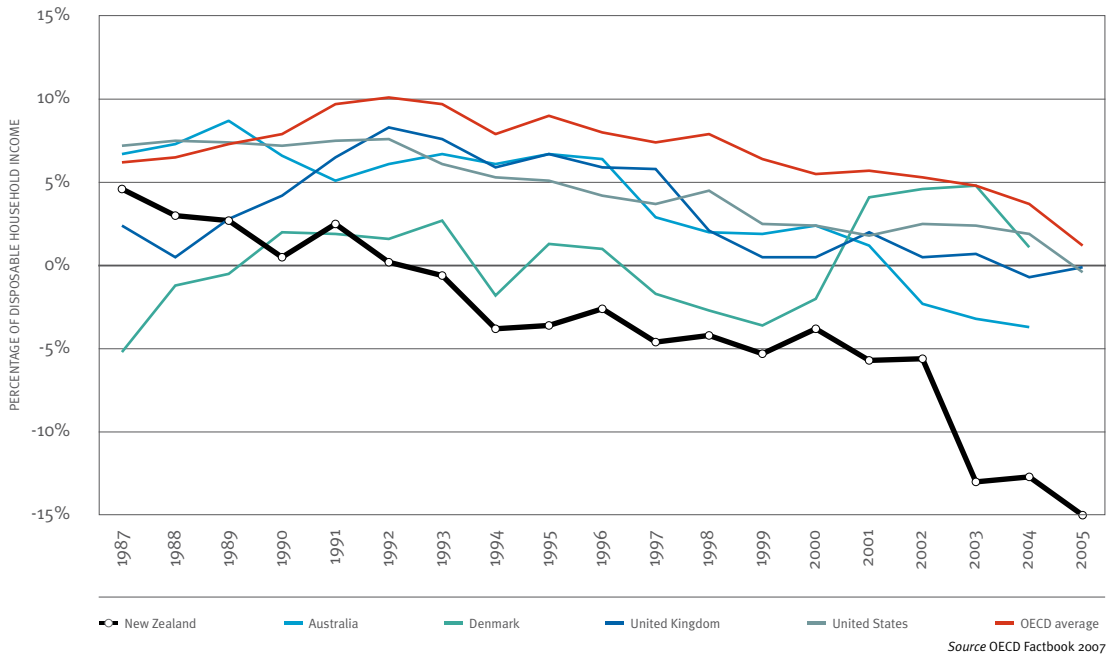


### 3.1.2 Saving

New Zealand's net national saving (gross national saving minus depreciation of fixed capital) as a percentage of GDP has fallen since 2003 and lies below all of the benchmark economies with the exception of the US.

FIG. 3.7 Household net saving as a percentage of disposable household income

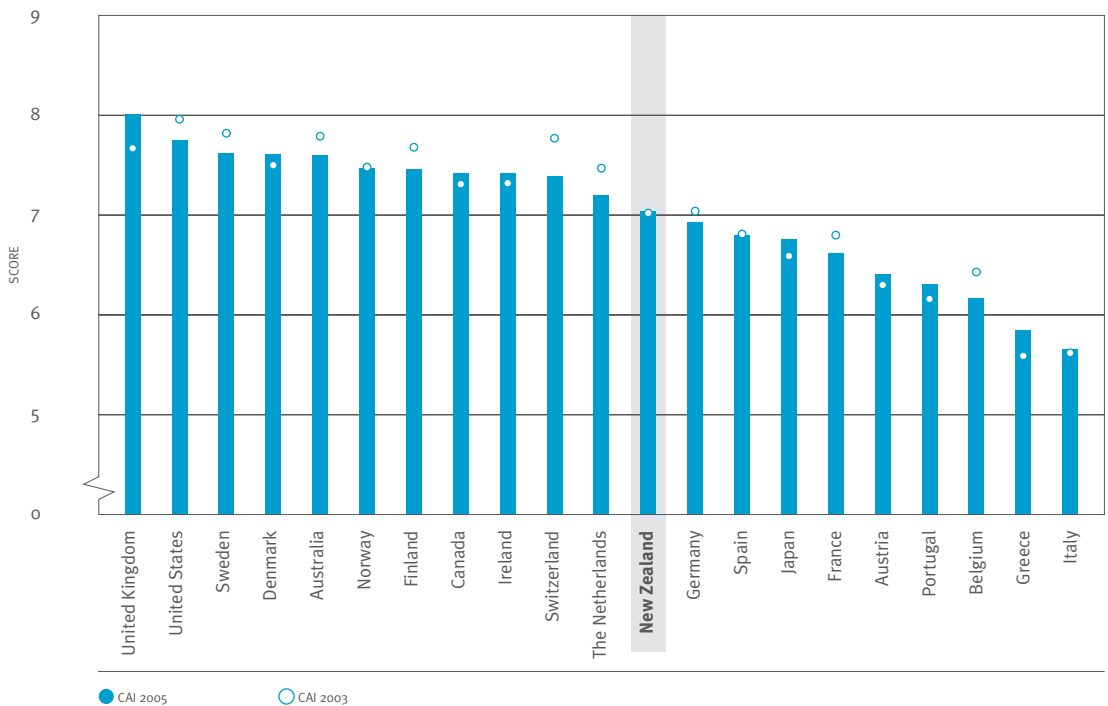
Historically, New Zealand's households have saved a low proportion of their disposable income. The negative figures since the early 1990s indicate "dis-saving" (i.e., household consumption has been higher than income). Since 2000, the saving rate has fallen more quickly in New Zealand than for benchmark economies.<sup>25</sup>



### 3.1.3 Financial Market Development

FIG. 3.8 Capital Access Index

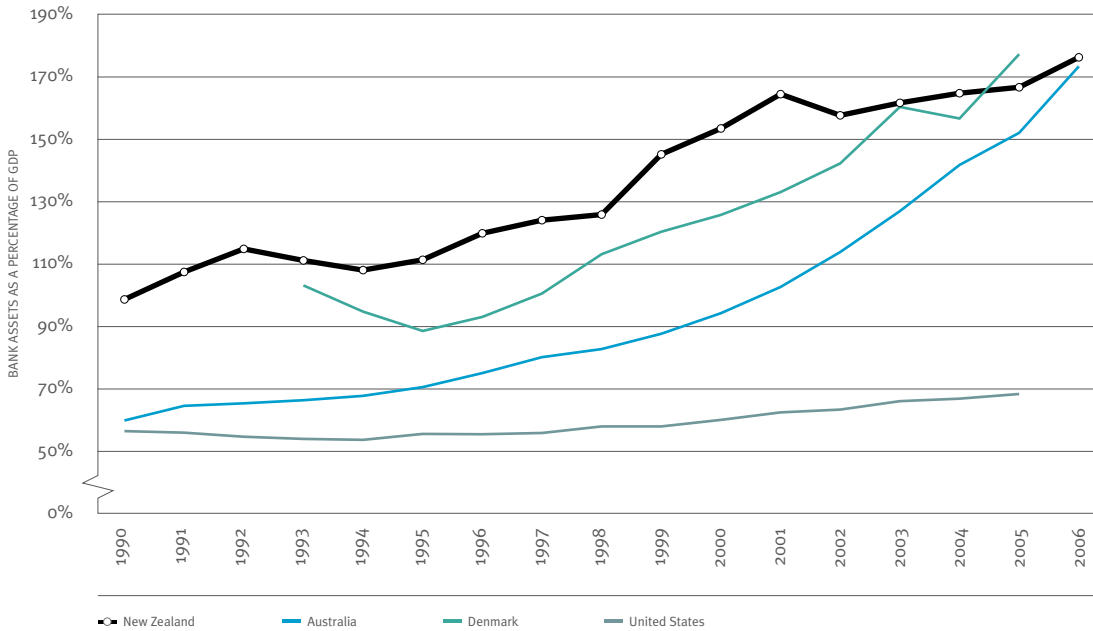
The Milken Institute's Capital Access Index evaluates the ability of new and existing businesses to access capital in countries around the world. It incorporates 56 quantitative and qualitative variables from multiple data sources. New Zealand ranks 14th out of 121 countries and 12th in the OECD.



Source Milken Institute, Capital Studies, 2005 Capital Access Index, October 2005

25. These household savings rates exclude capital gains, which have been substantial. In addition, a recent study by the Reserve Bank of New Zealand (Hodgetts et al, *Household Savings and Wealth*, 2006) indicated that the strong negativity of the official savings rate in New Zealand may be overstated, although the long-term downward trend remains accurate.

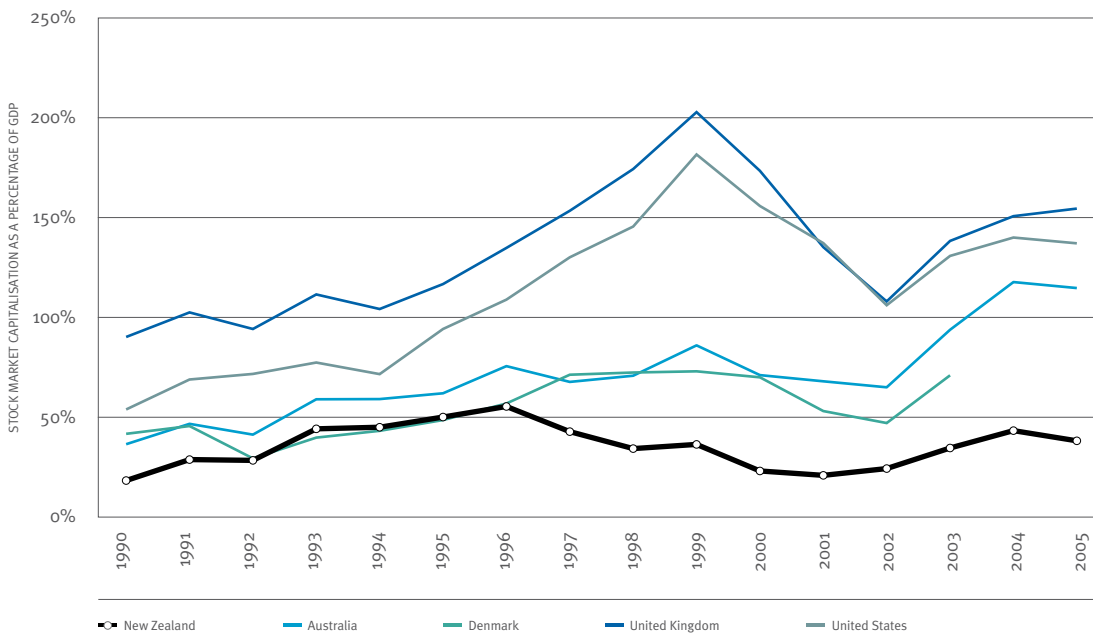
FIG. 3.9 Size of banking sector (measured by bank assets)



The size of New Zealand's banking sector, measured by its bank assets as a proportion of GDP, has been growing since the 1990s and is greater than that of the US or Australia.<sup>26</sup>

Source OECD Factbook 2007; Denmark National Bank; Reserve Bank of Australia; Reserve Bank of New Zealand; The Federal Reserve Board

FIG. 3.10 Size of sharemarket



New Zealand's sharemarket capitalisation, measured by market capitalisation as a percentage of GDP, is smaller than for comparator countries and is not growing.

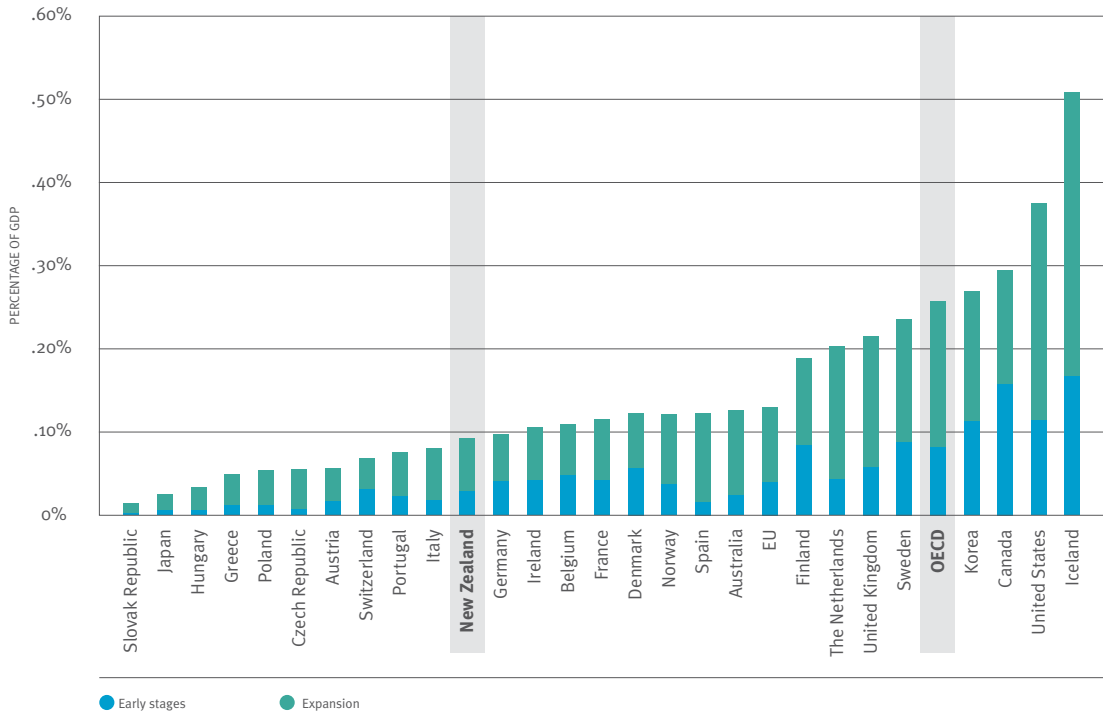
Source World Federation of Stock Exchanges; OECD Factbook 2007

26. The UK has been omitted from this analysis since its bank assets also comprise considerable offshore funds, which makes its banking sector an outlier in relation to the other economies in the sample.

Venture capital is a relatively small proportion of the economy in most OECD countries, but the size of New Zealand's venture capital industry is towards the lower end of the OECD range (17th).

FIG. 3.11

Investment in venture capital as a percentage of GDP, 2000–2003

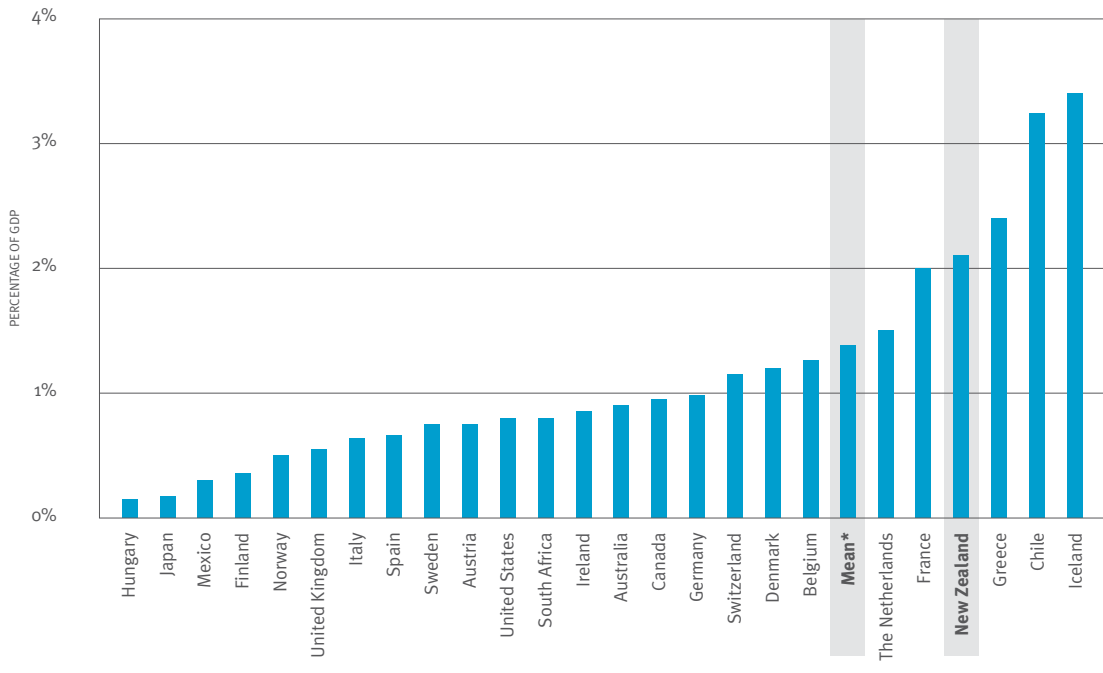


Source OECD Science, Technology & Industry Scoreboard 2005

Informal investment is an important source of funds for new firms in New Zealand and exceeds that of other benchmark economies when measured as a percentage of GDP. Countries with strong economic performance tend not to rely on informal investment.

FIG. 3.12

Informal capital market – informal investment, 2004



\* The mean is of all countries surveyed. Not all those countries are represented on this graph, and some of those surveyed are not in the OECD.

Source Global Entrepreneurship Monitor 2005 Executive Report

## 3.2 Innovation and Entrepreneurship

### Key Points

- Innovation underpins aggregate productivity growth, and entrepreneurship drives innovation.
- Indicators in this section present a mixed but improving picture for entrepreneurship and innovation in New Zealand.
- Overall, New Zealand ranks low relative to other OECD countries on the formal measures of innovation activity – research and development (R&D) and patenting. This underperformance can be explained by our distance from major world centres, lack of large firms and relatively large primary sector, suggesting that New Zealand has to be better than other countries in promoting innovation.
- Our basic science base is delivering relatively high levels of research outputs compared with the OECD average, we have a relatively large number of researchers, and our R&D has been growing at a fast rate relative to the OECD.
- New Zealand firms have high entry and exit rates.
- New Zealand firms have on average somewhat higher innovation rates than EU firms across a range of measures but very low levels of R&D.
- The level of high and medium-technology products exported by New Zealand firms is also far behind the OECD average, although sophisticated technology underpins the primary sector, which the OECD classifies as a “low technology intensive” sector.
- Although the level of business R&D is very low in New Zealand, it is growing much more rapidly than the OECD.
- Commercially viable innovations are often developed by a firm working in collaboration with other agencies. Proxy measures of collaboration across the innovation system suggest strong research links between business and government<sup>27</sup> in New Zealand but weaker research links between business and universities, and internationally.

### Introduction

Innovation is essential to ongoing labour productivity growth. Innovation is the dynamic and uncertain process through which firms create new economic value by creating, adopting and adapting knowledge into new or improved products and services, operational processes, organisational and managerial processes, and marketing methods, in pursuit of profits. Entrepreneurship is the human activity of envisaging these profit opportunities and undertaking the work necessary to take advantage of them.

Innovation activity is difficult to measure, and there is no single widely accepted indicator of the nature or extent of innovation. This chapter uses a suite of indicators that are individually partial but, taken as a whole, give some insight into how effectively innovation processes are functioning in New Zealand.<sup>28</sup>

27. Including Crown Research Institutes (CRIs).

28. For more detailed analysis of New Zealand's innovation performance, see “OECD Review of New Zealand Innovation System 2007” [http://www.med.govt.nz/templates/ContentTopicSummary\\_\\_\\_29677.aspx](http://www.med.govt.nz/templates/ContentTopicSummary___29677.aspx).

### 3.2.1 Formal Measures of Innovation

FIG. 3.13 TO FIG. 3.17

Two formal and widely recognised but narrow measures of innovation are aggregate R&D and patenting. R&D is an input to innovation activity.<sup>29</sup> Theory and empirical evidence suggest that R&D plays an important role, both in generating new knowledge and in facilitating technology transfer and the absorption of overseas knowledge. Patent-based indicators provide an indication of the effectiveness of New Zealand's R&D spending in generating commercial applications.<sup>30</sup>

New Zealand continues to have a low level of R&D and patenting compared with the OECD average. The low levels of R&D and patenting rates in New Zealand can be explained by our distance from world centres, small firm size, and an industrial structure weighted towards primary production.<sup>31</sup> However, the growth of R&D in New Zealand has been one of the strongest in the OECD. We generate more science and engineering research publications than the OECD average, and we have a relatively larger proportion of human resources devoted to research, mostly in the public sector.

### 3.2.2 Innovative Firms

FIG. 3.18 TO FIG. 3.22

In business, generating and absorbing new ideas and translating them into new goods, services, processes or markets is essential to enhance firm competitiveness. Innovative firms are more likely to record an increase in market share, profitability and total sales than non-innovative firms.<sup>32</sup> As described in Chapter 1, it is the dynamic process of innovation and productivity improvement at the firm level that drives aggregate productivity and economic growth.

The picture on New Zealand firms' innovation performance is mixed. Compared with the European Union (EU) average, our businesses generally have higher rates<sup>33</sup> of product innovation<sup>34</sup> and marketing methods innovation, and a similar rate of operational processes innovation, but a lower rate of managerial and organisational process innovation. Compared with Australian firms,<sup>35</sup> our firms are more innovative in every industry except electricity, gas and water supply. In terms of inputs to innovation, our firms have one of the lowest levels of R&D in the OECD, although the growth rate has been strong recently.

Another indicator of how well our firms are doing in harnessing innovation is their ability to produce products with high technology content that are competitive in the world market. The OECD<sup>36</sup> notes that technology-intensive exports<sup>37</sup> accounted for much of the growth in trade over the decade to 2005 and grew more rapidly than total manufacturing exports in all OECD countries except Japan.

New Zealand has one of the lowest shares of high- and medium- to high-technology manufactured exports of all OECD countries, although it is growing at a fast rate. In part, this low share is due to New Zealand's concentration on primary sector exports, which are classified as low-tech, even though there is a sophisticated science and technology base underpinning them.

29. The Statistics New Zealand Research and Development survey defines R&D as follows: "Research and experimental development comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge. Any activity classified as R&D is characterised by originality. Investigation is a primary objective."  
30. Patenting is not always the most effective way to protect intellectual property rights. This is particularly the case for industries where the rapid commercialisation of innovations and being first to market matter more than the long-term protection of securing a patent.  
31. See Crawford, R., R. Fabling, A. Grimes and N. Bonner, *Determinants of National R&D and Patenting: Application to a Small, Distant Country*, 2005, MED Occasional Paper #06/02. This suggests that New Zealand will have to be more effective than other countries in generating innovation if it is to attain comparable productivity levels.  
32. Statistics New Zealand, *Innovation in New Zealand 2005*.

33. For this survey, innovation is defined as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations". 2005 Oslo Manual p46.  
34. Innovation performance is often measured by surveys and is subject to definition and methodology differences. The firm innovation statistics cited here came from Statistics New Zealand's innovation surveys and were compared with similar statistics presented in Eurostat.  
35. Data for this indicator came from the innovation surveys conducted by the Australian Bureau of Statistics, which also followed the definition of innovation from the 2005 Oslo Manual.  
36. OECD Science, Technology and Industry Scoreboard 2005, p172.  
37. The OECD measures high technology by the intensity of R&D undertaken by the exporting industry. This can be misleading where inputs to the industry employ sophisticated R&D.

A study by Hausmann and Rodrik creates an outcome indicator of the sophistication of each four-digit product export. According to this measure, the sophistication of New Zealand's exports is consistent with its per capita income<sup>38</sup> – good for a resource-based exporter, but well below the most sophisticated exporters.

### 3.2.3 Innovation Linkages

FIG. 3.23 TO FIG. 3.25

Networking and collaboration play an important role in innovation. Commercially valuable innovations often do not arise in isolation, but develop out of collaboration between firms, customers, suppliers, employees, universities, government research institutes and other players. The degree to which such linkages exist may be an important indicator of the functioning of the innovation system as a whole.

Linkages are difficult to measure accurately – even more so than other aspects of innovation activity. One proxy measure for innovation linkages is the level of R&D financed across sectors and borders. The private sector in New Zealand appears to be well connected to public sector R&D providers (CRIs and government departments), with 17.5 per cent of government R&D financed by business – the highest proportion among those OECD countries shown. However, the level of New Zealand R&D financed from overseas is low compared with the OECD average, and our businesses finance only a low percentage of R&D carried out by universities.

### 3.2.4 Firm Dynamics

FIG. 3.26

Firm turnover rates give an indication of the availability and uptake of new business opportunities. OECD research<sup>39</sup> suggests that up to 50 per cent of labour productivity growth in OECD countries can be attributed to the entry of new and more productive firms into the market, and the exit of less productive firms. Preliminary results of Treasury research<sup>40</sup> on firm-level productivity indicate that similar figures are likely to apply in New Zealand.

New Zealand's firm turnover rates were between 22 and 23 per cent between 2001 and 2005, with entry rates slightly higher than exit rates.<sup>41</sup> Entering firms were mostly in the property and business services industry (40 per cent),<sup>42</sup> followed by the agriculture and construction industries, both with approximately 10 per cent of all entries. The government administration and defence sector is the least likely industry for businesses to enter.

Comparing New Zealand's firm turnover rates with those of other countries is difficult, as there are many methodological differences in collecting and interpreting entry and exit data across countries.<sup>43</sup> Preliminary results of Treasury research<sup>44</sup> that attempted to account for some of the methodological differences show that New Zealand's firm turnover rates were at the top of the OECD range in the 1990s, although not greatly different from countries such as the US and the UK. This may indicate that there is a relatively high level of entrepreneurial behaviour in New Zealand. However, one likely explanation for this high rate of start-ups is the relative ease of starting a business in New Zealand. Chapter 4.3 discusses New Zealand's business environment further.

38. The indicator for each four-digit product is constructed by calculating the share of world exports coming from high-income countries. They assume that products mainly exported by high-income countries are more sophisticated than other products. See Hausmann, R., J. Hwang and D. Rodrik, *What You Export Matters*, 2006 <http://www.cid.harvard.edu/cidwp/pdf/123.pdf>.

39. Stefano, S., P. Hemmings, T. Tresselt and J. Woo, *The role of policy and institutions for productivity and firm dynamics: Evidence from micro and industry data*, 2002, Paris: OECD, Economics Department, Working Paper No 329. [http://www.oecd.org/olis/2002doc.nsf/linkto/eco-wkp\(2002\)15](http://www.oecd.org/olis/2002doc.nsf/linkto/eco-wkp(2002)15).

40. Law, D. and N. McLellan, *The Contributions from Firm Entry, Exit and Continuation to Labour Productivity Growth in New Zealand*, 2005, Wellington, Treasury Working Paper 05/01.

41. The turnover rates here came from Statistics New Zealand's Longitudinal Business Frame (LBF), which attempts to identify entries and exits of enterprises due to administrative churn (such as company restructuring and changes of ownership), so that genuine business start-ups and closures/failures can be better identified. Most of the firms in the survey are small, and small firms tend to have higher turnover rates than larger firms.

42. According to Statistics New Zealand's Business Demography Statistics, around 83 per cent of firms in the property and business services industry have no employees.

43. See Vale S., *The international comparability of business start-up rates*, 2007, for a summary of the methodology differences.

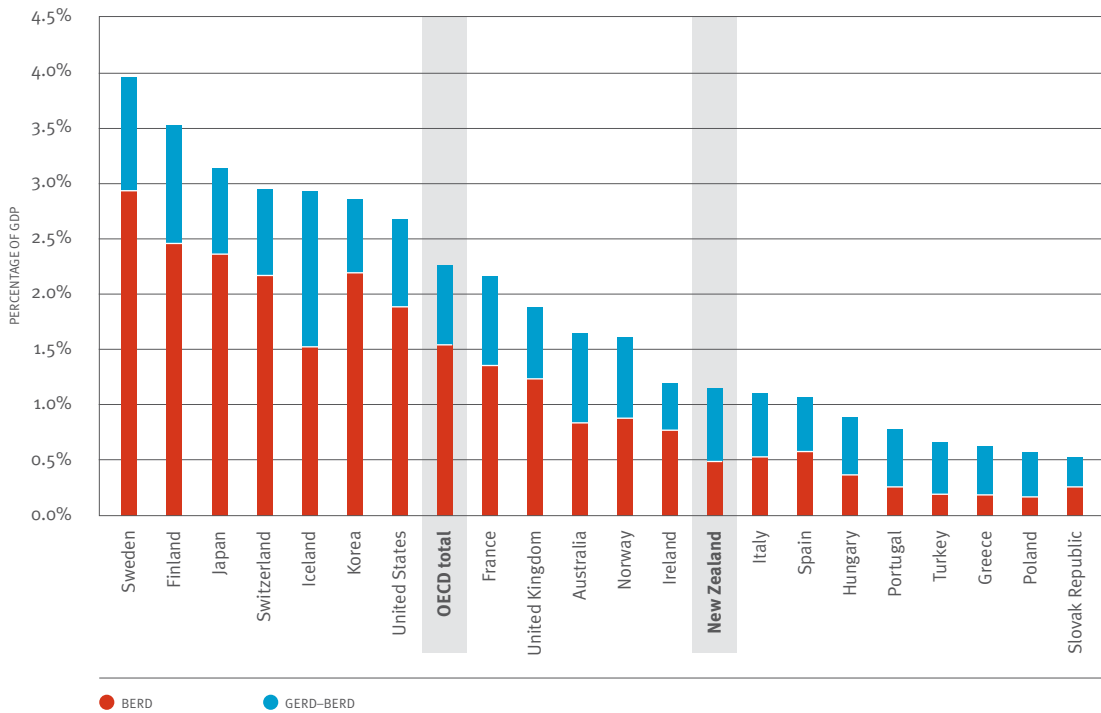
44. Mills, D. and J. Timmins, 2004 – this study omitted firms with no employees when comparing New Zealand's turnover rate internationally.

### 3.2.1 Formal Measures of Innovation

New Zealand has a lower share of gross expenditure on R&D (GERD) as a percentage of GDP than the OECD average. Our business expenditure on R&D (BERD) as a percentage of GERD is particularly low (New Zealand is 19th out of 24 countries).

FIG. 3.13

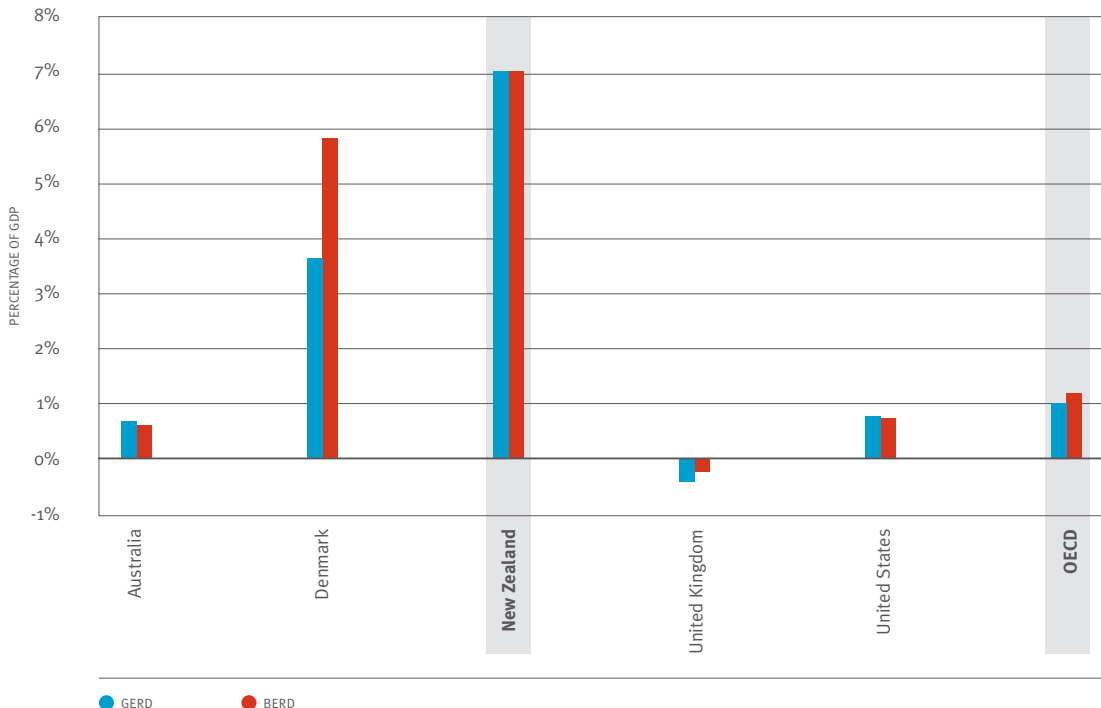
Research and development as a percentage of GDP (GERD), 2004



Source OECD in Figures 2006–07, page 40

FIG. 3.14

Average annual growth of GERD and BERD (selected OECD countries, 1995–2004, or latest year available)



Source OECD Science, Technology and Industry Outlook 2006, Table 38; NZ data from Ministry of Research, Science and Technology, *A Decade in Review*

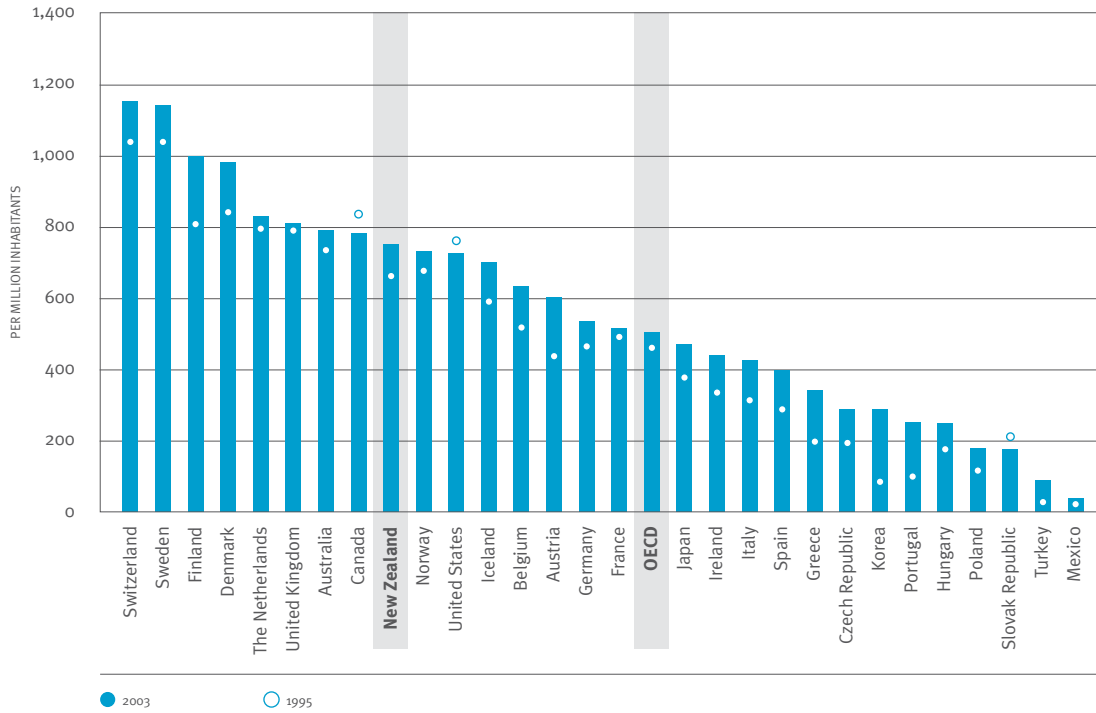
The growth of New Zealand's GERD and BERD<sup>45</sup> has been substantially higher than the OECD average.

45. The growth rates for New Zealand BERD and GERD come from the publication *Research and Development in New Zealand: A Decade in Review*, which accommodates the methodology changes between

Statistics New Zealand's 2002 and 2004 R&D surveys. The growth rates reported by this publication, however, might be mis-estimated, as firms with fewer than 10 employees are excluded over the entire period.

FIG. 3.15

Science and engineering articles per million inhabitants, 2003

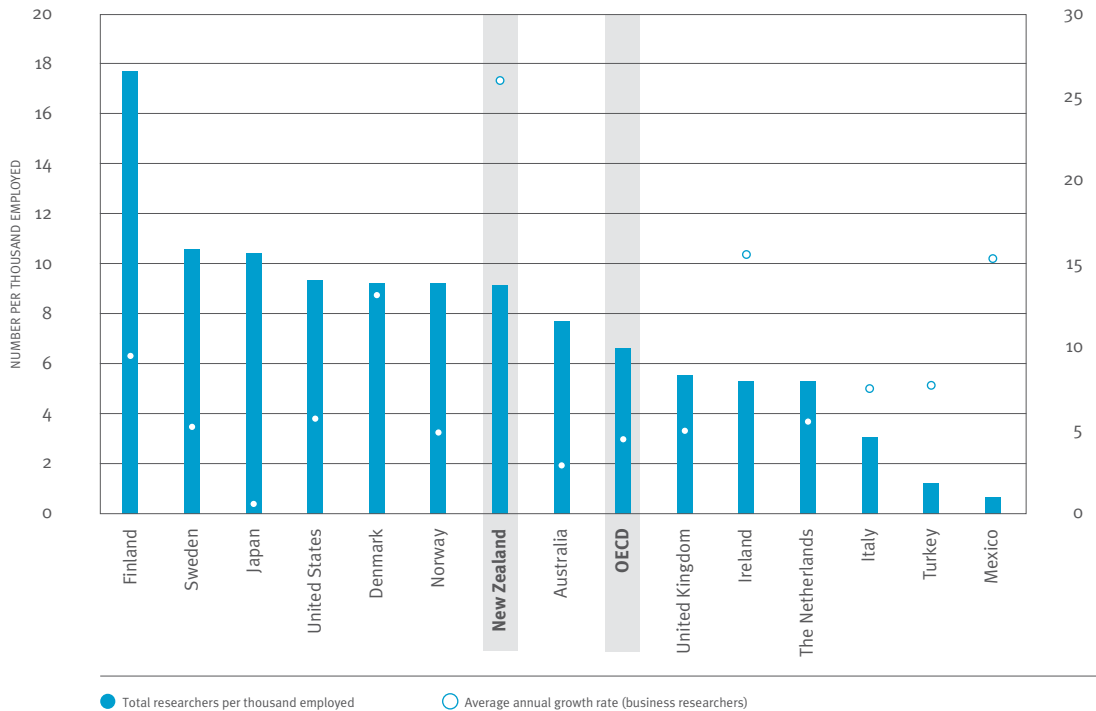


New Zealand publishes more science and engineering articles than the OECD average (New Zealand is 9th out of 23 countries).

Source OECD Science, Technology and Industry Outlook 2006, Table 38

FIG. 3.16

Researchers<sup>46</sup> per thousand employed and average annual growth for business researchers 1995–2003 (or latest period available)



The number of researchers in New Zealand is above the OECD average (New Zealand is 7th out of 23 countries). The number of researchers employed by New Zealand firms has been growing at the fastest rate in the OECD.

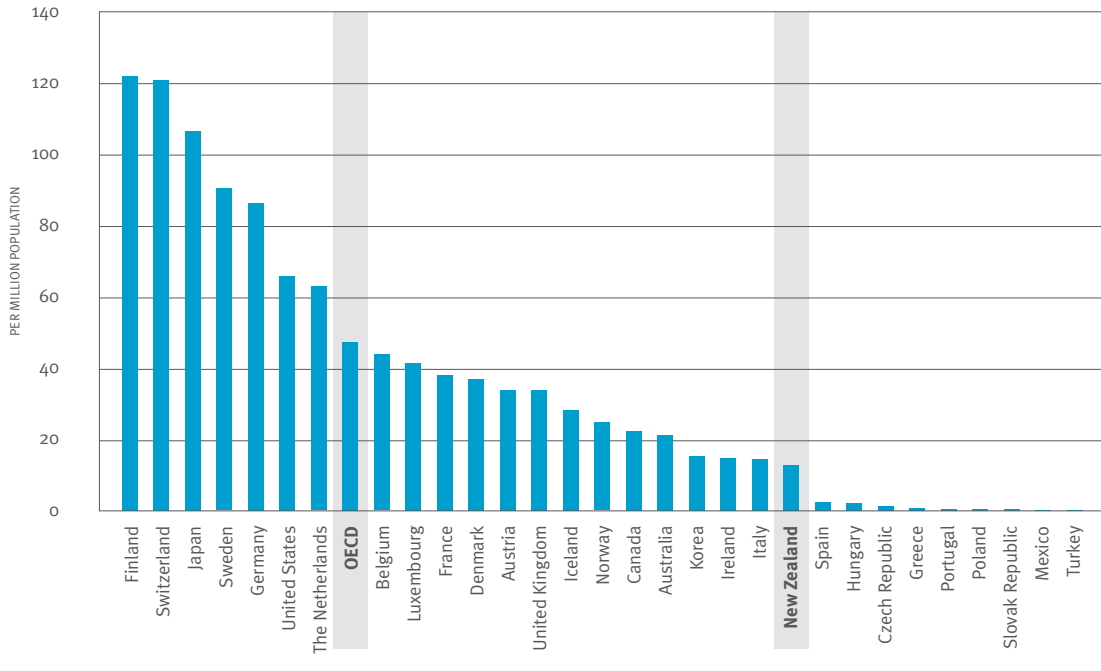
Source OECD Science, Technology and Industry Scoreboard 2005, Figure B8.1

46. "Researchers" here is a subset of the OECD's Human Resources in Science and Technology (HRST) occupations. HRST are defined, according to *Canberra Manual* (OECD and Eurostat, 1995), as people having graduated

at the tertiary level of education in a science or technology field of study, or people employed in a science and technology occupation for which a high qualification is normally required and the innovation potential is high.

New Zealand has a low level of patents per head compared with the OECD average (we are 19th out of 24 countries).

FIG. 3.17 Patents per million population, 2003

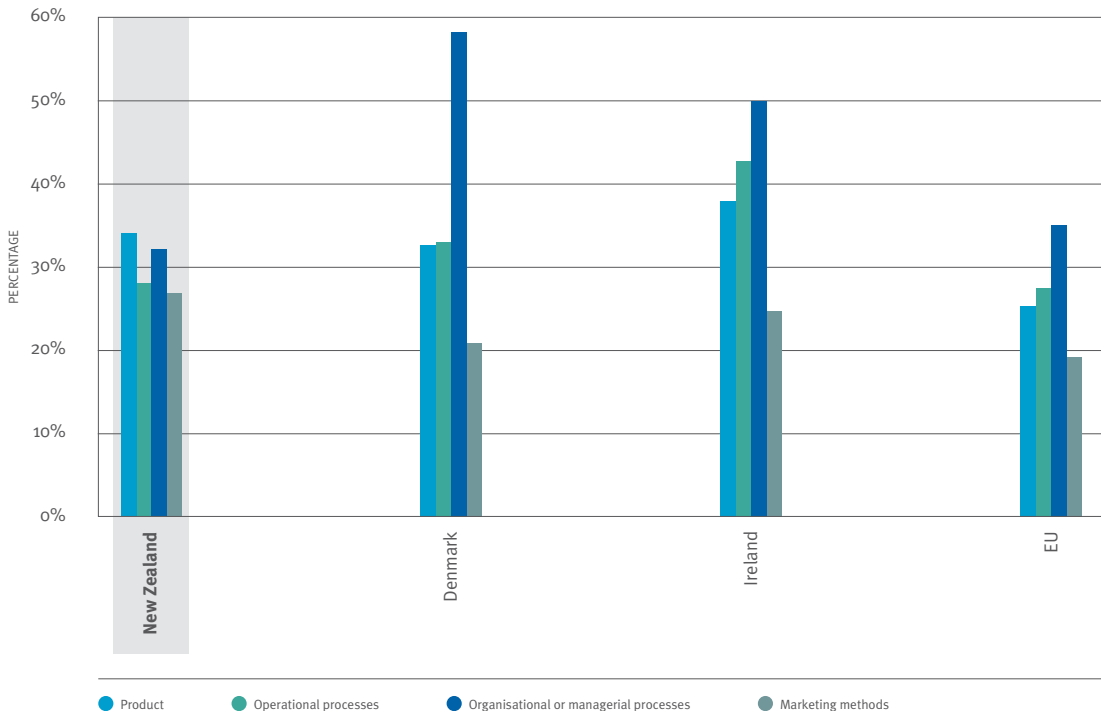


Source OECD Science, Technology and Industry Outlook 2006, Table 30; NZ Treasury database; MED calculation

### 3.2.2 Innovative Firms

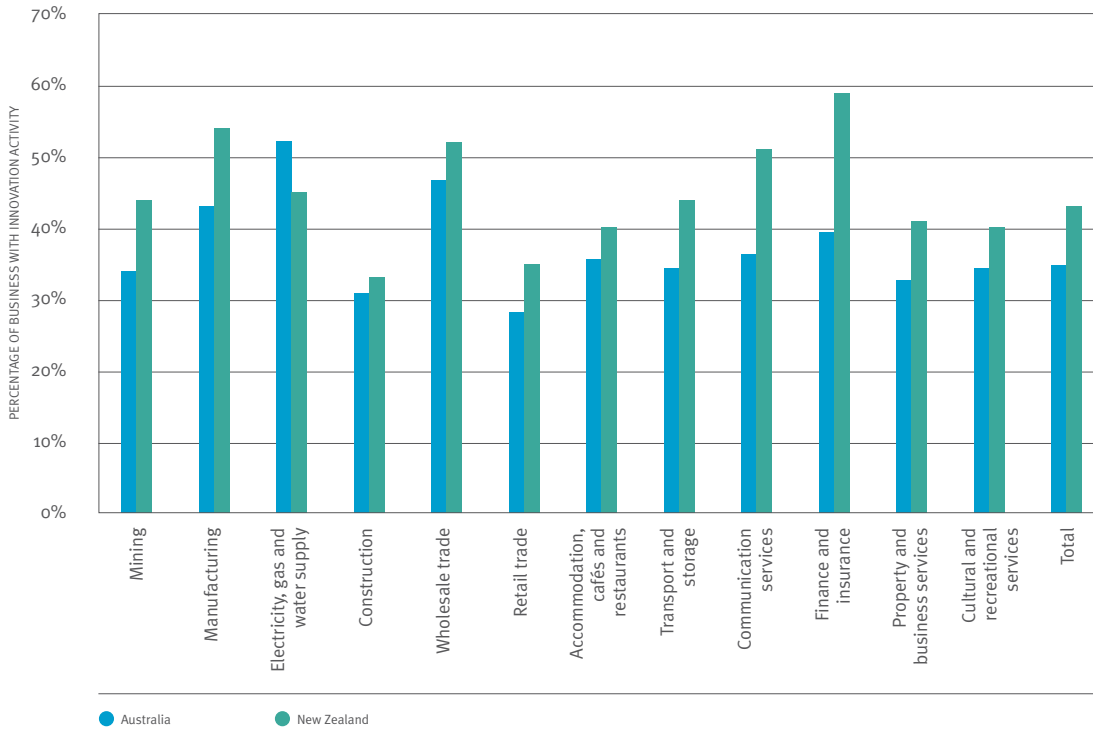
Compared with the EU average, New Zealand has higher rates of product innovation (we are 8th out of 26 countries) and marketing method innovation (4 out of 26), and a similar rate of operational processes innovation (14 out of 26), but a lower rate of organisational or managerial processes innovation (15 out of 26).

FIG. 3.18 Rates of innovation activity by type, New Zealand 2005, EU 2002–2004



Source Statistics New Zealand, Innovation in New Zealand 2005; Eurostat, Innovation in Europe 2004

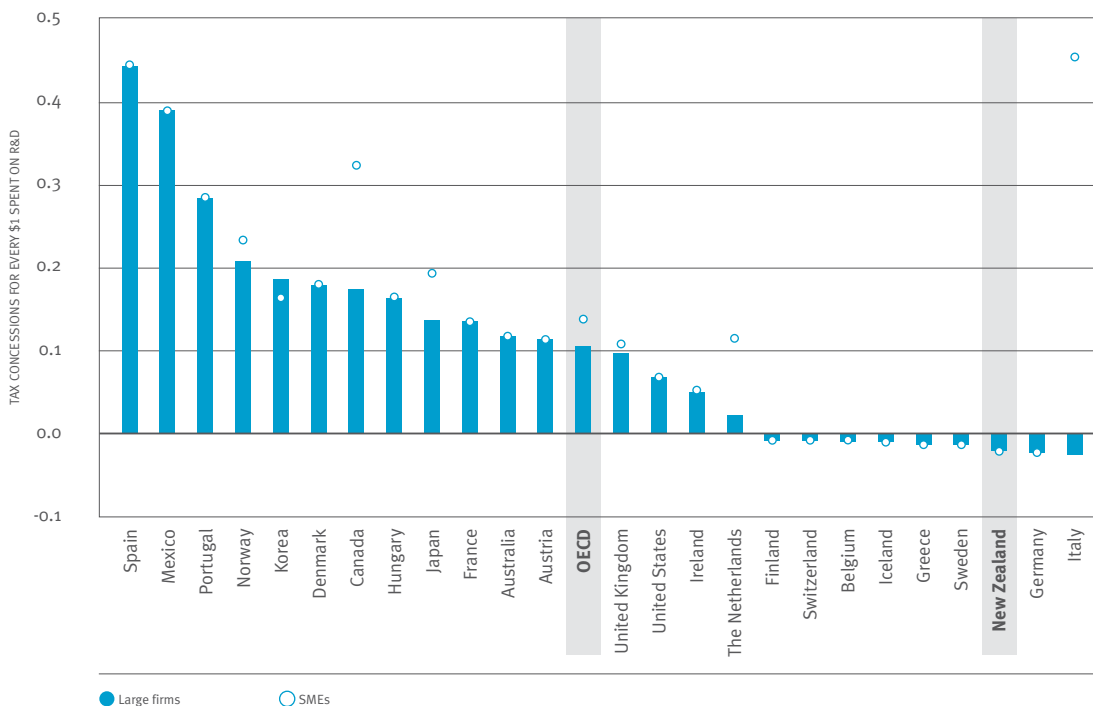
FIG. 3.19 Percentage of business innovating by industry, 2005



New Zealand firms are more innovative than Australian firms in every industry except electricity, gas and water supply.

Source Statistics New Zealand, Business Operation Survey, Module B; Australian Bureau of Statistics, No. 8158.0

FIG. 3.20 R&D tax concessions for large firms and SMEs, 2004



New Zealand has one of the lowest levels of tax concessions<sup>47</sup> for business R&D in the OECD (New Zealand is 19th out of 21 countries). This level will increase once the new tax credit (announced in Budget 2007 and coming into effect in 2008/09) is introduced.

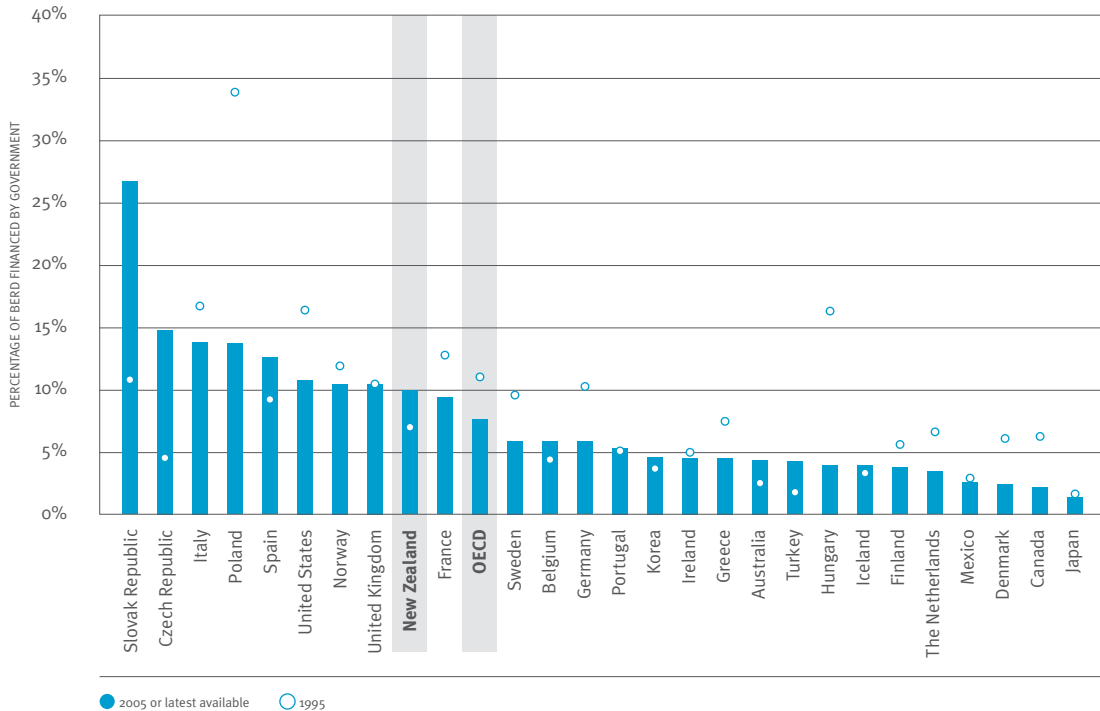
Source OECD Science, Technology and Industry Scoreboard 2005, Figure A 12.1

47. The tax concession is measured as 1 minus the B index. The B index is intended to represent the present value of pre-tax income necessary to cover the initial cost of R&D investment and to pay corporate income tax. The index is calculated using information on the depreciation allowances, tax credits and other specific allowances in national tax systems.

The New Zealand government provides more grants and subsidies for business R&D than many OECD countries (we are 7th out of 21 countries). In part, this reflects the low level of R&D tax concessions to business.

FIG.  
3.21

## Grants and subsidies for business R&amp;D, 2005 (or latest year available)

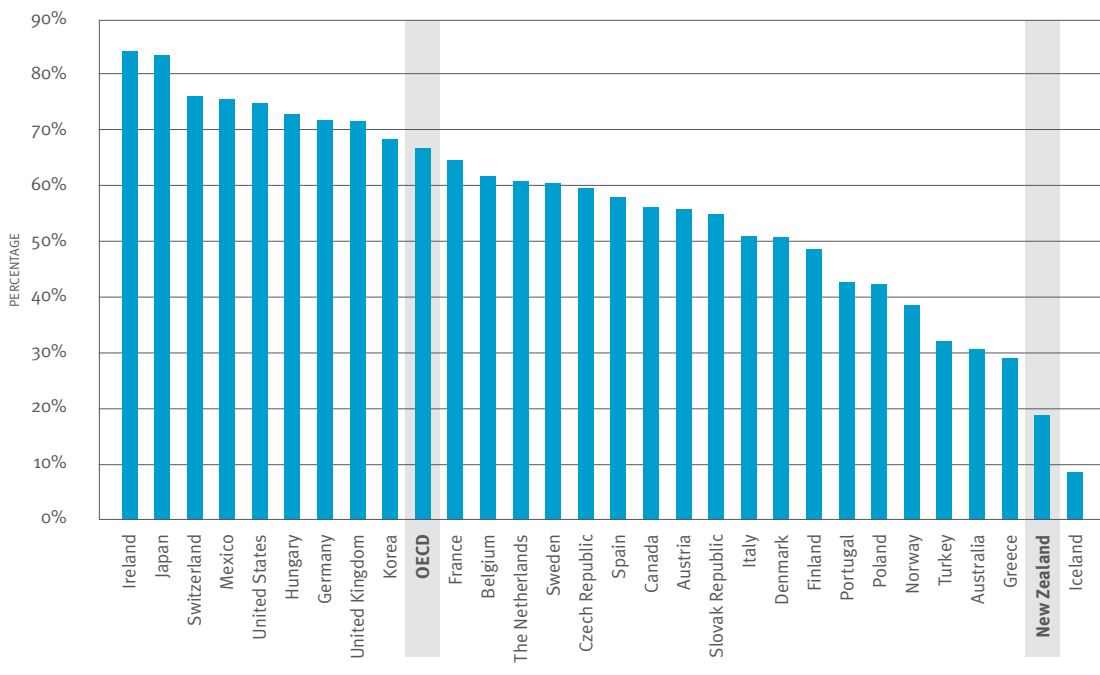


Source OECD, Main Science and Technology Indicators, December 2006, Table 36

New Zealand has low levels of high or medium-to-high-technology<sup>48</sup> manufacturing exports compared with other OECD countries (we are 22nd out of 23 countries), although the growth rates are higher than the OECD average. The classifications for “high”, “medium-to-high”, “medium-to-low” and “low” technology industries are made according to their aggregate R&D intensities, based on those of 13 countries, not including New Zealand.<sup>49</sup>

FIG.  
3.22

## Share of high- and medium-high-technology industries in manufacturing exports, 2003



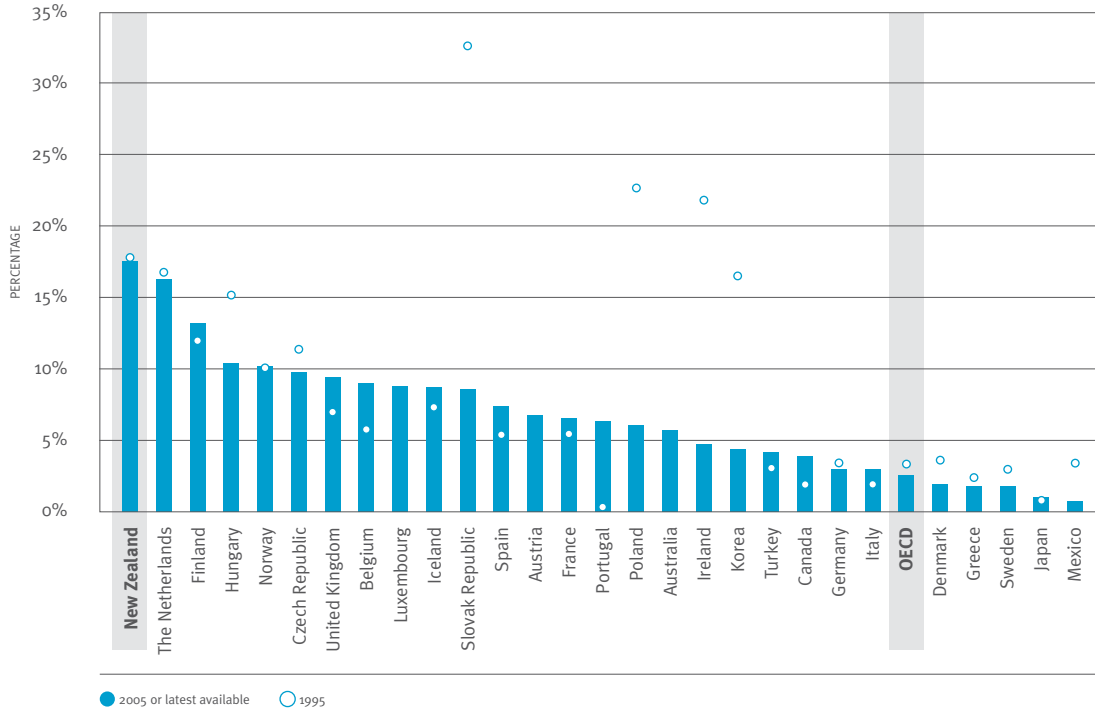
Source OECD Science, Technology and Industry Scoreboard 2005, Figure 8.1

48. High-technology industries include aircraft and spacecraft; pharmaceuticals; office, accounting and computing machinery; radio, TV and communications equipment; and medical, precision and optical instruments. Medium-to-high-technology industries are electrical machinery and apparatus; motor vehicles, trailers and semi-trailers; chemicals excluding pharmaceuticals; railroad equipment and transport equipment; and machinery and equipment.

49. Such classifications thus may not be appropriate for New Zealand. For example, the food and beverage industry is regarded as a low-technology industry, but it has a relatively sophisticated science and technology base underpinning it in New Zealand.

FIG. 3.23

Percentage of research funded by business carried out by government research organisations and departments



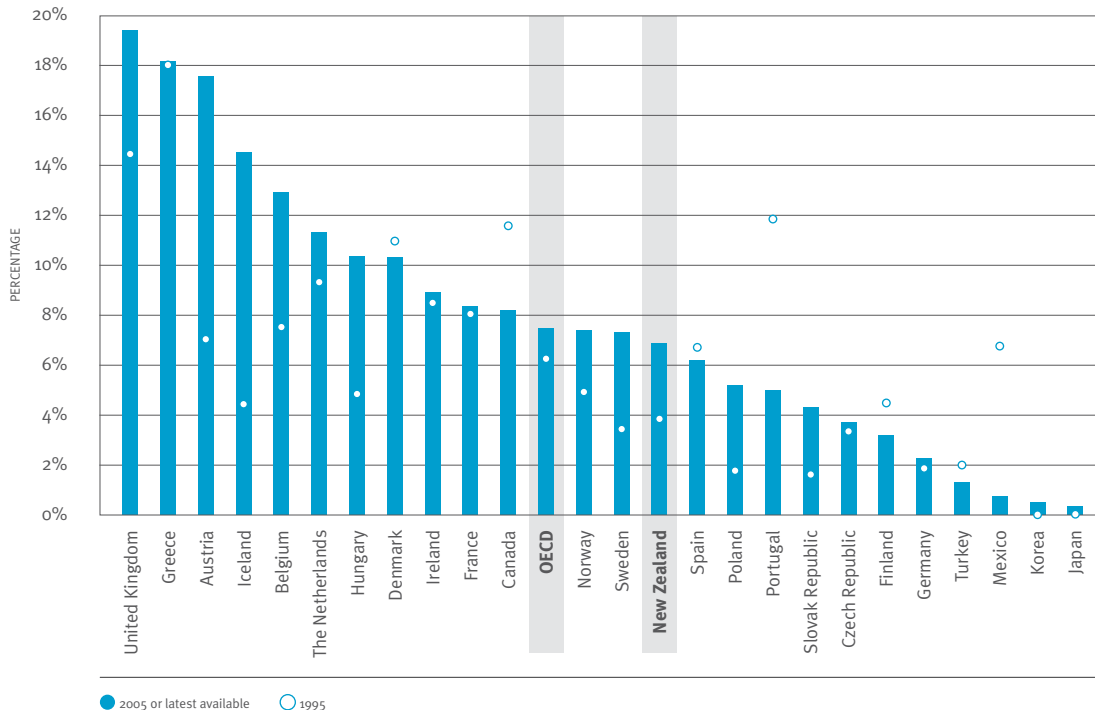
### 3.2.3 Innovation Linkages

New Zealand has the highest percentage of government R&D financed by business in the OECD.

Source OECD, Main Science and Technology Indicators, December 2006, Table 55

FIG. 3.24

Percentage of total research and development expenditure financed from overseas, 2005 (or latest year available)



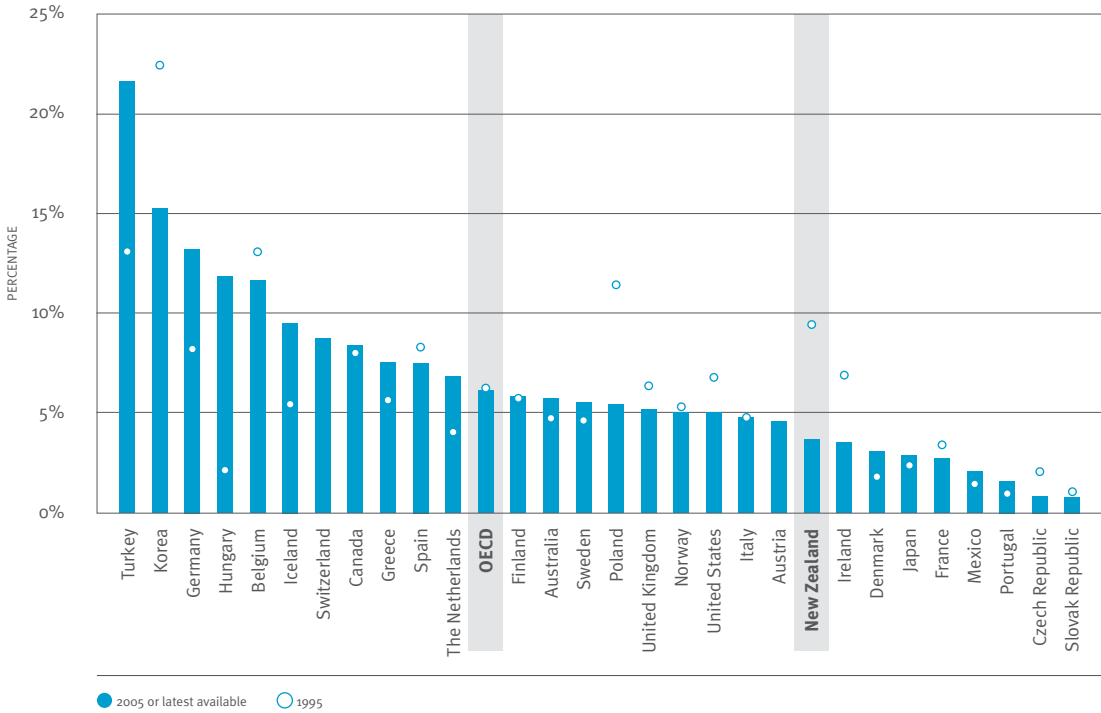
New Zealand has a lower percentage of GERD financed from overseas than the OECD average (we are 14th out of 23 countries), although the rate has been increasing.

Source OECD Science, Technology and Industry Outlook 2006, Table 13

New Zealand universities carry out a lower proportion of R&D financed by business than the OECD average (we are 20th out of 23 countries). The proportion in 2005 is significantly lower than in 1995.

FIG. 3.25

Percentage of research funded by business carried out by higher education institutes, 2005



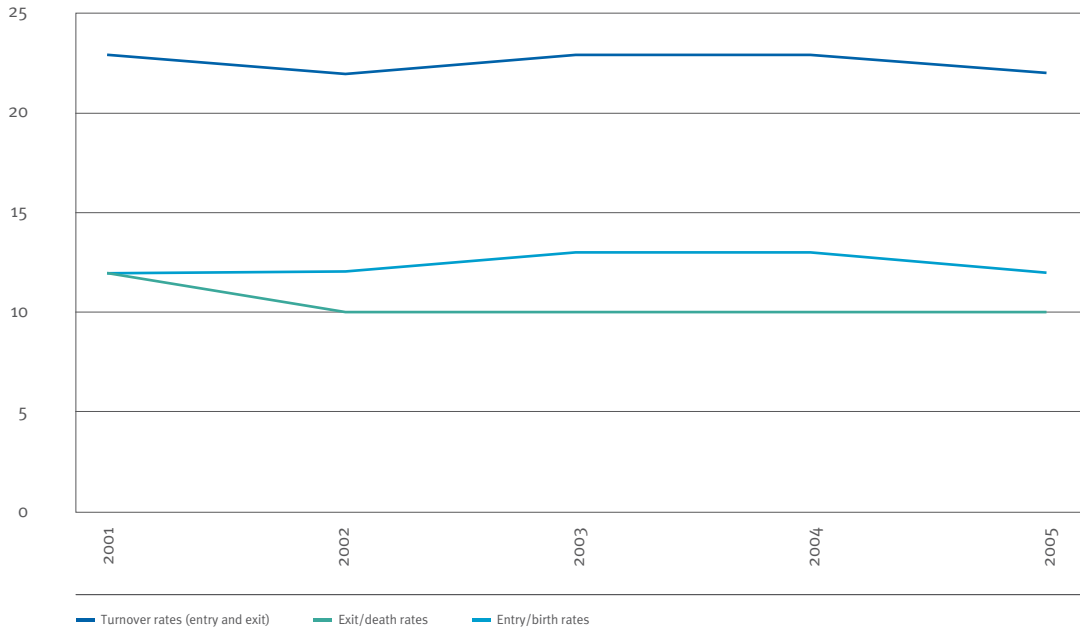
Source OECD Main Science and Technology Indicators 2006, Table 48

### 3.2.4 Firm Dynamics

New Zealand's firm turnover rates remained around 22 per cent over the period 2001–2005, with entry rates slightly ahead of exit rates.

FIG. 3.26

Firm entry, exit and turnover rates, 2001–2005<sup>50</sup>



Source Statistics New Zealand Business Demographic Statistics Review Report, May 2006, page 31

50. Data for this graph was collected by Statistics New Zealand's Longitudinal Business Frame (LBF), which removed entries and exits of enterprises due to administrative churn, leaving genuine business start-ups and closures/failures.

### 3.3 International Linkages

#### Key Points

- International linkages are important for productivity and economic performance. Such linkages support knowledge flows from overseas, help foster business relationships, provide markets for our exports and support the import of technology embodied in new equipment.
- New Zealand’s share in world trade is 0.36 per cent and has been relatively static, in line with the OECD average. As a percentage of GDP, New Zealand’s share of exports and imports falls in the lower half of the OECD, which is unusual for a country of New Zealand’s size.
- High levels of inward and outward foreign direct investment (FDI) are important for small, open economies like New Zealand’s. The stock of New Zealand’s inward FDI is high by OECD standards, with “greenfield” investment about average. Outward FDI is among the smallest in the OECD as a percentage of GDP.
- Flows of people (and their knowledge) also contribute to economic growth in New Zealand. Our net immigration has been high relative to the benchmark economies, with a significant share of these people educated to tertiary level.
- International students are a source of current export earnings, a potential source of future skilled migrants for New Zealand, and an important way of developing international networks. The number of foreign fee-paying students in the university sector has diminished in recent years.

#### Introduction

The depth of New Zealand’s international linkages is a key influence on economic performance. International linkages can impact on productivity via the development of scale economies, knowledge and technology transfers, increased domestic competition and improved resource allocation. Several forms of international linkage are discussed below. Cross-border R&D, discussed in Chapter 3 (section 3.2.3) above, is also important.

### 3.3.1 Trade and Foreign Investment

FIG. 3.27 TO FIG. 3.32

International trade can impact on domestic productivity levels, and vice versa. Entering and competing in international markets can help some types of firms to lift their performance higher than would otherwise be the case. Effective trade connections can also provide some firms with the opportunity to exploit markets for their products, develop economies of scale, and identify and develop new niche products and services.

As a percentage of GDP, New Zealand's trade levels (sum of exports and imports) increased from the mid-1980s to 2006. Exports, however, have reached a plateau and have not increased as a percentage of GDP since 2000.

New Zealand is an outlier, for a small country, in having a small ratio of exports and imports to GDP. Economies of a similar size, such as Denmark, have considerably higher levels of trade. In part, this is likely to be due to our distance from world markets.

Important international connections and improvements in productivity and growth can also be forged through inward and outward FDI.<sup>51</sup> High levels of FDI are important for and common among small, open economies like New Zealand's. Through its effect on competition, FDI may indirectly enhance the effectiveness of resource use in the host economy. FDI is also associated with a range of potential spillover benefits. These include the transfer and diffusion of technology, information, skills and management practices, which in turn can facilitate improvements in firm capability, and access to overseas resources and markets.

Like many small economies, New Zealand has a high stock of FDI relative to GDP.

One important type of FDI is "greenfield" investment. Greenfield FDI refers to investment projects that entail the establishment of *new* production facilities such as offices, buildings, plants and factories. Greenfield FDI thus directly adds to production capacity and capital formation in the host country. When adjusted for population size, the number of greenfield projects in New Zealand falls roughly in the middle of the OECD pack.

Outward FDI is typically driven by a firm's desire to gain improved access either to the host country's market or to production inputs, including skilled labour, infrastructure, production facilities or raw

materials. While the stock of New Zealand's *inward* FDI is high by OECD standards, New Zealand's levels of *outward* FDI are among the lowest in the OECD.

### 3.3.2 Migration

FIG. 3.33 TO FIG. 3.37

In addition to trade and investment, the flow of people (and their accompanying knowledge and ideas) is an important contributor to the strengthening of New Zealand's international linkages. Flows of people can expand and develop international networks, improve the understanding of international cultures, societies, markets and economies, and facilitate growth in trade flows.

New Zealand's net migration levels (expressed per thousand of the population) have been high relative to benchmark economies. However, large net inflows of migrants are insufficient in themselves to ensure improvements in outcomes related to New Zealand's international connections. As with FDI, it is the quality of flows that is important. Flows of appropriately skilled migrants facilitate the transfer of knowledge and ideas, and grow the skilled labour supply required to support New Zealand's ongoing economic development.

Recent data shows that, around 2000, there was a high percentage of New Zealand born people with tertiary qualifications resident in other OECD countries, but New Zealand has also attracted a high percentage of immigrants with a tertiary education (both from the OECD and from the rest of the world). This means that New Zealand has experienced more of a "brain exchange" than a "brain drain".

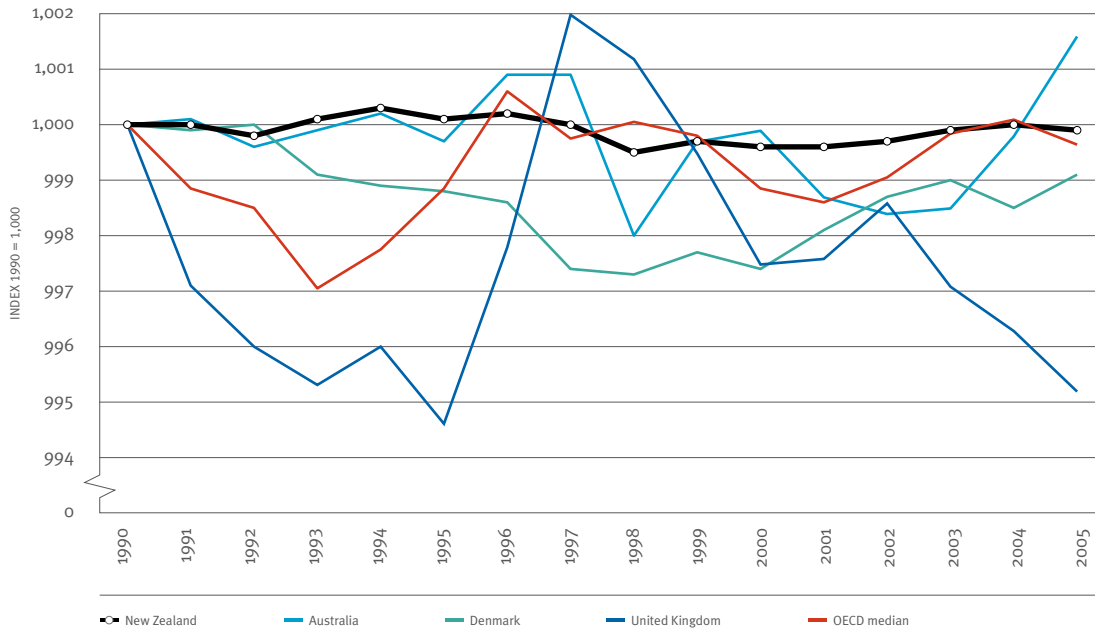
New Zealand now has one of the highest proportions of immigrant populations in the OECD. While this inflow of human capital has proved invaluable to attaining our "brain exchange", it raises important issues about effective settlement of new arrivals and ongoing social cohesion – dimensions that are important for economic growth and overall well-being.

International students are a potential source of future skilled migrants for New Zealand. They also contribute to current export earnings, the transfer of knowledge and ideas, and the expansion of international networks. The number of foreign fee-paying students in tertiary education reached a peak of 31,430 in 2004, with the majority being in the university sector. However, this number has been diminishing.

51. FDI measures the value of cross-border capital transactions, both debt and equity, between enterprises in a direct investment relationship.

FIG. 3.27

New Zealand's and other countries' share in the world trade for merchandise and services



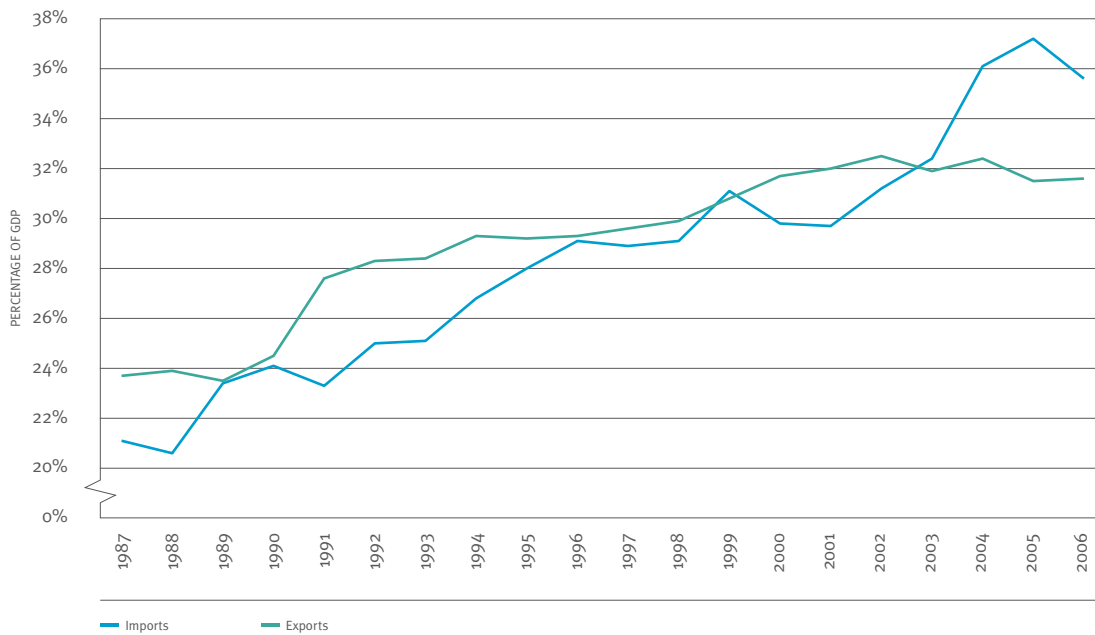
Source OECD Country Profile 2007

3.3.1 Trade and Foreign Investment

New Zealand's share of world trade has remained relatively steady over the past 10 years, in line with the OECD average.

FIG. 3.28

Value of exports and imports as a percentage of GDP – New Zealand



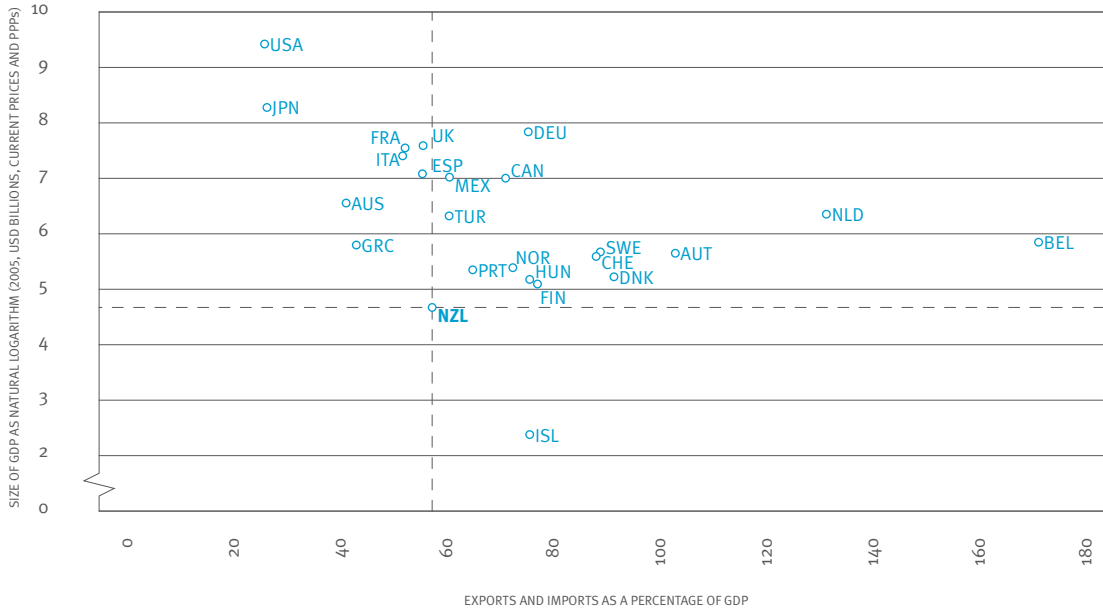
Source Statistics New Zealand

As a percentage of GDP, New Zealand's imports increased from the mid-1980s to 2006, although this trend has been subject to cycles. Exports, while displaying a steady upward trend over the long term, have not increased as a percentage of GDP since 2000.

New Zealand has a relatively low level of trade (value of exports and imports as a percentage of GDP) given its size. Small economies typically have high trade to GDP ratios.

FIG. 3.29

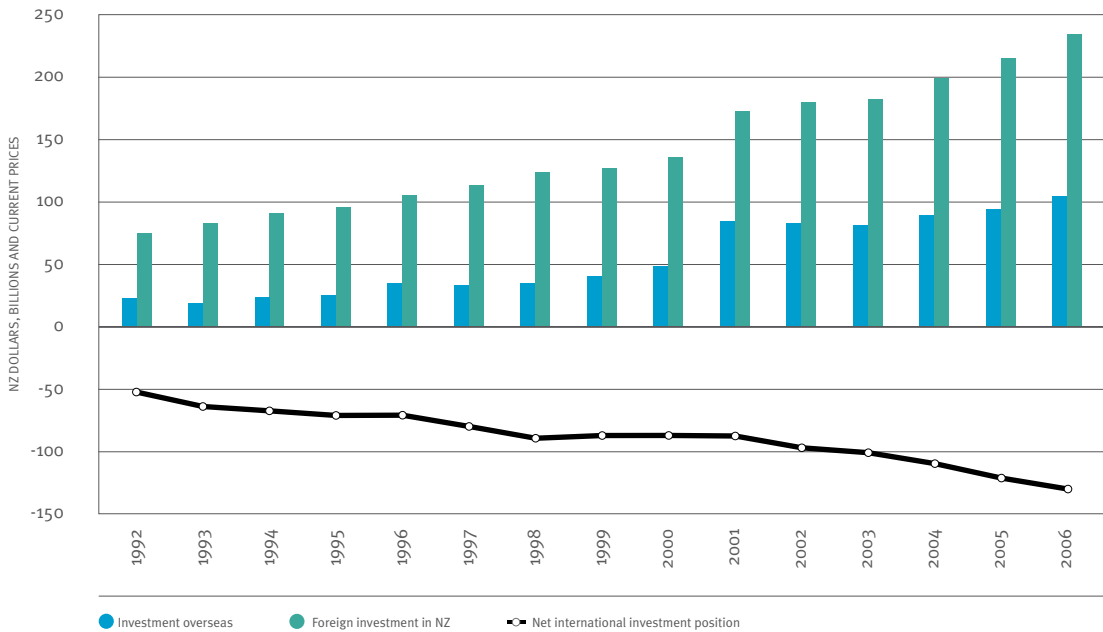
Trade as a percentage of GDP, and country size



Source OECD Country Profile 2007 and Factbook 2007

FIG. 3.30

Investment overseas, foreign investment in New Zealand and the net international investment position (stock measure)



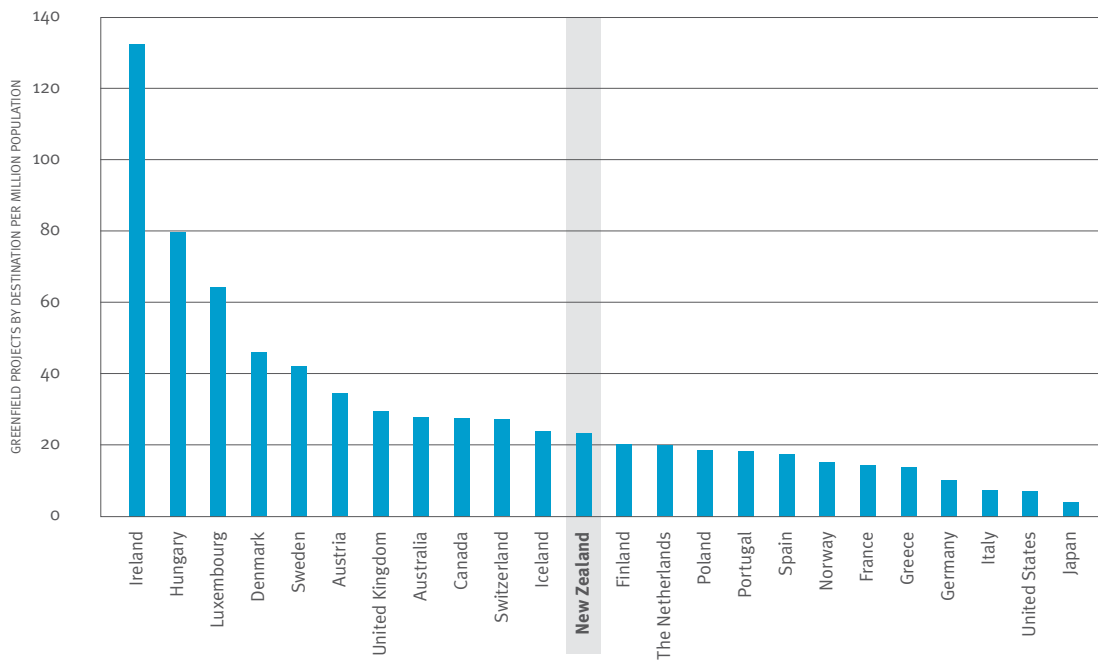
Source Statistics New Zealand

FIG. 3.31 Inward and outward FDI stock as a percentage of GDP, 2004



The stock of New Zealand's inward FDI is high by OECD standards, measured as a percentage of GDP. However, New Zealand's outward FDI levels are among the lowest in the OECD.

FIG. 3.32 Total number of greenfield projects by destination per million population, 2002–2005



Greenfield FDI refers to investment projects that entail the establishment of new production facilities. When adjusted for population size, the number of greenfield projects in New Zealand falls roughly in the middle of the OECD pack.

Source UNCTAD, World Investment Report 2006; OECD Factbook 2007

### 3.3.2 Migration

Net permanent and long-term migration has been cyclical. Nevertheless, since 2001, long-term arrivals in New Zealand have exceeded departures.

FIG. 3.33

Permanent and long-term migration per annum

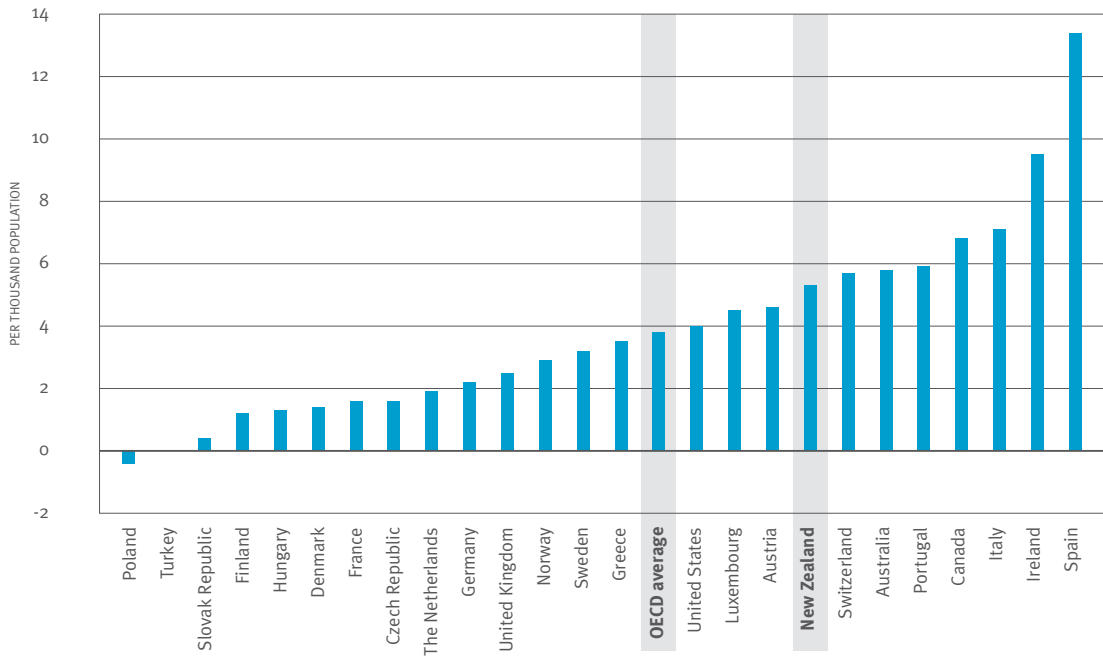


Source Statistics New Zealand

New Zealand's net migration per thousand of the population has been high relative to the benchmark economies and the OECD average.

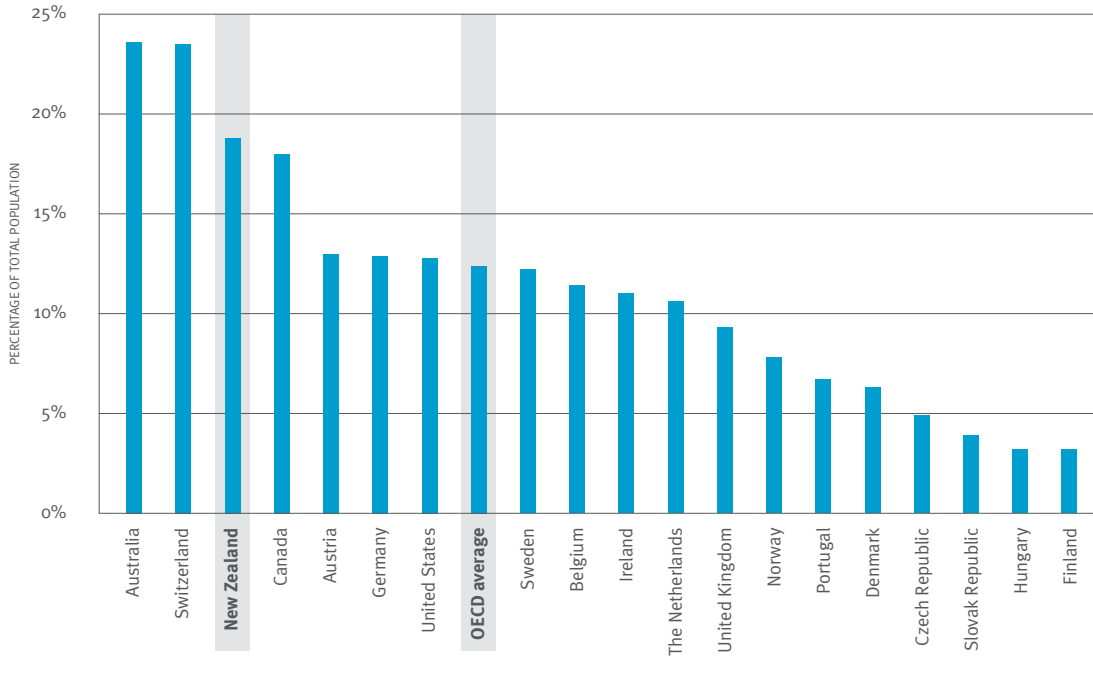
FIG. 3.34

Net migration per thousand population, (annual average 2000–2005 or latest available period)



Source OECD Factbook 2007

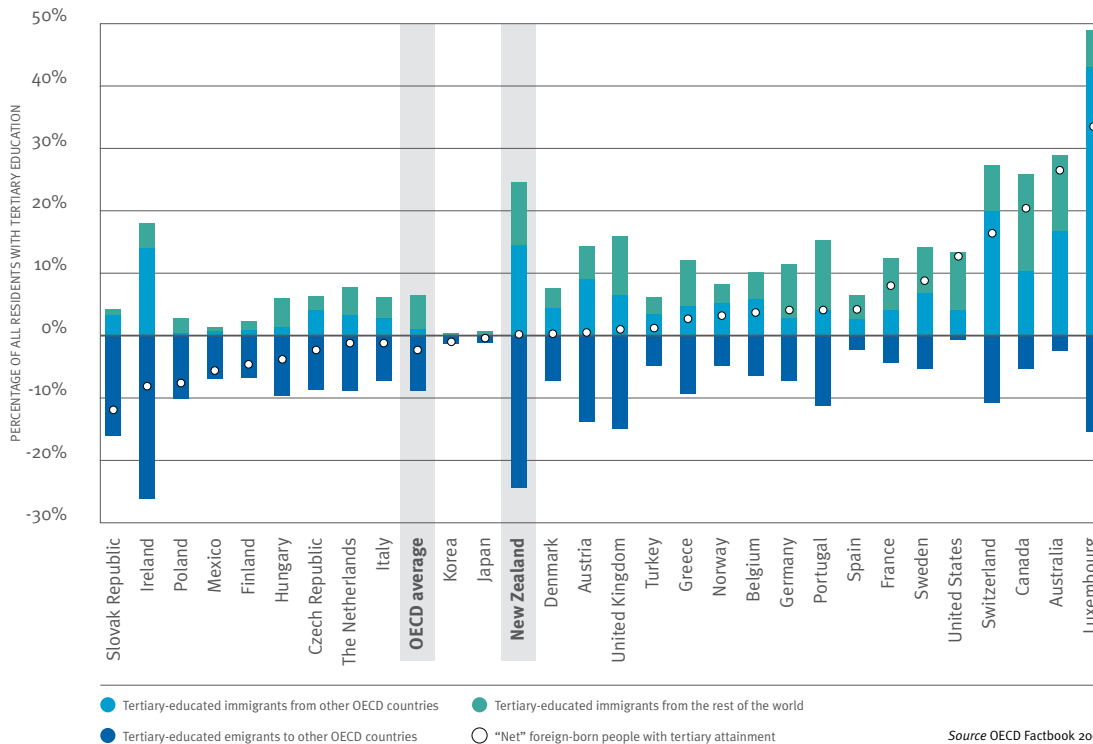
FIG. 3.35 Foreign-born people as a percentage of total population, 2004



Within the OECD, New Zealand has one of the highest proportions of immigrants in the population.

Source OECD Factbook 2007

FIG. 3.36 Foreign-born people with tertiary education, as a percentage of all residents with tertiary education, circa 2000

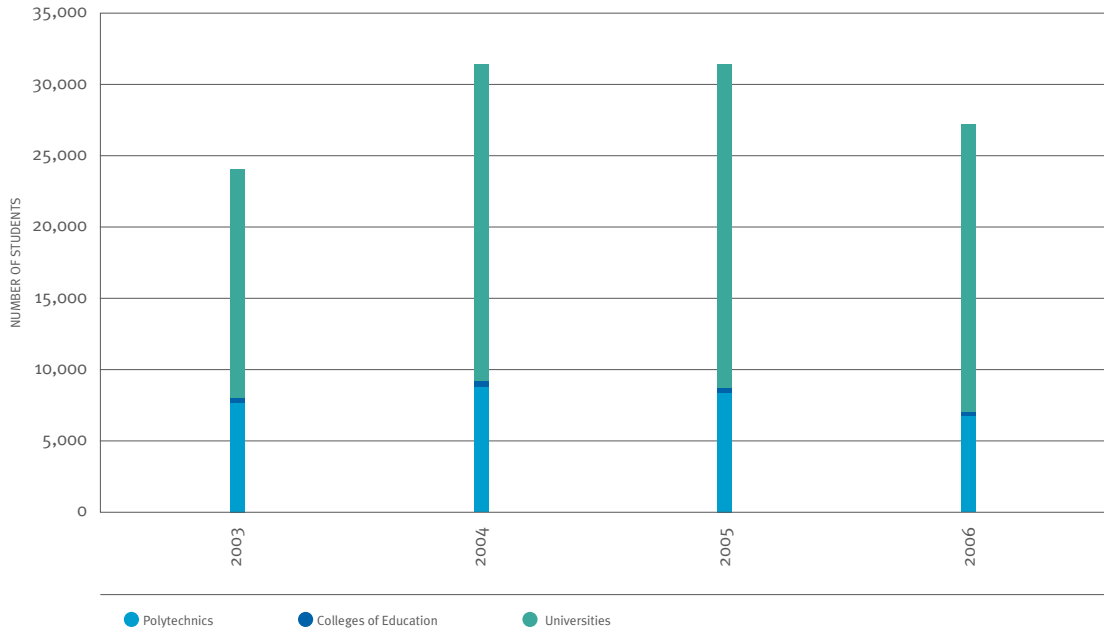


Circa 2000 (the latest available internationally comparable data), there was a high percentage of New Zealand-born people with tertiary qualifications resident in other OECD countries, but New Zealand has also attracted a high percentage of tertiary-educated immigrants (both from the OECD and from the rest of the world).

Source OECD Factbook 2007

FIG. 3.37 Foreign fee-paying students in tertiary education

The number of foreign fee-paying students in the tertiary education sector has diminished since its peak in 2004. The majority have been in the university sector.<sup>52</sup>



Source Ministry of Education

52. This graph omits students in private training establishments (e.g., language schools).

# Underlying Determinants of Productivity Growth – Business Environment

## 4.1 Skills and Talent

### Key Points

- Skills and talent are important to economic transformation.
- Management skills have a big impact on organisational performance. New Zealand’s perceived availability of management skills ranks below that of Australia, the UK and many OECD countries.
- Education levels are important because more highly educated people tend to be more productive.
- The education level of New Zealand’s workforce is above the OECD median and improving. However, we have significant numbers of people at the lowest levels of literacy and numeracy.
- New Zealand’s university graduation rate is one of the highest in the OECD, and our best university is similar in quality to the median leading universities in OECD countries. The mix of fields of study, however, may not be optimal from the perspective of economic growth. New Zealand’s 15- to 20-year-olds have lower enrolment rates than the OECD average, indicating a higher proportion of students leaving school and not enrolling in tertiary education.
- Māori and Pasifika educational achievement in schools is below average but improving.

### Introduction

Skills and talent are essential to improving productivity and incomes. People with the right skills help firms to create, develop and use new technology, new markets and new workplace practices. Skills are a focal point of the government’s strategy for economic transformation.

Skills and talent are influenced by formal learning processes, informal experiences, networking, and social and cultural norms. This chapter provides a general picture of New Zealand’s current performance in a number of aspects of skills and talent, including educational achievement, adult literacy and perceptions of managerial ability.<sup>53</sup>

53. The discussion focuses on educational attainment. This reflects the relatively good availability of statistics in this area, compared with other equally important aspects of human capital (such as management capability).

## 4.1.1

**Management and Leadership Skills**FIG.  
4.1

Management and leadership skills impact substantially on organisational performance. Skilled managers create an environment where innovation and skill development can flourish. A number of recent studies confirm the link between management quality and productivity.<sup>54</sup>

Because objective internationally comparable data on management skills is not available, we have relied on the International Institute for Management Development (IMD) World Competitiveness Yearbook. This asks business executives to rate management quality in their countries. This approach is not entirely satisfactory as perceptions may be biased, but it may provide some insight.

The IMD ranks perceived availability of management skills in New Zealand lower than in Australia, the UK and many OECD countries.<sup>55</sup>

## 4.1.2

**Advanced Skills**FIG.  
4.2 & FIG.  
4.3

Highly skilled and educated people are crucial to innovation. They create and embody knowledge and ideas, and they help facilitate the uptake of ideas from overseas and within New Zealand.

New Zealand's proportion of adults with a bachelor's degree was slightly above the OECD average in 2004. The proportion of the population with a bachelor's degree or higher and the proportion of the population with a tertiary qualification or higher have both grown since 1997, while the proportion of the population with no qualification has declined.

54. For example, Porter, M. and C. Ketels, *The skills and productivity challenge: A summary of the evidence base for the SSDA's strategic plan 2003–2006*, 2003, United Kingdom.

55. For more detailed information on New Zealand management capability, see Statistics New Zealand's Business Practices Survey, <http://www.stats.govt.nz/store/2006/07/business-practices-survey-2001-hotp.htm?page=para003Master>.

### 4.1.3 Basic Skills – Literacy and Numeracy

FIG.  
4.4

Adult literacy measures the ability of adults to use information effectively.

Recent studies have suggested that literacy is positively and significantly associated with employment outcomes.<sup>56</sup> Improving basic literacy skills is also likely to be important for lifting overall labour productivity.

The International Adult Literacy Survey (IALS)<sup>57</sup> in 1996 ranked New Zealand above the OECD median on prose literacy, but below the median on document and quantitative literacy.<sup>58</sup>

### 4.1.4 Upskilling the Current Labour Force

FIG.  
4.5

Knowledge and skills can accumulate outside formal education through self-training and workplace training and experiences. New Zealand has the highest number of hours of continuing education and training per adult according to the IALS 2000, but the IMD Survey ranks<sup>59</sup> New Zealand below many OECD countries in the emphasis given to employee training.

### 4.1.5 Ensuring New Entrants to the Workforce are Skilled – Educational Attainment

FIG.  
4.6 TO FIG.  
4.14

The skills of New Zealand's future workforce will depend on the skills of new entrants.

New Zealand's university graduation rates are high by OECD standards and are increasing.<sup>60</sup> According to the Times Higher World University Rankings, our best university is similar in quality to the median leading universities in OECD countries, suggesting that the quality of our university education is likely to be comparable with the OECD average.

New Zealand exceeds OECD norms in the number of science graduates, but falls well short in the number of engineering graduates. Many people graduate in fields that are not obviously connected to productivity growth. We trail well behind the OECD average in PhD graduations.

At the secondary school level, the picture is mixed. While our 15-year-olds perform above average on reading, scientific and mathematics literacy according to the Programme for International Student Assessment (PISA) measure, our 13- to 14-year-olds score below average on America's Trends in International Mathematics and Science Studies (TIMSS) measure.<sup>61</sup> The proportion leaving secondary school qualified to enter university is increasing, but the participation rate in education for 15- to 19-year-olds is well below the OECD average and is declining.<sup>62</sup> Māori and Pasifika educational attainment is still well below average, although improving.<sup>63</sup>

56. For example, see *The Connection between Literacy and Work: Implication for Social Assistance Recipients*, Human Resources and Social Development Canada.

57. The adult literacy and numeracy statistics here came from the IALS' *Literacy in Information Age* published in 2000. A new survey was conducted in 2006, and its preliminary results are to be published in January 2008.

58. Prose literacy, according to the IALS definition, measures "the knowledge and skills needed to understand and use information from text". Document literacy refers to "the knowledge and skills required to locate and use information contained in various forms such as timetables, graphs, charts, and forms". Quantitative literacy measures "the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in

printed materials, such as calculating savings from a sale advertisement or working out the interest required to achieve a desired return on an investment".

59. IMD World Competitiveness Yearbook 2006, Figure 3.2.09.

60. This high rate is in part due to the number of mature students.

61. Data from the Ministry of Education indicates that New Zealand's performance on TIMSS and PISA measures has been steady.

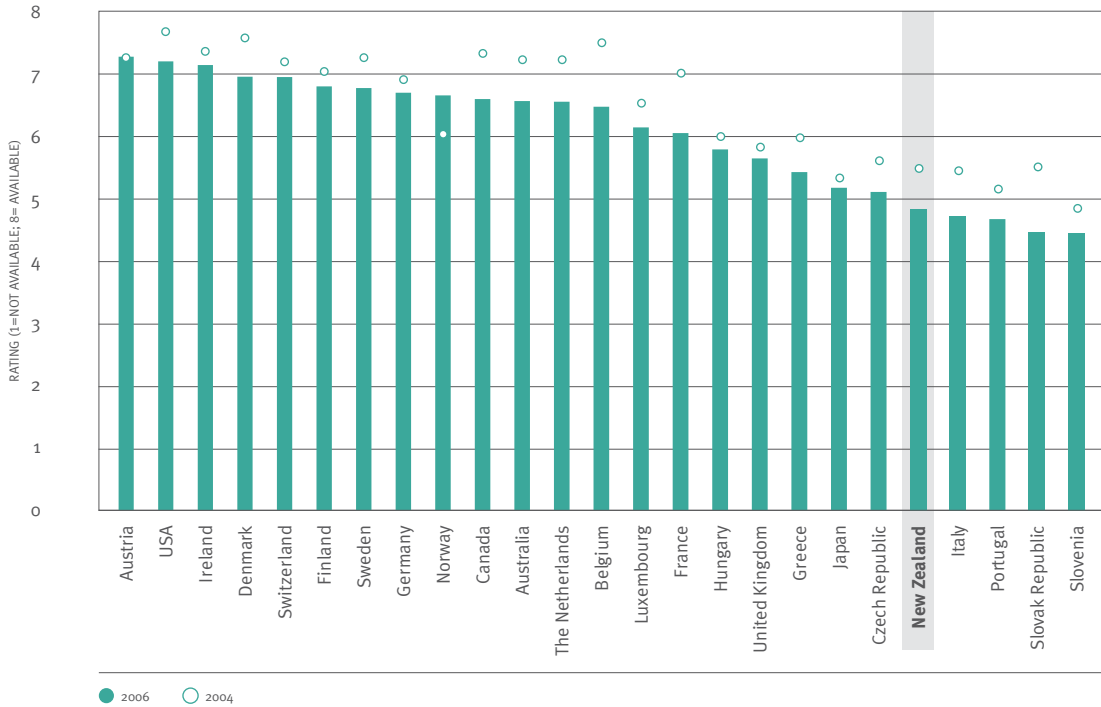
62. *Retention of Students in Senior Secondary Schools* by the Ministry of Education, <http://educationcounts.edcentre.govt.nz/indicators/engagement/simuzo.html>.

63. School leavers with no qualification statistics, Ministry of Education, New Zealand, [http://www.educationcounts.edcentre.govt.nz/indicators/education\\_and\\_learning\\_outcomes/qualifications/school\\_leavers\\_with\\_no\\_qualifications](http://www.educationcounts.edcentre.govt.nz/indicators/education_and_learning_outcomes/qualifications/school_leavers_with_no_qualifications).

### 4.1.1 Management and Leadership Skills

Survey results from the IMD indicate there is perceived to be a shortage of competent senior managers in the New Zealand labour market (we are 22nd out of 24 countries).

FIG. 4.1 Perceived availability of competent senior managers, 2004 and 2006

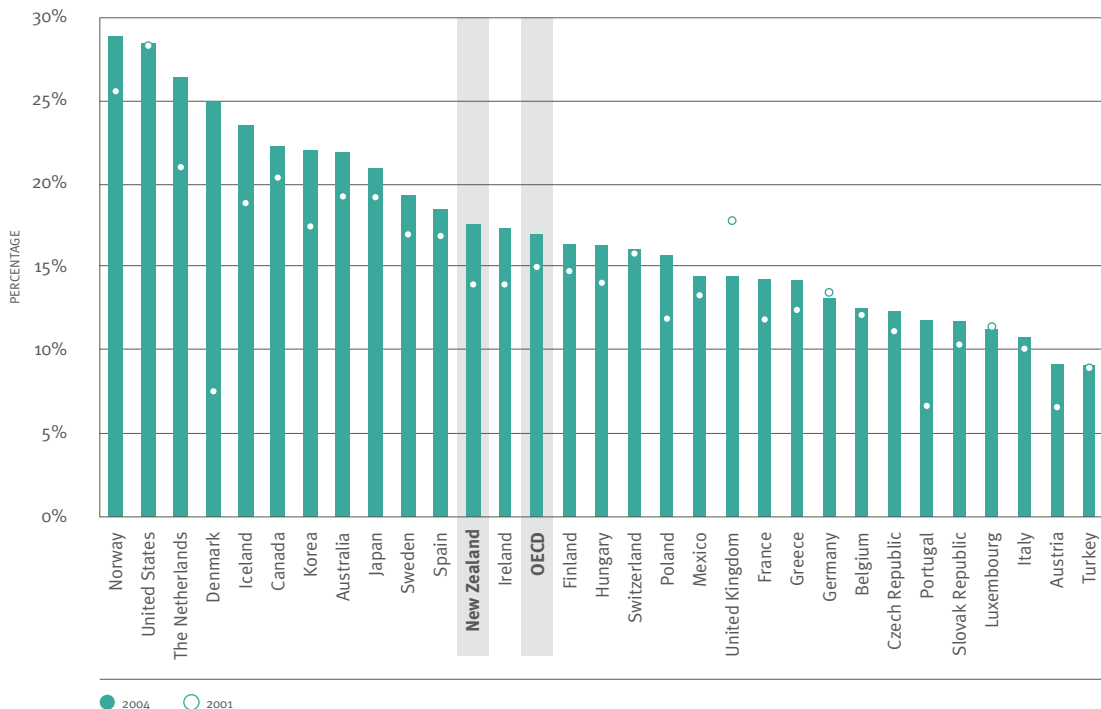


Source IMD World Competitiveness Yearbook 2006, Graph 3.2.21

### 4.1.2 Advanced Skills

The percentage of New Zealand adults with bachelor's degree<sup>64</sup> as the highest qualification is higher than the OECD average, and is improving (we are 11th out of 24 countries).

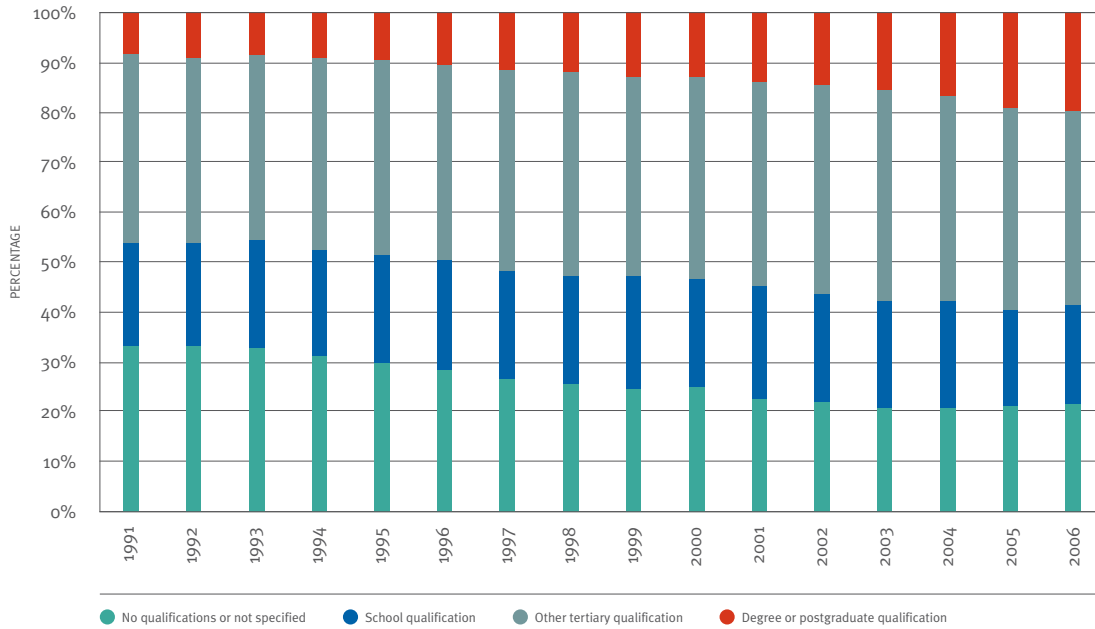
FIG. 4.2 Percentage of adult population with bachelor's degree as the highest qualification, 2001 and 2004



Source OECD, Education at a Glance 2006

64. Short-term and vocational qualifications are excluded. Also excluded are people with postgraduate degrees, for whom internationally comparable data is not available. 2001 figures also include advanced degrees.

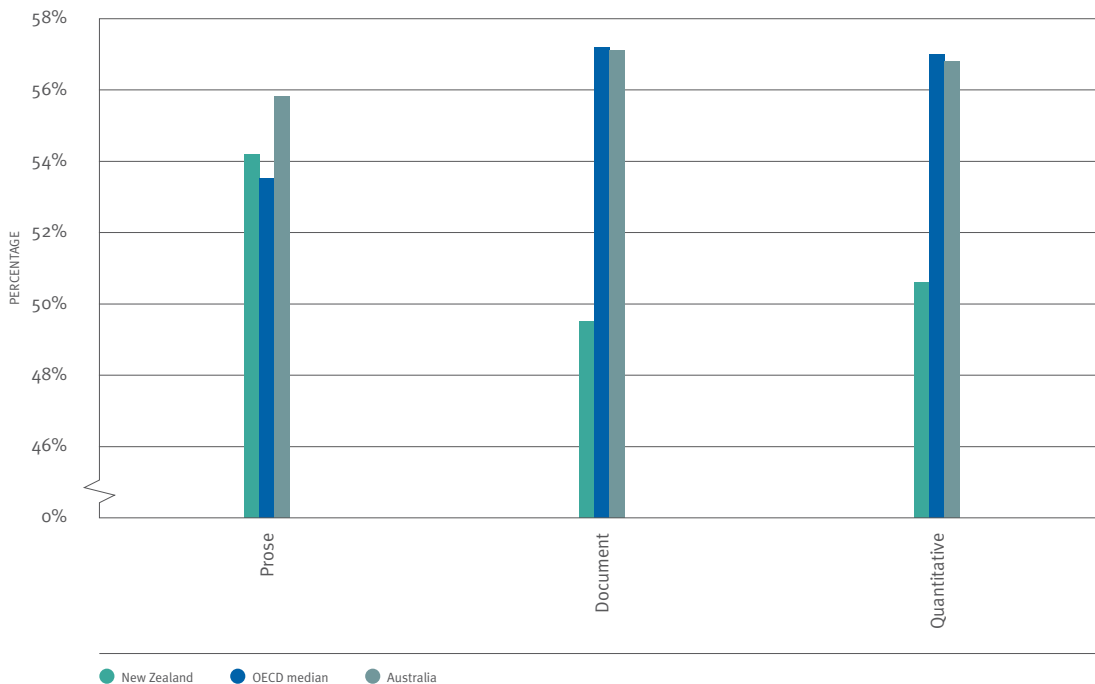
FIG. 4.3 Distribution of the population aged 25–64 years by highest qualification, 1991–2006



The proportion of the adult population with a tertiary qualification has increased, from 52 per cent in 1997 to 59 per cent in 2006. This growth has come primarily from an increase in the number of degrees and postgraduate qualifications.<sup>65</sup>

Source Statistics New Zealand, Household Labour Force Survey

FIG. 4.4 Percentage of adult population with higher skills (level 3 or above), 1996<sup>66</sup>



### 4.1.3 Basic Skills – Literacy and Numeracy

In 1996 (the most recent year for which data is available), New Zealand ranked above the OECD median on prose literacy (we are 7th out of 15 countries), but below the OECD on document literacy (13 out of 15) and quantitative literacy<sup>67</sup> (12 out of 15), according to the International Adult Literacy Survey (IALS).

Source OECD Literacy in the Information Age 2000, Table 2.2

65. These figures are based on highest qualifications, so they do not count the number of other tertiary qualifications held in addition to degrees and postgraduate qualifications.

66. International Adult Literacy Surveys (IALS) are only undertaken periodically, and results for the new Adult Literacy and Life Skills (ALL) Survey 2006 will not be available until after the publication of this report. The Ministry of Education will be publishing in January 2008 the results of New Zealand's performance in the 2006 survey.

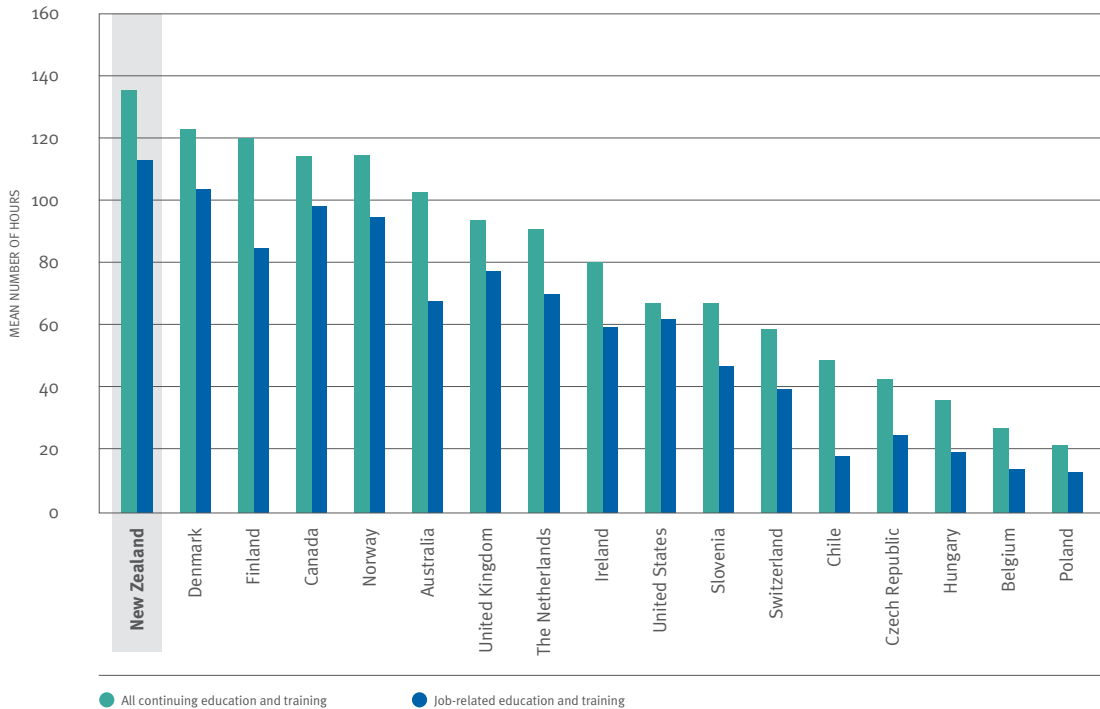
67. Prose literacy, according to the IALS definition, measures "the knowledge and skills needed to understand and use information from text". Document literacy refers to "the knowledge and skills required to locate and use information contained in various forms such as timetables, graphs, charts, and forms". Quantitative literacy measures "the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials, such as calculating savings from a sale advertisement or working out the interest required to achieve a desired return on an investment".

#### 4.1.4 Upskilling the Current Labour Force

New Zealand has the highest number of hours of continuing education and training per adult from 1994 to 1998 (the most recent year for which data is available) in the 17 countries that participated in the IALS survey.

FIG. 4.5

Hours of continuing education and job-related training per adult, 1994–1998

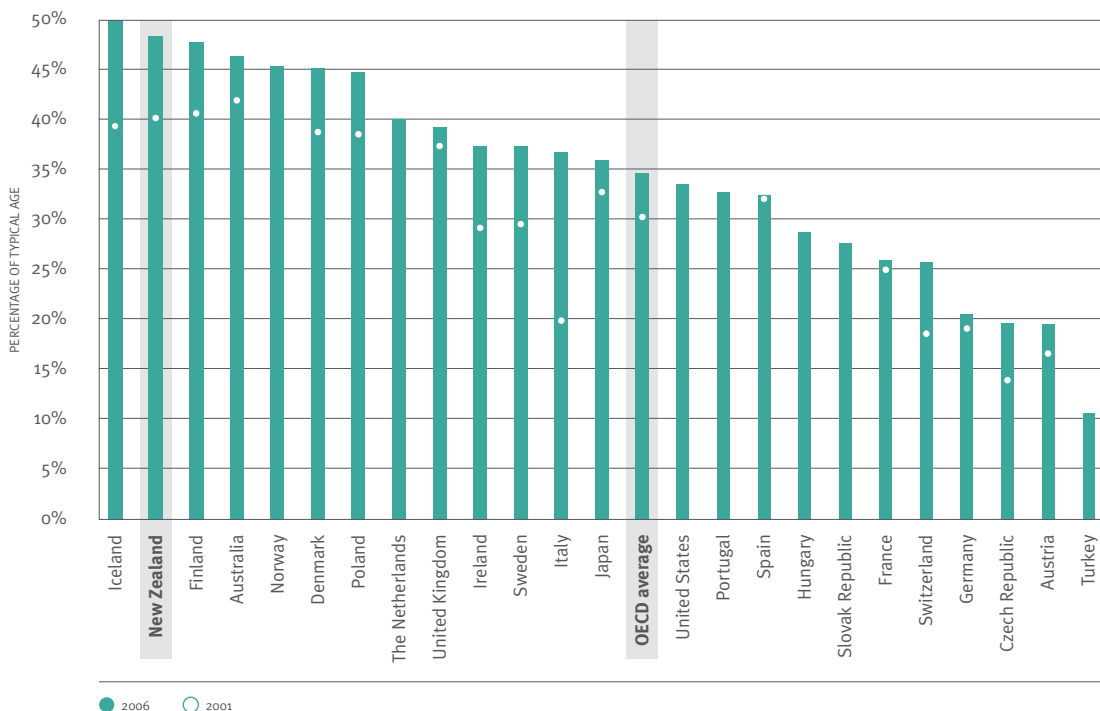


#### 4.1.5 Ensuring New Entrants to the Workforce are Skilled – Educational Attainment

New Zealand's university graduation rate is among the top in the OECD and the rate has been improving<sup>68</sup> (we are 2nd out of 20 countries). "University graduation rate" is defined as the number of students completing university degrees for the first time as a percentage of the age group normally completing university degrees.

FIG. 4.6

University graduation rates, 2001 and 2006

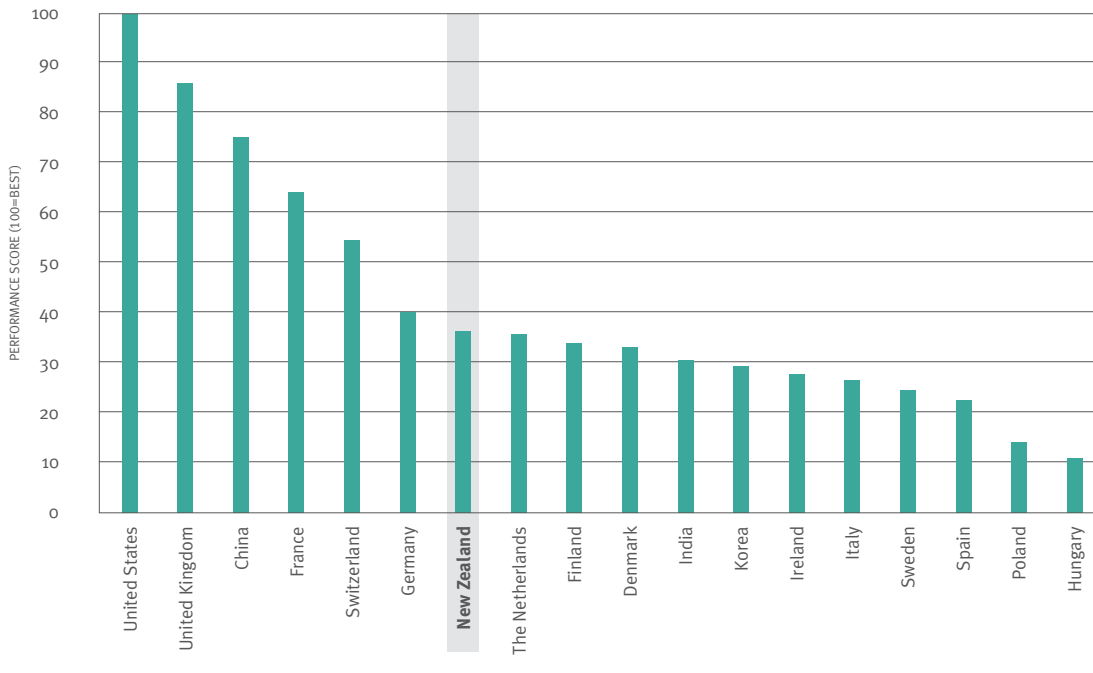


Source OECD Literacy in the Information Age 2000

Source OECD, Education at a Glance 2003 & 2006, Table A3.1

68. This high rate is in part due to the number of mature students, who are counted even though they do not form part of the "age group normally completing university degrees".

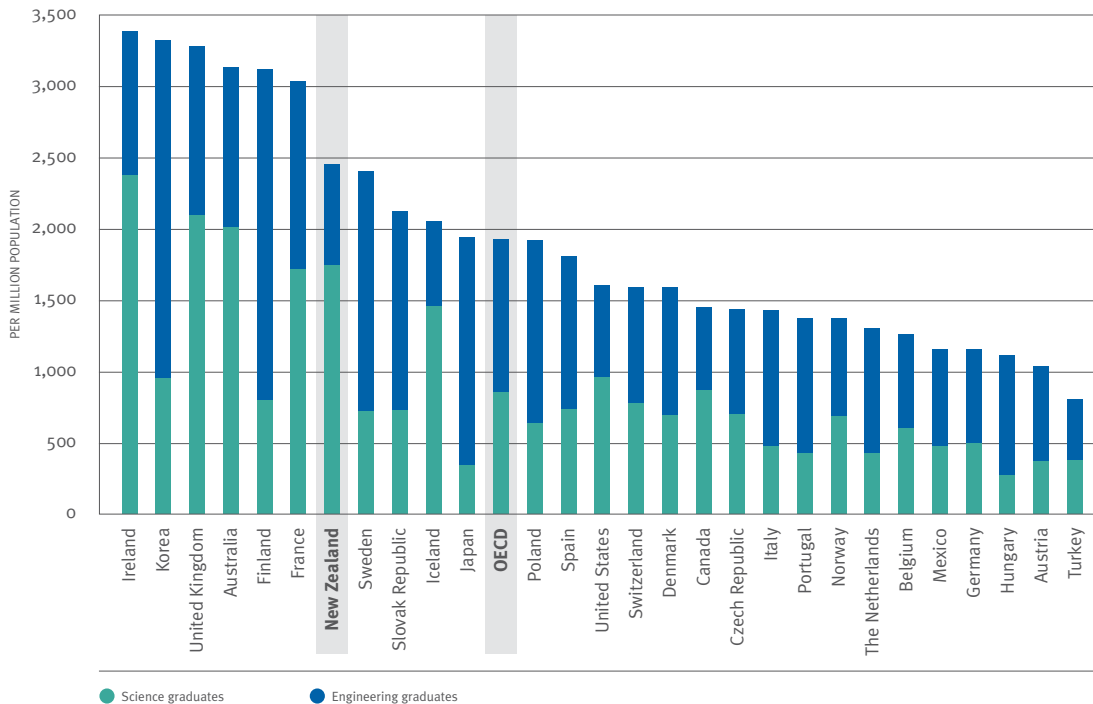
FIG. 4.7 Quality of leading universities,<sup>69</sup> 2006



On this measure, the quality of New Zealand's best university is similar to that of the median leading universities in the OECD but well behind the best. The performance score (100 = best) is awarded based on peer review from academics and graduate recruiters, staff to student ratio, research citations and a university's success in attracting international staff and students.

Source The Times Higher World University Ranking, 2006, Figure 4.55; Forfas, Annual Competitiveness Report 2006

FIG. 4.8 Science and engineering graduates per million population, 2003



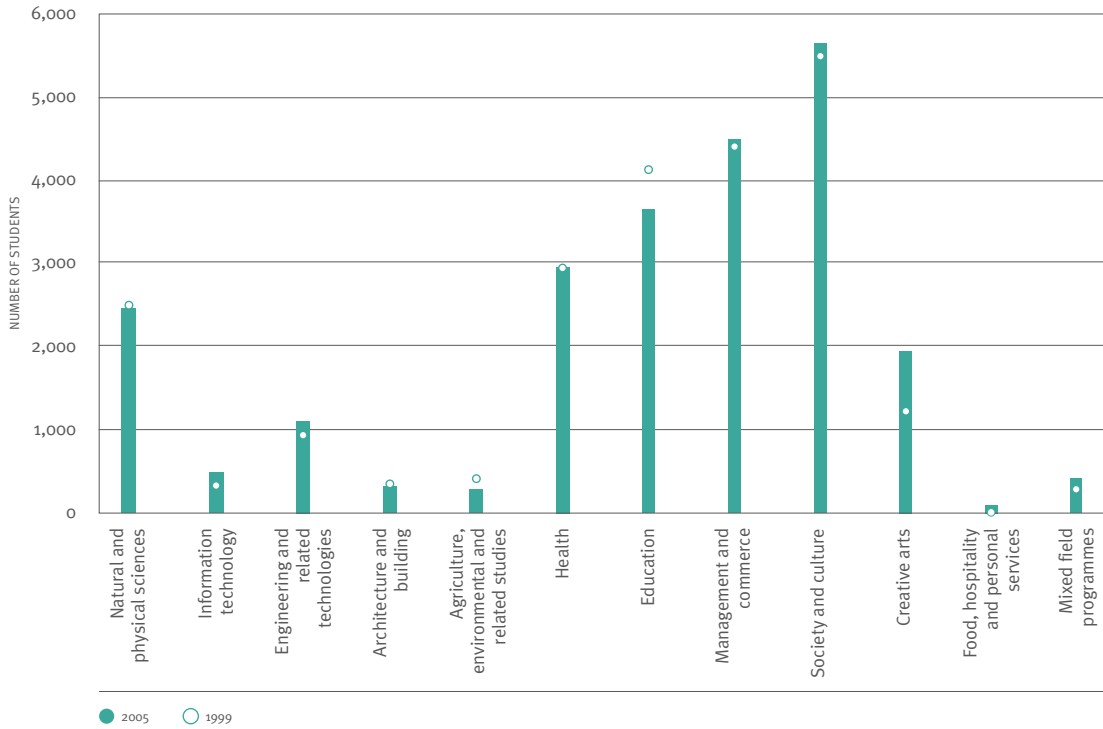
New Zealand has a high number of science graduates (4 out of 22) but a low number of engineering graduates (14 out of 22) as a proportion of the population, relative to the OECD average (6 out of 22 for total science and engineering graduates). 2003 is the most recent year for which data is available.

Source OECD Education at a Glance, Table A3.5; Treasury Aremos database; MED calculations

69. There are concerns about the validity of this ranking, reflecting the difficulties in comparing universities across countries. See Van Raan, A., *Challenges in Ranking of Universities*, 2005, <http://www.cwts.nl/cwts/AvR-ShanghaiConf.pdf>.

FIG. 4.9<sup>70</sup> Domestic bachelor's graduates by field of study, 1999 and 2005

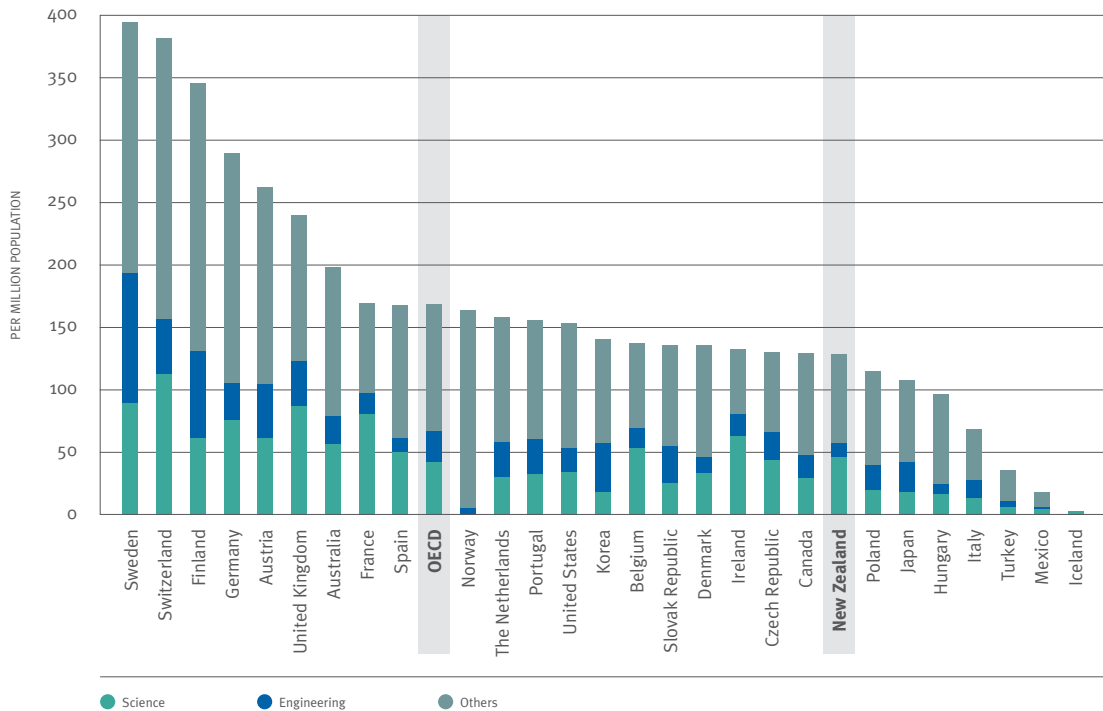
The pattern of domestic students graduating (excluding foreign students) by field of study has shown little absolute change between 1999 and 2005. “Creative arts” experienced the greatest percentage increase (37 per cent). “Agriculture, environment and related studies” experienced the greatest percentage decrease (52 per cent).



Source Education Counts (Ministry of Education website)

FIG. 4.10 PhD graduates per million population, 2002

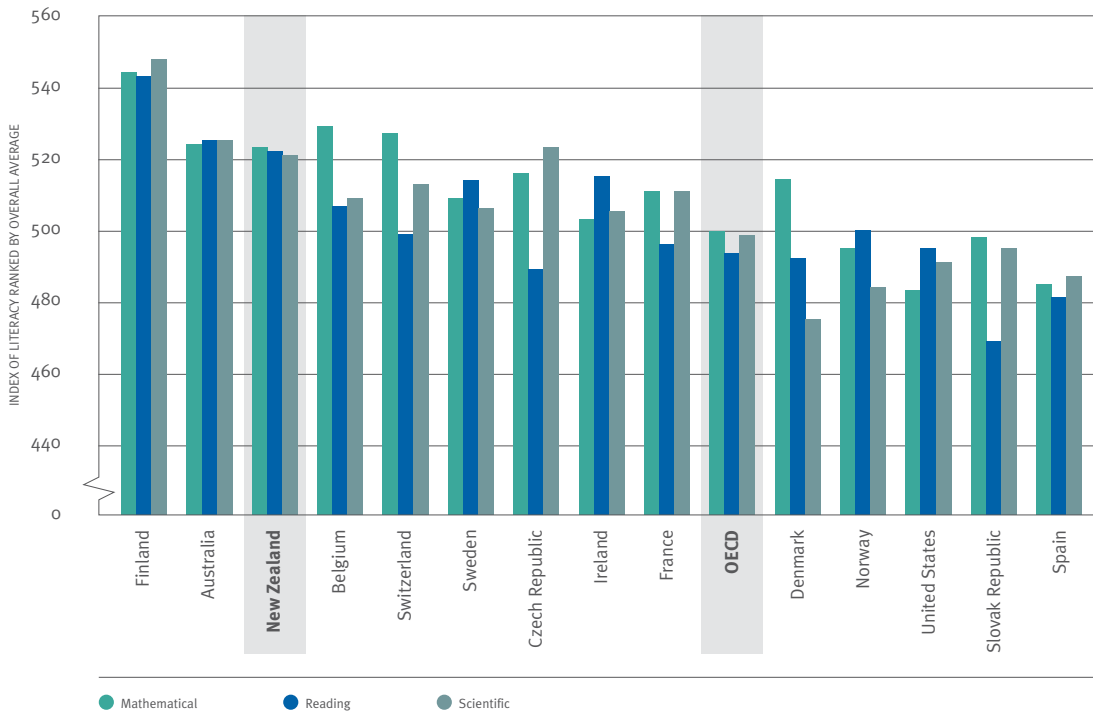
New Zealand has a low number of PhD students graduating as a proportion of the population, compared with other OECD countries (we are 18th out of 22 countries). The number of New Zealand science PhD graduates is slightly higher than the OECD average, but the number of engineering PhD graduates is much lower.



Source OECD Science, Technology and Industry Outlook 2006, Figure 3.5

70. There are differences in the way graduates are allocated to subject classifications between Figures 4.8 and 4.9.

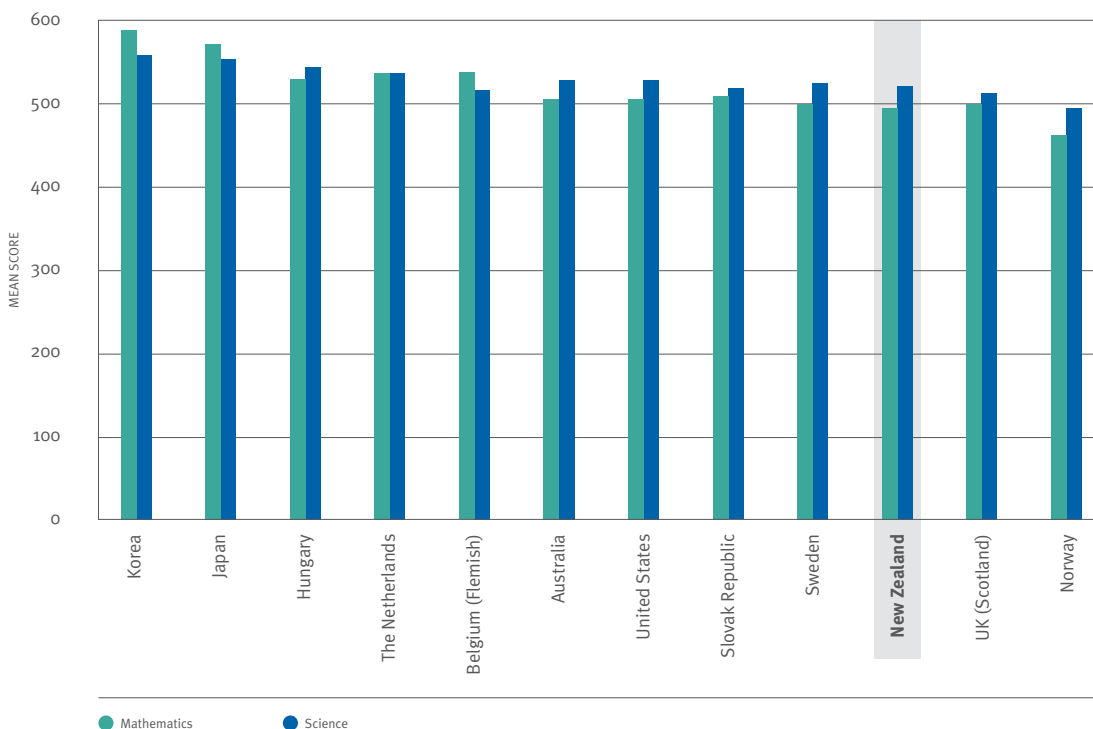
FIG. 4.11 PISA scientific, mathematical and reading literacy of 15-year-olds, 2003



The performance of New Zealand's 15-year-olds is towards the top of the OECD in terms of scientific (we are 5th out of 23 countries), mathematics (8 out of 23) and reading (4 out of 23) literacy, according to PISA.

Source OECD, Learning for Tomorrow's World

FIG. 4.12 TIMSS science and mathematics achievement of eighth grader (equivalent to 13- to 14-year-olds in New Zealand)



New Zealand's 13- to 14-year-olds' mathematics (we are 11th out of 12 countries) and science (8 out of 12) achievement is a little lower than in most European countries according to TIMSS.<sup>71</sup>

Source IEA's TIMSS 2003 International Report on Achievement in Mathematics Cognitive Domains: Findings from a Development Project

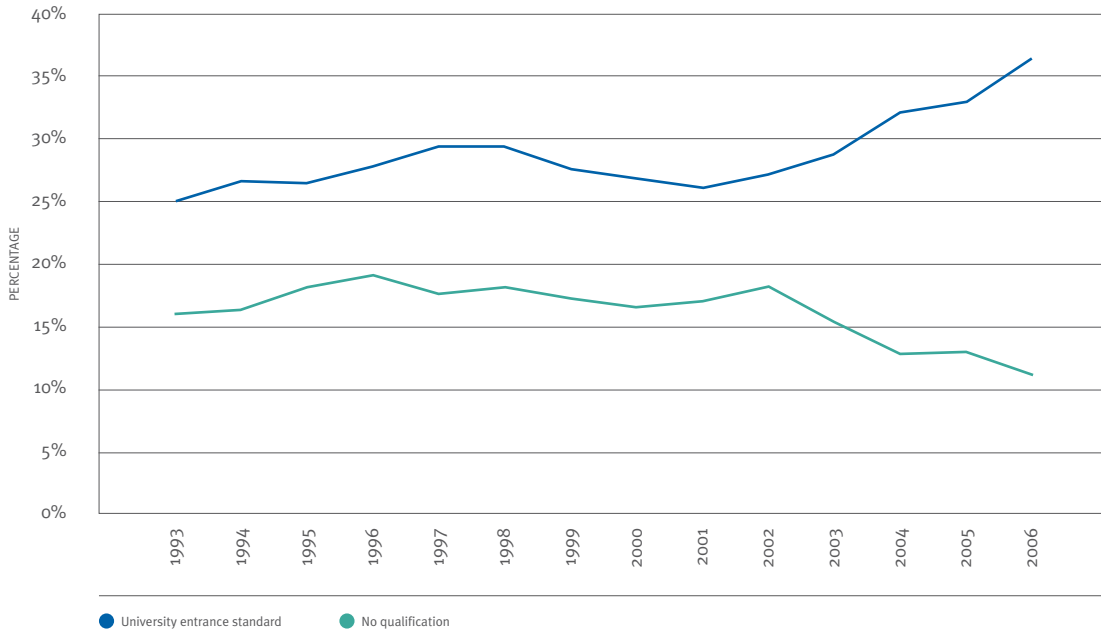
71. We cannot fully ascertain the difference in results between TIMSS and PISA. One suggested explanation is that the two studies target different population groups. TIMSS targets 8th graders, or Year 9 equivalent in New Zealand (13- to 14-year-olds), whereas PISA looks at 15-year-olds regardless of grade/year level. TIMSS's assessment also focuses on

curriculum-related tasks, while PISA is more literacy-based. For more details about the differences between TIMSS and PISA, see D. Hutchison and I. Schagen's presentation "Comparisons Between PISA and TIMSS – Are We the Man with Two Watches?" [http://www.brookings.edu/gs/brown/irc2006conference/HutchisonSchagen\\_presentation.pdf](http://www.brookings.edu/gs/brown/irc2006conference/HutchisonSchagen_presentation.pdf).

FIG. 4.13

Percentage of school leavers with university entrance standard vs school leavers with little or no qualification

The percentage of school leavers with little or no qualification has had a notable drop since (and probably associated with) the introduction of NCEA.<sup>72</sup> There was also a significant increase in the percentage leaving school with university entrance standard.

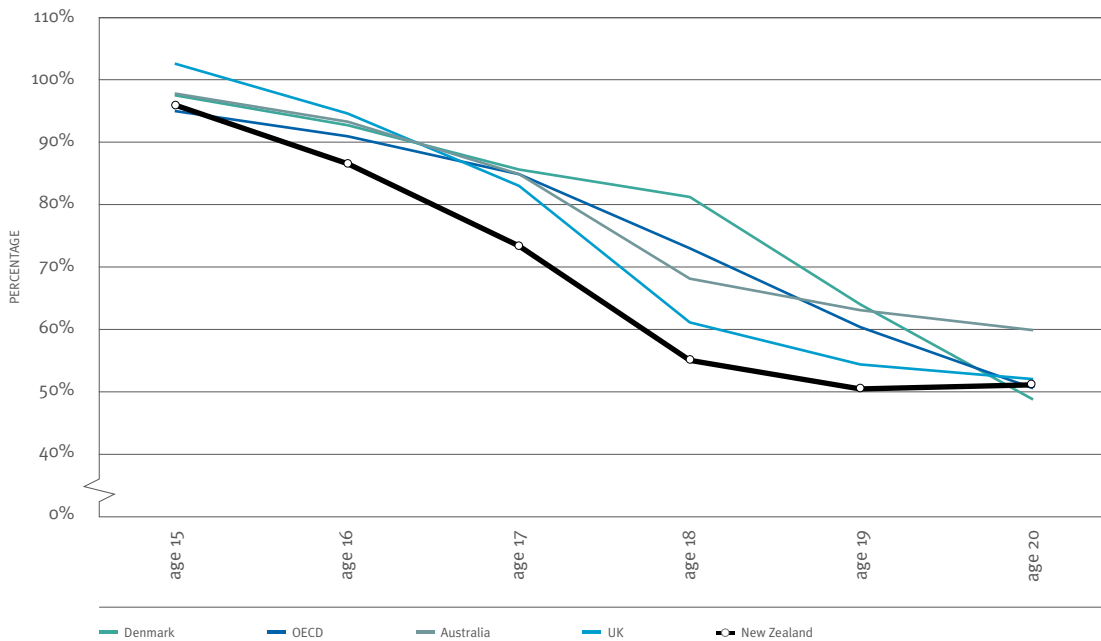


Source Education Counts (Ministry of Education website)

FIG. 4.14

Education enrolments at ages 15–20, 2004

New Zealand has lower enrolment rates for 15- to 20-year-olds than the OECD average. This indicates that New Zealand students are more likely to leave school early and are less likely to be enrolled in tertiary education and training at ages 15–19.



Source OECD, Education at a Glance 2006, Table C1.3

72. National Certificate of Educational Achievement.

## 4.2 Infrastructure

### Key Points

- Appropriate infrastructure has a positive effect on the economy as a whole by contributing to increasing productivity levels and maintaining New Zealand as an attractive country in which to do business.
- The quality of much of New Zealand’s infrastructure appears to be at or below the OECD average.
- New Zealand’s information and communications technology (ICT) infrastructure quality appears to be below that of most OECD countries, but recent improvements in certain areas (such as broadband subscriptions) are encouraging.
- New Zealand’s transport infrastructure quality appears to be slightly below the OECD average, but is equivalent to that of many countries with dispersed populations such as Norway, Finland and Australia.
- The perceived quality of energy infrastructure is low in comparison with other key countries, but is improving.

### Introduction

Infrastructure lies at the heart of economic and social development. It provides the foundation for virtually all modern-day activity, constitutes a major economic sector in its own right, and contributes significantly to raising living standards and quality of life.

The economic benefits of infrastructure have been the subject of debate for a number of decades. A broad consensus now exists that an appropriate level of public infrastructure has a positive productive effect on economies, in both the short and long term. Further, the evidence suggests that, over the long term, public investment in infrastructure encourages greater levels of private investment.<sup>73</sup>

The quantity and quality of infrastructure affects the functioning of firms, and also the functioning of the wider economy, in a number of ways. Infrastructure investment can make it easier for labour and materials to get to where they are used, thereby increasing productivity. It can also allow new opportunities to emerge and it can facilitate urban agglomeration.

Appropriate infrastructure has a positive effect on the economy as a whole, particularly in terms of increasing productivity levels and maintaining New Zealand as an attractive country in which to do business.

This chapter provides a picture of New Zealand’s infrastructure, including its overall quality, transport infrastructure, ICT infrastructure, energy infrastructure and water usage.

73. Refer to the MED paper Linkage between Infrastructure and Economic Growth, 2003, available on the MED website.

In contrast to most of the other chapters in this report, many of the following infrastructure indicators are survey-based and reflect public perceptions of the adequacy of New Zealand's infrastructure. This reliance on survey-based data was unavoidable; it was not possible to find more consistent and objective quantitative measures of infrastructure quality in a number of key areas. However, survey-based findings should be interpreted with care. Especially in a small country such as New Zealand, public perceptions and attitudes may sometimes be at odds with the harder evidence that is available. For this reason, we have attempted to include more quantitative measures where possible.

### 4.2.1 Overall Performance

FIG. 4.15 & FIG. 4.16

Overall, New Zealand is perceived to have lower-quality infrastructure than most high-income countries. We ranked 34th of the 125 countries included in the latest Global Competitiveness Report prepared by the World Economic Forum (WEF), below the majority of OECD countries. New Zealand respondents rated an inadequate supply of infrastructure as the second most problematic factor for doing business in New Zealand.

However, these survey-based findings contrast with OECD estimates of the levels of public capital stock per capita across a range of countries. On that measure, New Zealand ranks 5th of a selection of 21 OECD countries.

### 4.2.2 ICT

FIG. 4.17 TO FIG. 4.23

The perception-based data suggests that the quality of New Zealand's ICT infrastructure is below that of most high-income countries.

The harder data is mixed, but overall supports the conclusion that the quality of New Zealand's ICT infrastructure places us in the lower half of the OECD. New Zealand's overall levels of current investment in ICT appear to be above the OECD average. New Zealand's broadband subscription rate remains below the OECD average, but our recent growth in broadband subscription rates is higher than average. The statistics in this chapter do not refer to the quality or cost-effectiveness of broadband, and recently announced changes are expected to have a positive influence on these factors.

Mobile subscription rates are above the OECD average, although prepaid mobile costs are high by international standards.

### 4.2.3 Transport

FIG. 4.24 TO FIG. 4.26

Overall, New Zealand is considered to be around the middle of the OECD, in terms of perceived quality of road and port infrastructure. New Zealand cities are a little less congested than Australian cities (see Chapter 6 for more details on congestion). However, New Zealand compares favourably with developed nations with a similarly dispersed population profile. New Zealand has a large number of airports per capita. New Zealand does not appear to do well in terms of public transport infrastructure, although there is not a large amount of data to provide an objective ranking in this area (see Chapter 6 for more information).

### 4.2.4 Energy

FIG. 4.27 TO FIG. 4.30

Both the quality of energy infrastructure and the quality of the electricity supply are perceived to be lower than in most other OECD nations. It is not clear how well these perceptions reflect reality. A 2006 Forfas report indicates that New Zealand is in the upper half of the 12 OECD countries surveyed in terms of energy quality based on price, security of supply and access. In contrast, we ranked 19th out of 24 OECD countries on the perceptions based World Economic Forum Survey.<sup>74</sup> Energy prices in New Zealand have increased only slightly in real terms over the past 25 years – however, residential prices have increased significantly over the past five years, while commercial electricity prices have remained lower. Industrial energy prices are low, with only a slight increase observable over the past few years. Approximately 65 per cent of New Zealand’s electricity production capacity is derived from renewable sources, placing New Zealand second in the OECD in terms of this ranking.

New Zealand’s energy intensity measures the rates of energy supply to gross domestic product (GDP). It is relatively high compared with those of other nations. This is likely to reflect our mix of industries and geography.

### 4.2.5 Water

FIG. 4.31 & FIG. 4.32

New Zealand does moderately well in this area. We are particularly well off in terms of the amount of water available for use, and are average in the general quality and accessibility of water infrastructure.

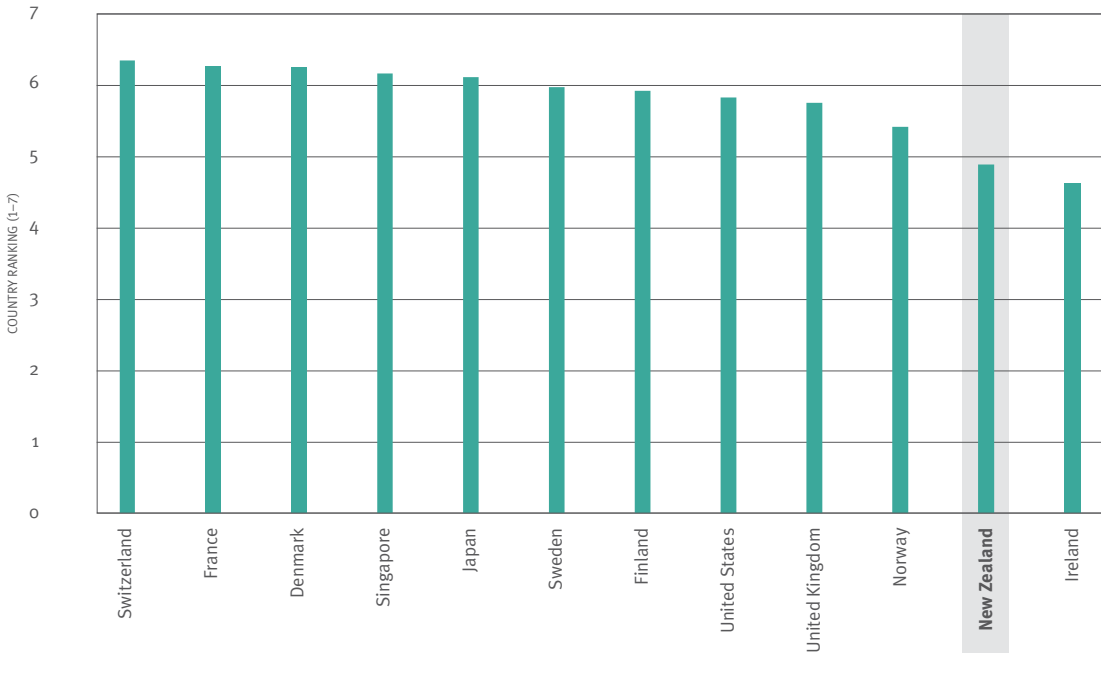
74. Forfas Electricity Benchmarking Analysis 2006 <http://www.forfas.ie/publications/show/pub253.html>. We have been unable to verify the integrity of the statistic. New Zealand scored 4.8 out of a possible rank of 7, for the perceived overall quality of our infrastructure under a recent World Economic Forum (WEF) survey. This rank was lower than that of the majority of OECD countries. The OECD ranking was 19 out of 24.

### 4.2.1 Overall Performance

The perceived overall quality of New Zealand's infrastructure is relatively low.

FIG. 4.15

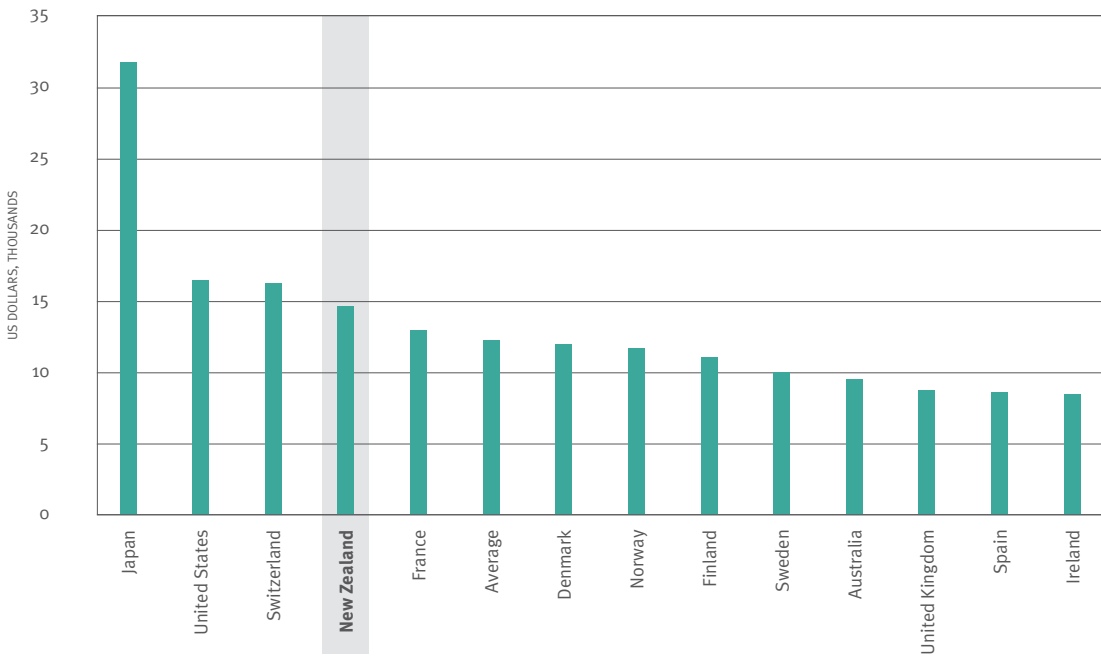
Perceived overall infrastructure quality, 2006



Source WEF Global Competitiveness Report 2006–2007, 2.01

FIG. 4.16

Public capital stock per person in thousands (USD), 2000

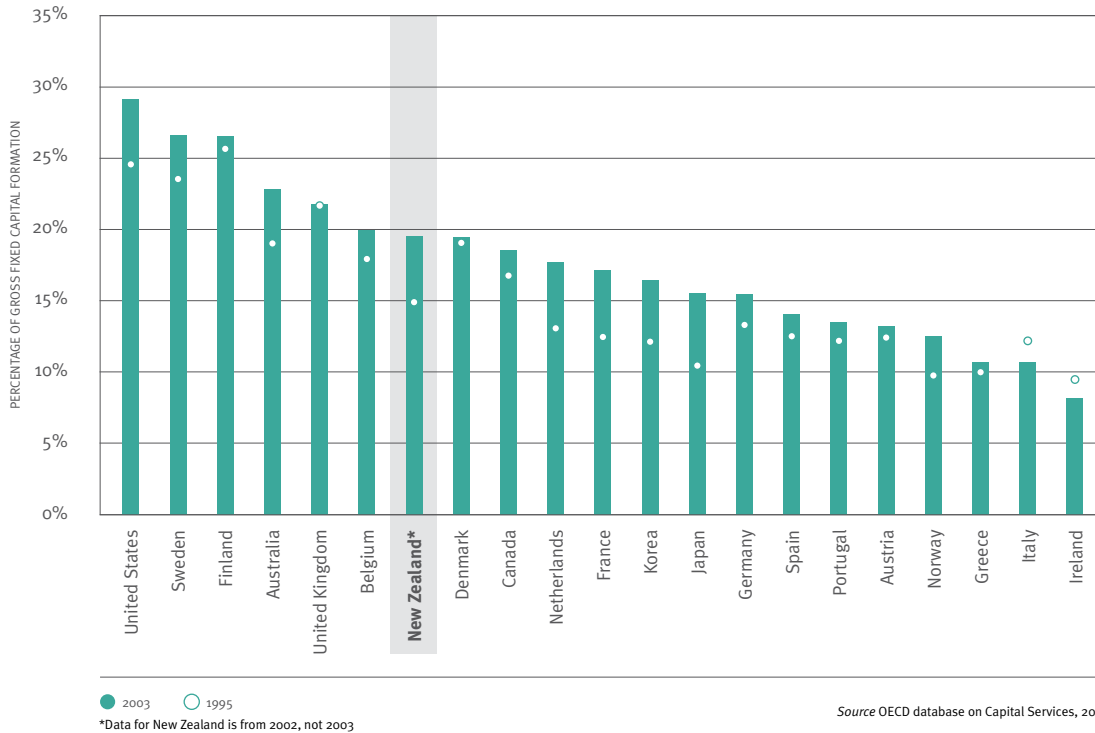


Source Forfas, Annual Competitiveness Report 2006

New Zealand's level of public capital stock per person<sup>75</sup> is 5th highest of 21 OECD nations.

75. This includes most forms of public (government) infrastructure, such as transportation systems, water treatment plants, schools, fire stations, police buildings and courthouses.

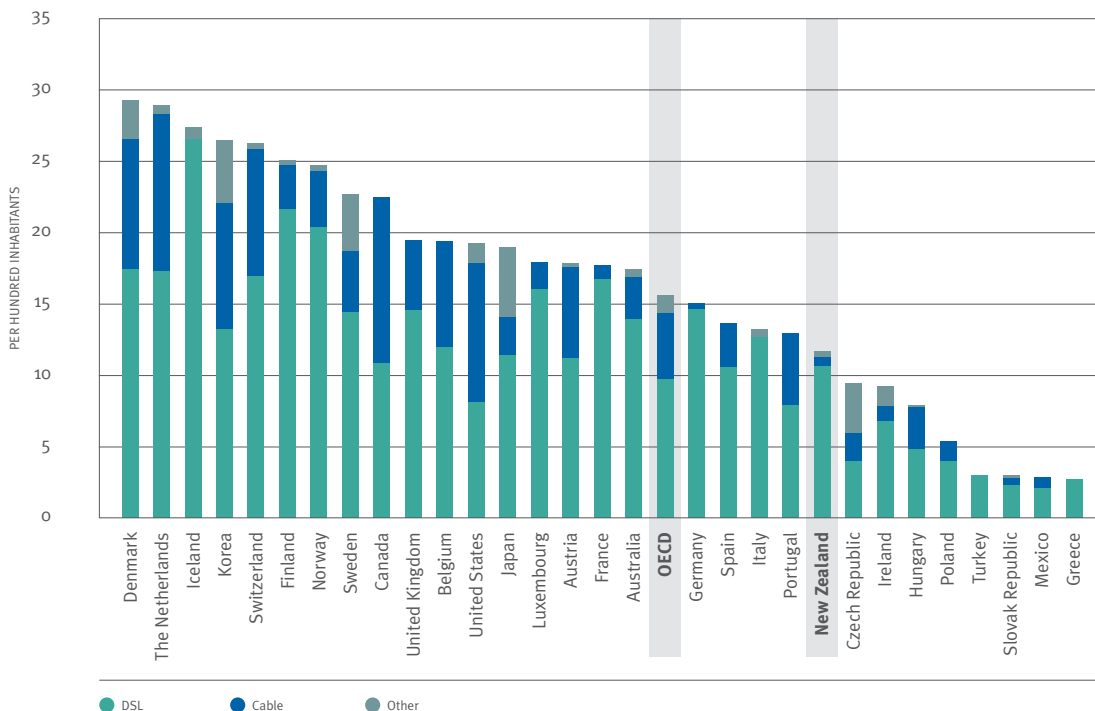
FIG. 4.17 ICT investment as a percentage of gross fixed capital formation, 1995 and 2003



4.2.2 ICT

New Zealand's level of ICT investment as a percentage of gross fixed capital formation has increased from 14.9 per cent in 1995 to 19.6 per cent in 2002 and places New Zealand in the upper half of the OECD (we are 7th out of 21 countries).

FIG. 4.18 Broadband subscribers per hundred inhabitants, 2006

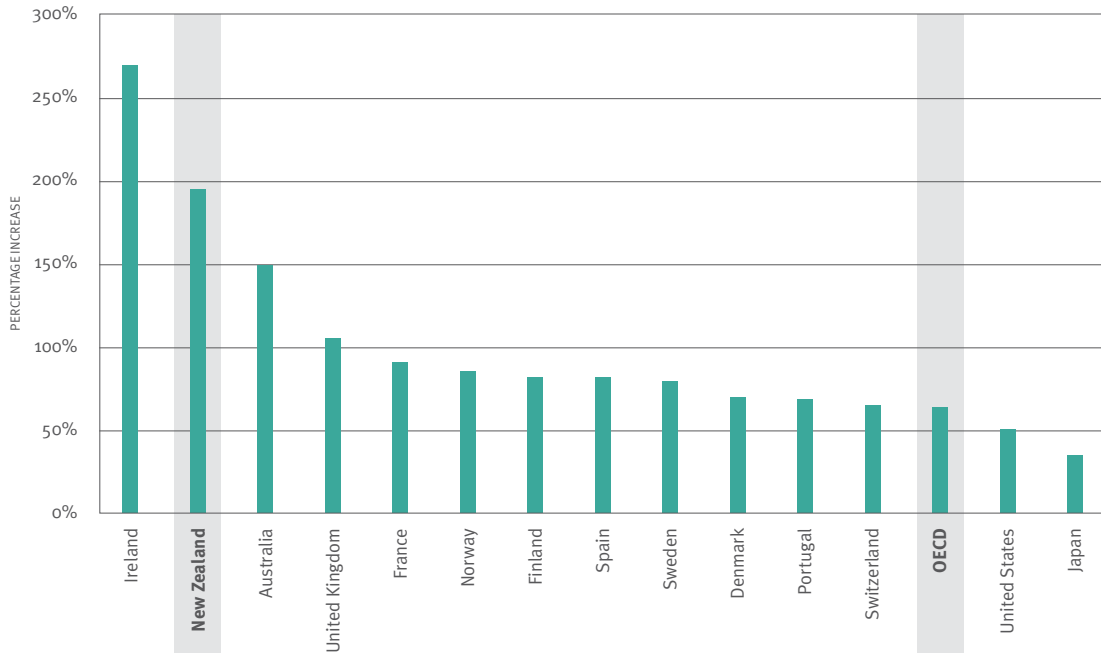


New Zealand's broadband subscription rates are lower than the OECD average (we are 20th out of 24 countries). DSL technologies are used to provide a higher proportion of broadband services in New Zealand than in most other OECD countries.

FIG.  
4.19

## Percentage increase in broadband subscription rates, 2004–2006

New Zealand's broadband subscription rates trebled from 2004 to 2006. This growth rate is well above the OECD average (New Zealand is second out of 14 countries) and most other comparable nations.

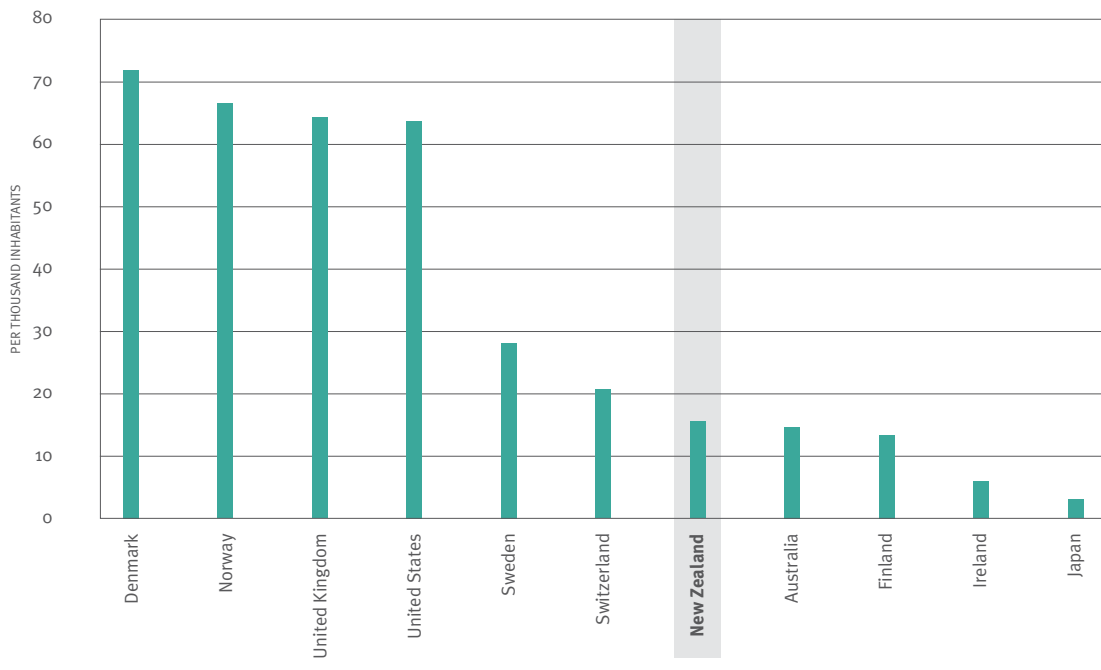


Source OECD Broadband Statistics 2006

FIG.  
4.20

## Number of websites per thousand inhabitants, 2002

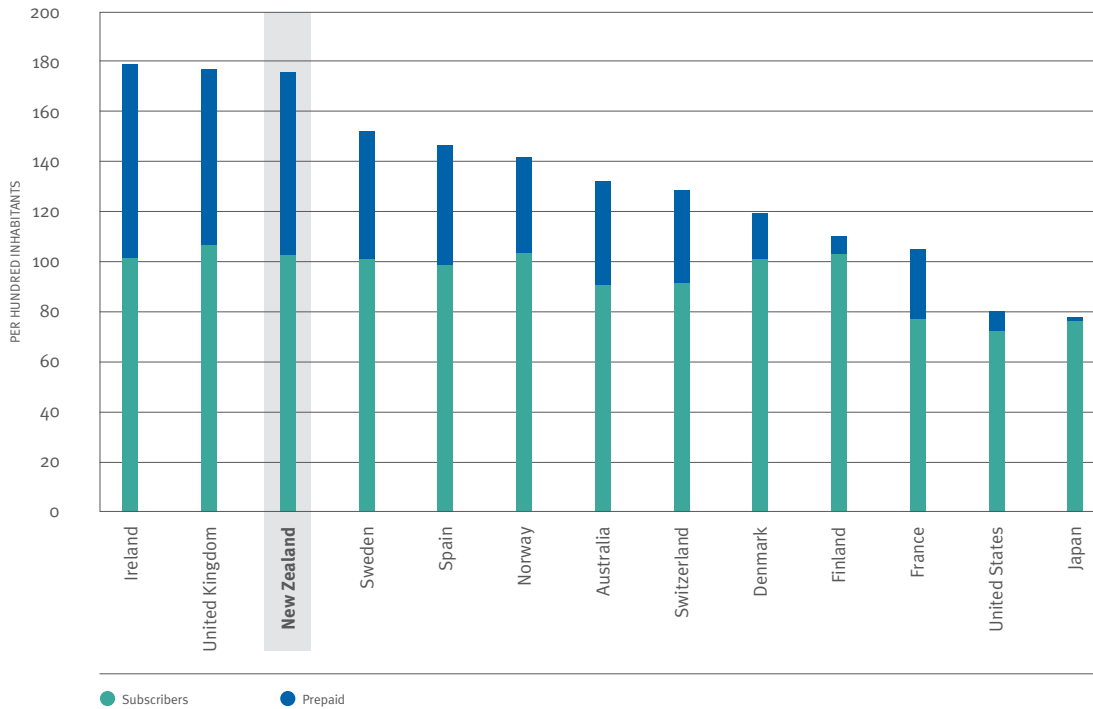
The number of websites per thousand inhabitants in New Zealand is ahead of other nations such as Australia, Finland and Ireland (we are 7th out of 12 countries). However it is significantly lower than in high-scoring countries such as Denmark. This statistic can be considered an innovation measure.



Source OECD Communications Outlook 2003; NationMaster 2007

FIG.  
4.21

## Mobile phone subscribers per hundred inhabitants, 2005

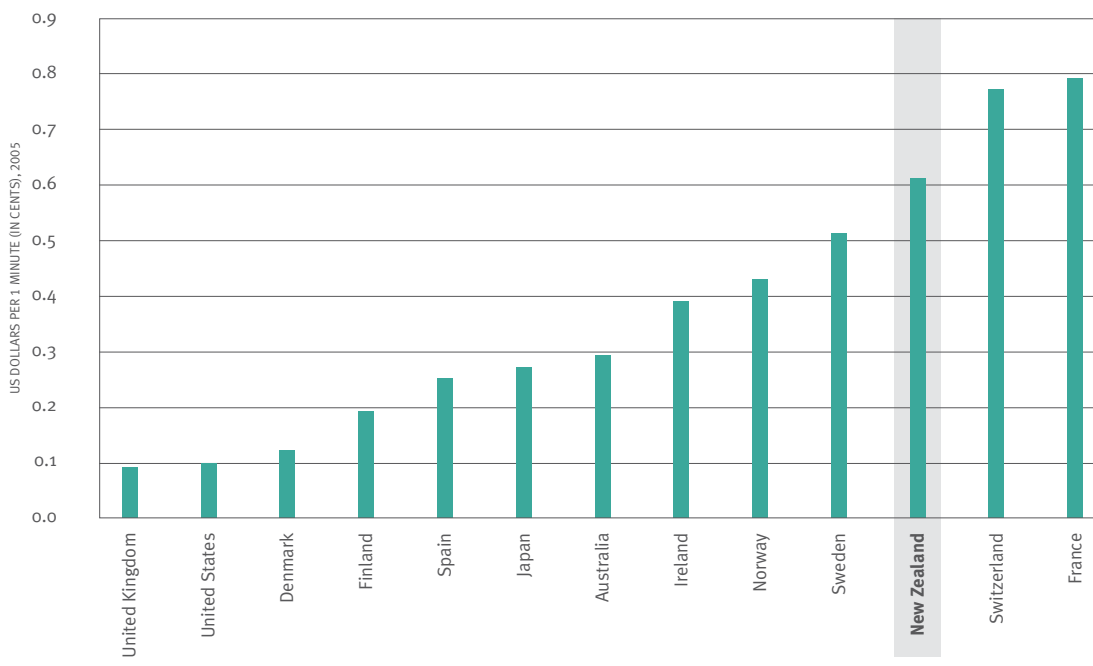


The number of mobile phone subscribers in New Zealand is higher than the OECD average (we are 6th out of 24 countries). This measure includes mobile subscribers and people using prepaid cards.

Source OECD ICT Indicators 2006

FIG.  
4.22

## Mobile telephone costs (prepaid), 2005



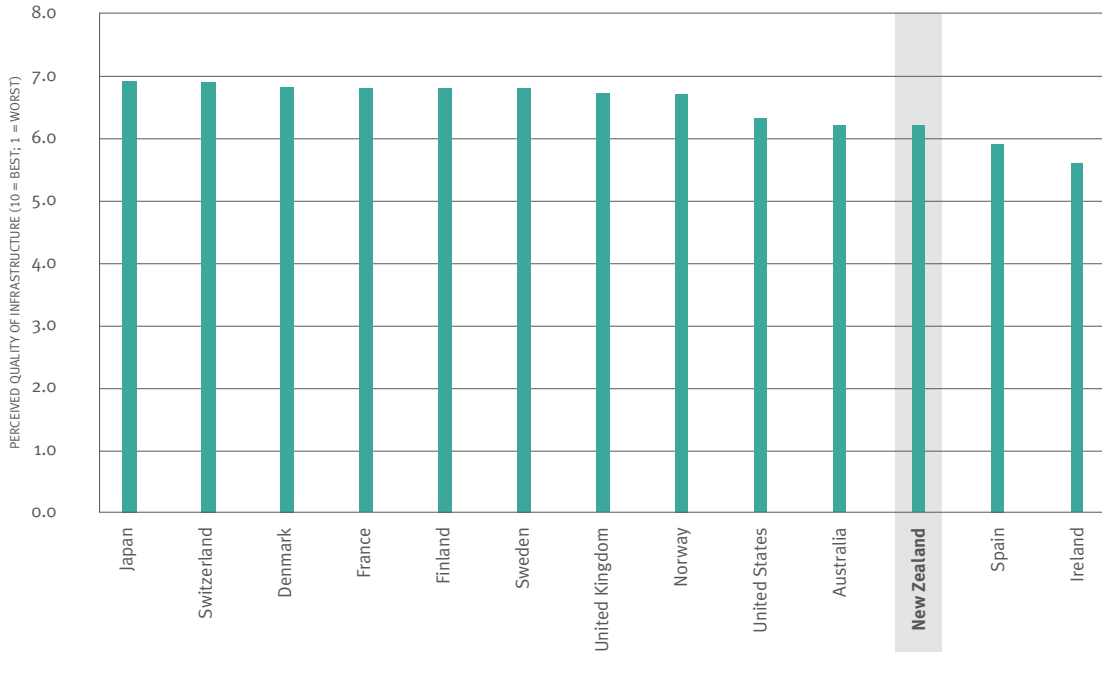
New Zealand's prepaid mobile costs (calculated at 2005 exchange rates) are higher than in many other nations (we are 21st out of 24 countries).

Source IMD Competitiveness Yearbook 2006, Table 4.2.05

FIG.  
4.23

Perceived quality of telephone and fax infrastructure, 2006

The perceived quality of telephone and fax infrastructure in New Zealand is slightly below that of other OECD nations (we are 18th out of 24 countries). New Zealand is of equal rank to countries such as Australia but slightly behind other countries in the OECD.



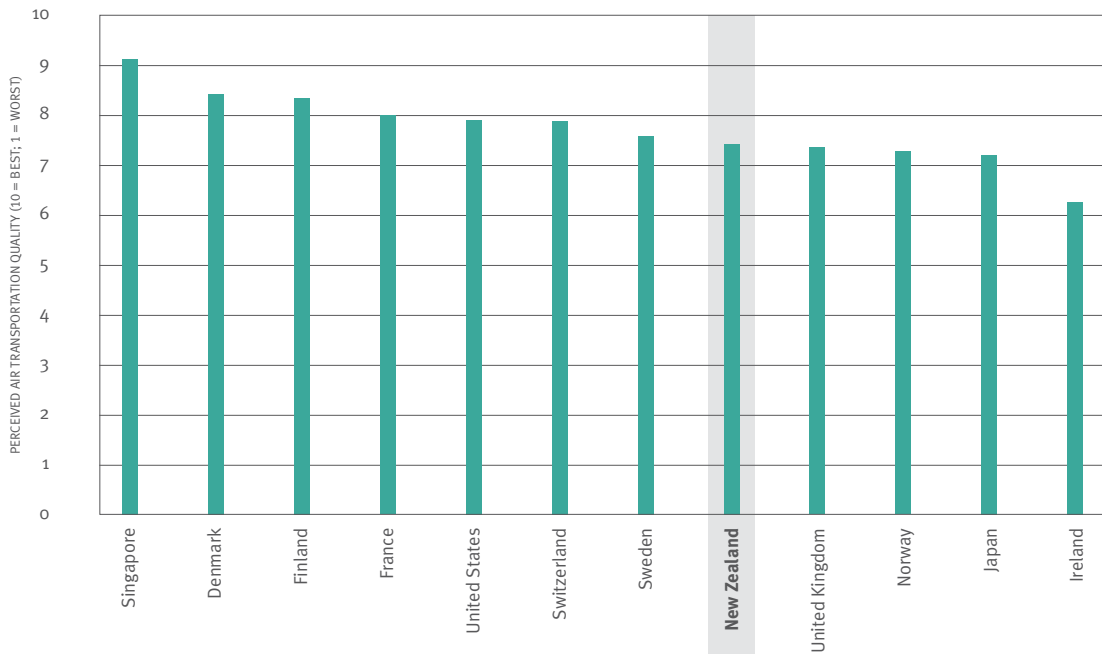
Source WEF, Global Competitiveness Report 2006–2007, Table 2.08

### 4.2.3 Transport

The perceived quality of air transportation is similar to the OECD average (New Zealand is 12th out of 24 countries). This indicator is based on business surveys asking whether the quality of air transportation deters or encourages business development.

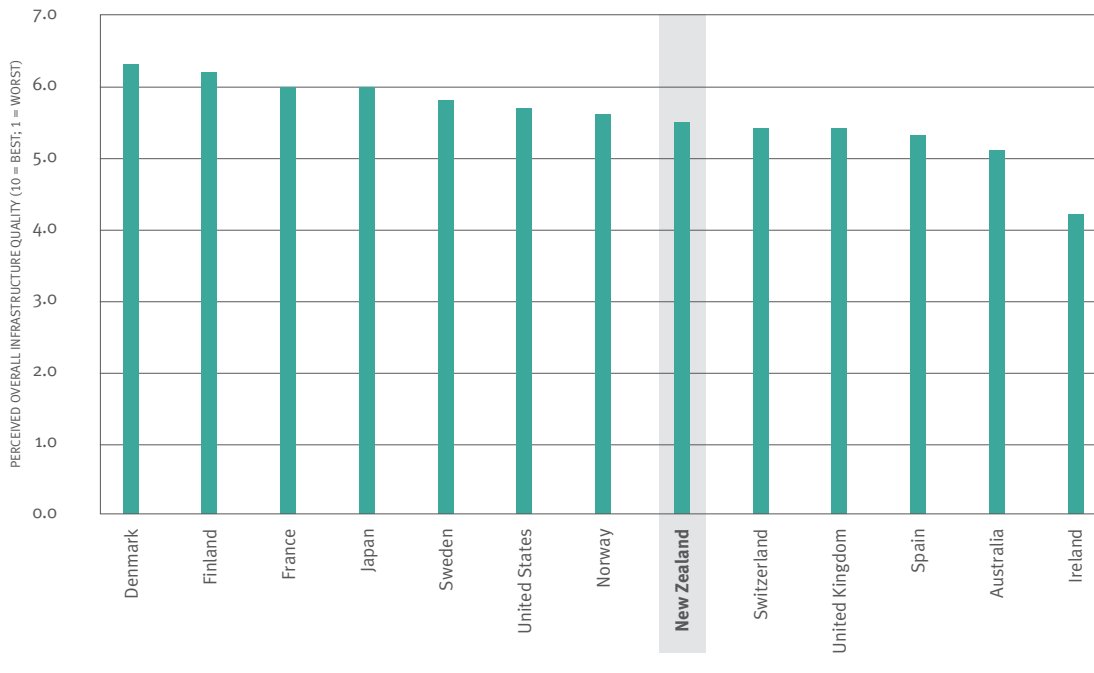
FIG.  
4.24

Perceived quality of air transportation, 2006



Source IMD Competitiveness Yearbook 2006, Table 4.1.11

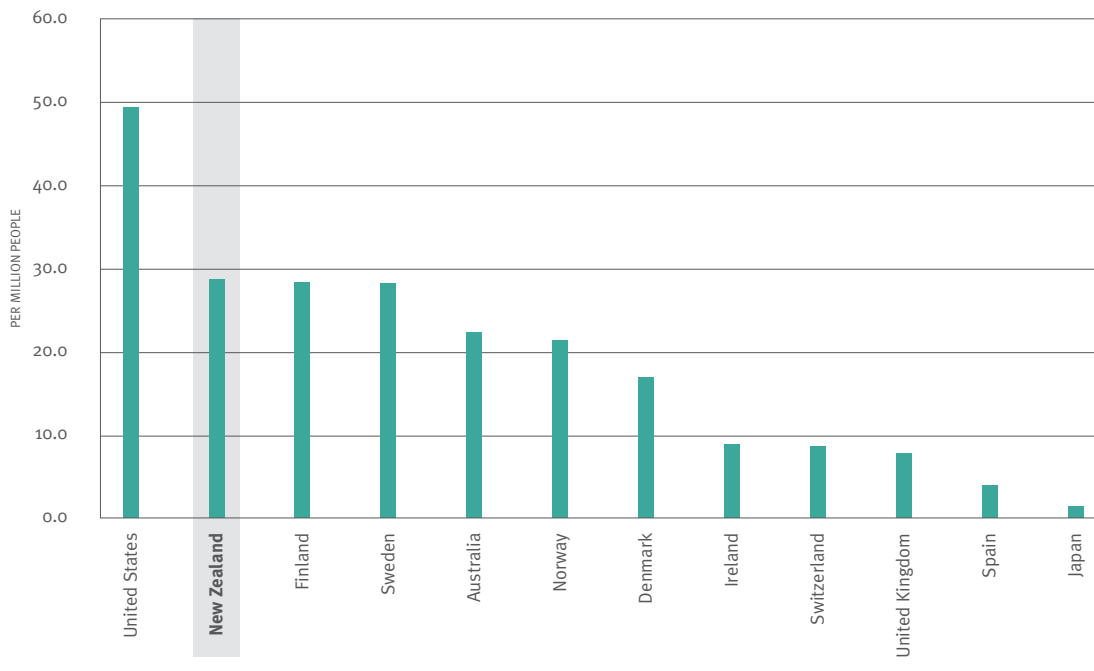
FIG. 4.25 Perceived quality of port infrastructure, 2006



New Zealand's perceived quality of port infrastructure is similar to the average in OECD countries surveyed (we are 13th out of 24 countries). This indicator is based on an international survey asking people their perceptions of the quality of port infrastructure.

Source Global Competitiveness Report, WEF, 2006–2007, Table 2.03

FIG. 4.26 Airports per million people, 2006



New Zealand has the second-highest number of airports per million population out of a selection of countries and the third-highest in the OECD. This is ahead of countries with similarly dispersed populations such as Finland and Norway.

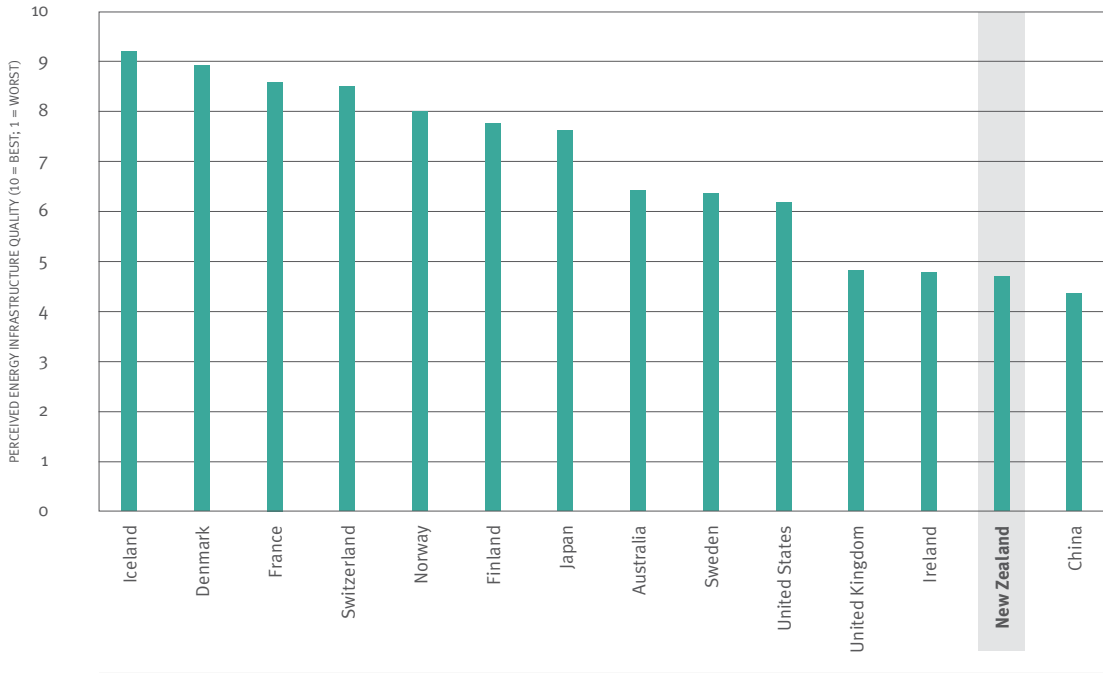
Source NationMaster Statistics, online at: [http://www.nationmaster.com/graph/tra\\_air\\_percap-transportation-airports-per-capita](http://www.nationmaster.com/graph/tra_air_percap-transportation-airports-per-capita)

### 4.2.4 Energy

New Zealand is ranked below other OECD nations in terms of the perceived quality and reliability of energy infrastructure. Although New Zealand is approximately level with Ireland and the UK, we rank below other comparable nations (New Zealand is 23rd out of 24 countries).

FIG. 4.27

Perceived quality of energy infrastructure, 2006

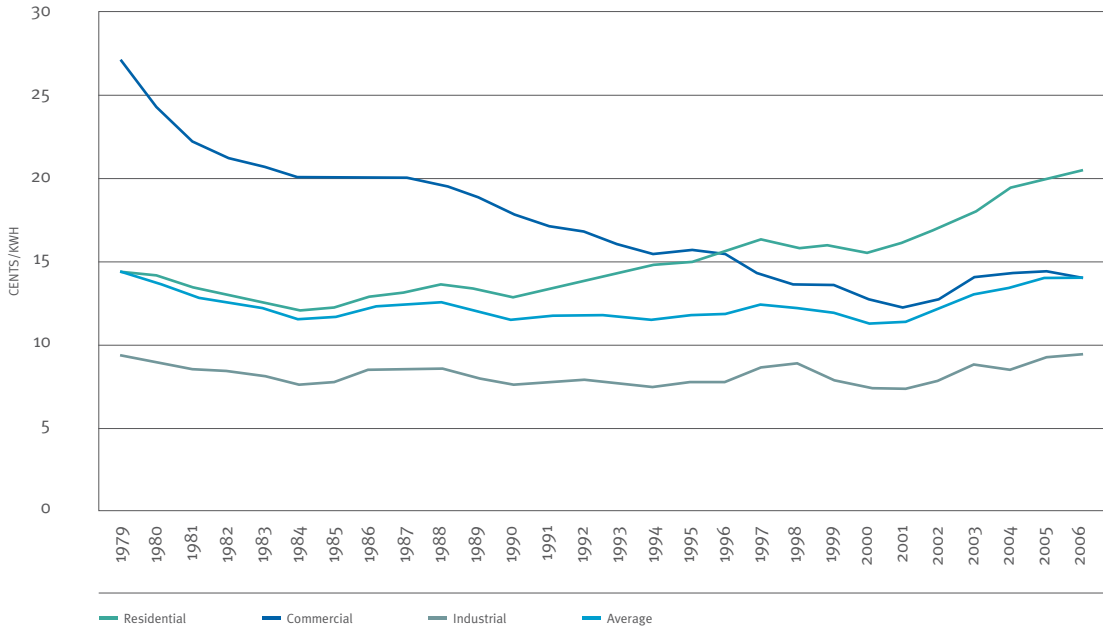


Source IMD Competitiveness Yearbook 2006, Table 4.1.15

FIG. 4.28

Electricity prices in New Zealand (2006 prices)

Over the past 15 years, real residential electricity prices have increased and commercial prices have decreased, but average real prices have not changed significantly.<sup>76</sup>

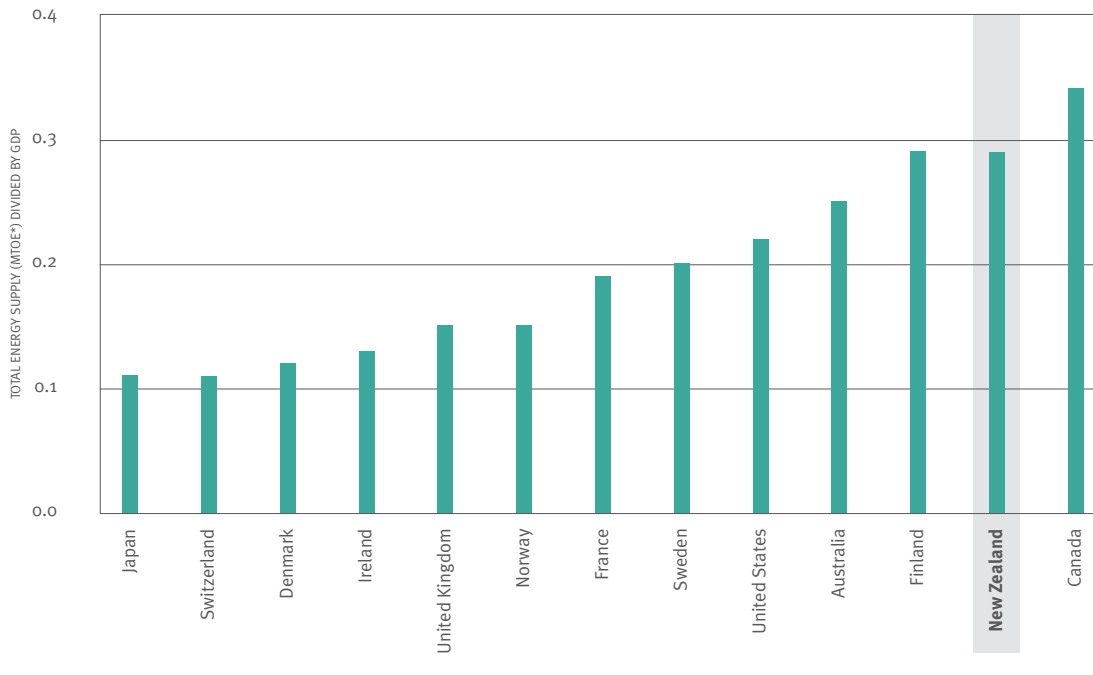


Source New Zealand Energy Data File 2007, online at: <http://www.med.govt.nz/upload/48437/000-200707.pdf>

76. The International Energy Agency (IEA) monitors electricity prices for OECD countries. In 2006, industrial energy prices for New Zealand were in the cheapest quartile among the 17 OECD countries that provided comparable data, while residential electricity prices were in the cheaper half.

FIG.  
4.29

## Energy intensity, 2004



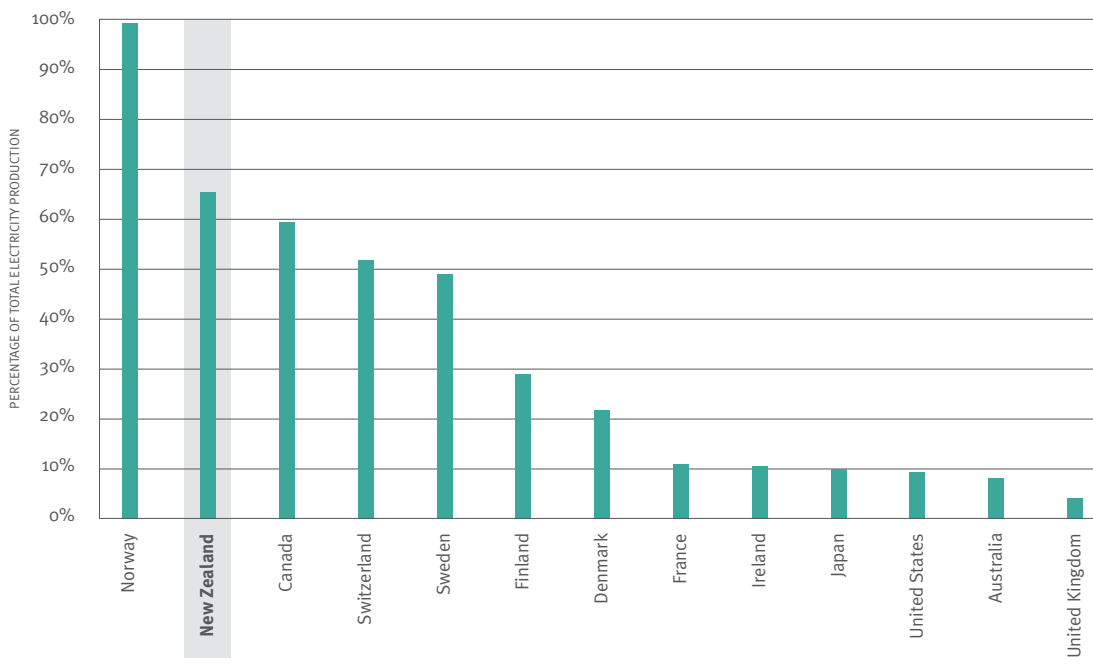
\*million tonnes of oil equivalent

Source OECD in Figures, 2006/07

New Zealand is above most comparator nations in terms of energy intensity (we are 12th out of 13 countries). This is likely to reflect our mix of industries and geography. Our energy intensity compares favourably with other countries with a similarly dispersed population such as Canada and Finland. Energy intensity is the total primary energy supply divided by GDP.

FIG.  
4.30

## Renewable electricity as a percentage of total electricity production, 2004



Source International Energy Agency, Renewables Information 2007

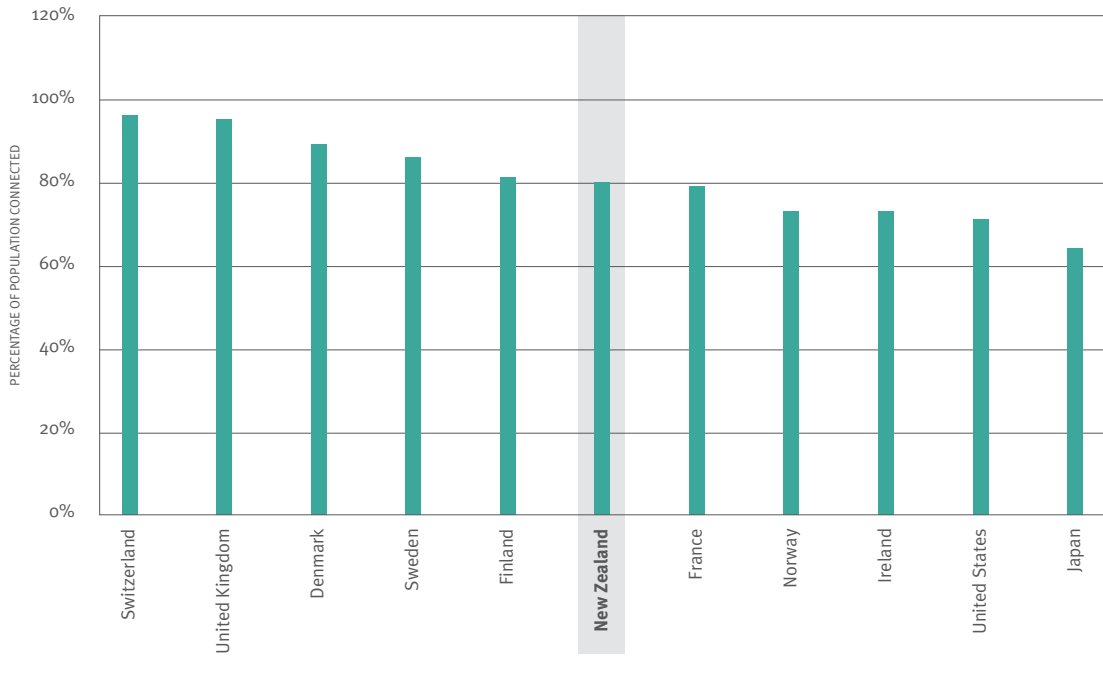
New Zealand is ranked 2nd in terms of renewable electricity production, with approximately 65 per cent of New Zealand's electricity capacity coming from renewable sources. This is based on a sample of 13 OECD nations.

### 4.2.5 Water

New Zealand is in the mid-range (we are 9th out of 23 countries) in terms of public waste water connections, with 80 per cent of households connected to waste water plants.

FIG. 4.31

Public waste water plants (percentage of population connected), 2005

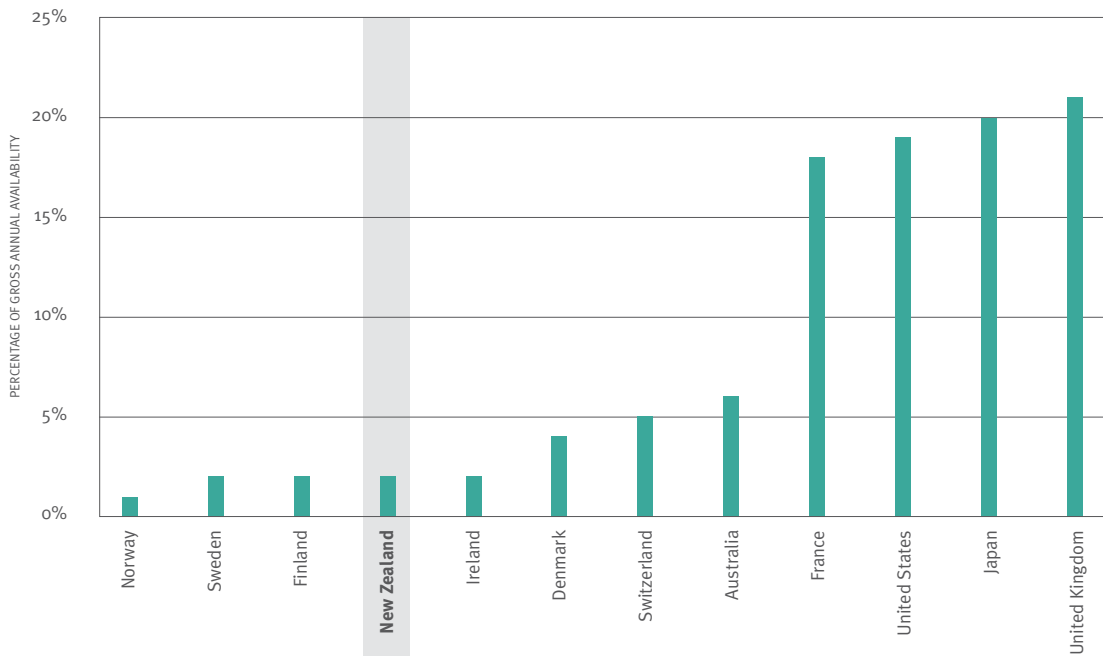


Source OECD in Figures, 2006/07

FIG. 4.32

Water withdrawal as a percentage of gross annual availability, 2005

New Zealand ranks ahead of most countries in terms of water withdrawal capacity (we are 4th out of 23 countries), with our percentage of withdrawal below 3 per cent. This figure shows the amount of water used as a percentage of gross annual availability (an estimate of all usable water).



Source OECD in Figures, 2006/07

## 4.3 Tax and Regulation

### Key Points

- New Zealand’s tax and regulatory settings influence the incentives for businesses and workers to locate or undertake additional economic activity in New Zealand.
- New Zealand is second in the world for overall ease of doing business. However, there is scope for further improvement in certain sub-indicators, particularly: ease of employing workers; ease of enforcing contracts; ease of closing a business; and ease of dealing with licences.
- New Zealand’s competition and employment regulations are very efficient by OECD standards (within the top seven).
- New Zealand’s total tax burden, measured by our tax to GDP ratio (35 per cent), is around the OECD median.
- The share of total taxes collected from personal and corporate income in New Zealand is high by OECD standards because New Zealand does not have a social security tax on wages and salaries, which is common in OECD countries. As a result, our tax on wages and salaries (including social security taxes and parts of income tax) is relatively low, whereas our tax on income from capital (taxes on corporate profits, interest, etc) is relatively high by OECD standards.
- New Zealand’s corporate tax rate is similar to rates in Australia and the UK, but high relative to some small economies (particularly Singapore, Ireland and Chile).
- Across the working population, New Zealand’s average tax wedge on personal income is relatively low compared with other OECD countries, even when the combined effect of income tax and GST is taken into account. However, there is variation in incentives to work more.
- New Zealand’s tax law is very easy to comply with.

### Introduction

New Zealand’s tax and regulatory settings influence the incentives for businesses and workers to locate or undertake additional economic activity in New Zealand. It is important for New Zealand to maintain internationally competitive tax and regulatory policies in order to attract and encourage globally competitive firms and skilled workers.

Regulation matters for productivity and growth because it directly affects how markets, and the firms in those markets, operate and allocate resources. Regulation provides a framework for the effective operation of markets and constrains anti-competitive practices. Regulation is also used to encourage innovation, to achieve public health and safety objectives, and to secure desirable social and environmental outcomes. Poor-quality regulation can constrain growth by creating incentives for socially unproductive activities and by increasing the costs of doing business.

The fundamental purpose of taxation is to finance government expenditure. Beyond this primary purpose, modern tax systems should be designed to promote economic growth and to be equitable<sup>77</sup> and simple.<sup>78</sup>

The revenue requirements of the tax system will be determined, to varying extents, by the government’s service and income-redistribution objectives. Because taxes and regulations are imposed for specific reasons, there is no ideal amount of taxation. Likewise, because regulation (either through statute or through common law) is necessary to a modern economy, less regulation is not necessarily better.<sup>79</sup> Rather, both should be appropriate to the social and economic objectives of the country. The challenge then is to make sure that the taxation and regulation that is in place is as effective as possible.

### 4.3.1 Ease of Doing Business

FIG. 4.33 & FIG. 4.34

Well-designed business regulation should aim to improve the functioning of markets and promote other objectives, while imposing the least possible compliance costs on firms. The World Bank measures the quality of regulation through its ease of doing business index, which averages each country’s percentile rankings on 10 topics. This index provides an overall indicator of the relative quality of regulation.

According to the World Bank index, New Zealand has a very business-friendly regulatory environment. We perform well overall, and in a number of specific areas, although other countries do better on some indicators.

### 4.3.2 Quality of Product Market and Competition Regulation

FIG. 4.35 & FIG. 4.36

Good regulation is important to promoting innovation.

The OECD’s product market regulation index measures the degree to which regulation promotes or inhibits competition in product markets. It is a composite index comprising the degree of state ownership and control, barriers to entrepreneurship,

and barriers to trade and investment. In 2003, New Zealand’s performance on this index was among the highest in the OECD.

One component of the product market regulation index measures barriers to competition, which itself is a composite index made up of legal barriers and antitrust exemptions. New Zealand was 7th lowest in the OECD in terms of barriers to competition in 2003.

### 4.3.3 Quality of Employment Regulation

FIG. 4.37 & FIG. 4.38

Effective labour markets are essential for achieving higher sustainable growth and low unemployment, and for ensuring that the benefits of growth are shared as widely as possible.

The efficiency of employment regulation is evaluated by the World Bank in its rigidity of employment index. This is a composite index that looks at the difficulty of hiring, dismissal and changing hours worked. New Zealand is the 5th lowest (most efficient) in the OECD on this index. Although it is marginally easier to hire workers in Australia than in New Zealand, both countries are similar in terms of the ease of dismissing workers.

77. Social preferences for equity can influence the design of the tax system by, for example, shaping the progressiveness of the personal income tax system, or the relative importance of different tax bases.

78. Simplicity is an important principle in tax design because it tends to make tax compliance cheaper and easier.

79. McMillan, J., *Reinventing the Bazaar*, 2002, and North, D. C., *Understanding the Process of Economic Change*, 2005.

The number of days lost to strikes, or work stoppages, per thousand employees can be used as a rough indicator of labour market relations. Strike figures are difficult to interpret as they are very sensitive to isolated large-scale strikes, even when averaged over five years. Nevertheless, New Zealand's strike figures appear to be close to the OECD median, and quarterly information collected by Statistics New Zealand shows work stoppages trending down over the past 15 or so years, and stabilising.

### 4.3.4 Total Tax Burden

FIG. 4.39 & FIG. 4.40

Tax revenue as a percentage of GDP is a measure of New Zealand's overall tax burden relative to other countries and across time. New Zealand's tax to GDP ratio (35 per cent) is close to the OECD average.

### 4.3.5 Tax Structure

FIG. 4.41 TO FIG. 4.43

The structure of tax revenue and how it is spent are important to economic performance. While the evidence is mixed, in New Zealand, it seems likely that taxes on income from capital (tax on corporate profits, interest, etc) tend to be more detrimental to growth than (in order of decreasing impact on growth) taxes on wages and salaries, consumption, wealth and land.<sup>80</sup>

In 2004, of New Zealand's tax revenue:

- 16.8 per cent was collected from corporate income tax (a tax on income from capital), compared with an unweighted OECD average of 9.6 per cent;
- 44.4 per cent was collected from personal income tax<sup>81</sup> (which taxes both wages and salaries, and income from capital), compared with an unweighted OECD average of 24.6 per cent; and
- none was collected from social security taxes (a tax on wages and salaries), compared with an unweighted OECD average of 25.9 per cent.

80. For a fuller discussion, see Grimes, A., *Economic Growth and the Size and Structure of Government: Implications for New Zealand*, 2003, Motu Working Paper #03-10. Of course other considerations, such as promoting equity, are also important in designing taxes.

81. Around 44 per cent of total personal income tax collected in New Zealand comes from only 9 per cent of taxpayers who earn NZ\$70,000 or above per annum. In Australia, according to 2004/05 figures, 12.1 per cent of taxpayers earned AU\$70,000 or above per annum and contributed to 46.8 per cent of total income tax collected. See <http://www.ato.gov.au/>

New Zealand's share of revenue from consumption taxes, including goods and services tax (GST), is around the OECD average. However, in New Zealand, a higher proportion of consumption taxes are raised from GST compared with other OECD countries: New Zealand collects 25 per cent of total revenue from GST, compared with the OECD average of 19.1 per cent. GST's comprehensive coverage makes it an efficient way to raise revenue without distorting saving decisions.

New Zealand's current corporate tax rate (33 per cent) is 4.6 percentage points above the OECD average, and below the United States' rate but above that of other small economies such as Denmark (28 per cent), Finland (26 per cent) and Ireland (12.5 per cent). A recently announced three percentage point reduction should bring New Zealand more in line with Australia and the UK from April 2008.

Even after accounting for GST, the average tax wedge on wages and salaries is moderate. However, the effective tax rate can be high for some workers because income from Working for Families tax credits can decline when wage income increases.<sup>82</sup>

New Zealand tax law is easy to comply with. PricewaterhouseCoopers<sup>83</sup> rates New Zealand 10th in the world and 3rd in the OECD in terms of ease of paying taxes. For corporate and consumption taxes, we have the 2nd equal least time required to comply.

### 4.3.6 Environmentally Related Taxes

FIG. 4.44

Environmentally related taxes are one way of making polluters pay for the negative externalities (costs to third parties) caused by pollution or other negative environmental impacts. New Zealand has relatively low taxes on pollution compared with other OECD countries. In addition to addressing environmental concerns, environmental taxes raise revenue that can be used to reduce other taxes. However, environmental concerns can also be effectively addressed by other policy approaches, such as tradable permit schemes. New Zealand plans to introduce a comprehensive greenhouse gas emissions trading scheme from 2008.

[budget/2007-08/bp1/html/bp1\\_bst5-10.htm](http://www.treasury.govt.nz/budget2007/taxpayers) and <http://www.treasury.govt.nz/budget2007/taxpayers>.

82. Effective marginal tax rates on individuals measure the percentage of a \$1 increase in income that is lost to income tax and income tests on government payments and services.

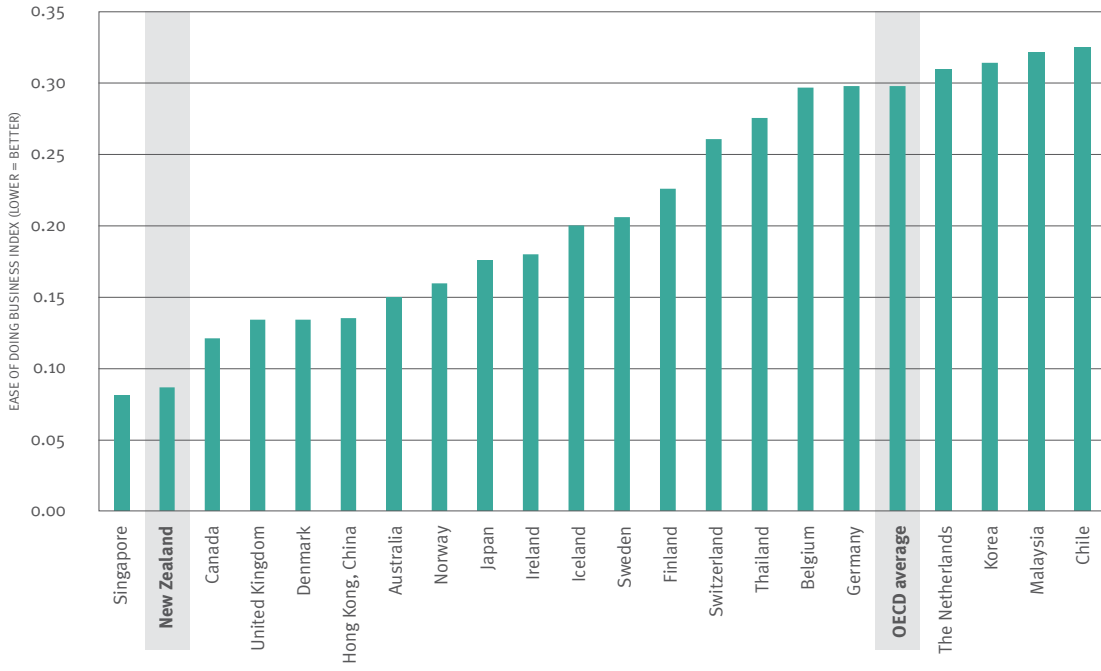
83. PricewaterhouseCoopers *Paying Taxes – The Global Picture*, [http://www.ifc.org/ifcext/media.nsf/AttachmentsByTitle/DB\\_Paying\\_Taxes/\\$FILE/DB\\_Paying\\_Taxes.pdf](http://www.ifc.org/ifcext/media.nsf/AttachmentsByTitle/DB_Paying_Taxes/$FILE/DB_Paying_Taxes.pdf).

### 4.3.1 Ease of Doing Business

New Zealand is a close second to Singapore in the World Bank ease of doing business index.

FIG. 4.33

Ease of doing business index (lower = better), 2007

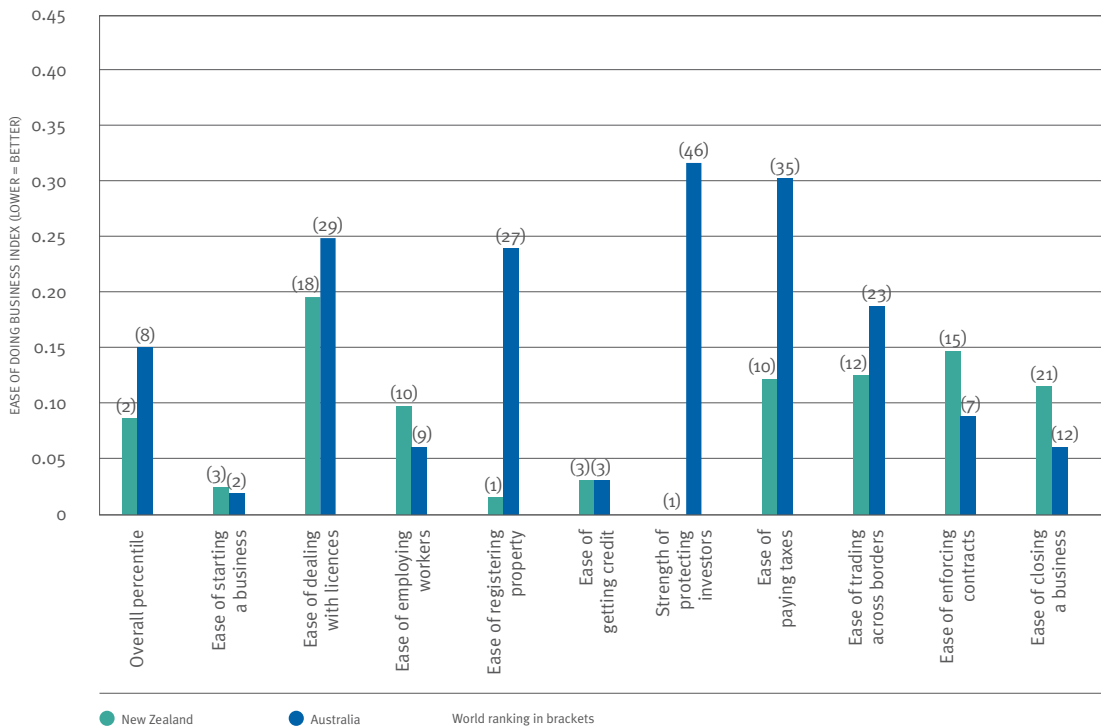


Source World Bank, 2007, [http://www.doingbusiness.org/documents/Ease\\_of\\_DB\\_2007.xls](http://www.doingbusiness.org/documents/Ease_of_DB_2007.xls)

FIG. 4.34

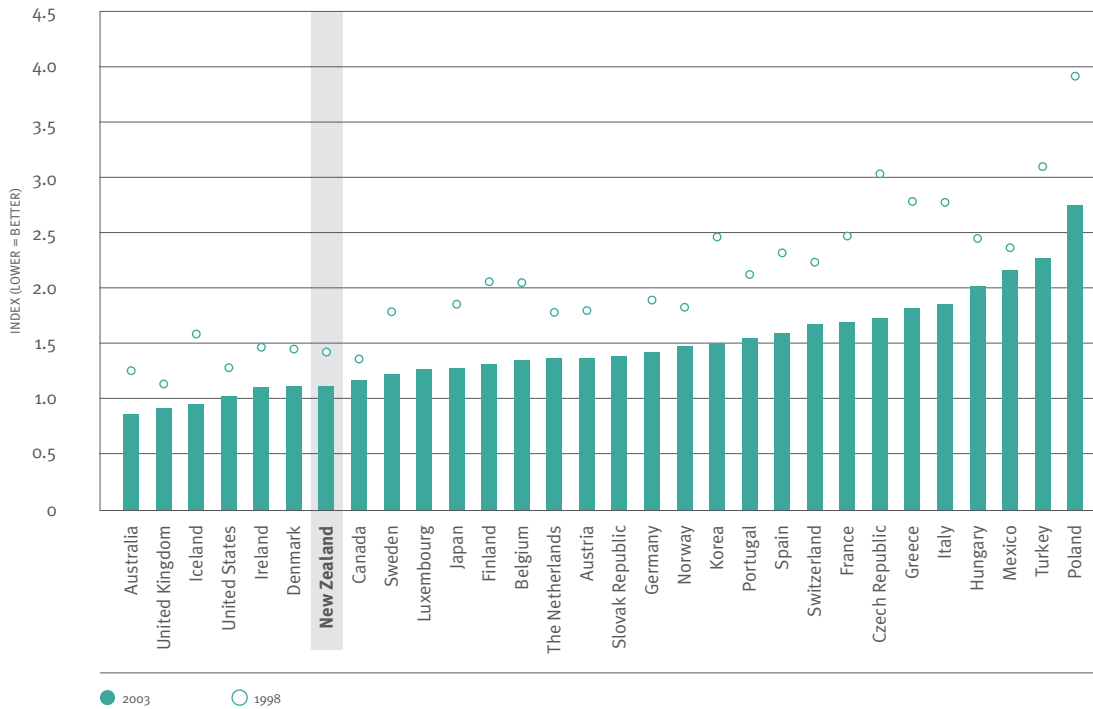
Ease of doing business index (lower = better), 10-category breakdown, 2007

Of the 10 sub-categories of the World Bank's ease of doing business index, New Zealand was a top performer in four: ease of starting a business, ease of registering property, ease of getting credit and strength of protecting investors. We are around 10th on the remaining six sub-categories.



Source World Bank, 2007, [http://www.doingbusiness.org/documents/Ease\\_of\\_DB\\_2007.xls](http://www.doingbusiness.org/documents/Ease_of_DB_2007.xls)

FIG. 4.35 Product market regulation and competition index,<sup>84</sup> 1998 and 2003

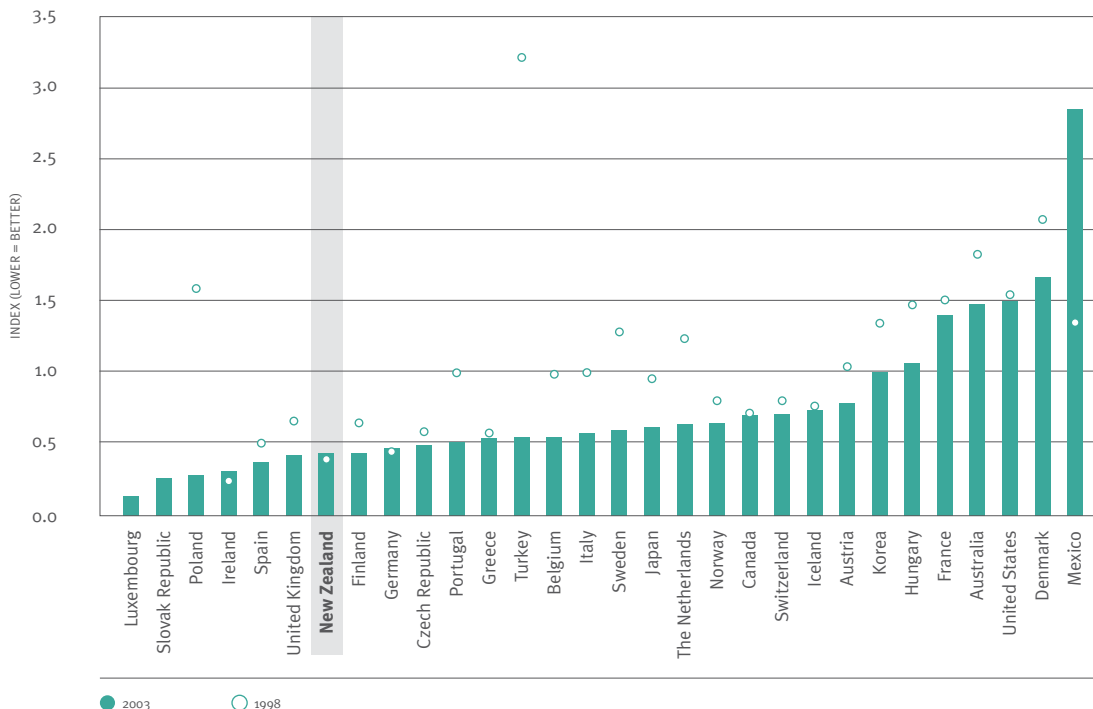


Source Conway, P., V. Janod and G. Nicoletti, *Product Market Regulation in OECD Countries, 1998 to 2003*, 2005, OECD Economics Department Working Paper No 419

### 4.3.2 Quality of Product Market and Competition Regulation

New Zealand's product market regulation is among the most favourable in the OECD for promoting competition (we are 7th out of 24 countries). However, Denmark, Iceland and Ireland have improved more rapidly and now have better regulation than we do.

FIG. 4.36 Barriers to competition index,<sup>85</sup> 1998 and 2003



Source Conway, P., V. Janod and G. Nicoletti, *Product Market Regulation in OECD Countries, 1998 to 2003*, 2005, OECD Economics Department Working Paper No 419

New Zealand has the 7th lowest regulatory/legal barriers to competition in the OECD. In 1998, New Zealand achieved 2nd place.

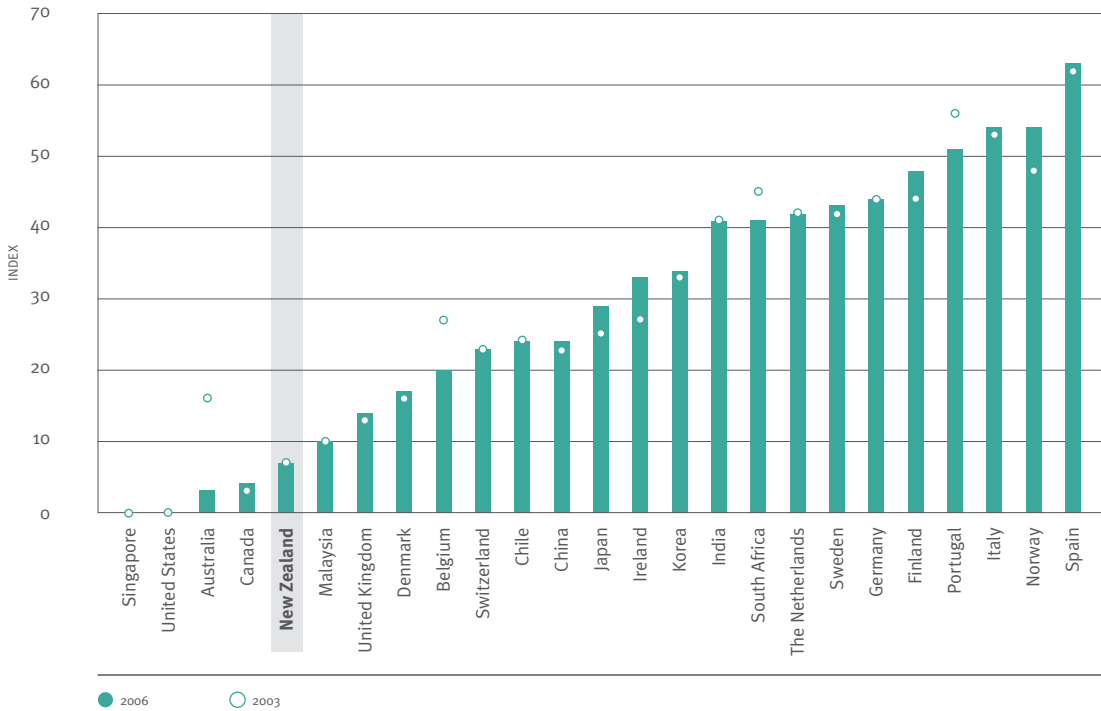
84. The degree to which product market regulation promotes competition is measured using a composite index comprising the degree of state ownership and control (29 per cent), barriers to entrepreneurship (31 per cent) and barriers to trade and investment (41 per cent).

85. This is a composite index made up of legal barriers (30 per cent) and antitrust exemptions (70 per cent).

### 4.3.3 Quality of Employment Regulation

The World Bank considers New Zealand's employment regulation to be very flexible by world standards (we are 4th out of 23 countries). Australia has dramatically reduced its rigidity of employment index since 2003 and is now more flexible than New Zealand.

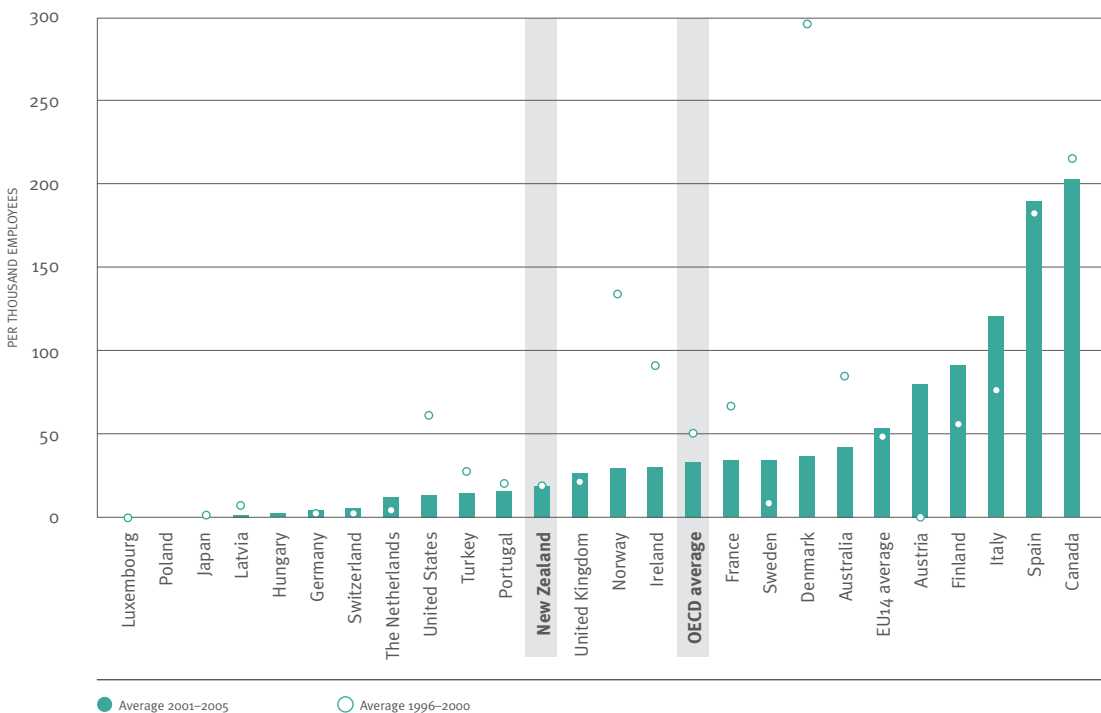
FIG. 4.37 World Bank rigidity of employment index,<sup>86</sup> 2006



Source World Bank, 2007, <http://www.doingbusiness.org/ExploreTopics/EmployingWorkers/>

New Zealand's strike figures are below the OECD average (New Zealand is 9th out of 21 countries) and close to the OECD median. Days lost to strikes per thousand employees is a rough indicator of labour market relations and the quality of labour market regulation.

FIG. 4.38 Days lost to strikes per thousand employees

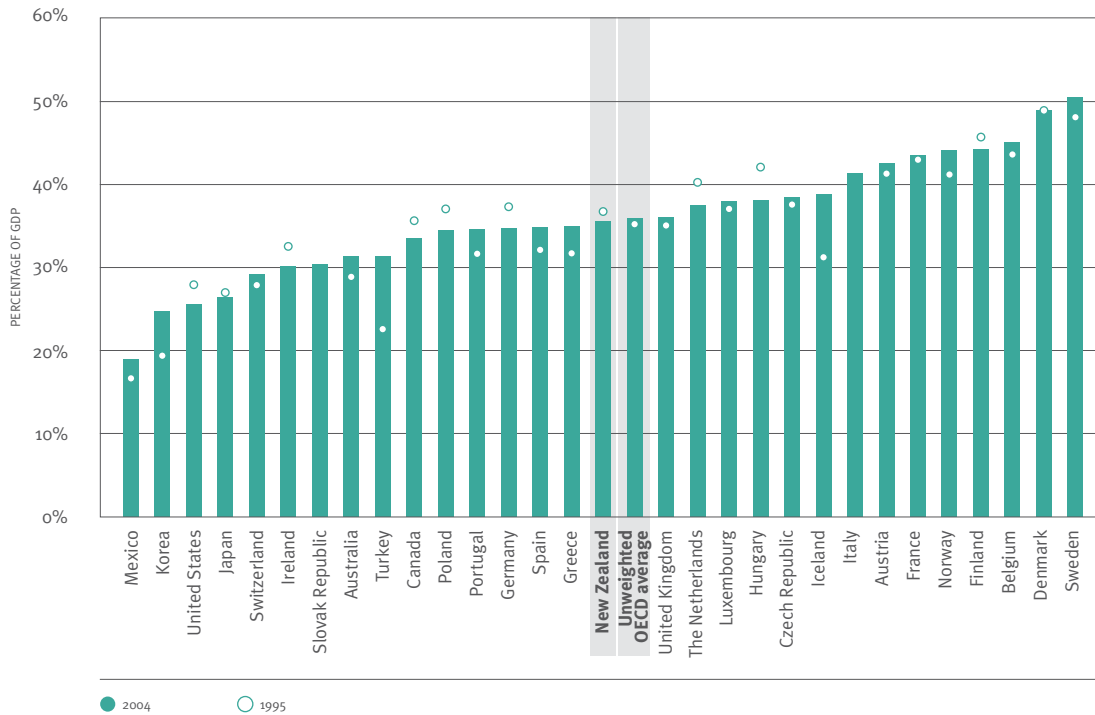


Source Hale, Dominic, 2007, "International Comparisons of Labour Disputes in 2005," *Economic & Labour Market Review*, Vol 1, No 4, April 2007

86. The World Bank measures rigidity of employment using a composite index of the difficulty of hiring, of dismissal and of changing hours worked.

FIG. 4.39

Central and local government tax revenue as a percentage of GDP, 2004<sup>87</sup>



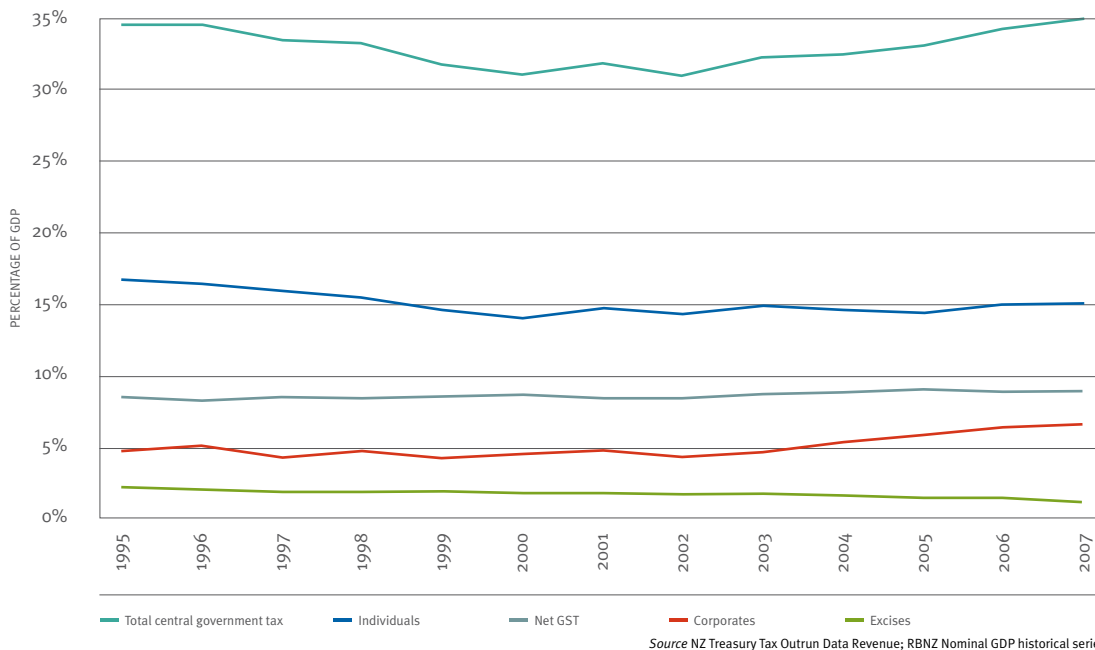
Source OECD Revenue Statistics 2006, Table A

### 4.3.4 Total Tax Burden

New Zealand's total (central plus local government) tax to GDP ratio (35 per cent) is on the OECD median (we are 12th out of 24 countries). The Nordic countries have the highest ratios.

FIG. 4.40

Central government tax revenue as a percentage of GDP, New Zealand, 1995–2007



Source NZ Treasury Tax Outrun Data Revenue; RBNZ Nominal GDP historical series

New Zealand's central government tax to GDP ratio dipped from nearly 35 per cent in 1995/96 to slightly under 31 per cent in 1999/2000 before returning to 35 per cent in 2006/07. The increases since 2001 have come primarily from higher corporate tax revenues, resulting from increased business profitability.

87. The recently published provisional estimates showed that total tax to GDP ratio was 36.6 per cent in New Zealand in 2005, 14th highest of the 24 countries measured. See the OECD's Revenue Statistics – Special Feature: Taxes Paid on Social Transfer 1965–2005.

4.3.5 Tax Structure

New Zealand, Australia and Denmark have high proportions of tax revenue from labour and corporate income (around 60 per cent) compared with the rest of the OECD (average of 34.2 per cent). New Zealand and Australia are the only countries in the OECD without social security taxes.

FIG. 4.41

Breakdown of tax revenue by source, 2004

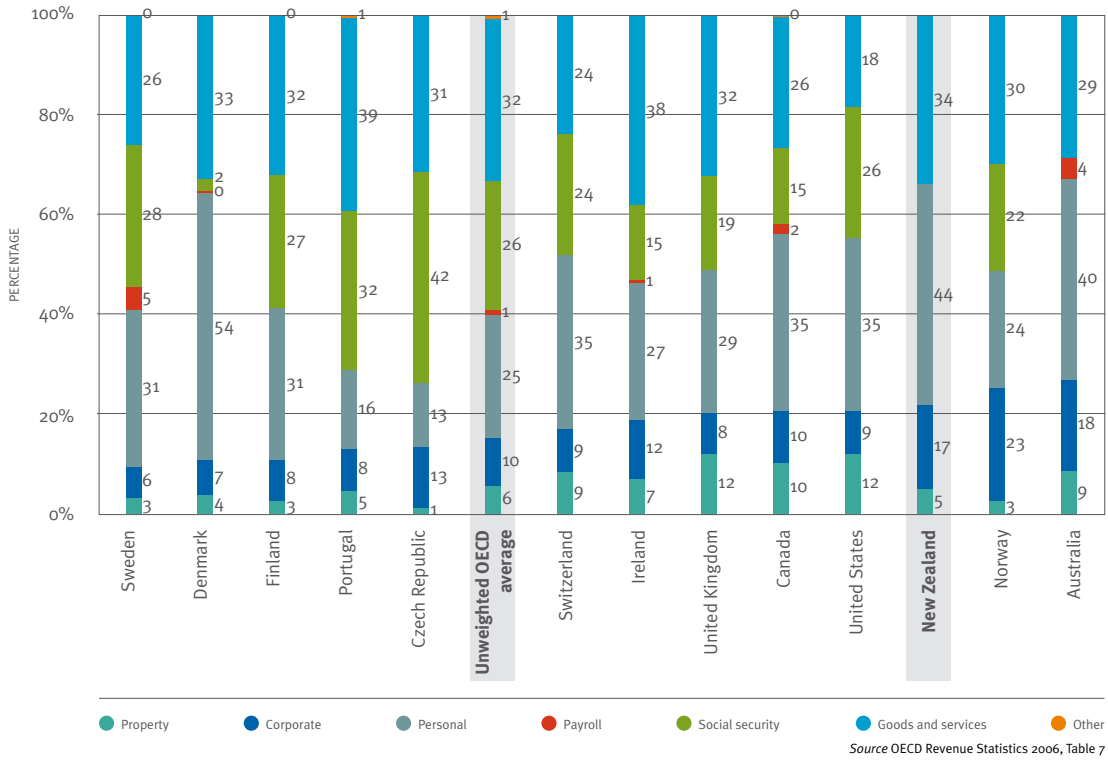


FIG. 4.42

Corporate tax rate (total central and local), 2000–2006

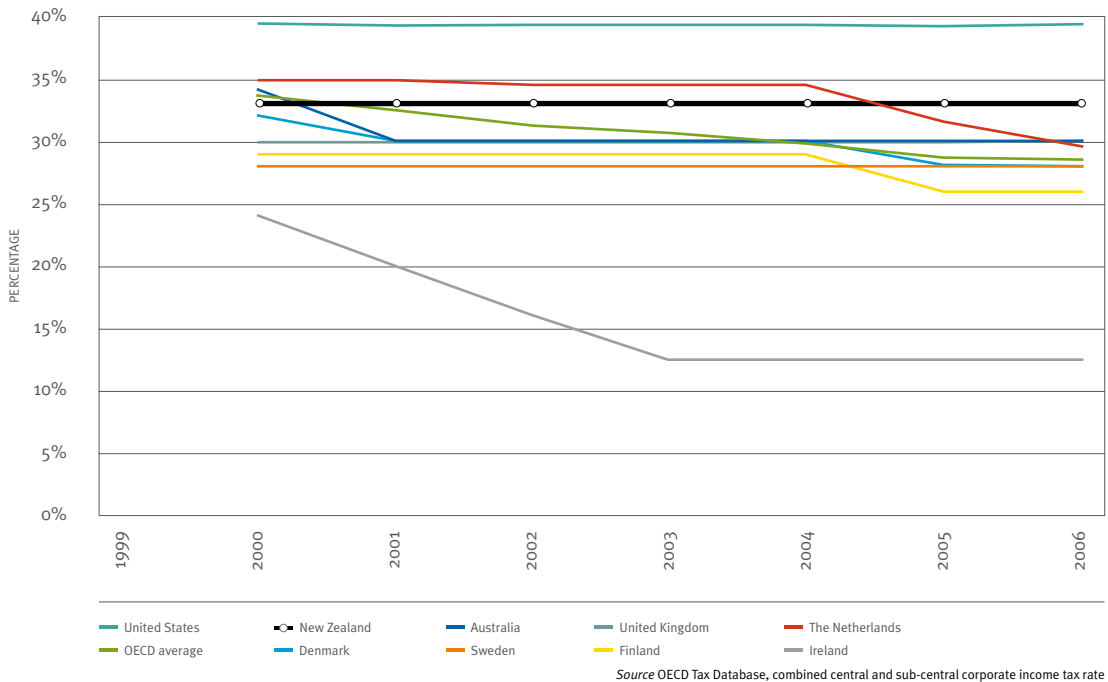
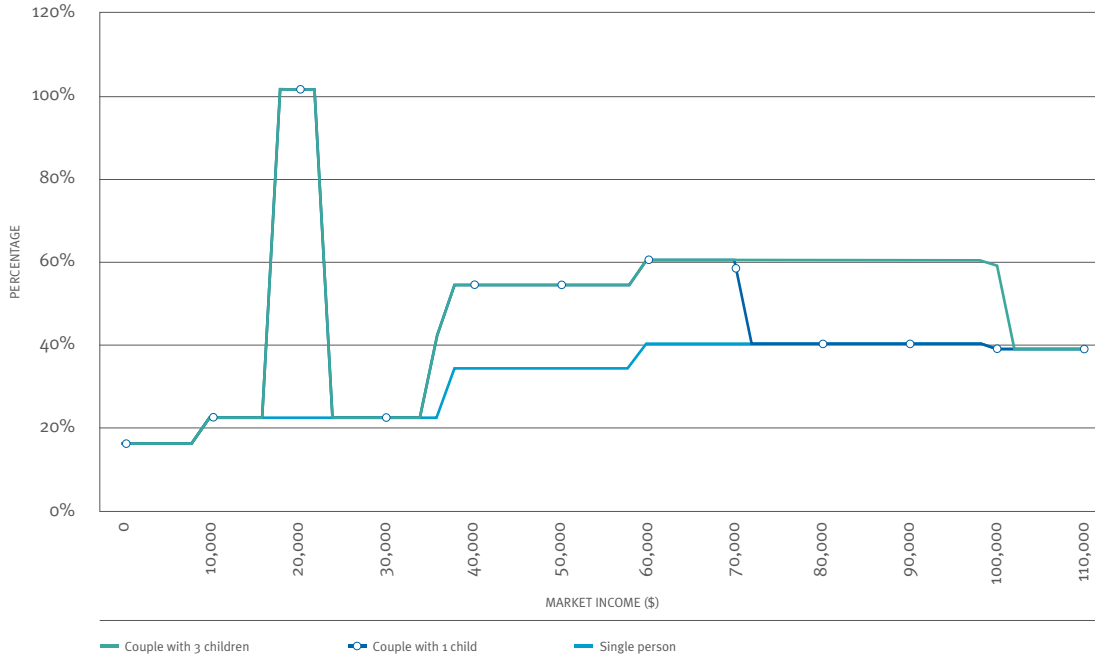


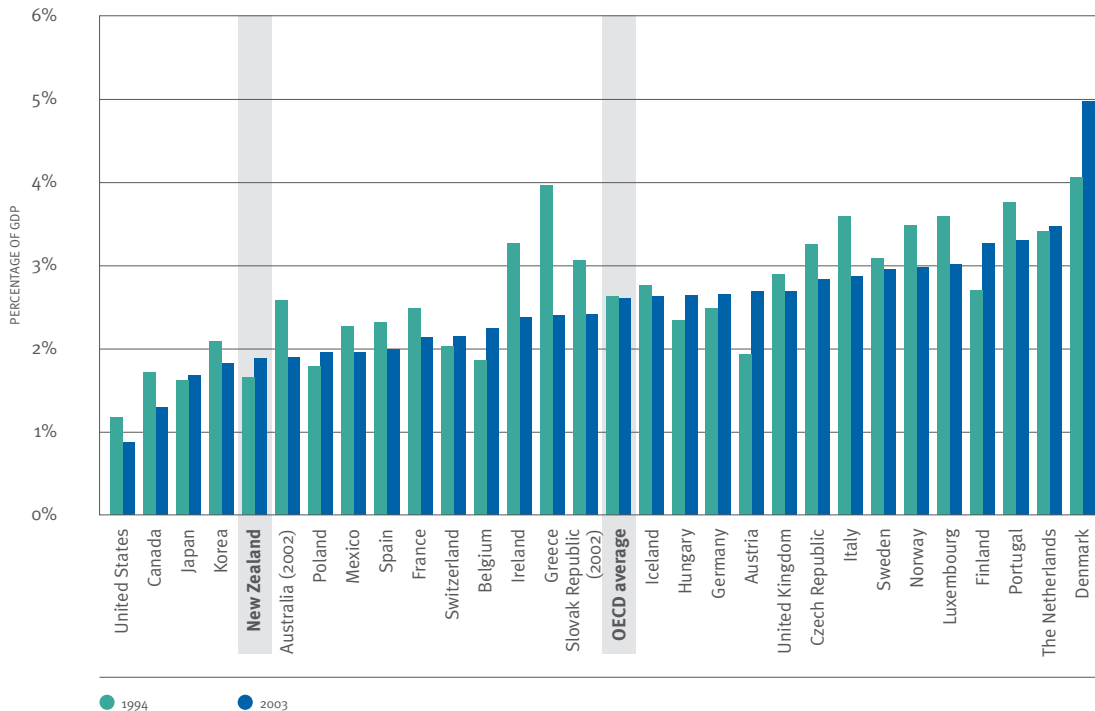
FIG. 4.43 Effective marginal tax rates on individuals, single income earner, New Zealand, 2008



Workers with children face higher marginal effective tax rates. This occurs because Working for Families tax credits decline with increases in wage income.

Source: IRD. Includes: Tax ACC earner premium, Working for Families tax credit. Excludes: accommodation supplement, welfare benefits. Assumes: single earner family, any children are aged under 13

FIG. 4.44 Revenue from environmental taxes for pollution control as a percentage of GDP



### 4.3.6 Environmentally Related Taxes

New Zealand has relatively low taxes on pollution compared with other OECD countries.

Source: Consumption Tax – Trends VAT/GST and excise rates, trends and administration issues

## 4.4 Macroeconomic Foundations

### Key Points

- GDP growth rate volatility has decreased since the 1980s and early 1990s, but is higher for New Zealand than for comparator countries.
- While inflation is still within the target band, it has increased since 2003.
- New Zealand’s high government surpluses compensate to some extent for low savings elsewhere in the economy and provide a buffer against shocks.
- New Zealand’s real long-term interest rate has been reducing along with global interest rates since the early 1990s, but is higher and more volatile than in most of the benchmark economies.
- New Zealand’s terms of trade have increased since 2003, increasing national income.
- New Zealand’s current account deficit and level of external liabilities have increased since the 1980s and are larger than in all of our comparator economies.
- New Zealand’s real effective exchange rate has been more volatile than that of comparator countries.

### Introduction

Policies that ensure stable and sustainable macroeconomic conditions are important for economic growth.<sup>88</sup> Macroeconomic instability creates uncertainty for businesses and households, and can make long-term planning difficult, with adverse impacts on investment, savings and labour productivity. Conversely, well-designed fiscal and monetary policies can facilitate growth by reducing uncertainty, lowering interest rates and improving resilience to shocks.

Macroeconomic stability can be measured by the degree of peak-to-trough cyclicity in key macroeconomic variables, such as GDP growth, inflation, interest rates and the exchange rate.<sup>89</sup> Sustainability is often associated with the *levels* of certain macroeconomic variables, such as spending, external indebtedness and current account deficits, and whether these levels can persist without inhibiting long-term growth.

88. The proceedings of a recent macroeconomic policy forum held by The Treasury and the Reserve Bank of New Zealand (Buckle, B. and A. Drew (eds), *Testing stabilisation limits in a small open economy*, 2006, Treasury and RBNZ) are a good source of further reading on New Zealand’s macroeconomic policy framework.

89. In Table 1 on page 94 and elsewhere, we have used the annual standard deviation as a proxy for this peak to trough cyclicity. We use the term “volatility” to describe the peak to trough cyclicity in what follows.

### 4.4.1 GDP Growth Volatility

FIG. 4.45

Volatility in GDP growth (fluctuations in GDP growth rates) may increase investor uncertainty, with negative consequences for the trend growth in GDP per capita. Furthermore, under volatile conditions, job turnover tends to be higher, reducing the opportunity for workers to accumulate skills and knowledge on the job.

Volatility can be approximated by the standard deviation of average GDP growth. Since the 1980s, GDP growth volatility has decreased for New Zealand as well as for the OECD overall. We still remain higher by comparison. This is likely to reflect the fact that, in comparison with the many larger economies in the OECD, New Zealand is a small, open, commodity-exporting economy.

### 4.4.2 Inflation and Inflation Volatility

FIG. 4.46 & FIG. 4.47

Inflation is commonly measured by the annual percentage change in the consumer price index (CPI). Low and stable inflation means consumers and producers can depend on prices to reflect economic value, and so reduce uncertainty in the economy. By improving the environment for private sector decisions, low and stable inflation may also result in higher and more stable output growth. In recent years, most OECD countries have achieved low inflation, and New Zealand is no exception. While inflation has increased since 2003, it still falls within the pack of benchmark economies and within New Zealand's target band. The reduction in the inflation rate has coincided with reduced inflation volatility. New Zealand's inflation volatility is now less than the OECD median, a considerable improvement on that seen in the 1980s.

Given the recent boom in the housing market, an index of house prices is also a useful indicator of inflation in this sector of the economy. *The Economist* has surveyed house price changes in 20 economies. New Zealand house prices have increased by a smaller percentage than the survey average, from 1997 to 2006, although this may be in part a reflection of the period chosen.

### 4.4.3 Fiscal Aggregates

FIG. 4.48 & FIG. 4.49

General government spending in New Zealand has decreased since the late 1980s. As a percentage of GDP it now lies at 38.3 per cent, less than the OECD average of 40.8 per cent.<sup>90</sup> Government spending can have a positive effect on economic growth by, for example, increasing infrastructure and providing education. However, high levels of spending may also reduce private sector investment and overall productivity levels. Spending must normally be financed by taxation and borrowing, which can also affect private sector investment and labour supply.

The fiscal balance represents the difference between government current spending and revenue. In recent years, New Zealand has experienced higher financial surpluses<sup>91</sup> than the benchmark OECD economies and the OECD median. It lies at 4.4 per cent of GDP, larger than those of all the benchmark economies except for Denmark. This provides a substantial buffer against shocks, and offsets low saving elsewhere in New Zealand.

### 4.4.4 Interest and Exchange Rates

FIG. 4.50 & FIG. 4.51

Investment and trade are sensitive to interest and exchange rate movements. While these movements help an economy to adjust to economic shocks, excessive exchange rate and interest rate volatility may reduce domestic activity and international trade.

New Zealand's real long-term interest rate is high but has been reducing with global interest rates since the early 1990s. However it remains higher than the OECD median, and more volatile. Furthermore, both the level and volatility of our real effective exchange rate have increased since the mid-1980s. Because the real effective exchange rate<sup>92</sup> affects the foreign competitiveness of domestic products, this results in a fall in the competitiveness of New Zealand's exports and import substitutes.

90. Measures of government spending must be interpreted with care. As well as taking into account all levels of government, size of government comparisons need to take account of structural differences, such as compulsory private retirement schemes, rather than the public provision of pensions funded from general taxation.

91. The financial balance includes the operating balance and net investment expenditures, whereas the fiscal balance reported in the Crown accounts and budget documents is simply the operating balance. Thus, the financial

balance presented here for New Zealand will be less positive than the headline fiscal balances.

92. The nominal effective exchange rate (NEER) is a weighted average of major bilateral nominal exchange rates, with weights based on the trade shares, reflecting the relative importance of each currency in the effective exchange rate basket. The real effective exchange rate is obtained by adjusting the NEER for inflation differentials between the countries whose currencies are included in the basket.

### 4.4.5 Terms of Trade

FIG. 4.52

New Zealand's terms of trade have recently increased. An increase in the terms of trade means the price of exports has risen relative to the price of imports, which raises national income. Less volatile terms of trade also enhance economic growth through lowering transaction costs and facilitating more efficient planning decisions. Australia's terms of trade have increased dramatically in recent years.

The current account can be broken down into two components: the goods and services balance and the investment income balance. New Zealand's current account deficit is the result of a large persistent deficit in net investment income, together with a deficit in goods and services.

### 4.4.6 Overall External Position

FIG. 4.53 & FIG. 4.54

New Zealand's level of external liabilities has increased since the 1980s. A current account deficit arises when a country spends more than it earns, or (equivalently) when it invests more than it saves. This difference needs to be financed by a net inflow of capital. New Zealand's current account deficit increased between mid-2001 and 2005, giving us the largest deficit of the benchmark economies used in this study. In part, this reflects the recent relatively strong economic cycle.

The level of net external liabilities (net equities held by foreigners and debt owed to foreigners) is the stock resulting from previous current account deficits. New Zealand's large net liability position reflects the fact that New Zealand has been running current account deficits over many years. As a percentage of GDP, this stock is greater than each of the benchmark economies, positioning us at the bottom end of the OECD.

TABLE 1 Summary of key macroeconomic indicators

New Zealand's real GDP growth, inflation rate and real interest rates have been similar to the OECD median over the past 10 years. In contrast, the volatility of the real exchange rate and the size of the current account deficit have been much larger than the OECD median.

	New Zealand		OECD Median	
	1987–1996	1996–2005	1987–1996	1996–2005
Real GDP growth	2.01%	3.06%	2.81%	2.69%
Standard deviation (annually)	0.026	0.015	0.010	0.009
Inflation rate	4.67%	1.96%	6.11%	3.45%
Standard deviation (annually)	0.044	0.009	0.015	0.010
Real interest rate	5.62%	4.58%	6.11%	3.45%
Standard deviation (annually)	0.023	0.012	0.015	0.010
Real effective exchange rate	117.91	119.32	105.49	104.42
Standard deviation (annually)	8.72	13.53	1.14	2.97
Current account balance (% of GDP)	-4.03%	-5.33%	-0.50%	-0.07%
Fiscal balance (% of GDP)	-0.77%	2.25%	-3.67%	-2.06%

Source OECD Factbook 2007; OECD, Main Economic Indicators

FIG. 4.45

### Real GDP growth



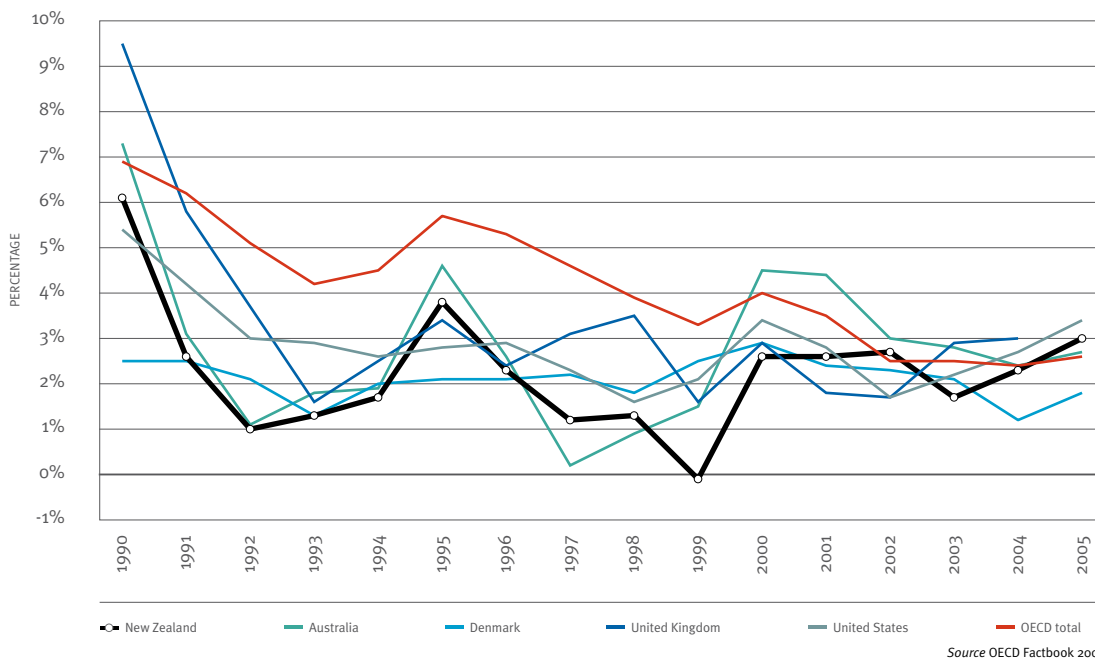
Source OECD Factbook 2007

### 4.4.1 GDP Growth Volatility

Real GDP growth has been more volatile for New Zealand than for comparator countries from 1981 to 2005. However, volatility is not so great as it was in the 1980s and early 1990s. Average GDP growth is similar to that of benchmark OECD economies.

FIG. 4.46

### Inflation rate (growth rate in CPI)



Source OECD Factbook 2007

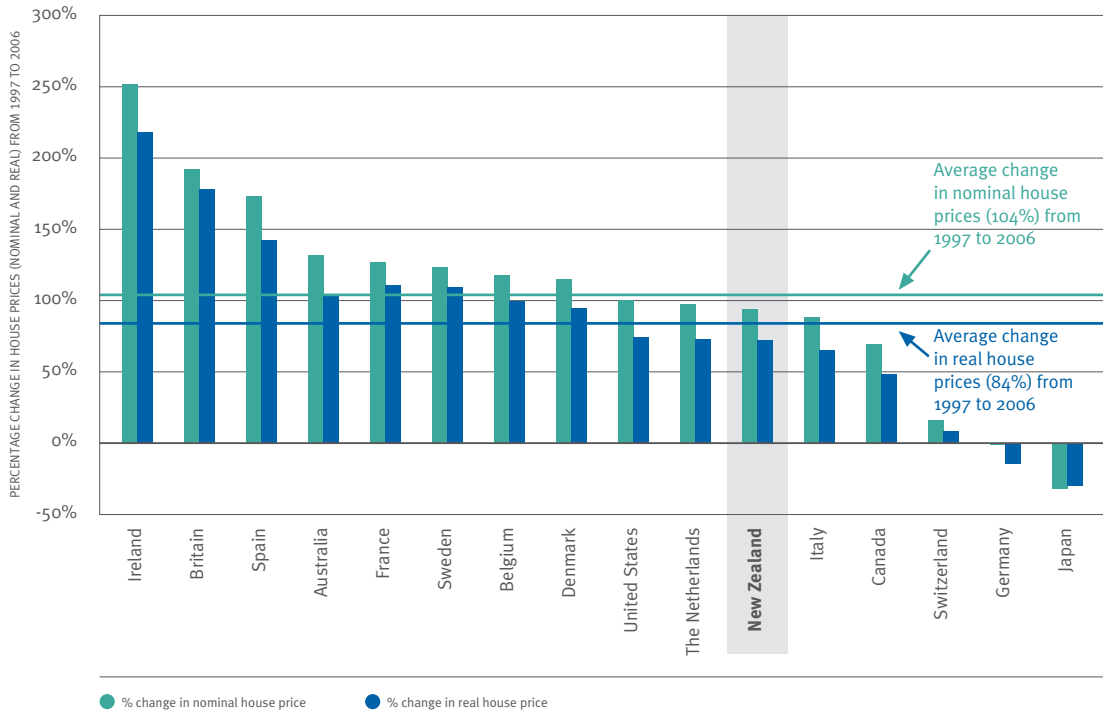
### 4.4.2 Inflation and Inflation Volatility

In recent years, New Zealand and most OECD countries have achieved low inflation. Furthermore, inflation volatility has reduced considerably in New Zealand and in benchmark economies.

In an *Economist* survey of national house price changes between 1997 and 2006, New Zealand ranked slightly below average for the group of 16 OECD economies.<sup>93</sup>

FIG. 4.47

National house price index change, 1997–2006



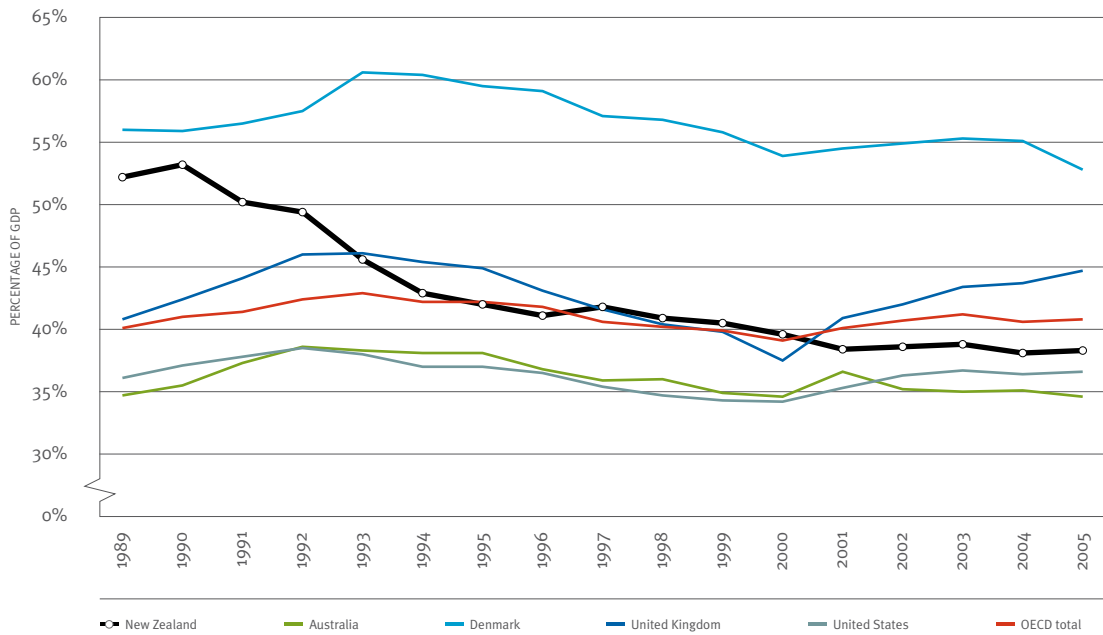
Source Economist 7 December 2006, [http://www.economist.com/displaystory.cfm?story\\_id=8381960](http://www.economist.com/displaystory.cfm?story_id=8381960)

### 4.4.3 Fiscal Aggregates

New Zealand has a similar level of government spending as a percentage of GDP to most OECD countries.

FIG. 4.48

General government total outlays as a percentage of GDP

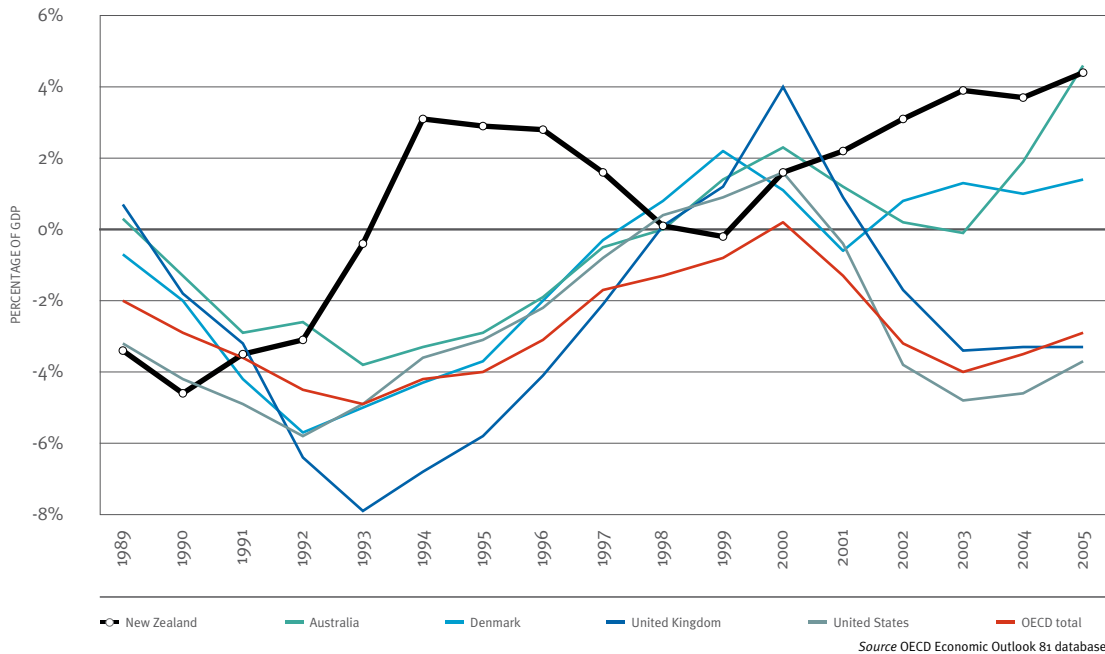


Source OECD Economic Outlook 81 database

93. The *Economist* survey comprised 20 economies. South Africa, Singapore, China and Hong Kong were not included in the average shown in the diagram above.

FIG.  
4.49

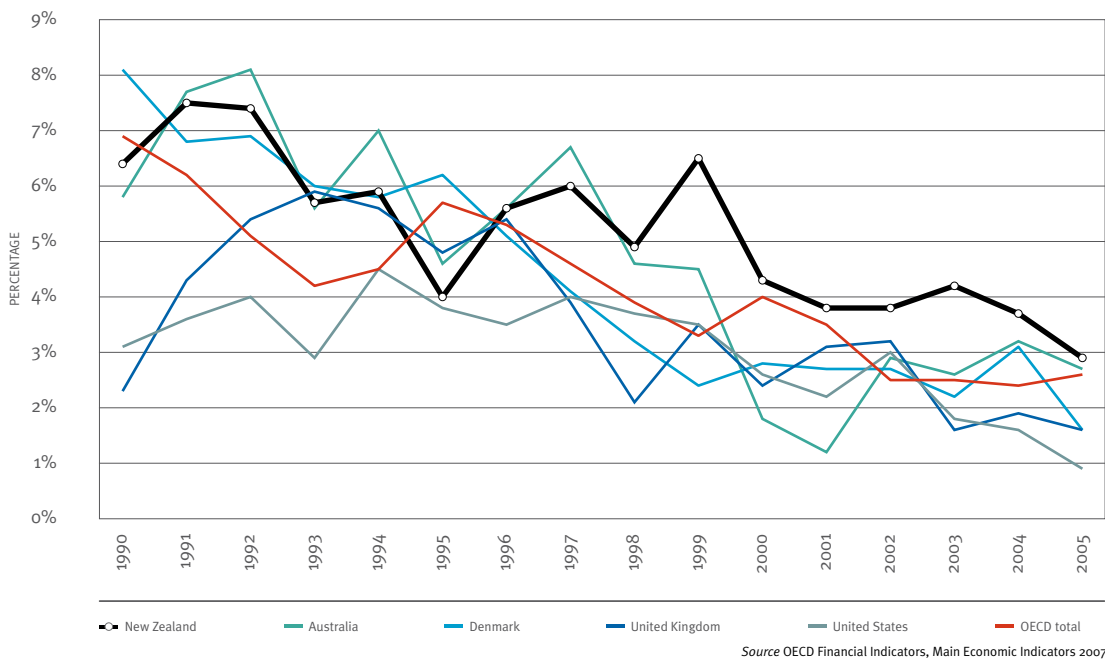
## General government financial balance as a percentage of GDP



New Zealand has run higher financial surpluses than the benchmark economies and the OECD average since 2001. High surpluses contribute to economic resilience and national savings.

FIG.  
4.50

## Real interest rate (10-year annual government bond yield less inflation rate)

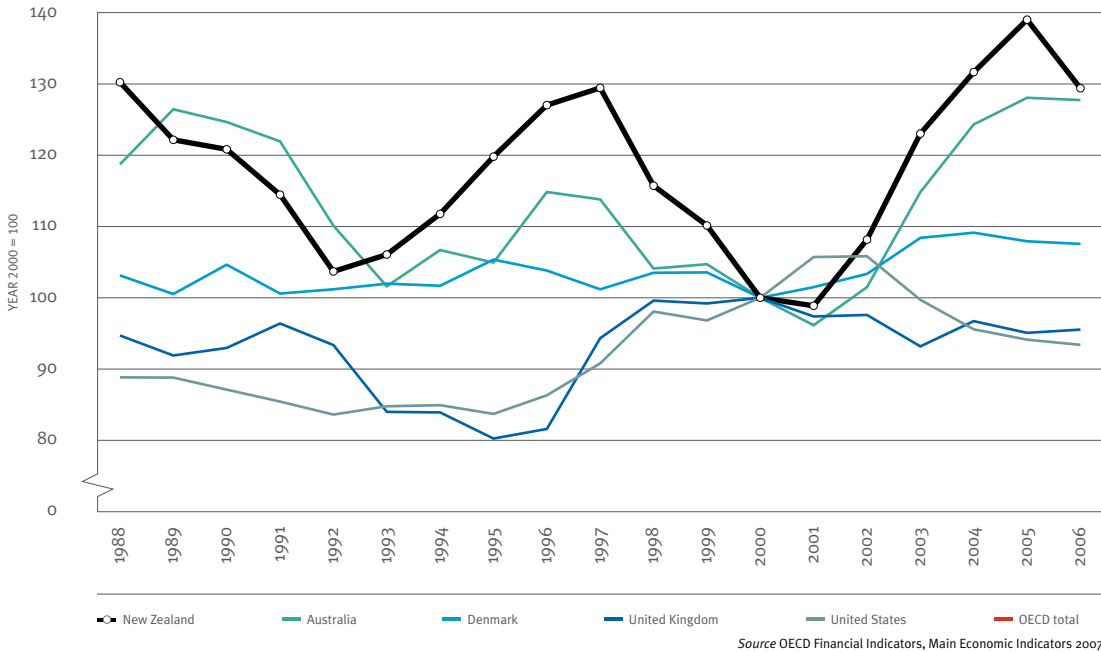


## 4.4.4 Interest and Exchange Rates

Between 1990 and 2005, New Zealand's real interest rate declined as it has in the benchmark economies, but it is still relatively high.

FIG. 4.51 Real effective exchange rate (year 2000 = 100)

New Zealand's real effective exchange rate has been more volatile than for comparator countries and has been increasing since late 2001, resulting in a fall in the competitiveness of our economy's exports since then.



#### 4.4.5 Terms of Trade

FIG. 4.52 Terms of trade (end quarter 2000 = 1,000)

New Zealand's terms of trade have increased in recent years, reflecting an increase in export prices relative to the price of imports. Australia has experienced a far greater increase since 2003. Since 2006, New Zealand's terms of trade have also increased.

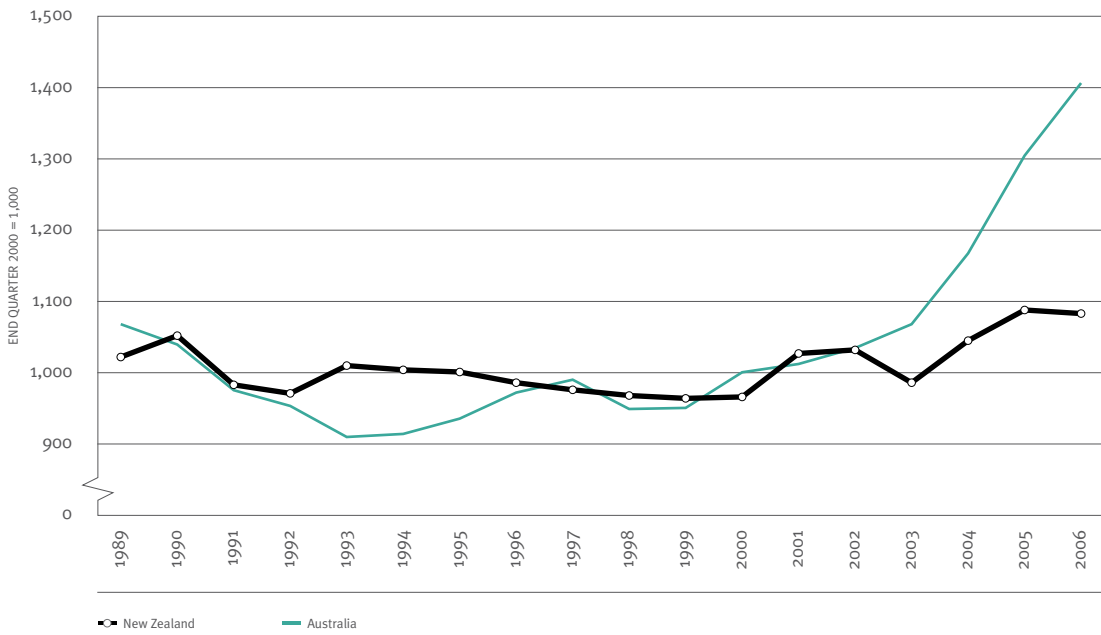
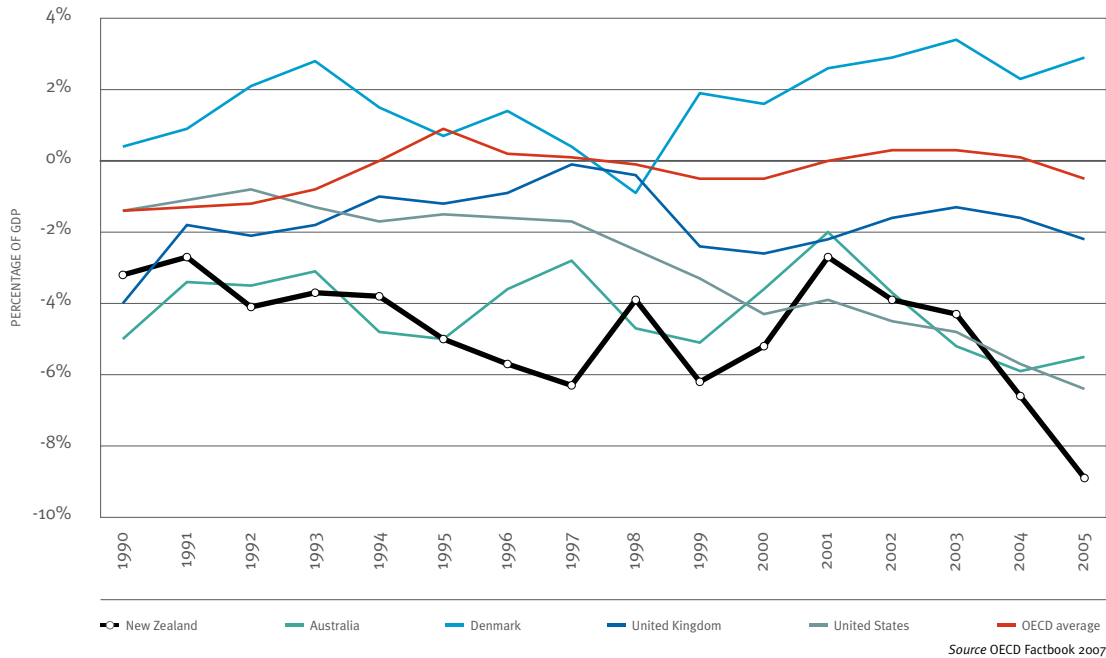


FIG.  
4.53

## Current account balance as a percentage of GDP

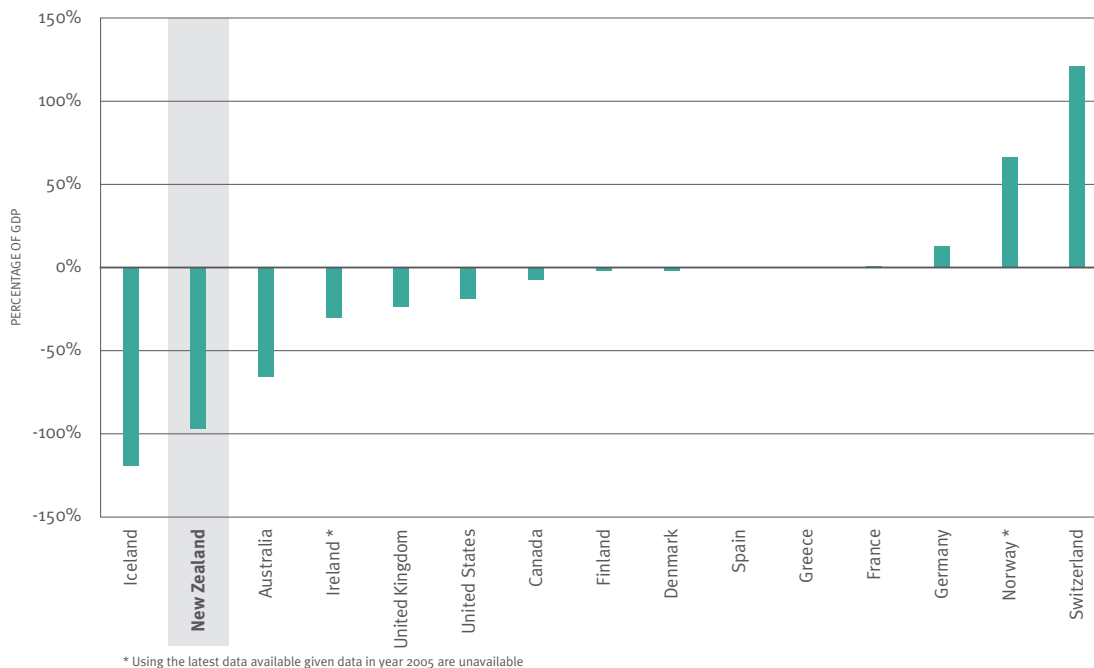


## 4.4.6 Overall External Position

New Zealand's current account deficit (the difference between saving and investment) is larger than that of all of the benchmark economies, and has widened recently.

FIG.  
4.54

## Net external liability, 2006



New Zealand's net external liabilities are among the highest in the OECD.

## CHAPTER

## 5

# New Zealand's Economic Relationship with Australia and its States

## Key Points

- New Zealand appears to be more highly integrated with the Australian economy than with that of any other country, but is still less integrated than the Australian states are with each other.
- New Zealand's economic performance will be an important determinant of our ability to compete with the Australian states for key resources, such as highly skilled workers and investment.
- New Zealand's growth in gross domestic product (GDP) per capita has been in the middle of the Australian states, but our level of GDP is lower than all of those states other than Tasmania.
- Australia has become an important destination for emigrating New Zealanders, resulting in a large and growing New Zealand diaspora. However, the magnitude of the net outflows are not a great deal bigger than that experienced by some of the Australian states to other parts of that country.
- New Zealand is a net importer from Australia of a number of high-value services, although we have a higher proportion of our workforce in finance, insurance and business services than do most Australian states.
- Australia accounts for a large and growing proportion of foreign investment in New Zealand, which has led to a large negative net investment position from New Zealand's perspective.

## Introduction

Strong international evidence suggests that country borders typically reduce levels of economic interaction. For example, trade between geographically close regions in the US and Canada is much less than trade between distant provinces within Canada.<sup>94</sup>

Considerable work has been undertaken to reduce the barriers to economic flows between New Zealand and Australia. This started with the negotiation of a New Zealand/Australia Free Trade Agreement, which evolved into the Closer Economic Relations (CER) agreement. Since then, our two countries have introduced a wide range of further policy measures and greater regulatory coordination, and have established a number of joint institutions. New policy efforts are now being undertaken under the Trans-Tasman Single Economic Market initiative.

As a result of these measures, and our geographical proximity, New Zealand now appears to be more economically integrated with Australia than with any other country. It is our largest trading partner, there is considerable cross-Tasman investment, and significant numbers of New Zealanders live and work in Australia.

However, border effects still exist between our two countries. For example, work on price similarities has shown that New Zealand is less integrated into the Australian economy than states such as Western Australia.<sup>95</sup>

With a population of 4.2 million people, New Zealand is a similar size to many of the Australian states – smaller than New South Wales and Victoria, but larger than South Australia or Western Australia. Given this, and the high levels of trans-Tasman economic integration, it is useful to compare the performance of the New Zealand economy with that of the individual states of Australia, in addition to that of the country as a whole. New Zealand's relative performance will, to a degree, determine our ability to compete with those states in key areas, such as for highly-skilled workers and investment.

In the context of the two countries' ongoing efforts to move towards a single economic trans-Tasman market, it is also useful to consider whether in some key areas, such as migration and investment, the economic flows between our two countries are closer to those that would normally be seen between different regions within a single country, rather than between two separate nations.

94. McCallum, J., "National Borders Matter: Canada-US Regional Trade Patterns", 1995, *The American Economic Review*, Vol 85, No 3 (Jun 1995), pp615–623.

95. Coleman, A., and T. Daghish, *Regional price convergence in Australia and New Zealand 1984–1996*, 1998, Treasury Working Paper 98/3.

## 5.1 Growth and Employment

FIG. 5.1 TO FIG. 5.4

New Zealand's GDP growth has been in the middle of the Australian states.<sup>96</sup> However, New Zealand's GDP per capita is lower than that of all the Australian states other than Tasmania. After severe declines in the late 1980s and early 1990s, New Zealand's employment growth has been high, only exceeded by Western Australia and Queensland since 1995.

Differences in standards of living may be more pronounced than GDP per capita implies, as the latter does not include interstate transfers, which reduce income differences between states. For example, Tasmania's state government receives a disproportionate share of goods and services tax (GST) revenues,<sup>97</sup> and on average, its residents receive substantially more in social benefits and services (health and education) than they pay in income taxes and indirect taxes. In 2003/04, Tasmania's household incomes excluding transfers were 24 per cent below Australia's as a whole. However, when government cash and in-kind transfers to Tasmanian households are included, final household incomes were only 12 per cent below average.<sup>98</sup>

New Zealand's relatively low output per capita is reflected in wages, which are lower than in the Australian states. In 2006, the average weekly earnings of full-time workers in Australia ranged from NZ\$1,025 in Tasmania to NZ\$1,248 in Western Australia (converted at purchasing power parity PPP exchange rates). In New Zealand, earnings averaged NZ\$906. This wage gap has widened over time: in New Zealand, real wages grew on average 1.1 per cent each year from 1997 to 2006, whereas Australian state real wage growth ranged from 1.3 per cent (Western Australia) to 1.7 per cent (Tasmania).<sup>99</sup>

## 5.2 Migration

FIG. 5.5 TO FIG. 5.7

Lower wages in New Zealand may be one influence on migration to Australia, together with family connections, lifestyle considerations and job opportunities. Australia has become important for New Zealand's outward migration in the past 40 years, and is now the destination for a substantial majority of emigrating New Zealanders. This migration has accumulated to form a considerable New Zealand diaspora, which grew to an estimated 389,000 people in 2006, the equivalent of about 10 per cent of the New Zealand population.<sup>100</sup> Unlike migrants to other destinations – which immigration restrictions bias towards the highly skilled – the skill distribution of New Zealanders moving to Australia is similar to that of the general New Zealand population. New Zealanders in Australia have a higher labour force participation rate than do Australian-born residents of Australia, and are concentrated in the young adult age group.<sup>101</sup>

Examining individual states, New Zealand has seen net migrant outflows to Australia of a similar magnitude to those experienced by Tasmania and New South Wales to the other Australian states. Queensland has been a major net recipient of people from most of the Australian states and New Zealand. Although we do not have statistics on the numbers of Australians now resident in a different state, we expect at least some of those groups to be of a similar size or larger than the number of New Zealanders living in Australia. This is implied by gross migration flows, which are less between Australia and New Zealand than between Australian states. Given that migration flows within countries are generally much greater than flows between them, this data suggests that New Zealand and Australia's labour markets are now highly, but still not perfectly, integrated.

96. To aid comparability, 1995 corresponds to a peak in the business cycle of each country, following recessions in the early 1990s.

97. In 2007/08, the Tasmanian government will receive a share of GST revenues that is 1.54 times its population share in Australia. See Australian Government, Budget Paper No 3, 2007, <http://www.budget.gov.au/2007-08/bp3/html/index.htm>.

98. Australian Bureau of Statistics, Government benefits, taxes and household income – Australia 2003/04, 2007, ABS Catalogue No 6537, p13.

99. These growth figures are based on state capital consumer price indices, and vary from the growth rates in Figure 5.4, which uses an Australia-wide

PPP exchange rate to convert values to constant New Zealand dollars. See Australian Bureau of Statistics, Consumer Price Index – Australia, Catalogue No 6401.0, Table 1.

100. This figure is from the Australian census. The estimated residential population born in New Zealand was 477,000 in 2006. This differs from the census results shown in Figure 5.5, as it is adjusted for census undercount.

101. Australian Department of Immigration and Citizenship, Fact Sheet 17 – New Zealanders in Australia. Available at URL: <http://www.immi.gov.au/media/fact-sheets/17nz.htm>.

### 5.3 Trade and Industry

FIG. 5.8 TO FIG. 5.10

Each Australian state has its own industrial structure and specialisations, which influence its economic performance. New Zealand's industrial specialisations can be compared with those of the individual Australian states in two ways: through the composition of its workforce, and by examining trade between New Zealand and Australia.

New Zealand is a net importer from Australia of a number of high-value services: computer and information services, royalties and licences, and, to a lesser extent, financial services. There is a particular imbalance in royalties and licences: in 2007, New Zealand exported NZ\$51 million to Australia, and paid Australians NZ\$193 million. On the other hand, financial services exports from New Zealand have grown from NZ\$5 million in 2003 (and probably lower in 2001) to NZ\$63 million in 2007, close to imports of NZ\$65 million.

Finance and insurance services and business services are two industry groups with higher than average labour productivity and wages.<sup>102</sup> The New Zealand workforce has relatively fewer finance and insurance workers than do New South Wales or Victoria, but more than the other states. In New South Wales, employment in these services fluctuated around 4.8 per cent of the total workforce over the whole period, and in Victoria, it has remained around 4.0 per cent. After a decline between 1996 and 2002, the proportion of New Zealand workers in the finance and insurance industries has grown more strongly than in any of the Australian states and now comprises 3.1 per cent of New Zealand's workforce. This may suggest that New Zealand is increasingly developing its own economic activity in these areas and is not serviced by Sydney and Melbourne's financial sectors to the extent that the other states of Australia appear to be. Property and business services employment became more important in all states of Australia from 1996 to 2006, and New Zealand kept up with this trend.

102. In 2004, New Zealand value added per worker in finance and insurance was \$146,000, and in property and business services \$95,000, compared with an economy average of \$65,000. In March 2007, the average weekly earnings of New Zealand finance and insurance workers was \$1,067, and in property and business services \$801, compared with an economy average of \$742. Figures for value added by industry are from Statistics New Zealand, *Hot Off the Press – National Accounts for the Year Ended March 2006, 2006*, Table 1.5; and figures for the number of employees are from Household Labour Force Survey data. Wages are from the Quarterly Employment Survey.

### 5.4 Investment

FIG. 5.11 & FIG. 5.12

The fourth dimension of New Zealand's relationship with Australia is investment. In recent years, Australia has tended to be a net investor in New Zealand.<sup>103</sup> Net investment has been positive since 2002 after briefly turning negative in 2001.

Accumulated net investment by Australians has raised New Zealand's net liabilities to Australia by 270 per cent since 2001. Australia now accounts for a third of New Zealand's total net foreign liabilities. This is large compared with Australia's share of world investment stocks, suggesting a high and growing level of capital market integration between New Zealand and Australia.

Previous work has indicated that this Australian component of New Zealand's foreign liabilities is less likely to be associated with a current account reversal than that owed to nationals from other countries, reducing the potential risk.<sup>104</sup> However, taken together, Australia and New Zealand have a net international investment deficit position of 61 per cent of Australasian GDP, which is still large by international standards.

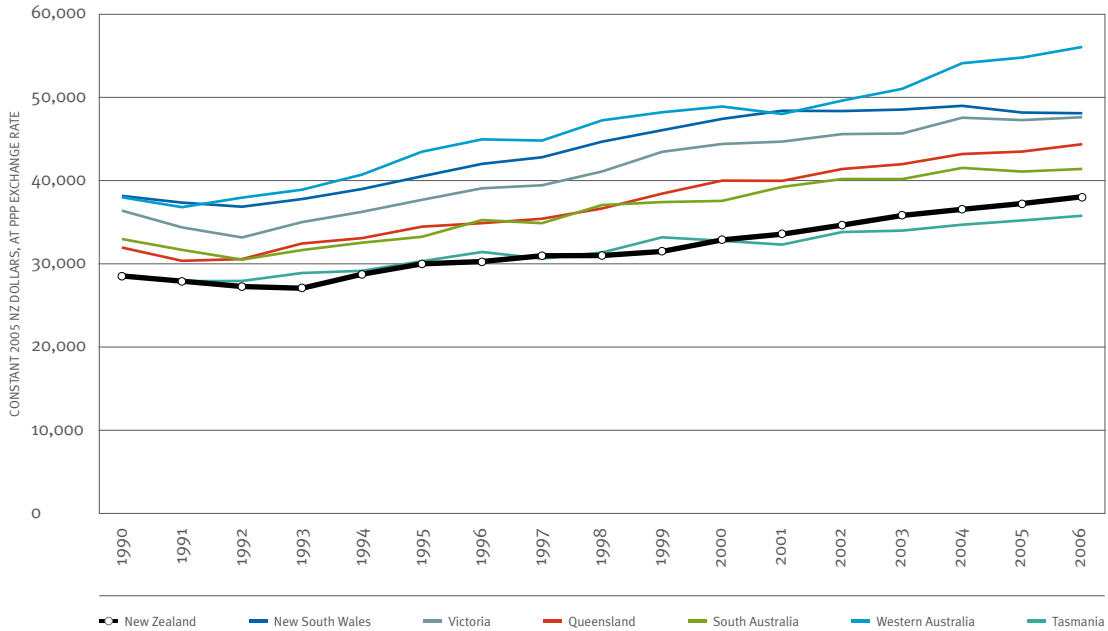
103. As noted in Figure 5.11, in some cases, Australian investment in New Zealand represents Australian residents acting as intermediaries for funds originally sourced from a third country.

104. Edwards, S., "External imbalances in New Zealand", from *Testing stabilisation policy limits in a small open economy: proceedings from a macroeconomic policy forum*, 2007, Reserve Bank of New Zealand, available at URL: <http://www.rbnz.govt.nz/research/workshops/12jun06/tspl-edwards.pdf>.

### 5.1 Growth and Employment

New Zealand's GDP per capita is lower than all of the Australian states other than Tasmania.

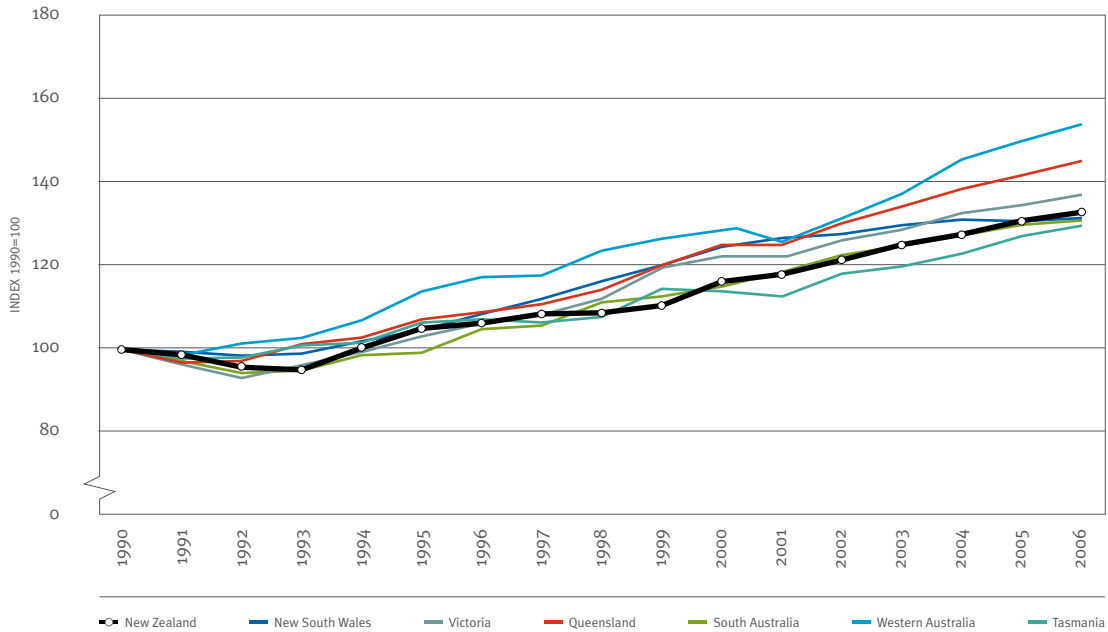
FIG. 5.1 Real GDP per capita<sup>105</sup>



Source Statistics New Zealand, National Accounts; Australian Bureau of Statistics, 5220.0 Australian National Accounts: State Accounts, Table 1 – Gross State Product, Chain volume measures and current prices

New Zealand's per capita growth since 1990 has been in the middle of the Australian states.

FIG. 5.2 Index of real GDP per capita

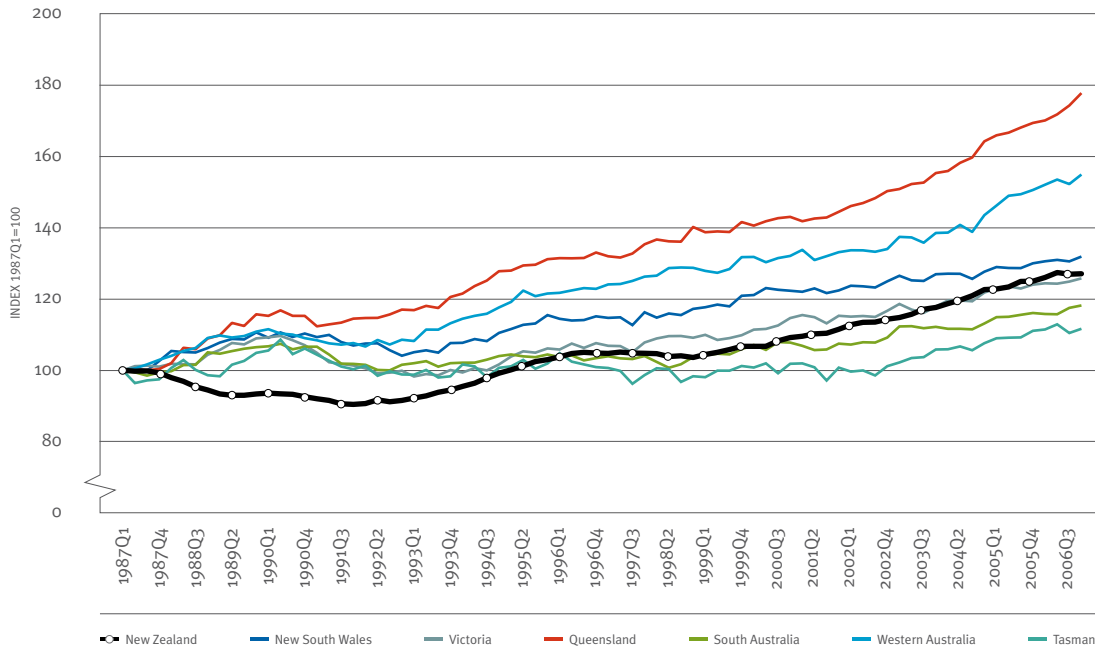


Source Statistics New Zealand, National Accounts; Australian Bureau of Statistics, 5220.0 Australian National Accounts: State Accounts, Table 1

105. To perform the conversion for the Australian states, we have to account for the greater purchasing power of Australian dollars. Here, we use annual purchasing power parity (PPP) exchange rates provided by the Organisation for Economic Co-operation and Development (OECD). Note that the Australian state GDP figures are converted into New Zealand

dollars using an Australia-wide exchange rate. In reality, price levels will differ across Australian states: cheaper Australian states will have higher real GDP than shown, and more expensive Australian states will have lower real GDP.

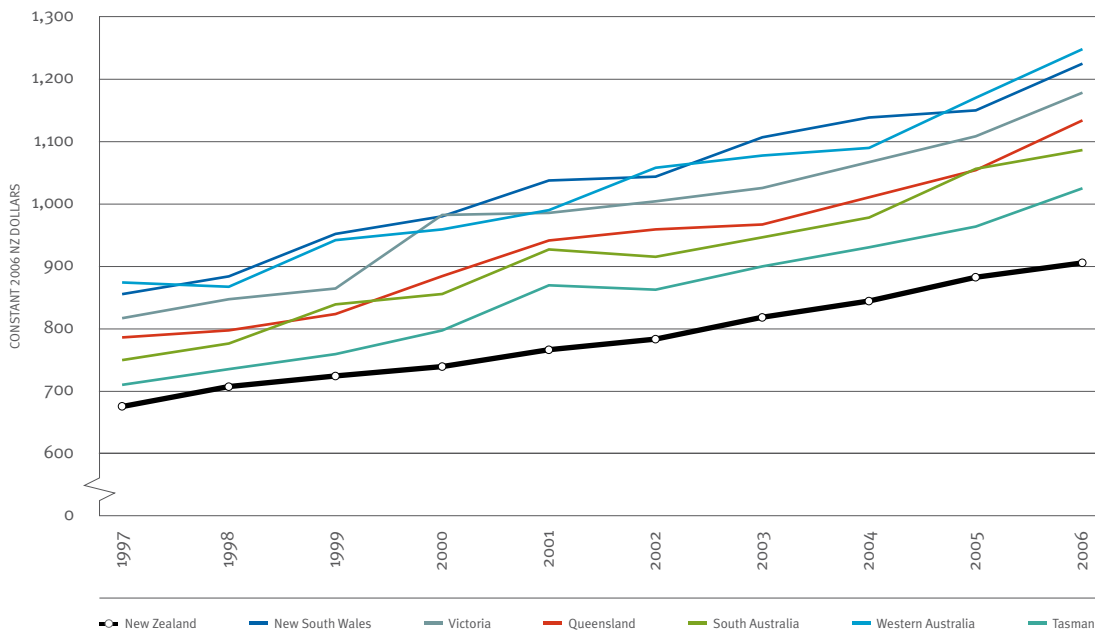
FIG. 5.3 Aggregate employment growth



Source Statistics New Zealand, Household Labour Force Survey; Australian Bureau of Statistics, 6291.0.55.003 Labour Force, Table 5

New Zealand's employment growth since 1987 was in the middle of the Australian states. Measured from June 1995, it was higher than all but two of the states.

FIG. 5.4 Mean full-time weekly salary and wage income<sup>106</sup>



Source Statistics New Zealand, Customised Income Survey Data; Australian Bureau of Statistics, 6310.0 Earnings, Benefits and Trade Union Membership, Table 1

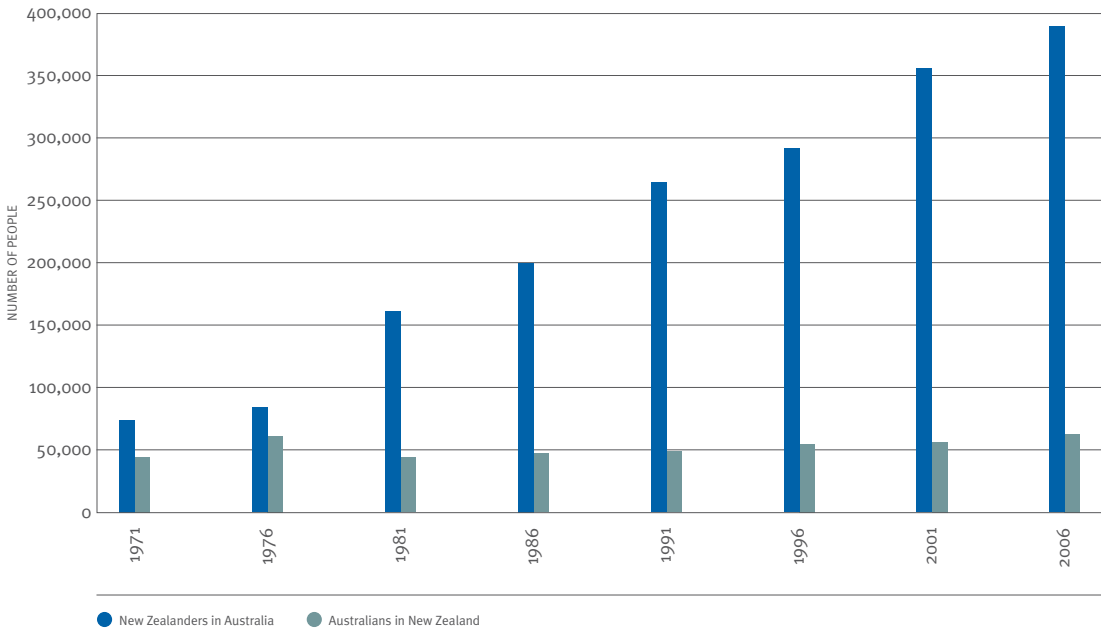
New Zealand has lower wages than all the Australian states. Wages are highest in Western Australia and New South Wales.

<sup>106</sup> Annual PPP exchange rates are provided by the OECD, and adjust for different rates of inflation in New Zealand and Australia. Real wages are obtained using the New Zealand consumer price index. "Full-time" is defined using the Australian Bureau of Statistics standard as work exceeding 35 hours per week.

## 5.2 Migration

The number of New Zealanders living in Australia has increased since 1971. In 2006, there were 389,000 New Zealanders in Australia – 2.1 per cent of the Australian population and the equivalent of 9.7 per cent of the New Zealand population.

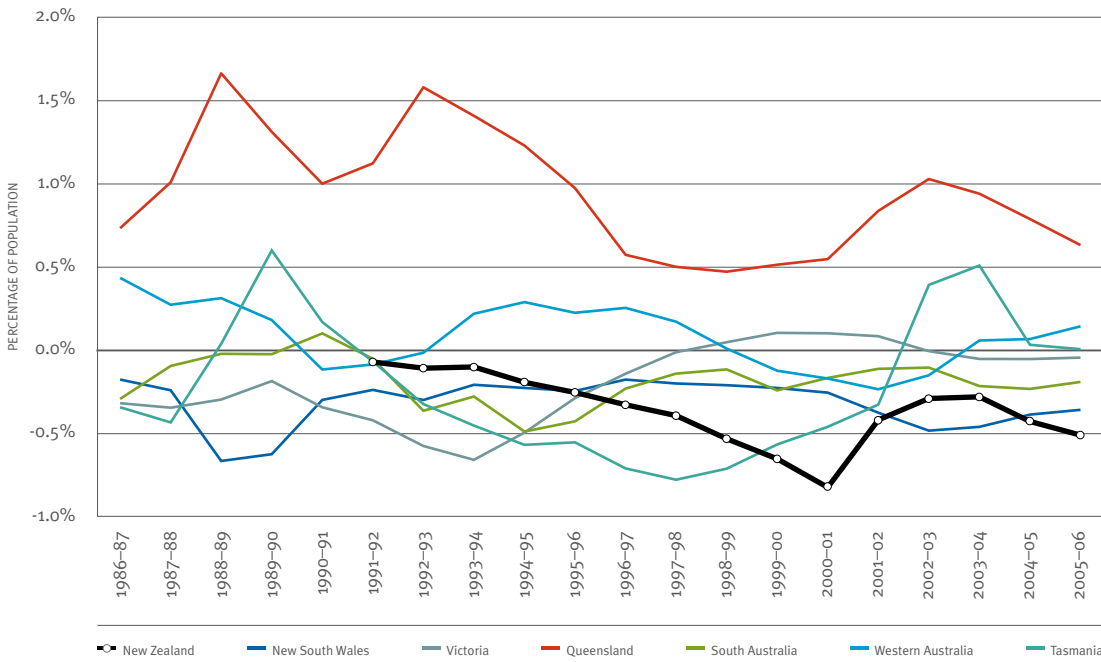
FIG. 5.5 New Zealand and Australian diaspora<sup>107</sup>



Source Statistics New Zealand, Census tables 1971-2006; Australian Bureau of Statistics, 3105.0.65.001 Australian Historical Population Statistics, Tables 80-84; ABS, 2068.0 2006 Census Tables

New Zealand has experienced large outflows of people to Australia for a number of years. However, the size of these flows is not dissimilar to past migration from NSW and Tasmania to the other states.

FIG. 5.6 Annual net migration between Australian states and between New Zealand and Australia<sup>108</sup>

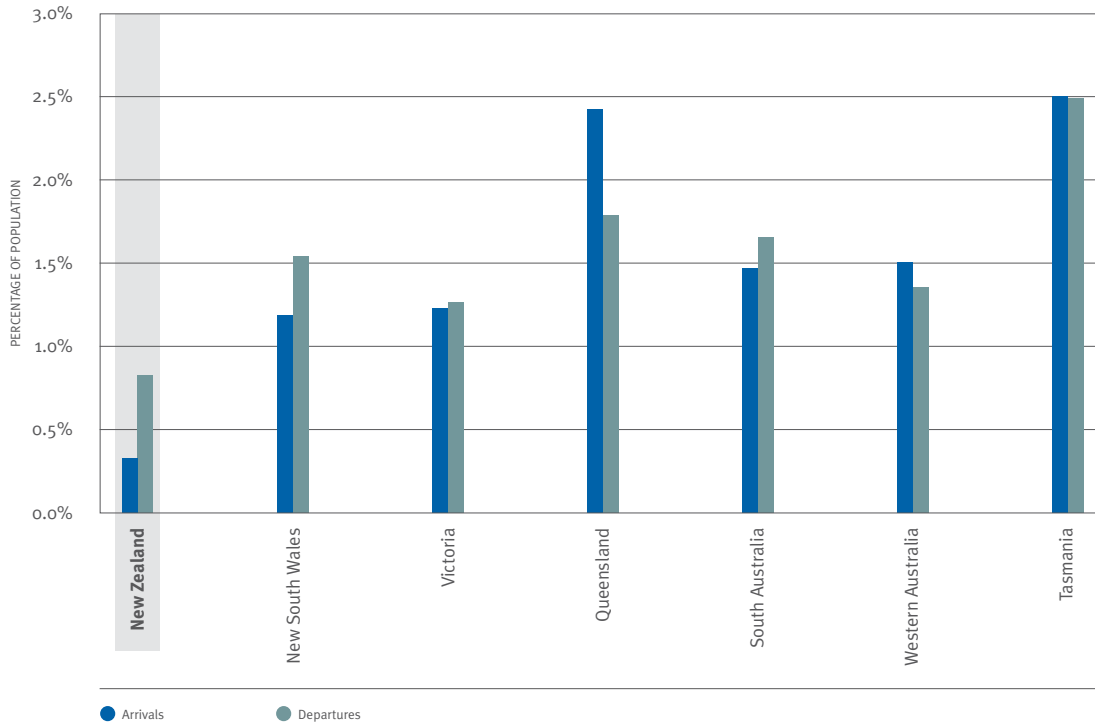


Source Statistics New Zealand, External Migration; Australian Bureau of Statistics, 3412.0 Migration 2005-06, Table 5.7

107. This is measured as the number of New Zealanders and Australians by birthplace usually resident in the other country.

108. The Australian state figures do not include net exchanges with New Zealand, as state-New Zealand migration statistics are not available. The effect of adding these flows would be to slightly shift all of the Australian net migration figures (generally upwards, given that they will tend to be net recipients of New Zealanders).

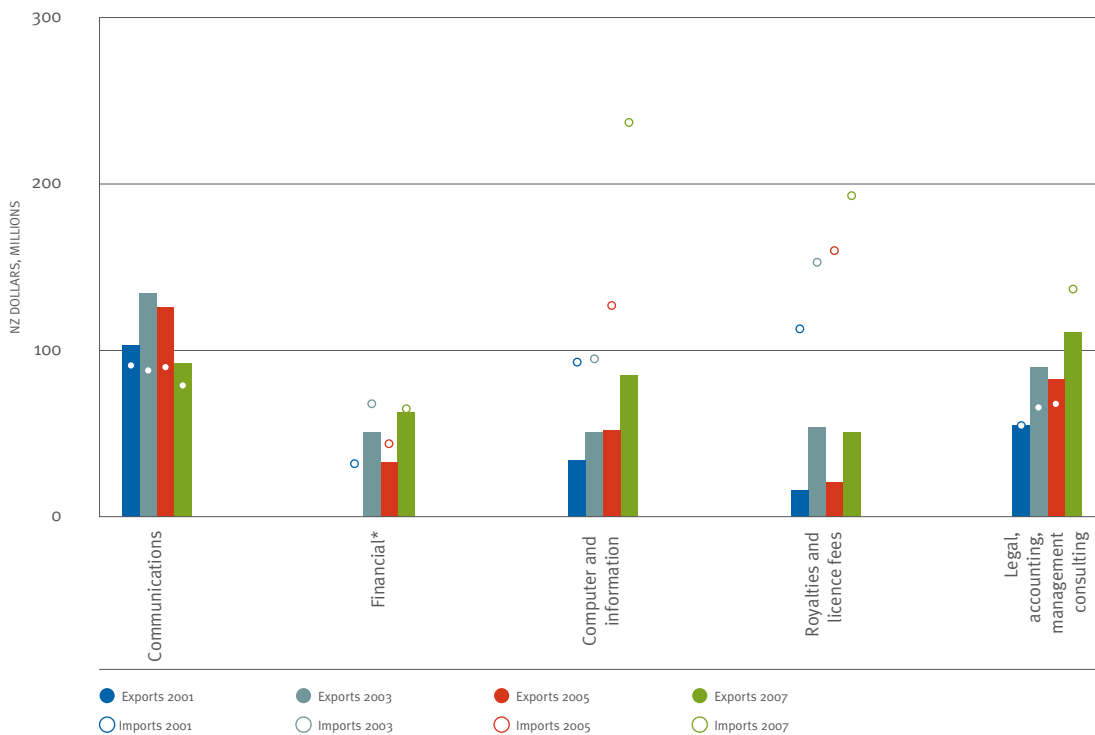
FIG. 5.7 Gross migration flows between Australian states and between New Zealand and Australia, 2005–2006<sup>109</sup>



New Zealand's gross migration flows to Australia in 2005–2006 were considerably smaller than Australian interstate flows, and more unbalanced.

Source Statistics New Zealand, External Migration; Australian Bureau of Statistics, 3412.0 Migration 2005-06, Table 5.7

FIG. 5.8 Value of services trade with Australia



### 5.3 Trade and Industry

New Zealand is a net exporter of communications services to Australia, but a net importer of finance, computer and information services as well as intellectual property.

\*Exports of financial services to Australia were confidential in 2001

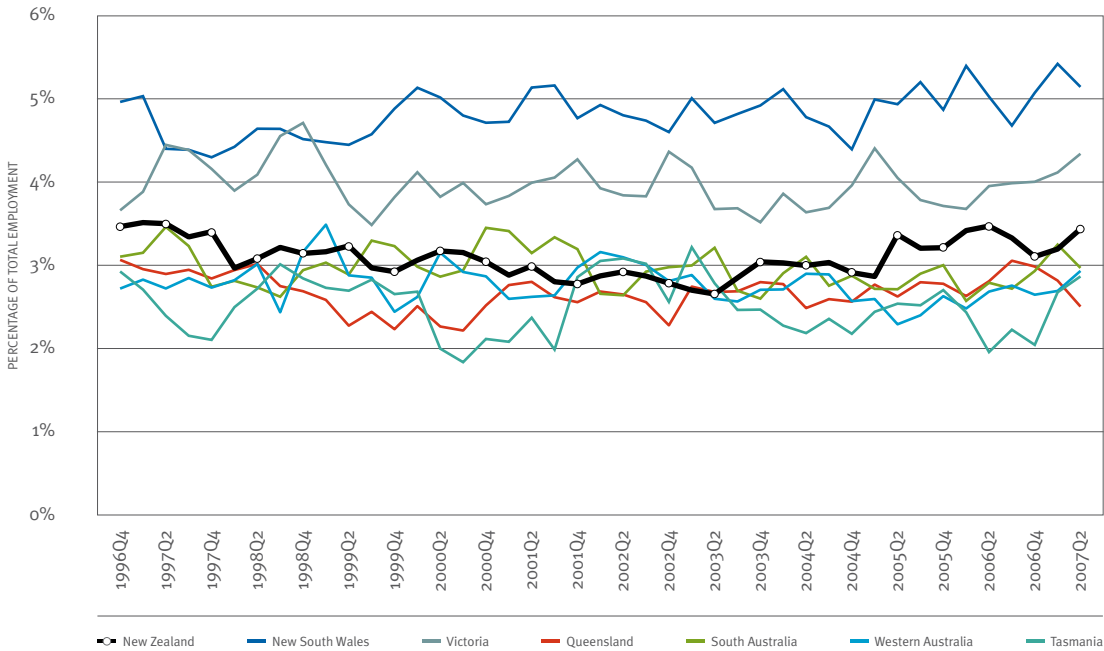
Source Statistics New Zealand, Customised balance of payments data

109. Note that the Australian state figures do not include migration to and from New Zealand.

New Zealand's levels of employment in the finance and insurance industries are a little higher than all of the states but lower than New South Wales and Victoria.

FIG. 5.9

Finance and insurance employment

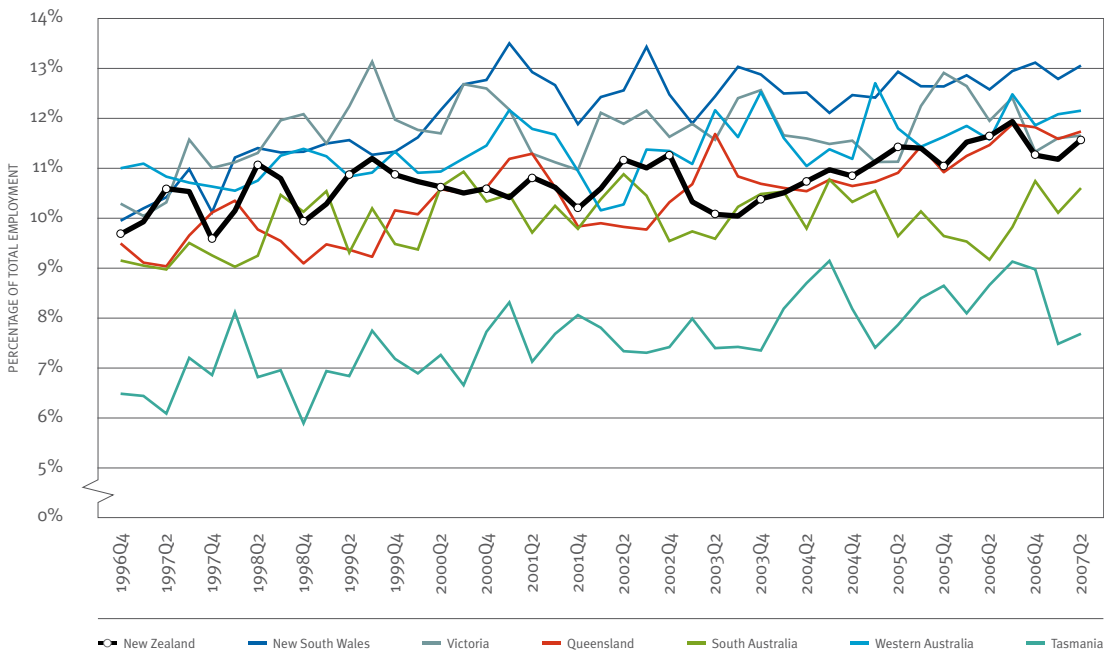


Source Statistics New Zealand, Household Labour Force Survey; Australian Bureau of Statistics, 6291.o.55.003 Labour Force, Table 5

New Zealand's levels of employment in the property and business services industries sit broadly in the middle of the Australian states.

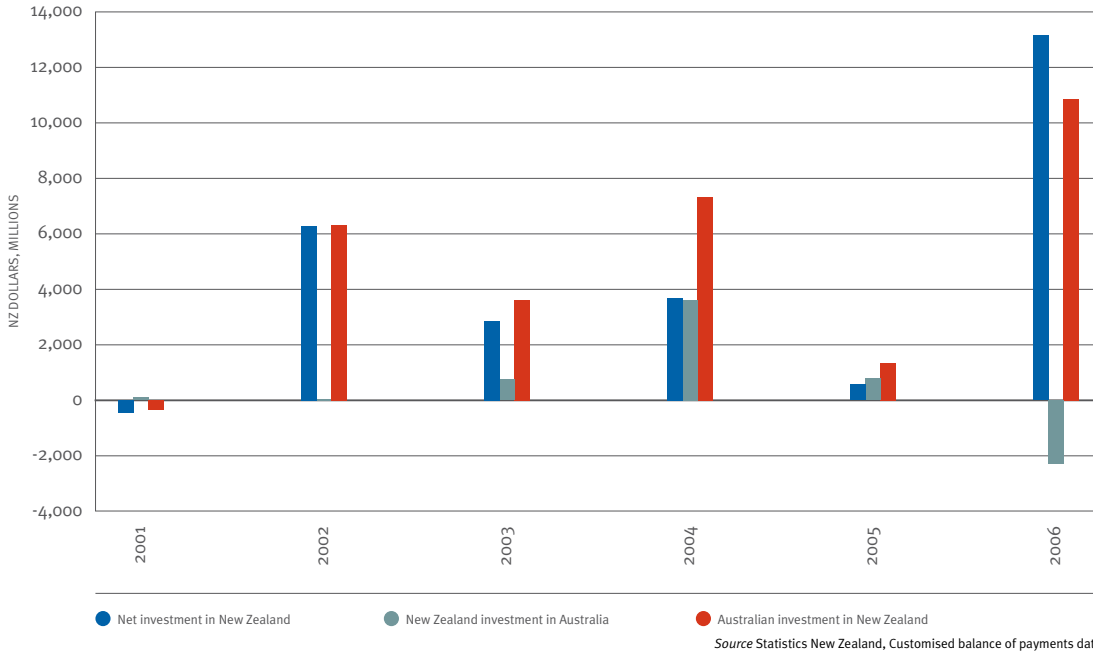
FIG. 5.10

Property and business services employment



Source Statistics New Zealand, Household Labour Force Survey; Australian Bureau of Statistics, 6291.o.55.003 Labour Force, Table 5

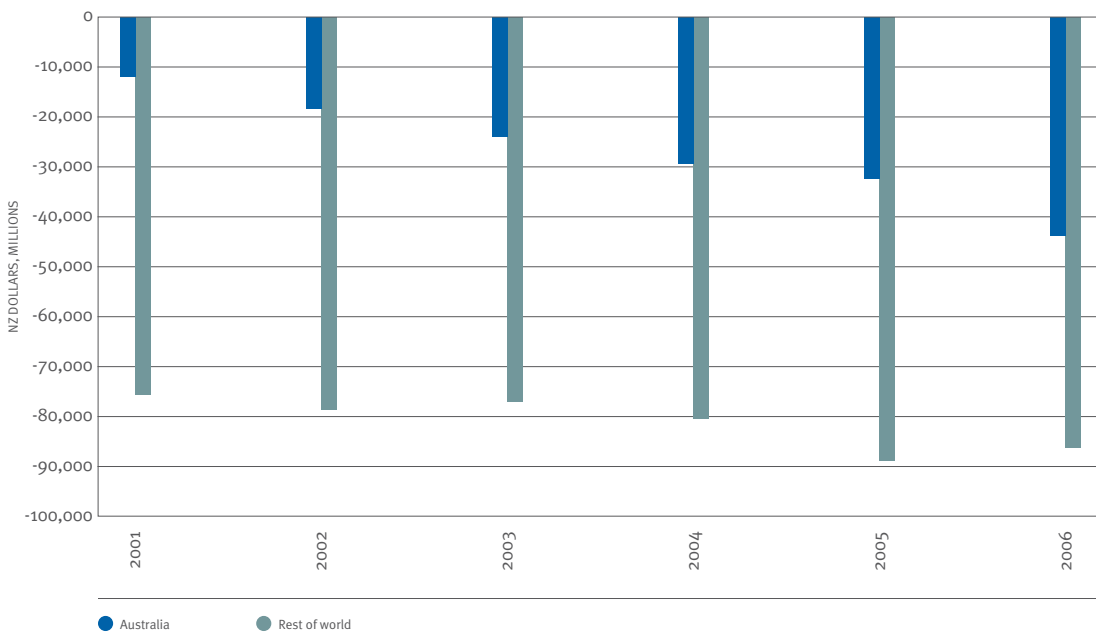
FIG. 5.11 Investment between Australia and New Zealand



### 5.4 Investment<sup>110</sup>

New Zealand has had high, but fluctuating, net investment from Australia since 2002. In 2006, investment from Australia was \$10.9 billion, while New Zealand disinvested \$2.3 billion from Australia.

FIG. 5.12 New Zealand's net international investment position



New Zealand's net international investment position with both Australia and the rest of the world is large and negative. However, since 2001, Australia has made up a growing proportion of New Zealand's net foreign liabilities (33.6 per cent in 2006, up from 13.6 per cent in 2001).

110. Note that, in these figures, the country of investment is the country in which the immediate non-resident counterparty is resident. In some cases, Australian investment in New Zealand represents Australian residents acting as intermediaries for funds originally sourced from a third country.

# Auckland – an Internationally Competitive City

## Key Points

- Large, outward-facing, global cities play an increasingly important role in economic development.
- Auckland’s gross domestic product (GDP) per capita is lower than all but one of the international benchmark cities chosen, but only slightly so in most cases. However, it is substantially lower than the cities (predominantly large) with the highest GDP per capita.
- Importantly, Auckland is also assessed as offering a high quality of life by international standards, offsetting to some degree its lower GDP per capita.
- Auckland’s productivity levels (GDP per worker) are lower than the average of a sample of 78 metropolitan regions in the OECD and below most comparator cities.<sup>111</sup>
- The difference in productivity between Auckland and New Zealand as a whole – the Auckland “premium” – is in the middle of the comparator cities, suggesting that, in the New Zealand context, Auckland is contributing normally to economic growth.
- Auckland’s population growth rate is very high by international standards. This is driven by high levels of inward international migration. Within New Zealand, Auckland has experienced low net population outflow over recent years relative to the region’s population.
- With regard to the underlying factors that influence productivity growth, Auckland’s performance is mixed:
  - Auckland’s levels of patent applications per capita are relatively low by international standards, as is its share of the working age population with a tertiary education.
  - Auckland City’s share of employment in high-tech services and goods manufacturing is broadly in the middle of the international comparator cities.

111. The comparator cities chosen for this document are Brisbane, Melbourne, Adelaide, Seattle, Vancouver and Copenhagen.

## Introduction

International evidence suggests that large, outward-facing, global cities are playing an increasingly important role in driving economic development.<sup>112, 113</sup> Successful cities allow greater levels of specialisation, and thicker and deeper markets, attract highly skilled workers, and are centres of innovation and entrepreneurship. They are therefore competitive locations for global and regional company headquarters. The proximity of universities to research and production facilities means cities are often the places where new products are developed and commercialised.

Cities are not automatically synonymous with success, however. OECD analysis shows that cities such as Berlin, Fukuoka, Lille, Naples and Pittsburgh perform below their respective national averages for income, productivity, skills and employment. There is also some evidence that mega-size cities – those with more than 7 million people, such as Seoul, Mexico City, Istanbul and Tokyo – have outgrown the economies of scale normally associated with cities.

Auckland is a relatively small city by international standards. In the New Zealand context, however, Auckland is the only city that has the size necessary to provide the benefits that large cities can offer.<sup>114</sup>

It is therefore useful to assess the extent to which Auckland is acting as an engine of growth for the New Zealand economy and demonstrates the characteristics of a successful global city – such as high levels of productivity, income, specialisation and skills.

This chapter examines Auckland’s performance relative to the other regions of New Zealand and to a small number of international benchmark cities – Brisbane, Melbourne, Adelaide, Seattle, Vancouver and Copenhagen.<sup>115</sup> These cities are useful comparators for Auckland as they are mostly similar in size, density and economic make-up. The more successful also provide an example of the sorts of results Auckland could sensibly aspire to. Auckland’s relative performance will, in part, influence its ability to compete with other cities for resources (such as skilled workers, businesses and investment).

For the purposes of this chapter, the data provided refers to the greater Auckland area, defined as the area within the Auckland Regional Council boundaries, unless otherwise stated.

### 6.1 Well-being and Prosperity

FIG. 6.1 TO FIG. 6.3

Measures of well-being and quality of life provide good overall indicators of city performance.

In terms of quality of living, Auckland compares very favourably with most other metropolitan cities internationally. The Mercer Worldwide Quality of Living Survey ranked Auckland 5th equal out of 215 cities, and higher than all of the comparator cities other than Vancouver. This quality of living indicator is a broad-based composite measure, taking account of 39 factors in the areas of: political and social environment; economic environment; sociocultural environment; medical and health considerations; schools and education; public services and transport; recreation; consumer goods; housing; and the natural environment.

While a high quality of life is not in itself sufficient for Auckland to become increasingly internationally competitive, it suggests that Auckland has a foundation to build on.

Auckland’s GDP per capita level is lower than that of five of the six benchmark cities discussed above, the exception being Adelaide. Encouragingly, the size of that gap is relatively small for all those cities other than Seattle. Also, the difference in GDP per capita between Auckland and New Zealand as a whole – the Auckland “premium” – is greater than that of all of the comparator cities (relative to their national averages) other than Seattle.

These income statistics suggest that Auckland is more productive than the rest of New Zealand, but is still slightly underperforming relative to the comparator international cities.

112. Parkinson, M., M. Hutchins, J. Simmie, G. Clark and H. Verdonk, *Competitive European cities: Where do the Core Cities Stand?* 2004, London, Office of the Deputy Prime Minister.

113. OECD territorial reviews: Competitive cities in the global economy, 2006, Paris, OECD.

114. See, for example, OECD territorial reviews: Competitive cities in the global economy, 2006, Paris, OECD, for discussions on metropolitan area definitions and size.

115. Where any of these cities is excluded from the graph, it is because we have been unable to find comparable data. In those cases we have compared Auckland to the subset of cities for which data is available.

## 6.2

### Immediate Drivers of Income Growth

FIG. 6.4 TO FIG. 6.9

As noted in Chapter 2, improvements in material living standards can be attributed to increases in either labour utilisation (the number of hours worked per head of population, per year) or labour productivity (the amount of output produced for each unit of paid work).

Auckland's labour productivity (output per worker) is below the average productivity of the sample 78 OECD metropolitan regions and in the middle of comparator cities. Auckland's productivity is similar to that of Tokyo, Madrid and comparator city Vancouver. While Auckland's overall economic performance is comparable with that of a number of mid-range OECD cities, it also appears to have considerable scope for improvement.

Auckland's productivity "premium" relative to New Zealand as a whole is in the middle of the comparator cities (and slightly lower than the OECD average). This data again suggests that, while Auckland's productivity levels are low relative to the comparator cities, it is contributing normally to economic growth within New Zealand.

Auckland has experienced very high rates of population growth over recent years. This has been supported by higher levels of inward international migration compared to other New Zealand regions. Within New Zealand, Auckland has experienced a low net outflow of workers over recent years relative to the city's total population.

## 6.3

### Underlying Determinants of Productivity Growth

FIG. 6.10 TO FIG. 6.16

International evidence suggests that a number of generic factors underpin most successful and competitive cities.<sup>116</sup> In this chapter, we focus on Auckland's performance in the areas of innovation, skilled human capital, connectedness, economic diversity and transport infrastructure.

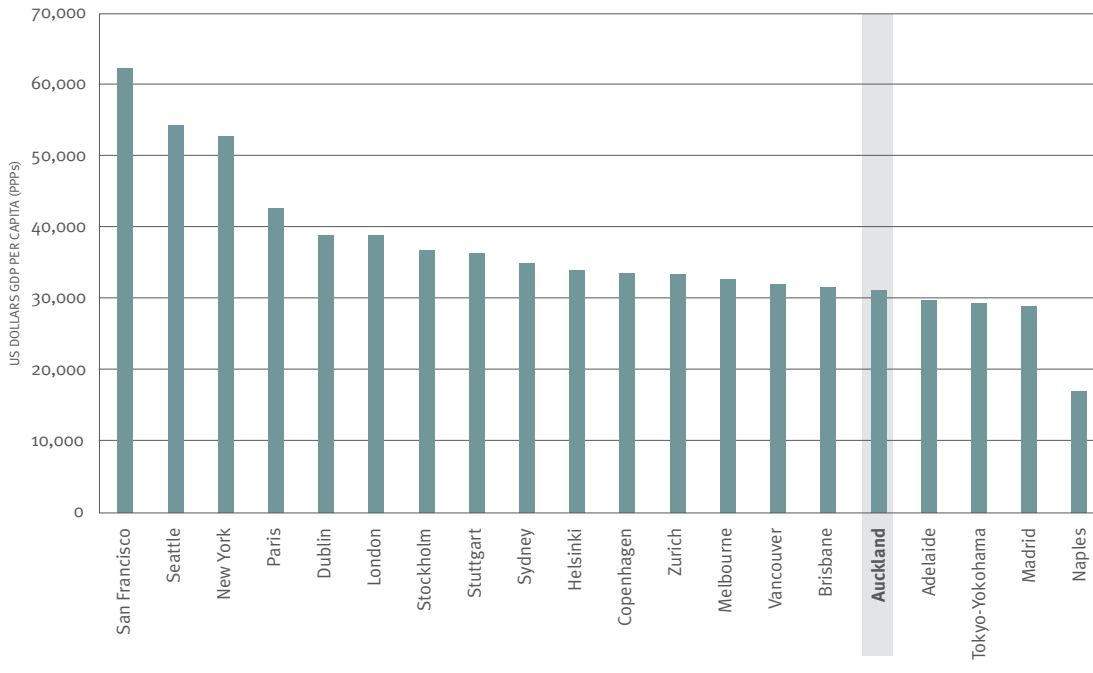
With regard to the underlying factors that influence productivity growth, Auckland's performance is more mixed. Auckland's levels of patent application per capita are in the middle of the comparator cities but relatively low by international standards. Auckland's share of the working age population with a tertiary education is also low. Turning to knowledge-intensive employment, Auckland City's share of employment in high-tech services and goods manufacturing is broadly in the middle of the international comparator cities.

Connectivity both within and between cities is critically important to urban competitiveness. Connectivity takes many forms, including physical road, rail and air connections; electronic communications; and business networks. The available data suggests that Auckland's broadband access is high compared to Australian states and territories as well as New Zealand regions. However, comparisons were only able to be made at the state level and, since Australian states include a larger proportion of rural areas than does the Auckland region, this suggests that Auckland's broadband access may not be as good in relative terms as the figures suggest.

Road congestion rates in Auckland City is less than the Australian capital city areas. The available data suggests that Auckland's road transportation infrastructure is geared towards peak traffic, and public transport usage in Auckland is relatively low.

116. Parkinson, M., M. Hutchins, J. Simmie, G. Clark and H. Verdonk, *Competitive European cities: Where do the Core Cities Stand? 2004*, London, Office of the Deputy Prime Minister.

FIG. 6.1 Ranking of metropolitan regions by income (USD GDP per capita in PPPs), 2002

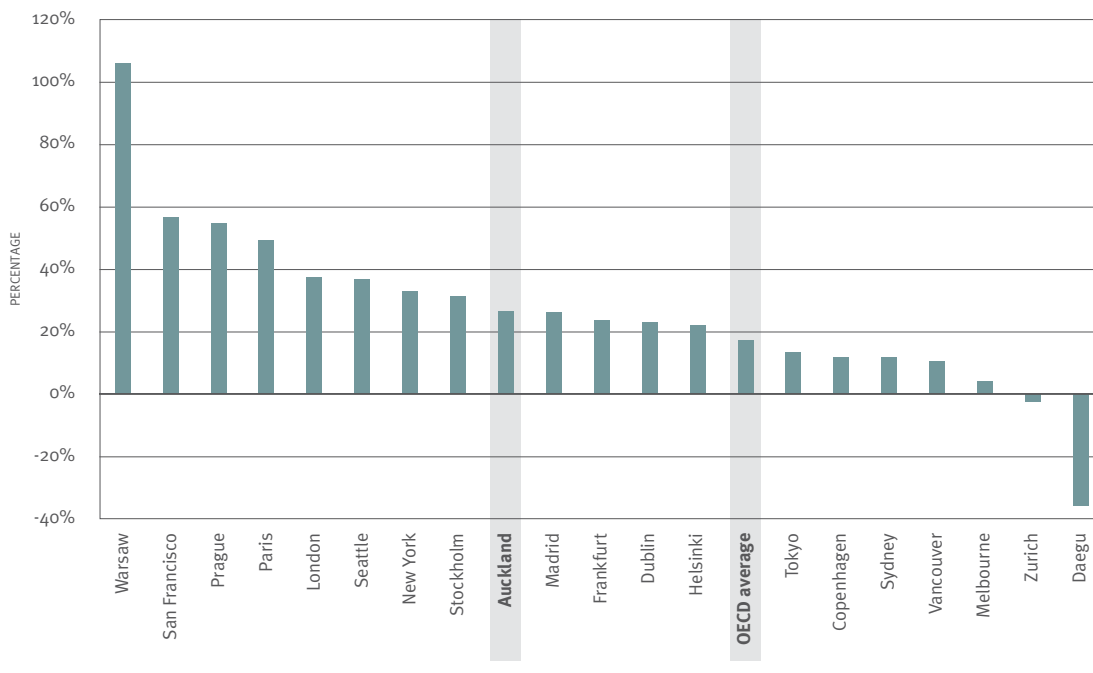


### 6.1 Well-being and Prosperity

Auckland's GDP per capita is below that of most of the comparator cities (Brisbane, Vancouver, Melbourne, Copenhagen and Seattle), but higher than Adelaide. Overall, Auckland's ranking for this indicator is 80th out of 116 countries.<sup>117</sup> Auckland's GDP per capita is high relative to other New Zealand regions.<sup>118</sup>

Source Demographia, Gross Domestic Product Estimates: Metropolitan Regions, April 2007

FIG. 6.2 Differences in per capita GDP of metro-regions and their national level, 2002



Auckland's GDP per capita is higher than New Zealand's national GDP per capita. This GDP per capita differential is higher in Auckland than all other comparator cities, other than Seattle (we are 27th out of 78 countries).

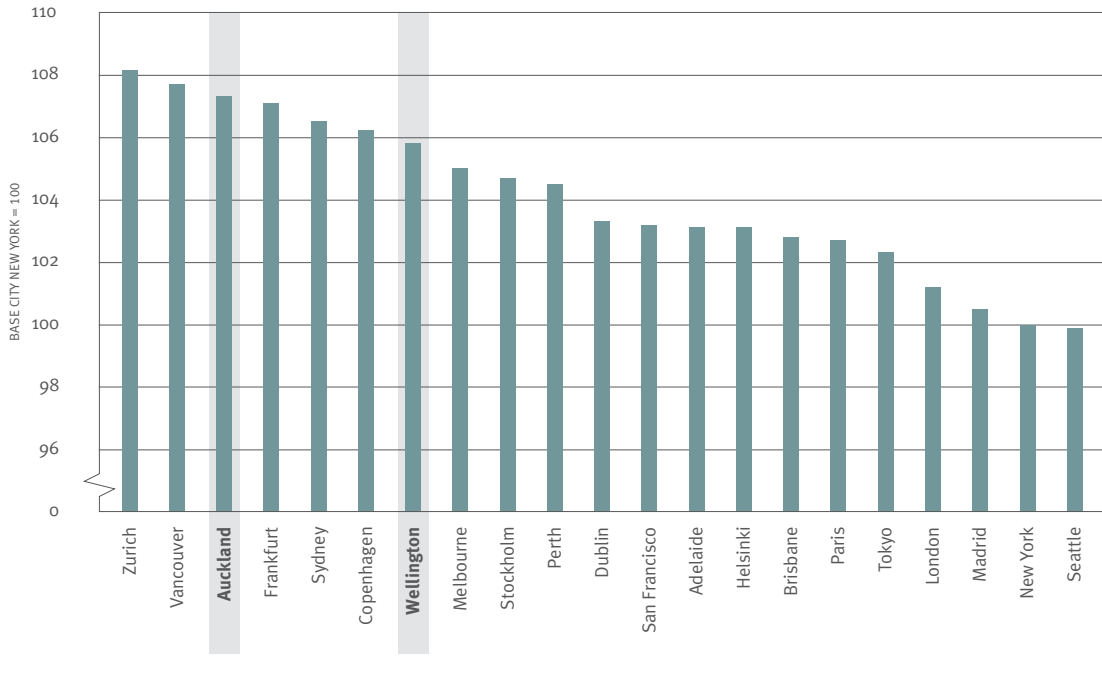
Source OECD Territorial Reviews: Competitive Cities in the Global Economy, 2006 – OECD metropolitan database

117. Where data presented is from a single source with a fixed sample size, the rankings provided in this chapter show Auckland's ranking for the sample as a whole.

118. Statistics New Zealand research report on regional gross domestic product, 2006, Wellington: Statistics New Zealand.

Auckland's quality of living has been in the top 5 cities in the world in 2007, 2006 and 2004 (we were 3rd out of 215 countries in 2007). It dropped to 8th in 2005, behind Dusseldorf, Frankfurt and Munich. This indicates that, overall, Auckland offers a good lifestyle with high quality amenities, offsetting to some degree its relatively low GDP per capita.

FIG. 6.3 Quality of living, 2007 (base city: New York = 100)

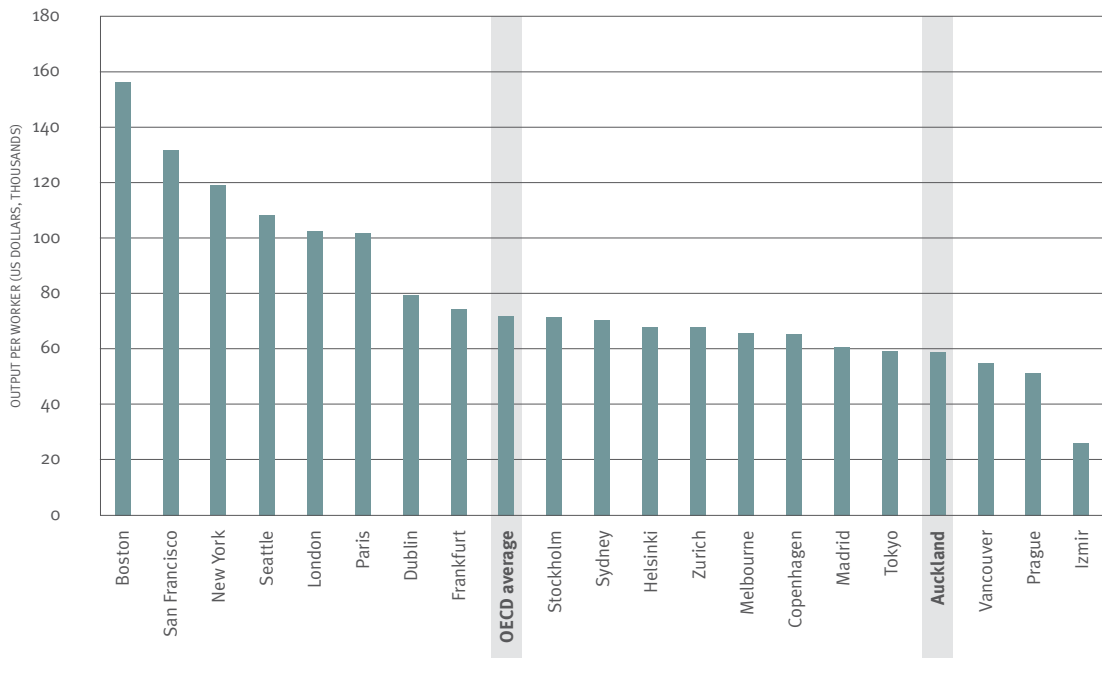


Source Mercer Human Resource Consulting Worldwide Quality of Living Survey 2007

## 6.2 Immediate Drivers of Productivity Growth

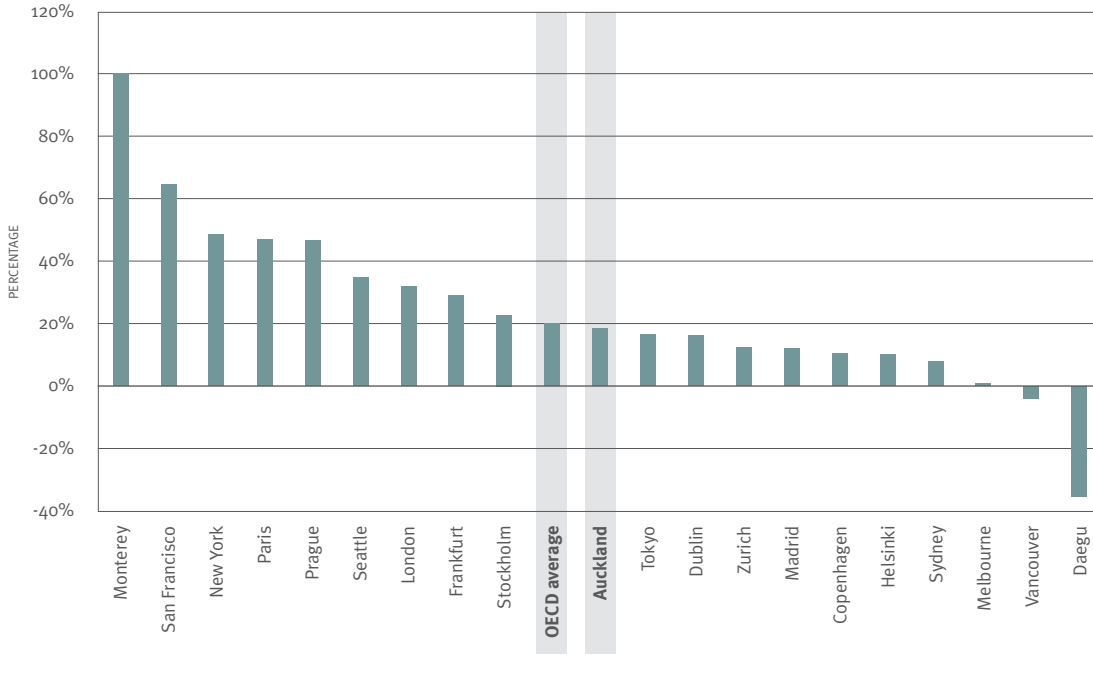
Auckland's labour productivity is lower than the OECD average of a sample of metropolitan regions, and all of the comparator cities other than Vancouver (we are 54th out of 78 countries).

FIG. 6.4 Labour productivity (in thousands, USD)



Source OECD Territorial Reviews: Competitive Cities in the Global Economy, 2006 – OECD metropolitan database

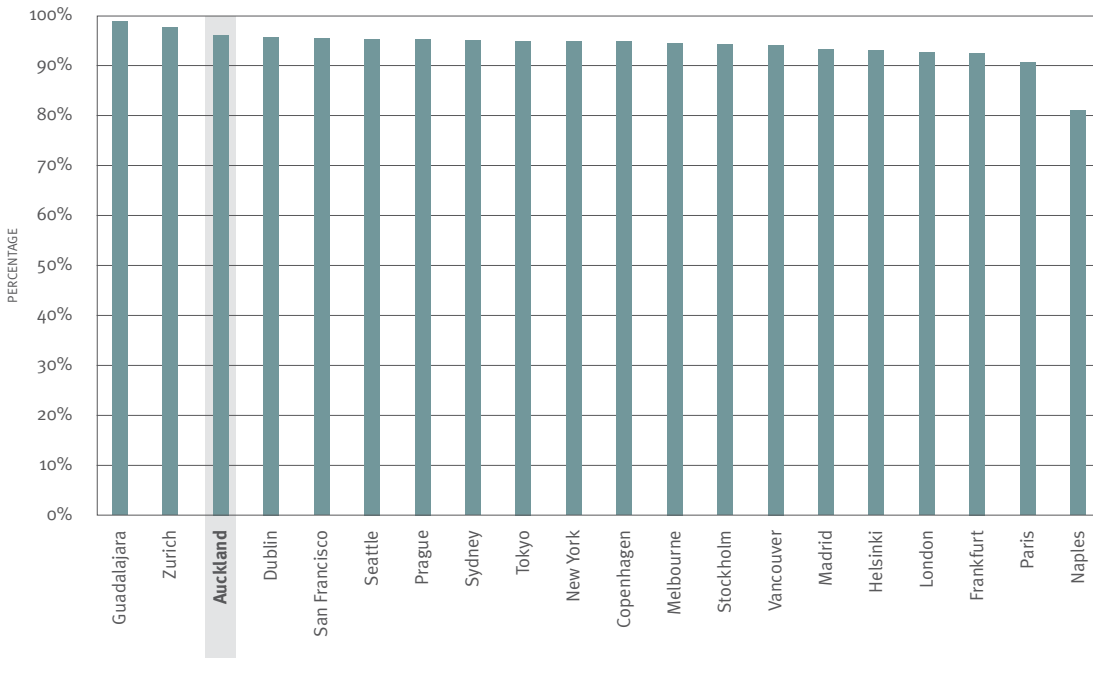
FIG. 6.5 Productivity differences between metro-regions and their national level, 2002



Auckland has higher labour productivity compared with other New Zealand regions<sup>119, 120</sup> and the New Zealand national average. Internationally, Auckland's productivity relative to the national average is about equal to the OECD average, and in the middle of the comparator cities (we are 38th out of 78 countries).

Source OECD Territorial Reviews: Competitive Cities in the Global Economy, 2006 – OECD metropolitan database

FIG. 6.6 Employment rate of OECD metropolitan regions



Auckland's employment rate is the 3rd highest in this sample of OECD metropolitan regions. As at March 2006, approximately 638,600 people were employed, and the unemployment rate was 3.6 per cent, slightly below the national average of 3.7 per cent.

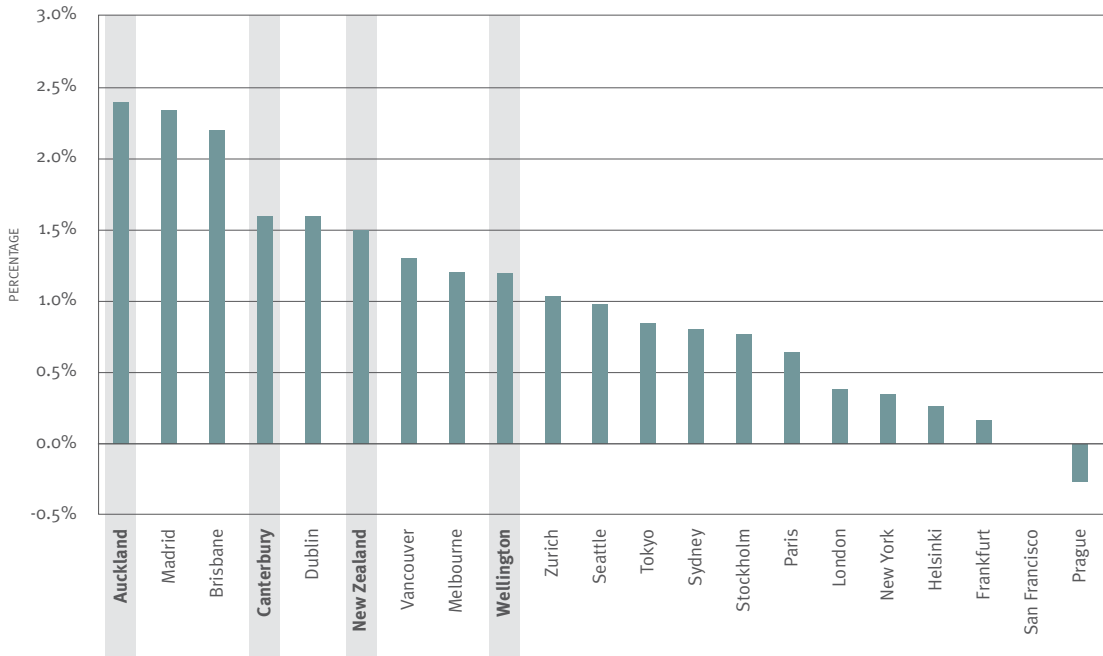
Source OECD Territorial Reviews: Competitive Cities in the Global Economy, 2006

119. Statistics New Zealand research report on regional gross domestic product, 2006, Wellington, Statistics New Zealand.

120. Lewis, G., and S. Stillman. *Regional economic performance in New Zealand: How does Auckland compare?* 2005, New Zealand Treasury Working Paper 05/08, Wellington, The Treasury.

Auckland had the highest average annual population growth rate of this sample of metropolitan regions, at 2.4 per cent. Other Australasian city regions also exhibit relatively high growth rates.

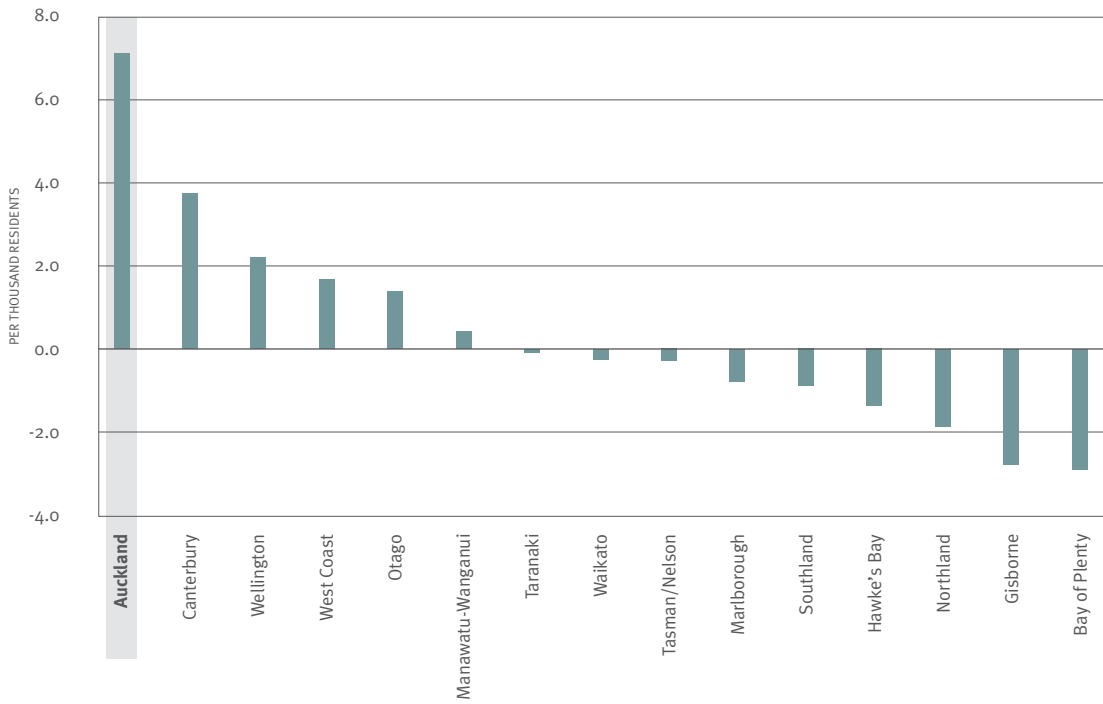
FIG. 6.7 Annual average population growth rate (sample of metropolitan regions and New Zealand average)



Source Eurostat, 2000–2005 and 2000–2004, General and regional statistics: Demographic statistics; Statistics New Zealand, 2007, Demographic Trends 2006; Australian Bureau of Statistics, 2006, Regional population growth; Statistics Canada 2002–2006, Community profiles; US Census Bureau, 2001–2006; Annual Population Estimates and Estimated Components of Population Change for the United States and States: April 1, 2000 to July 1, 2006; Japan Statistics Bureau, Population of major cities, 2001–2006

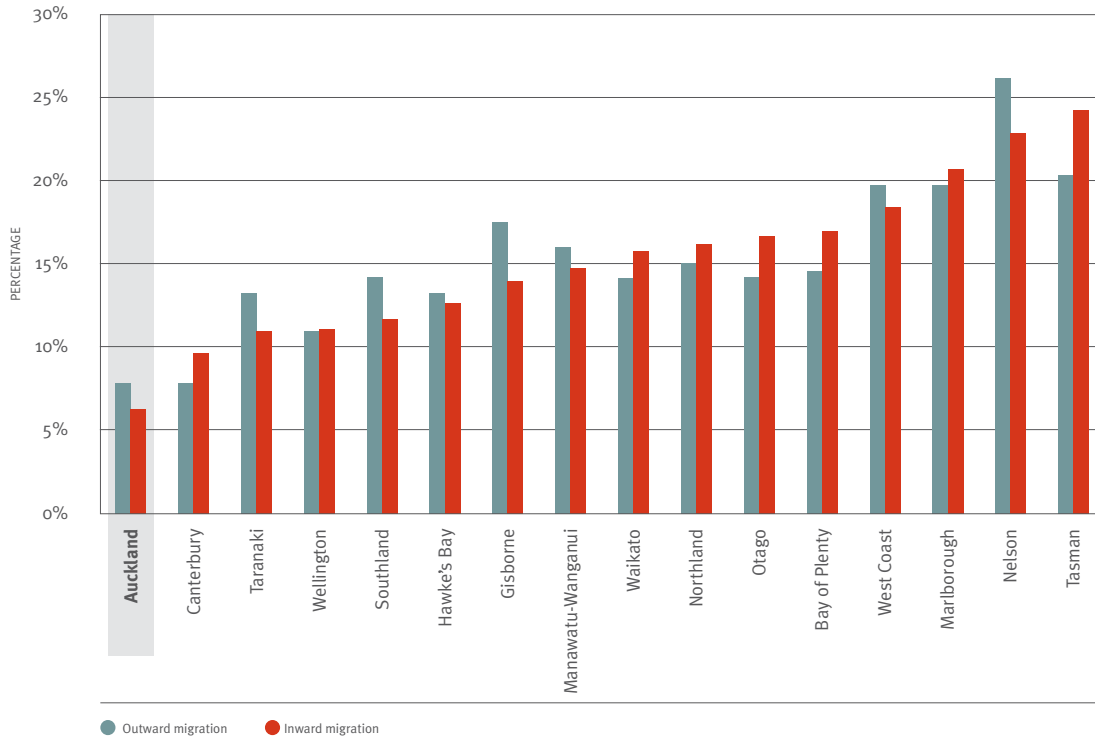
For the year ended December 2006, the Auckland region had the highest rate of international net permanent and long-term migration of all the New Zealand regions.

FIG. 6.8 Net permanent and long-term migration from overseas, 2006



Source Statistics New Zealand, Tourism and migration 2006

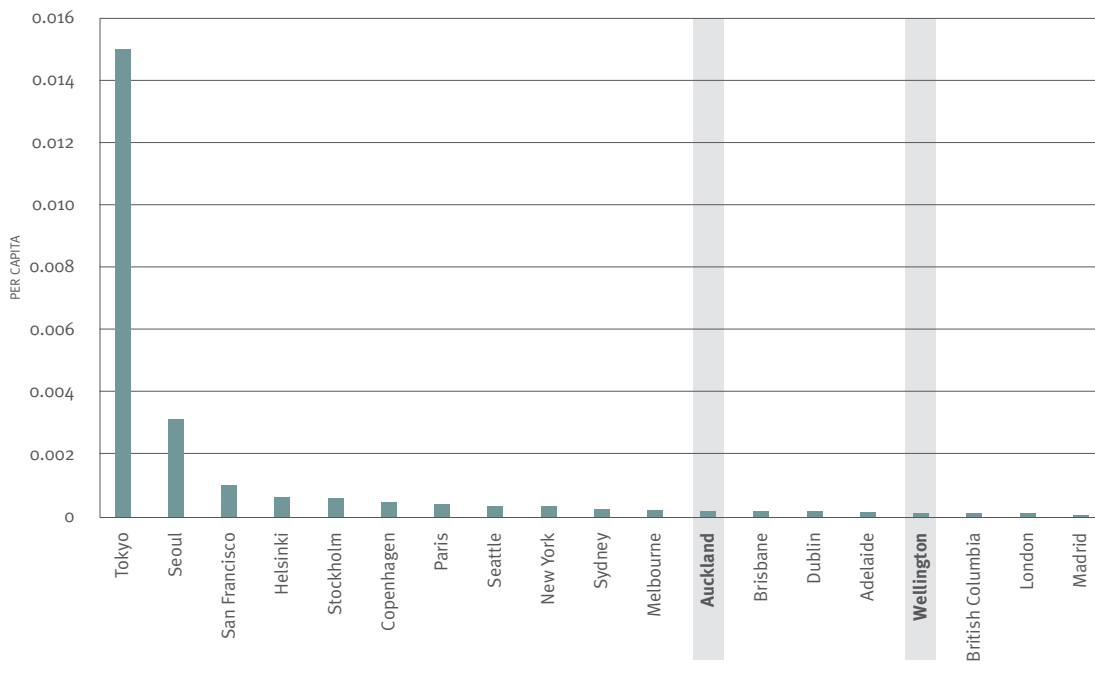
FIG. 6.9 Proportion of the population moving into and out of New Zealand regions, 2001–2006



Auckland had the lowest proportion of population of any New Zealand region moving out of the region. However in absolute terms Auckland had the highest net loss of people moving out of the region between 2001 and 2006.

Source: Statistics New Zealand, Census 2006, QuickStats about population mobility

FIG. 6.10 Patent applications per capita



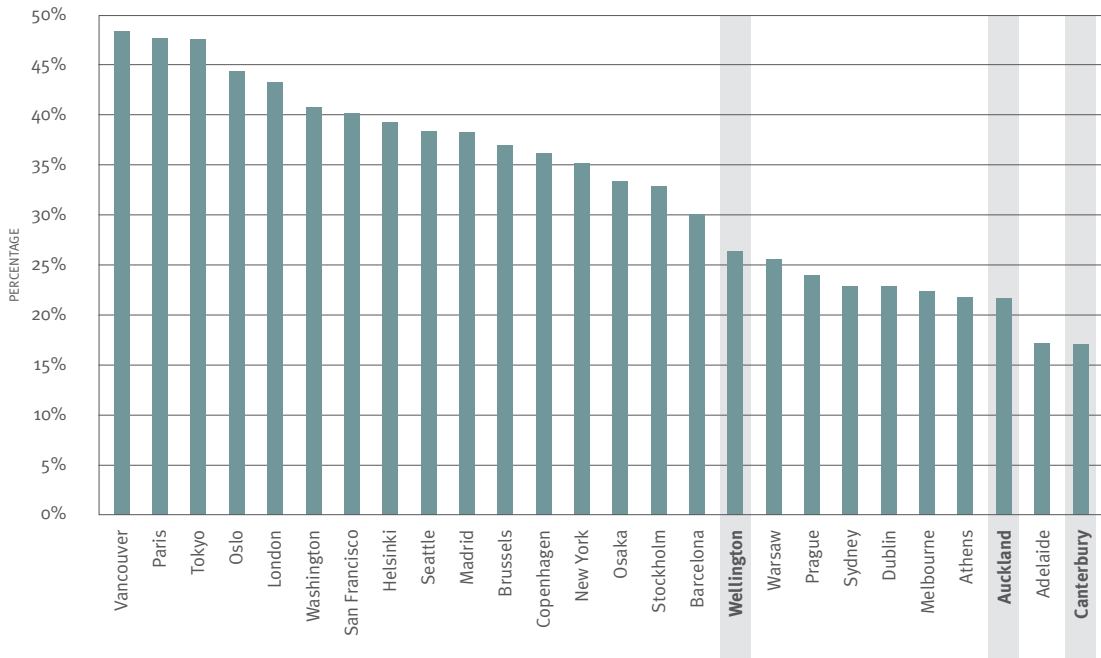
### 6.3 Underlying Determinants of Productivity Growth

Auckland is near the lower end of metropolitan regions on number of patent applications filed per capita, with the standout being Tokyo. Auckland had more patent applications filed than other New Zealand regions and was in the middle of comparator cities.

Source: OECD Regions at a Glance, 2005; Statlink; Intellectual Property Office of New Zealand, Customised data, 2007

Compared with other cities around the world and all but one of the comparator cities, Auckland has a low share of the population with a tertiary education. Despite this, in 2006, Auckland ranked 2nd highest nationally at 17.7 per cent of the population with qualifications at bachelor's degree level or above.<sup>121</sup>

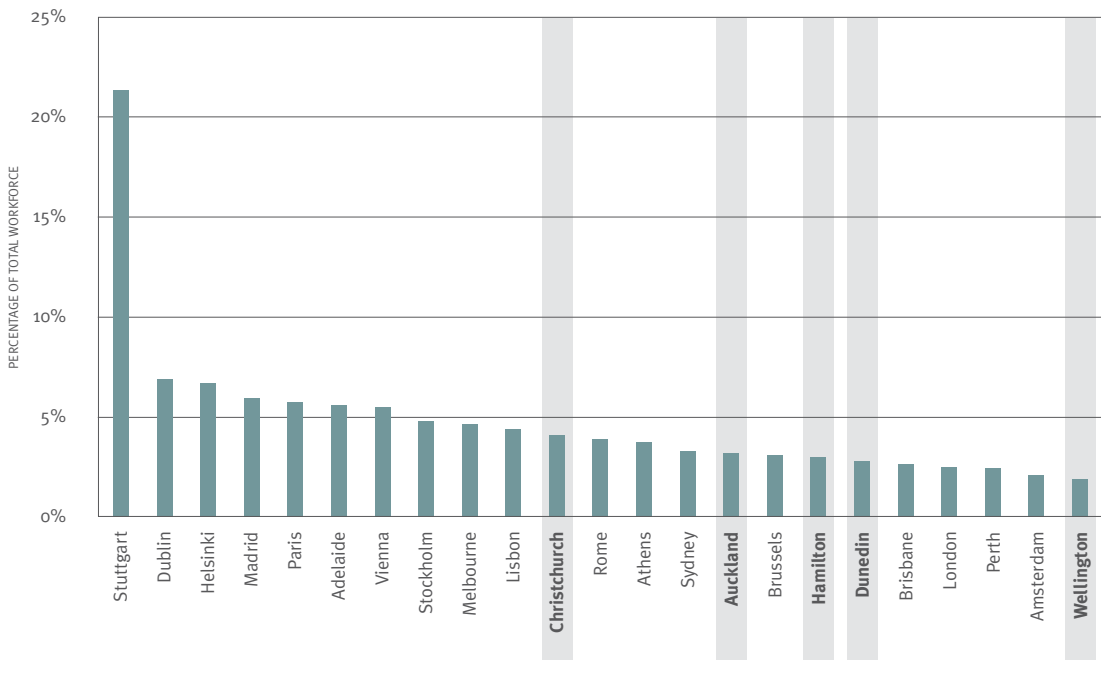
FIG. 6.11 Share of population of 15 years and more with tertiary education



Source OECD Regions at a Glance, 2005; Statlink

Auckland City<sup>122</sup> has higher levels of employment than some Australian and European cities, and the comparator cities in medium and high-tech manufactured goods. However, that city has relatively low levels of employment in these areas by international standards.

FIG. 6.12 Employment in medium- and high-tech manufactured goods

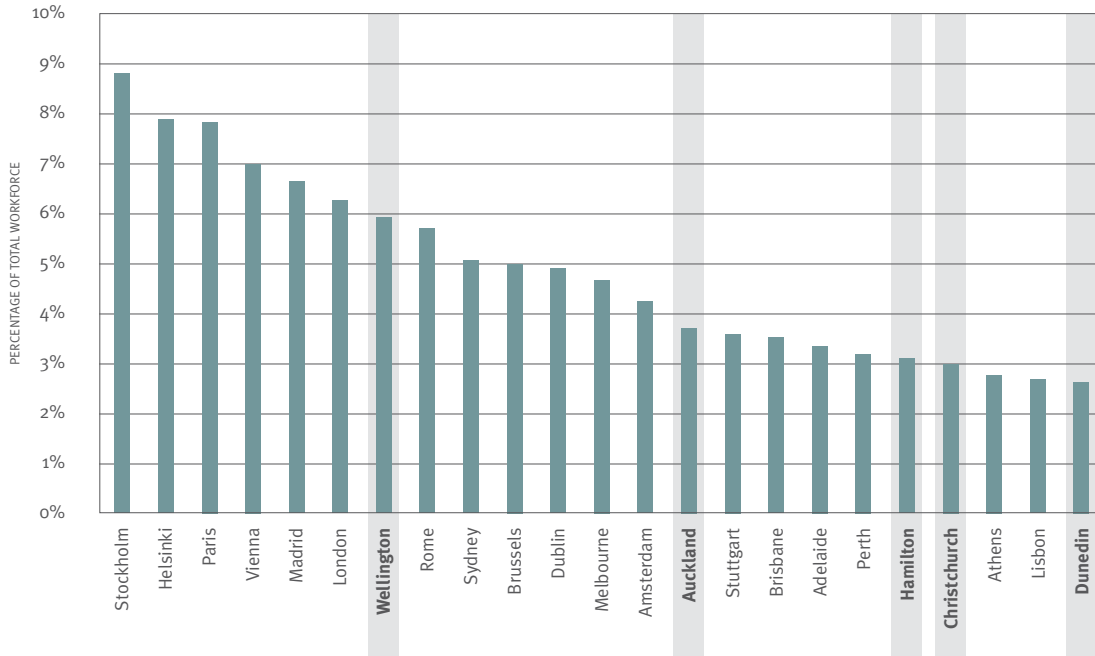


Source Statistics New Zealand, Number of employed persons by 6-digit industry, 2001; Australian Bureau of Statistics, Number of employed persons by 6-digit occupation, 2001; European Commission, 2003 European Innovation Scoreboard: Technical paper No 3

121. Statistics New Zealand 2006 Census of Population and Dwellings – Regional summary tables by regional council, 2007, Wellington, Statistics New Zealand.

122. For figures 6.12 and 6.13, the New Zealand cities refer to main urban areas (very large urban areas centred on a city or major urban centre with a minimum population of 3000). For Auckland this comprises Auckland City, North Shore City, Papakura District and urban parts of Waitakere City, Manukau City, Franklin District and Rodney District.

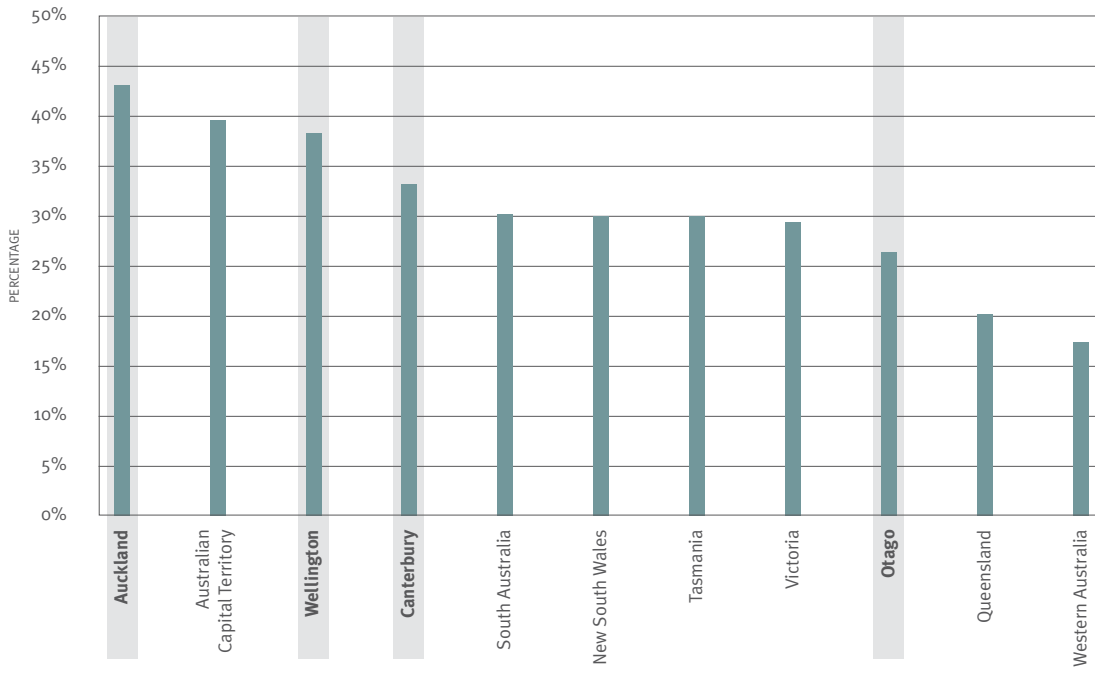
FIG. 6.13 Employment in knowledge-intensive high-tech services



Auckland City's levels of employment in knowledge-intensive high-tech services (as opposed to goods) is slightly below the median of the comparator cities.

Source Statistics New Zealand, Number of employed persons by 6-digit industry, 2001; Australian Bureau of Statistics, Number of employed persons by 6-digit occupation, 2001; European Commission, 2003 European Innovation Scoreboard: Technical paper No 3 – Regional innovation performances, Annex Table C

FIG. 6.14 Percentage of households with access to broadband in Australia and New Zealand, 2005–2006



Percentage of access to broadband at home is high in Auckland compared with Australian states and territories and New Zealand regions. Some Australian states include a larger proportion of rural areas than the Auckland region, which suggests that Auckland's broadband access may not be as good in relative terms as the figures suggest. In New Zealand, Auckland has the highest access at 43.1 per cent. This does not indicate the quality of broadband or cost effectiveness, which are generally recognised as poor in New Zealand.<sup>123</sup>

Source Statistics New Zealand, Household Use of ICT Survey 2006; Australian Bureau of Statistics, Household use of Information Technology, Australia, 2005–06

123. OECD Communications Outlook 2007, 2007, Paris, OECD.

Compared with most Australian capital city areas, Auckland City<sup>124</sup> has fewer travel delays. Auckland has a shorter off-peak delay than all capital city areas.

FIG. 6.15

Congestion in Australian capital city areas and New Zealand urban areas

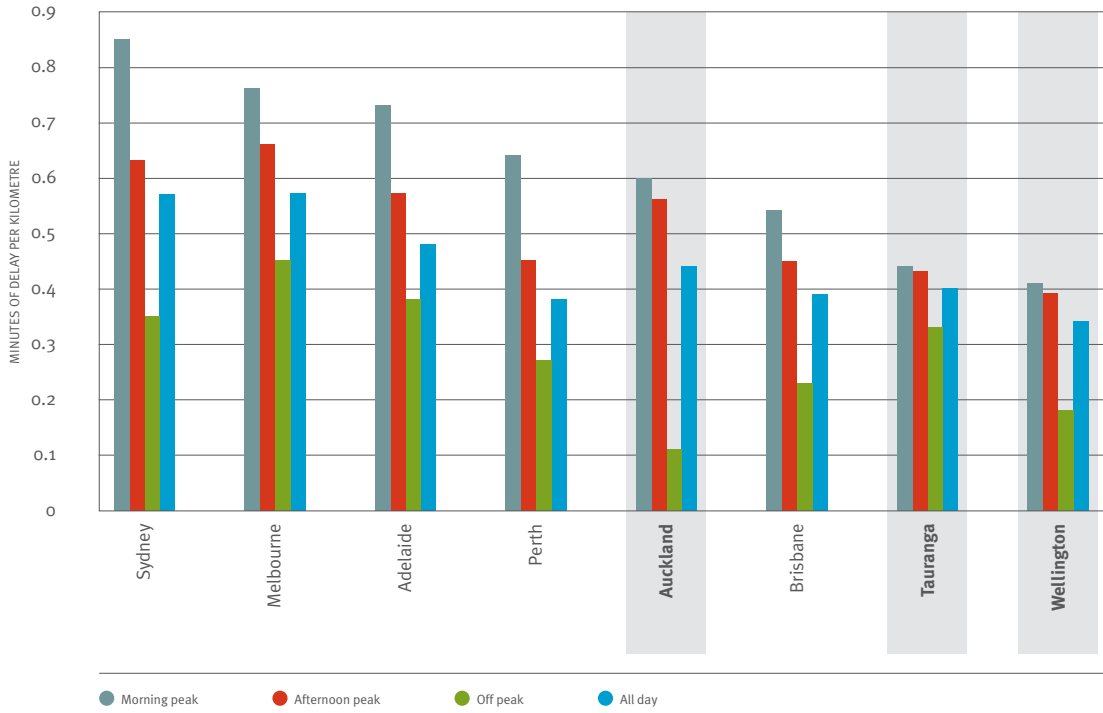
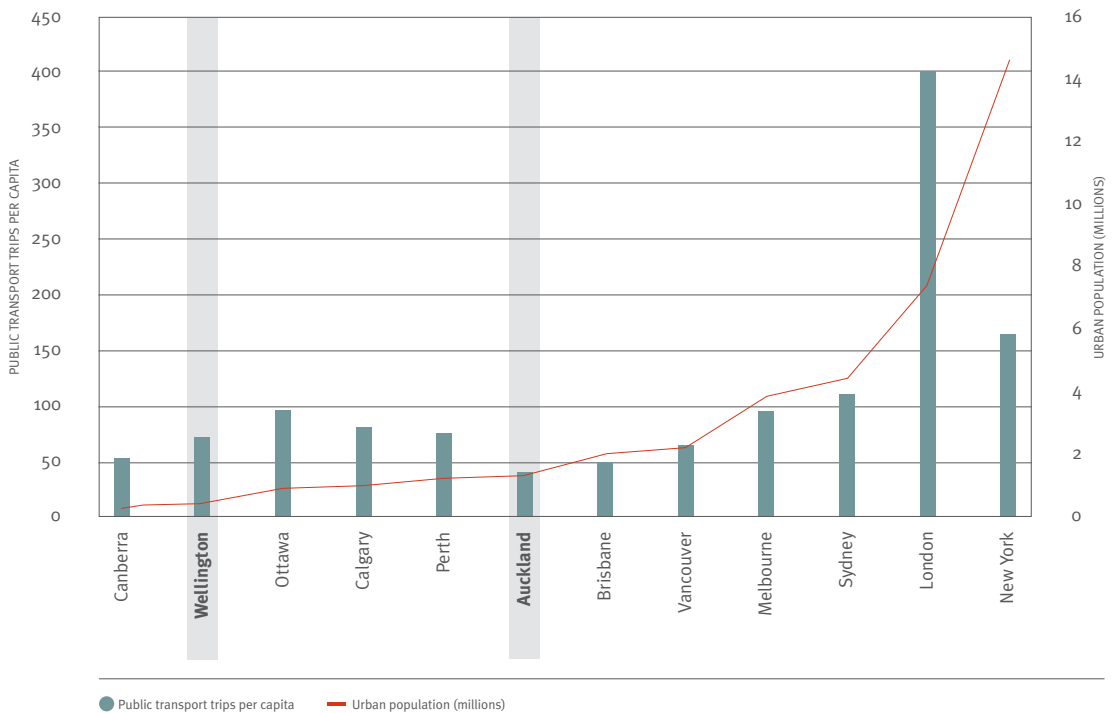


FIG. 6.16

Urban population vs public transport trips per capita per annum

Auckland's public transport patronage is low relative to the comparator cities. Public transport trips in Auckland have declined from approximately 100 trips per capita per annum in 1963 to the current level of 40.<sup>125</sup>



124. For this graph the Auckland area comprises motorways, state highways and regional arterials of the main urban areas.

125. Auckland Regional Transport Authority 2007 Patronage by mode – 1963 to present.

## Glossary

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ANZSIC	Australia and New Zealand Standard Industrial Classification
BERD	business expenditure research and development
CER	Closer Economic Relations
CPI	consumer price index
CRI	Crown Research Institute
EPI	Environmental Performance Index
ESI	Environmental Sustainability Index
EU	European Union
FDI	foreign direct investment
FFP	foreign fee-paying (student)
FRST	Foundation for Research, Science and Technology
FTA	free trade agreement
GCR	Global Competitiveness Report
GCR	Global Competition Review
GDP	gross domestic product
GERD	gross expenditure research and development
GIF	Growth and Innovation Framework
GNI	gross national income
GST	Goods and Services Tax
HRC	Health Research Council
HRST	Human Resources in Science and Technology
IALS	International Adult Literacy Survey
ICT	information and communication technology
IEA	International Energy Agency
IMD	Institute for Management Development
IMF	International Monetary Fund
MED	Ministry of Economic Development
MFP	multi-factor productivity
NEER	nominal effective exchange rate
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
PMR	product market regulation
PPP	purchasing power parity
R&D	research and development
REER	real effective exchange rate
STI	(OECD) Science, Technology and Industry Scoreboard
TIMSS	Trends in International Mathematics and Science Studies
UNCTAD	United Nations Conference on Trade and Development
UNHDI	United Nations Human Development Index
VAT	Value added tax
VIF	Venture Investment Fund
WCY	World Competitiveness Yearbook
WEF	World Economic Forum
WTO	World Trade Organisation

[www.med.govt.nz/indicators](http://www.med.govt.nz/indicators)

