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Structural Policies
to Overcome Geographic
Barriers and Create
Prosperity in New Zealand

Yvan Guillemette

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ABSTRACT/RÉSUMÉ

Structural policies to overcome geographic barriers and create prosperity in New Zealand

New Zealand's living standards remain well below the OECD average. This is entirely attributable to persistently low labour productivity, which in turn is related to economic geography as well as structural policy factors. The small size and remoteness of the economy diminish its access to world markets, the scale and efficiency of domestic businesses, the level of competition and proximity to the world's technology frontier. This points to the need for a "New Zealand policy advantage", that is, a set of structural policies attractive and welcoming enough to overcome the geographic handicap and attract the drivers of prosperity – investment, skills and ideas – to New Zealand. The reforms of the 1980s and 1990s laid much of the groundwork for creating this advantage and for a pick-up in productivity growth. But in recent years, New Zealand has lost ground relative to its OECD peers. The reform focus shifted away from growth and the government introduced much often poor quality regulation. Policies should be refocused around the productivity goal in a number of areas, beginning with those covered in this paper, namely international trade, the business climate for domestic and foreign investment, public sector efficiency, infrastructure, innovation and natural resources management. This paper also evaluates the recently legislated emissions trading scheme through a productivity lens. This Working Paper relates to the 2009 *OECD Economic Survey of New Zealand* (www.oecd.org/eco/surveys/nz).

JEL classification: O16; O24; O38; O43; O56

Keywords: living standard; standard of living; productivity; economic geography; investment; productivity growth; regulation; regulatory; foreign investment; taxation; infrastructure; innovation; natural resources; water; emissions trading scheme; ETS

* * * * *

Les politiques structurelles requises pour surmonter les obstacles géographiques et promouvoir la prospérité en Nouvelle-Zélande

Les niveaux de vie en Nouvelle-Zélande restent bien inférieurs à la moyenne de l'OCDE. Cet écart est entièrement attribuable à une croissance durablement faible de la productivité du travail, qui s'explique pour sa part par la géographie économique ainsi que par des facteurs liés à la politique structurelle. La petite taille et l'éloignement de l'économie limitent son accès aux marchés mondiaux ainsi que l'échelle et l'efficacité des entreprises intérieures, et influent sur le degré de concurrence et la situation par rapport à la frontière technologique mondiale. Il faut, dans ces conditions, élaborer des politiques qui représentent un avantage pour la Nouvelle-Zélande, c'est à dire un ensemble de politiques structurelles suffisamment attrayantes pour surmonter le handicap géographique et attirer dans le pays les moteurs de la prospérité – investissements, compétences et idées. Les réformes des années 80 et 90 ont largement préparé le terrain à la mise en œuvre de telles politiques et à un redressement de la croissance de la productivité dans les années à venir. Ces dernières années, cependant, les autorités ont grignoté une partie des progrès réalisés durant la période de réformes, notamment en introduisant de nombreuses réglementations, souvent mal conçues. Les politiques devraient être recentrées autour de l'objectif de productivité dans plusieurs domaines, à commencer par ceux couverts dans la présente étude, à savoir le commerce international, les conditions de l'investissement national et étranger, l'efficacité du secteur public, l'infrastructure, l'innovation et la gestion des ressources naturelles. Le système d'échange de droits d'émissions, qui a récemment fait l'objet d'un texte de loi, est aussi examiné ici dans l'optique de la productivité. Ce Document de travail se rapporte à l'*Étude économique de l'OCDE de la Nouvelle-Zélande 2009* (www.oecd.org/eco/etudes/nz).

Classification JEL : O16 ; O24 ; O38 ; O43 ; O56

Mots clés : niveau de vie ; productivité ; géographie ; investissement ; croissance ; réglementation ; investissement étranger ; taxation ; infrastructure ; innovation ; ressources naturelles ; eau ; système de droits d'émissions

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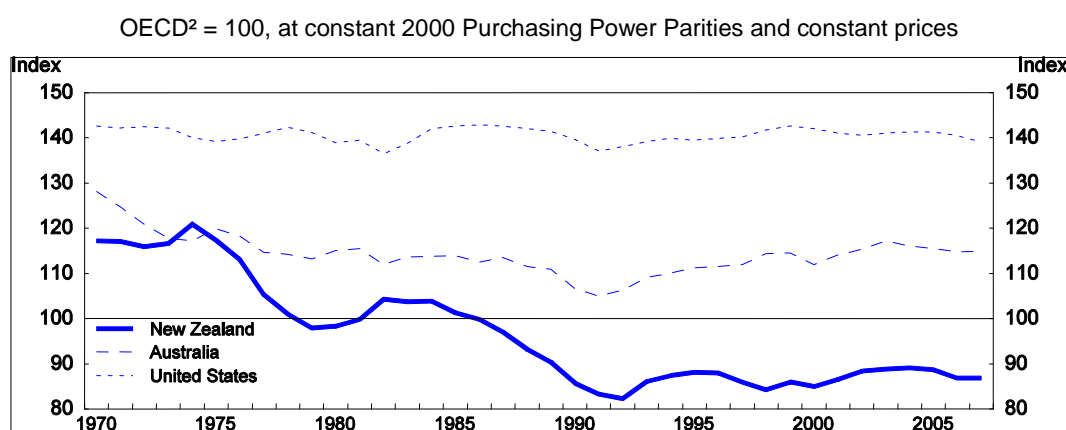
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Structural policies to overcome geographic barriers and create prosperity in New Zealand

By Yvan Guillemette¹

New Zealand is among the most economically advanced and developed countries in the world, with modern, if not world-leading, institutions and policies in many areas. Nevertheless, it is in the lower half of the OECD prosperity rankings. On a purchasing-power-parity (PPP) basis, GDP per capita was USD 27 100 in 2007, about 40% below that of the United States, 25% below that of Australia, and 12% below the OECD average (Figure 1).² It was not always thus. In the first half of the 1970s, New Zealand's real GDP per capita was only 18% below the United States', approximately equal to Australia's and about 15% above the OECD average. From 1970 to 2006, however, it grew at an average annual rate of only 1.2%, the lowest rate apart from Switzerland among 26 OECD countries with comparable data.³ During this period, real GDP per capita grew at an average annual rate of 2% in the OECD. Consequently, New Zealand's relative standard of living had already fallen below the OECD average by the early 1980s

Figure 1. Real GDP per person¹



1. GDP per capita is calculated in USD at constant prices and constant PPPs.
2. 26 countries, Czech Republic, Hungary, Poland and Slovak Republic excluded.

Source: OECD National Accounts database.

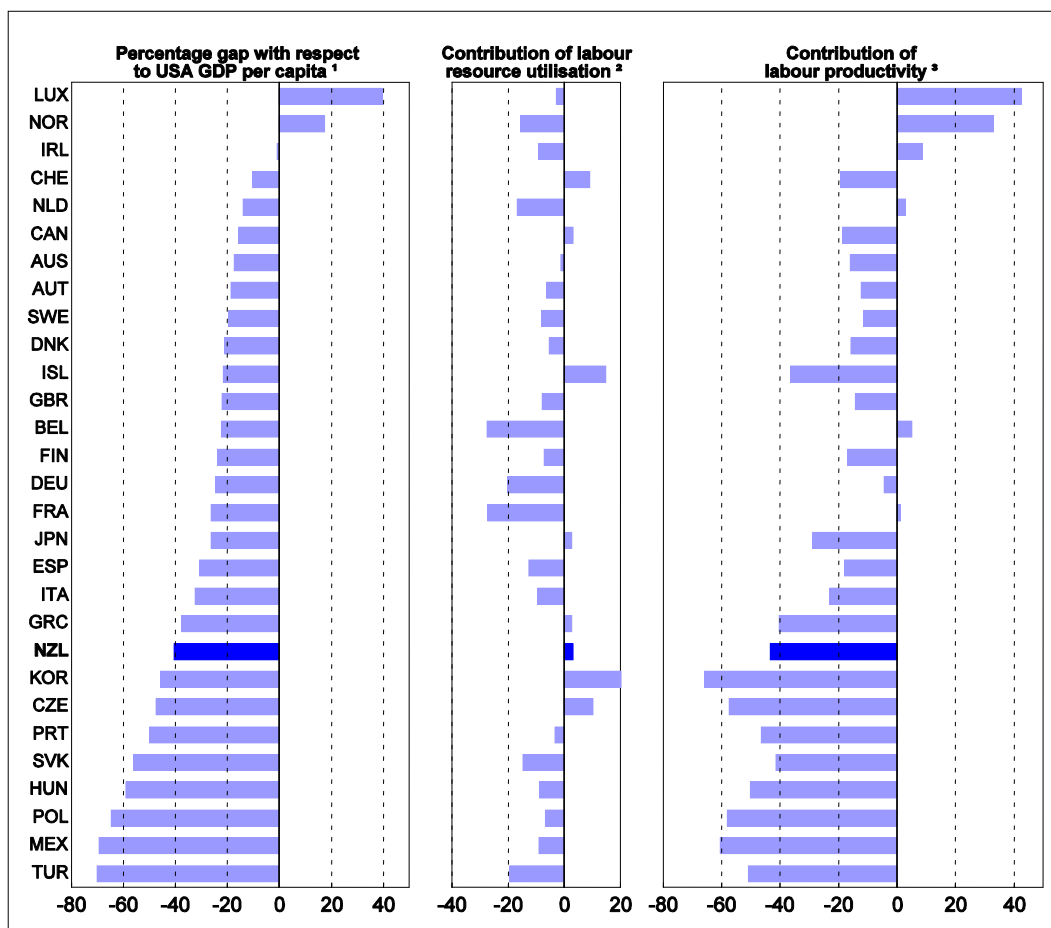
1. Economist in the Economics Department. This paper was originally prepared for the 2009 *OECD Economic Survey of New Zealand*, published under the responsibility of the Economic and Development Review Committee. The author is grateful for the valuable comments received on earlier drafts from Alexandra Bibbee, Andrew Dean, Robert Ford, Stéphanie Jamet, Peter Jarrett and Andrew Wyckoff as well as for discussions with officials from the New Zealand government. Special thanks go to Françoise Correia for statistical assistance and to Mee-Lan Frank for editorial support.
2. Per capita GDP is the most commonly used measure of the standard of living. It measures value-added in New Zealand. However, servicing the country's unusually large stock of net foreign liabilities (93% of GDP at end-2008) means that the actual income per head available to New Zealand residents lags several percentage points further behind the OECD average than the per capita GDP measure suggests.
3. The excluded OECD member countries are the Slovak Republic, Hungary, the Czech Republic and Poland.

and bottomed at 20% below the OECD average in the early 1990s, not far below where it is today. After a brief examination of the sources of New Zealand’s prosperity gap and the channels through which geography affects economic performance, this paper reviews recent progress in some structural policy areas and suggests avenues for further improvement.

The sources of the prosperity gap

The prosperity gap can be decomposed into labour utilisation and labour productivity components. Labour utilisation reflects hours worked per capita and is influenced by the age structure of the population, the participation rate, the unemployment rate and the average number of hours worked per employee. Labour productivity measures the value of goods and services produced per hour of work. This decomposition shows that the prosperity gap is due entirely to low labour productivity: New Zealand is currently 22nd out of the 30 OECD countries when measured by GDP per hour worked, the same ranking as in GDP per capita (Figure 2). On average, an hour worked in New Zealand produces approximately 30%

Figure 2. The source of real income differences, 2007



1. Based on current purchasing power parities and current prices. For Luxembourg, the population is augmented by the number of cross-border workers in order to take into account their contribution to GDP.
2. Labour resource utilisation is measured as total hours worked divided by population.
3. Labour productivity is measured as GDP per hour worked.

Source: OECD (2009), *Going for Growth*.

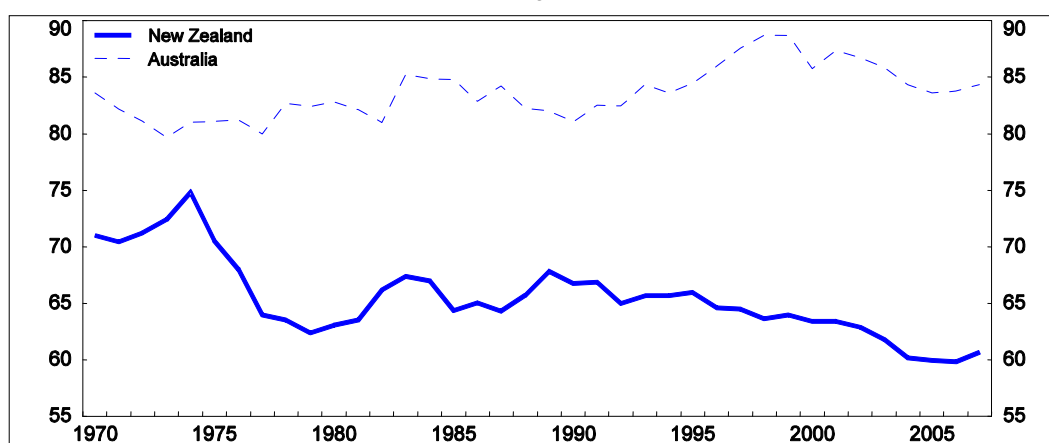
less output than an hour worked in Australia and 40% less than an hour worked in the United States. On labour utilisation, however, New Zealand performs well. It has the fifth highest labour utilisation rate in the OECD. Reforms have visibly paid off in this area, with many women now in the labour force, a high overall older-worker participation rate and a low unemployment rate. There is little policy makers can do to boost labour utilisation beyond the current level, besides perhaps lengthening working life by putting public pensions on an actuarially fair basis. Hence, going forward, enhancing labour productivity is the key to closing the prosperity gap and to dealing with the economic and fiscal challenges of an ageing population.

Low labour productivity growth

Unfortunately, hourly labour productivity growth has been tepid for a long time, and it has worsened in recent years along with that of most other OECD countries (Figures 3 and 4). Consequently, New Zealand's gap in GDP per capita has hardly narrowed since its trough in the early 1990s. The modest improvement has been due mainly to rising labour utilisation, which also explains some of the recent weakness in labour productivity growth. The economic upturn from 1999 to 2007 brought many lower skilled people into the workforce and damped average worker productivity (and, by implication, average wage growth). With a short-run elasticity of labour productivity growth to an increase in the employment rate of -0.4 (estimated from a panel of 25 countries), the rise in labour utilisation by about 1% per year from 2001 to 2006 could have depressed average annual labour productivity growth by as much as 0.4 percentage point over this period (Belorgey, Lecat and Maury, 2006). Similarly, compositional changes among workers from 1999 to 2007 may have reduced cumulative real average earnings growth for a full-time-equivalent worker from about 15% to 9% (Maré and Hyslop, 2008). Another factor that could have biased aggregate productivity growth downward of late is the change in the composition of employment by industry, as sectoral labour productivity levels can vary considerably. Earlier strong growth in domestic demand led to an expansion of construction and services relative to goods-producing industries such as manufacturing, where recorded productivity tends to be higher (New Zealand Treasury, 2008). That said, labour productivity growth was weak even before the acceleration in labour utilisation or the rise in domestic demand that began in the early 1990s. The causes of low productivity growth in New Zealand appear to have been entrenched for a long time, suggesting that long-standing structural factors are at work.

Figure 3. **Hourly labour productivity**

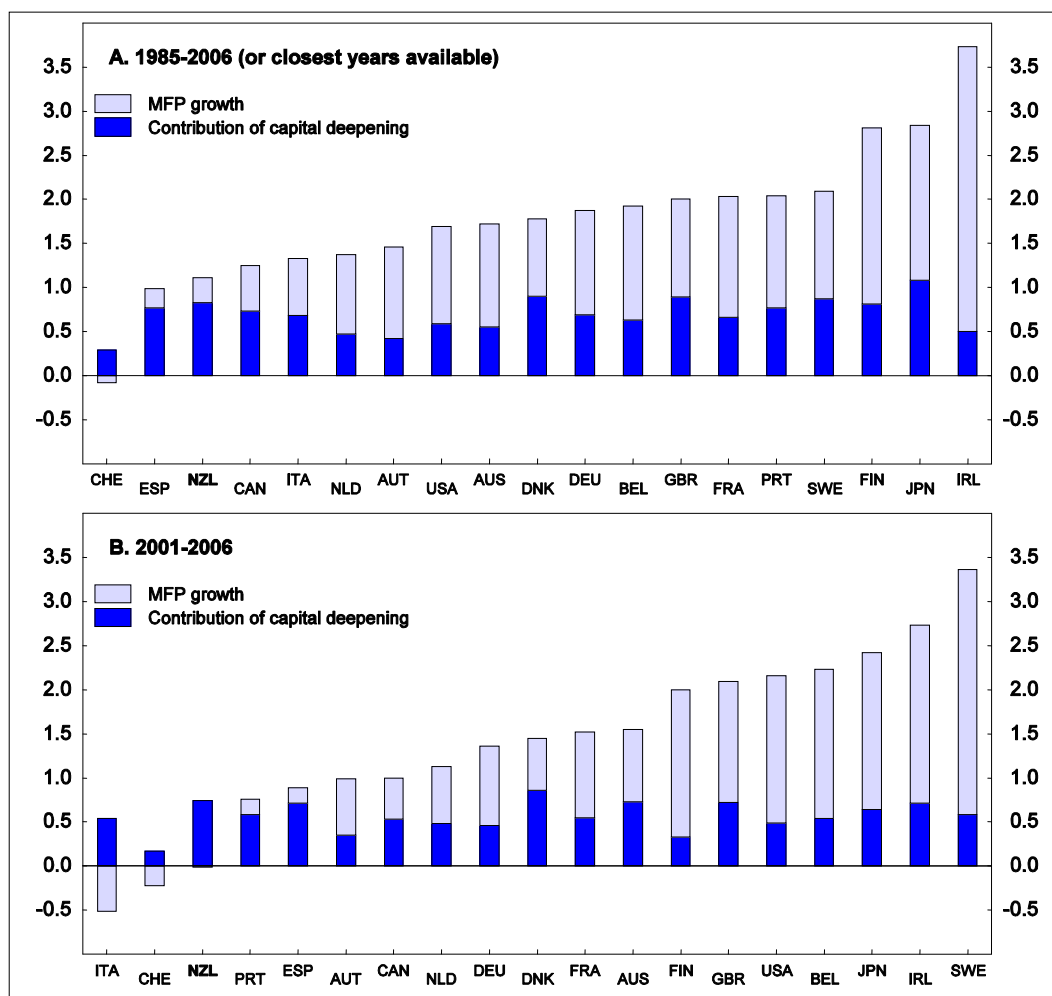
At constant 2000 purchasing power parities; USA = 100



Source: OECD National Accounts database and labour productivity database.

Figure 4. **Decomposition of labour productivity growth into MFP growth and capital deepening**

Total economy, average annual growth rate



Source: OECD (2008), Productivity database.

Low capital intensity

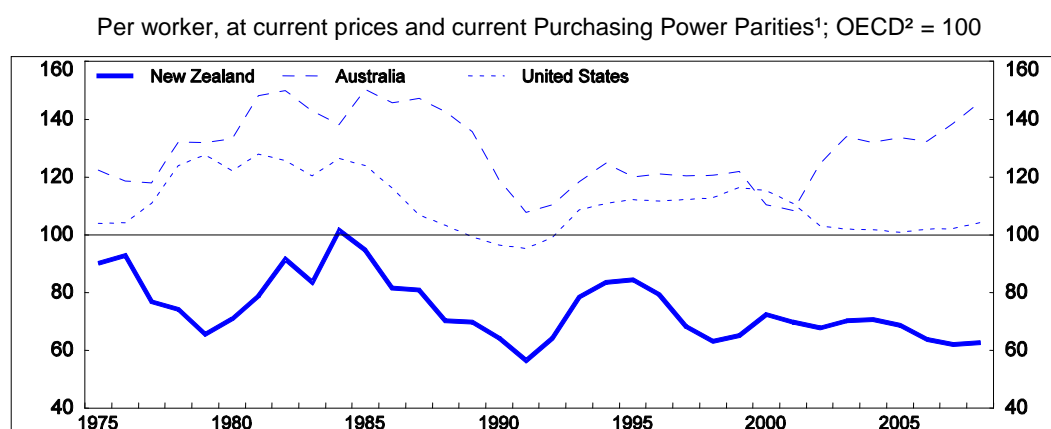
The two drivers of labour productivity growth are the accumulation of physical capital through investment and improvements in the efficiency with which labour and capital are combined to transform inputs into outputs, or so called multifactor productivity (MFP) growth. Hourly labour productivity growth can thus be decomposed into a capital-intensity component and an MFP component. This type of decomposition is problematic for many reasons, not the least of which is the difficulty of obtaining reliable and comparable capital-stock data for many countries. The results are sensitive to the data and measurement concepts used and must be interpreted with care.⁴ This decomposition for New Zealand, based on the OECD Productivity Database, suggests that poor MFP growth accounts for most of the low growth rate of hourly labour productivity since 1985. From 1985 to 2006, New Zealand had the fifth

4. See OECD (2008a) for an overview of the different methods and challenges associated with productivity decompositions. For instance, the OECD Productivity Database uses the concept of “capital services per hour worked” to measure capital deepening, which is not directly comparable to either capital stock or investment.

highest average rate of capital deepening amongst the 19 OECD countries with comparable data (Figure 4, Panel A). More recently, from 2001 to 2006, it had the second highest contribution of capital deepening amongst these 19 countries, trailing only Denmark (Figure 4, Panel B). On the other hand, New Zealand has had the third worst MFP growth performance since 1985, one quarter the average rate of its OECD peers. It also ranks third worst in the more recent 2001-06 period. These figures would suggest that a lack of capital investment is not the source of the slow rate of hourly labour productivity growth, and that policies should instead focus on raising the growth rate of MFP.

Other evidence on the flow and stock of investment per worker suggests, however, that New Zealand does indeed have an investment problem. On a PPP-adjusted basis, investment per worker was only 63% of the OECD average in 2008 (Figure 5).⁵ The rate of investment per worker in Australia was more than twice that. Capital intensity also seems much lower in New Zealand. The Ministry of Economic Development and the Treasury (2005) estimated that New Zealand's level of capital intensity in 2002 (capital per unit of labour) was about 71% of the US level and 74% of Australia's level. Using more sophisticated methods, Schreyer (2005) produces even lower estimates for the same year: 49% of the US level and 63% of Australia's. Paucity of capital, while broad-based, is especially apparent in several key domestically oriented sectors. For example, the wholesale trade, retail trade, and transport and storage sectors all have capital per hour worked around half the levels of the United Kingdom (Mason and Osborne, 2007).

Figure 5. **Gross fixed non-residential capital formation**



1. PPPs for GDP.

2. Czech Republic, Hungary, Luxembourg, Poland, Portugal, Slovak Republic, Turkey and Mexico excluded.

Source: OECD.

In any case, capital intensity and MFP interact with each other in various complex ways. MFP growth is mainly driven by the expansion of the world's technology frontier and New Zealand's degree of access to it. But better technology raises the productivity of capital and thus the returns to capital investments, which should increase capital intensity. In addition, lots of new technologies result from innovation and research and are embodied in capital goods, such as new equipment, or intermediate goods. Therefore, the impediments to capital deepening and to MFP growth in New Zealand probably overlap to a large extent.

5. The robustness of these results was checked by resorting to the PPPs for gross fixed capital formation rather than for GDP for the most recent year (2005). New Zealand's relative price for investment is higher than in Australia or the United States. Thus, the figure cited in the text would be even lower with the alternative measure.

And, given the long period of time over which labour productivity growth has been underperforming, they probably include many long-standing structural factors, including macroeconomic imbalances.

Economic geography

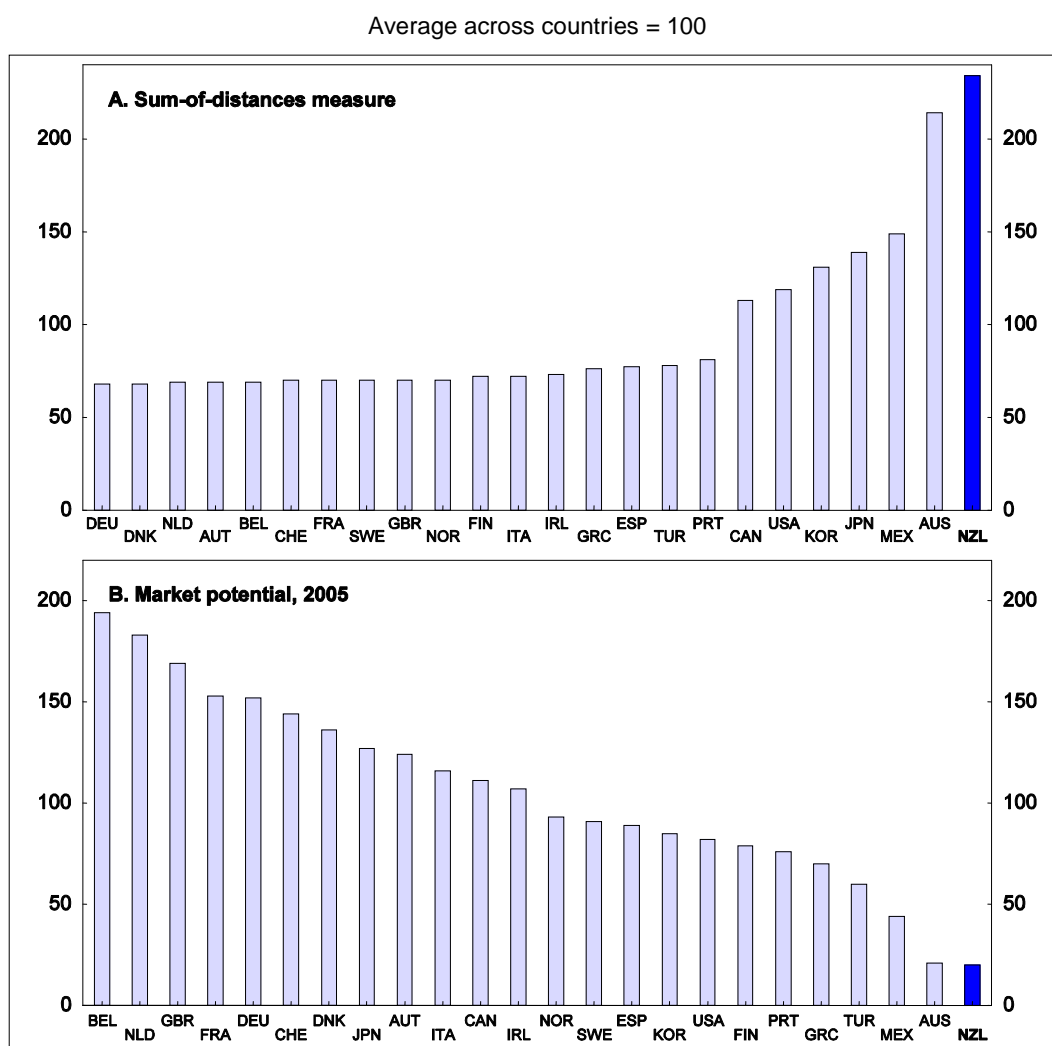
Research suggests that countries that are economically smaller and farther away from international markets are likely to be poorer than those that have larger domestic markets and that are closer. Prosperous countries tend to be built around large affluent agglomerations, but New Zealand has only one large agglomeration, Auckland, and by international standards even it is not very large. But New Zealand's most striking feature is not its size but its remoteness, which can affect productivity and income levels through various channels, all interrelated, including trade, foreign investment and technology diffusion. There is thus a strong presumption that part of the prosperity gap is attributable to its special geography: no other OECD member has such a striking combination of small size and remoteness.

Distance directly raises transport costs and thereby reduces trade in much the same way as a tax on exports or a tariff on imports. Despite the commonly held view that distance has become less important for trade over time (the so-called "death-of-distance" hypothesis), empirical evidence shows that a 10% increase in distance reduces trade by around 10%, and that this effect has not diminished over the last 30 years (Nicoletti *et al.*, 2003; OECD, 2008b). With 10 000 km to the United States or China and even 2 250 km to Australia, New Zealand is a considerable distance from its main trading partners. Its market potential – defined as the sum of all countries' GDP weighted by the inverse of the bilateral distance from the country under consideration – is only about a fifth of the OECD average (Figure 6). Reduced trade opportunities affect domestic productivity in many ways. Low market access limits opportunities for concentrating production in activities where there is a comparative advantage: domestic businesses produce goods that could be supplied more efficiently from abroad, were it not for transportation costs. By segmenting markets, distance also limits the extent to which domestic firms can operate on an efficient scale, an effect magnified by the country's small size. With 4.2 million people, New Zealand is about a tenth as populous as the average OECD country, limiting the extent to which firms can exploit internal economies of scale, benefit from product market competition and gain from specialisation. Moreover, by providing a natural shelter from foreign competition, distance weakens the pressure on domestic companies to be efficient and innovate.

Foreign direct investment (FDI) is also sensitive to distance (Nicoletti *et al.*, 2003). While FDI theory suggests that firms will invest abroad rather than supply foreign markets by exporting where trade costs are high, distance can still affect FDI negatively, all else equal, if the costs of operating overseas affiliates rise the further they are from the multinational's headquarters. Studies indeed show a negative elasticity between FDI and distance, of -0.42 in Di Mauro (2000) for instance.⁶ A 10% increase in distance would thus reduce FDI flows by about 4%, a smaller effect than on trade, but significant nonetheless. No doubt lower FDI inflows due to remoteness explain part of New Zealand's low capital intensity.

6. The study estimates gravity equations for the flows of FDI from eight home countries (France, Germany, Italy, United Kingdom, Japan, South Korea, United States and Canada) to 32 host countries (including OECD and non-OECD members, among which New Zealand).

Figure 6. Distance/proximity to markets



Source: OECD (2008), *Going for Growth*.

But the most important effects of trade and FDI on a country's prosperity may well be through their roles as channels of technology diffusion. In many economic growth frameworks, convergence in per capita income ultimately depends on the degree of international technology diffusion, with trade and FDI being the two main channels of knowledge spillovers between countries (Coe, Helpman and Hoffmaister, 2008). Moreover, as pointed out above, distance can reduce the degree of competition in the domestic economy, and a major determinant of a firm's decision to acquire existing technology and innovate is the degree of product market competition it faces. Empirical evidence confirms the effect of distance on technology diffusion. Based on the productivity effects of R&D expenditures in the G7 countries between 1970 and 1995, the geographic half-life of technology, that is, the distance at which half of the technology has disappeared, has been estimated at 1 200 km, with most of the effect (around two-thirds) occurring through the trade channel (Keller, 2001 and 2002). There is little doubt then that New Zealand's access to the world's technology frontier is impaired by its small size and remoteness, and that it suffers a permanently lower level of GDP per capita as a result.

Altogether, recent OECD work on economic geography for *Going for Growth* confirms that economic-geography factors account for a large part of the prosperity gap. While the OECD methodology is unable to quantify the relative contribution of different transmission channels, it generates estimates that New Zealand's distance to markets reduces its GDP per capita by about 10% (Boulhol, de Serres and Molnar, 2008; Boulhol and de Serres, 2008; OECD, 2008b). By comparison, remoteness reduces Australia's GDP per capita by about 10% as well, while the effect for the United States is very close to zero. According to these estimates then, geographical location may explain up to three quarters of the gap in New Zealand's living standards relative to the OECD average, but virtually none of the gap relative to Australia.

It is important to interpret this result correctly. It means that the GDP per capita gap cannot, on its own, serve as a measure of unfinished policy business. It does not mean, however, that New Zealanders cannot aspire to close the prosperity gap with other countries. But it suggests that to do so, New Zealand will have to do better than its OECD peers. Unlike some of them, it cannot rely on closeness to other large markets to compensate for mediocre policies. Though blessed with abundant natural resources, the work just cited finds that these make a small negative contribution to GDP per capita, perhaps because fluctuations in their prices add to macroeconomic volatility. Going forward, the continuing integration of China, India and eventually other Asian countries into the global economy will keep shifting the centre of economic gravity away from Europe and North America and toward Asia, improving the position of New Zealand relative to key markets and lessening the negative impact of economic geography. At the same time, it is likely to increase competition, as some domestic markets will become easier to supply from overseas, which puts a premium on building a competitive business environment. To attract increasingly footloose talent, skills, capital, technology and entrepreneurship from around the world, then, New Zealand must offer a better policy environment than can be found elsewhere, one attractive enough to overcome the obstacles posed by economic geography. To do so, it must be at the forefront of OECD policymaking by seeking not only to emulate OECD best practices in every policy area, but to go beyond them, relentlessly and consistently, so as to create a distinct New Zealand advantage.

Create an international economic integration advantage

It is essential for a small open economy like New Zealand to be an active and consistent supporter of free international trade and investment.⁷ As the previous section's discussion suggested, an outward orientation accelerates technological innovation and diffusion in the domestic economy, allows specialisation to take place by procuring the relevant economies of scale, guarantees access to international markets, and strengthens the competitiveness of domestic firms by subjecting them to invigorating international competition. New Zealand has already achieved a great deal on this front, having eliminated most tariffs, duties and quotas and having negotiated several bilateral trade agreements, most recently with China and the Association of Southeast Asian Nations (ASEAN). Unfortunately, it continues to be handicapped by other countries' high levels of agricultural protection. Nevertheless, more can be done to deepen integration with world markets. Steps that could be taken include simplifying administrative procedures and costs associated with international maritime trade, and adopting a more welcoming attitude toward incoming foreign direct investment.

Facilitate maritime trade

Because of the importance of maritime exports and imports to the New Zealand economy, anything that hampers maritime trade is likely to be a significant constraint on economic performance. These constraints are reflected in the costs of shipping goods by sea. Distance, volumes and product characteristics are important determinants of maritime transport costs, but port efficiency is also critical. In

7. Exports of goods and services make up more than 30% of New Zealand's GDP.

turn, port efficiency depends on governance and competition within the sector, on the quantity and quality of infrastructure, as well as on administrative overhead costs due to regulations.⁸ It is thus important for New Zealand's economic potential that regulations do not unnecessarily inflate transport costs, that the infrastructure necessary to deliver goods and services to other markets is efficient, that port governance is appropriate for the sector and that a healthy level of competition exists.

Although New Zealand scores relatively well on World Bank indicators that measure the ease of trading across borders, some other OECD countries do far better, suggesting that improvement is possible (Table 1). Some of the policies that have been implemented in recent years by countries seeking to cut the time and costs associated with trade include providing electronic filing of trade documents (through electronic data interchange systems), allowing shippers to declare manifests online, reducing document requirements and using risk-based inspections. Another approach is to provide a single window for obtaining different permits and authorisations to reduce the time spent preparing documents. In Denmark, for example, three main trade documents (bill of lading, commercial invoice and customs declaration) suffice for most trade transactions. And these are transmitted online. Traders can begin the clearance process before goods arrive at the port. Because risk-based inspections apply, only about 2% of cargo is physically inspected. It takes only five days for goods to leave the factory, clear customs and be on a vessel heading to their destination. The resulting gains in trade can be substantial.⁹ Comparing New Zealand's performance to those of leading countries such as Denmark, France and Finland suggests that it should be able to cut the number of documents required to engage in trade by half, cut the number of days required to clear customs by the same proportion and reduce costs per inbound or outbound container by about 25%. According to a conservative empirical estimate, such a reduction in transport costs could potentially boost its bilateral trade by about 10% (Djankov, Freund and Pham, forthcoming).

Table 1. **Ease of trading across borders**

Indicator	New Zealand indicator	Leading OECD country	Indicator for leading OECD country
Documents to export (number)	7	France	2
Time to export (days)	10	Denmark	5
Cost to export (USD per container) ¹	868	Finland	495
Documents to import (number)	5	France	2
Time to import (days)	9	Denmark	5
Cost to import (USD per container) ¹	850	Finland	575

1. The costs required to import and export include the costs of obtaining all the documents, inland transport, customs clearance and inspections, port and terminal handling. They do not include overseas shipping costs, bribes or tariffs.

Source: World Bank (2008), *Doing Business 2009: Comparing Regulation in 181 Economies*, World Bank, Washington.

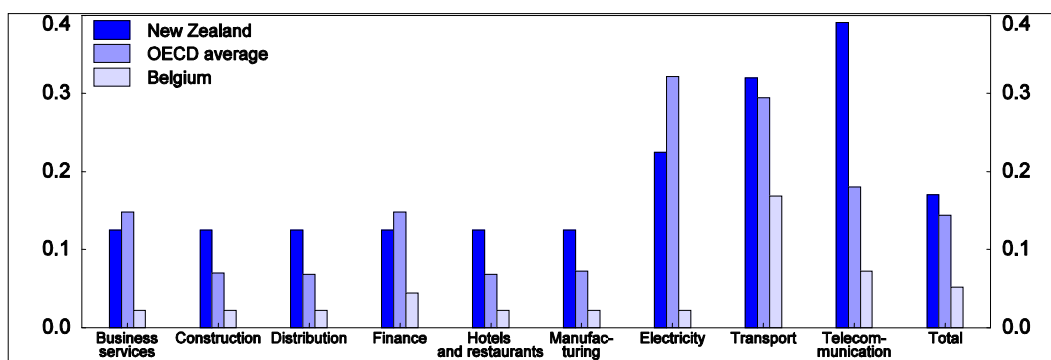
8. According to empirical estimates, raising transport costs by 10% reduces the volume of trade by more than 20%, and poor infrastructure accounts for more than 40% of predicted transport costs (Limao and Venables, 2001). Similarly, improving port efficiency from the 25th to the 75th percentile reduces shipping costs by 12% and increases bilateral trade by anywhere between 5% and 25% (Clark *et al.*, 2004; Blonigen and Wilson, 2008).
9. A recent study of 126 economies calculates the loss from export delays at around 1% of trade for each extra day. For perishable agricultural products, the cost is nearly 3% of the volume of trade for each day of delay (Djankov, Freund and Pham, forthcoming). Another study finds that each extra signature an exporter has to collect reduces trade by 4.2% (Sadikov, 2007). For high-end exports the reduction is nearly 5%.

Port governance, ownership structure and competition shape incentives for operating efficiency and for the provision of appropriate infrastructure. In New Zealand, ports are largely owned by local authorities, which may have objectives, often political ones, other than maximising the long-term return on assets. Sure enough, the return on port assets is below the cost of capital (McDouall Stuart, 2006). Moreover, local-government ownership leads to infrastructure duplication and to a lack of co-ordination in decision-making. Ports say consolidation is needed to reduce these problems and enhance their negotiating position *vis-à-vis* ever stronger international shipping conglomerates, which enjoy an exemption from domestic competition laws. Privatisation of port assets, in part or in full, could help bring market discipline to port operations, raise the return on assets and facilitate raising capital. Some consolidation would likely occur, and competition concerns could emerge, but these are best dealt with by existing institutions such as the Commerce Commission.

Improve the business environment for foreign investment

In response to investment opportunities offered by the retreat of government from many sectors in the 1980s and 1990s, inward direct investment increased steadily (Golub, 2003). Today, New Zealand has one of the highest stocks of inward FDI relative to GDP among OECD countries. Despite this good performance, OECD comparisons suggest that New Zealand could do even more to create a welcoming environment for FDI. The latest OECD FDI restrictiveness indices show that in 2006 FDI restrictions in New Zealand were still above OECD averages in six out of the nine sectors examined (Figure 7).¹⁰ As suggested in the discussion on economic geography, meeting average OECD levels of restrictiveness is unlikely to be enough to substantially boost FDI and benefit from the growth spillovers that go with it. Instead, New Zealand should target best practices by emulating leading countries, such as Belgium, which show that it is possible to reduce FDI restrictions to well below OECD averages, if not to eliminate them completely.

Figure 7. FDI regulatory restrictiveness in nine sectors¹, 2006



1. The indicators take into consideration discriminatory barriers to entry – relative to domestic investment – in the form of limitations on foreign ownership, special screening procedures that apply only to foreign investors, as well as post-entry management and other operational restrictions. The total score ranges between 0 and 1, with 0 being completely open and 1 completely closed. See Annex 6.A2 of the source for more details.

Source: OECD (2007), *International Investment Perspectives*.

10. They are particularly high in three sectors: telecoms, transportation and electricity. Restrictions are high in telecoms partly because of foreign equity ownership limits in Telecom New Zealand. In air transport, there is a 50% foreign ownership limit as well as partial state ownership of the principal carrier. Public ownership of rail assets makes the barrier to both domestic and foreign entry in this sector very high. And in the electricity sector, the presence of three state-owned enterprises among the five largest electricity generators and the high degree of vertical integration in the sector limit competition and foreign investment opportunities.

Ease screening requirements

Disaggregating FDI restrictiveness indices into different sources shows that screening requirements in New Zealand are some of the highest among OECD countries. One way in which screening requirements are typically implemented is by requiring a FDI “net benefit test” for the host country, that is, the foreign investors presenting an application must demonstrate that the investment will benefit the host economy.

Unfortunately, such screening requirements can be used to limit investments for non-economic reasons. A high-profile example is the New Zealand government’s refusal in 2008 to allow the Canada Pension Plan Investment Board (CPPIB) to purchase a 40% stake in Auckland airport, an offer that had been approved by shareholders. The government introduced a new factor that the Overseas Investment Office (OIO) must consider when evaluating if a foreign investment on “sensitive land” is beneficial.¹¹ The new criterion requires the OIO to assess “... whether the overseas investment will, or is likely to, assist New Zealand in maintaining New Zealand control of strategically important infrastructure on sensitive land”. After appraisal by the OIO, two government ministers are required to make a decision. In the airport case, the ministers were not satisfied that the benefit to New Zealand criterion was met. They therefore rejected the application. A subsequent bid by the State Grid Corporation of China for the Vector Wellington Electricity Network was not subject to the new factor because the electricity network is not located on sensitive land. By creating uncertainty and a lack of transparency around the approval process, this type of retrospective and arbitrary intervention by the government into international investment transactions sends the wrong signal to foreign investors.

Almost all applications for foreign investments are eventually accepted, but many take a long time to get approval. As a result some investors may prefer to invest in countries where screening requirements are less of an obstacle. One way to reduce the screening requirement while preserving the option for government to deny an investment it judges truly harmful to the country is to transfer the onus from the investor to the minister who must then, in a case where an investment is denied, demonstrate that the investment would do net damage to the economy. Such a rule would send better signals to foreign investors and would force a greater degree of transparency regarding the justification for turning down an investment. Some OECD countries have totally eliminated screening requirements for foreign investments, and New Zealand should consider doing so as well to improve its foreign investment climate.

Lower the corporate income tax

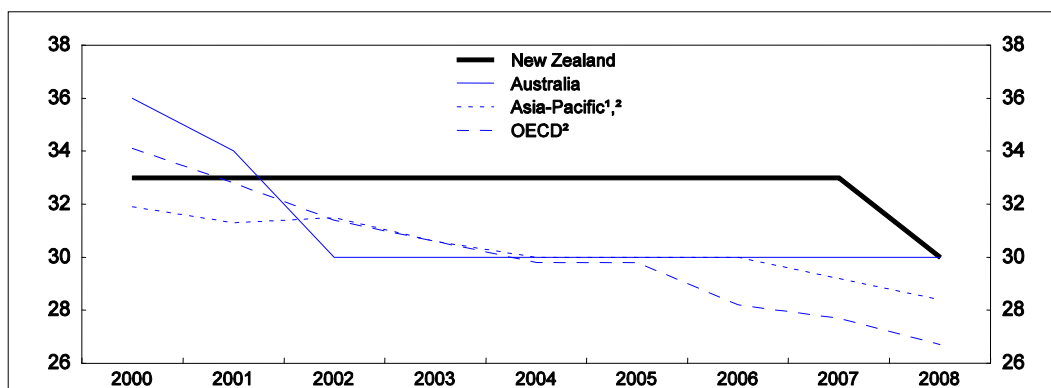
Another way in which New Zealand could encourage foreign, as well as domestic, investment is by lowering the corporate income tax rate. Business taxes are among the most harmful to growth (Johansson *et al.*, 2008). They lower all forms of income (including wages) more than other types of taxes, such as value-added or payroll taxes. They also harm a country’s attractiveness to foreign investors, and this effect may be particularly acute for smaller countries or those facing comparative disadvantages related to distance or transaction costs (OECD, 2007d; Hajkova *et al.*, 2006).

New Zealand has a relatively high rate of business taxation (Figure 8). An earlier small advantage was eroded, as for a long time New Zealand kept its corporate tax rate constant while other countries brought theirs down. Only in 2008 did it cut its rate from 33% to 30% to match Australia’s, but the rate remains above the OECD average (26.7%) and the Asia-Pacific average (28.4%). Besides discouraging both domestic and foreign investment, high corporate taxation relative to other countries creates incentives for multinational firms to thinly capitalise their operations, or use transfer-pricing schemes to funnel profits

11. “Sensitive land” was an existing OIO term and refers to land specifically listed in the Overseas Investment Act. Examples of sensitive land include: land which is non-urban (and exceeding five hectares), land subject to a heritage order and land adjoining the foreshore.

away from New Zealand and into lower-tax jurisdictions. New Zealand does have tax rules against thin capitalisation and transfer pricing, but they are difficult to enforce and can thus never be completely effective.

Figure 8. **General corporate income tax rate**



1. Asia-Pacific includes Australia, Bangladesh, China, Fiji, Hong Kong SAR, India, Indonesia, Japan, Korea, Macau, Malaysia, New Zealand, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam.
2. Unweighted average.

Source: KPMG (2008), *KPMG's Corporate and Indirect Tax Rate Survey 2008*, KPMG, United Kingdom.

Instead, New Zealand should catch up with the well-established OECD trend and further reduce its rate of corporate tax. Lowering it to at least match the OECD average would eliminate a competitive disadvantage relative to many Asia-Pacific and OECD countries and encourage multinational companies to locate in New Zealand to service the Asia-Pacific market. A meta-analysis of many empirical estimates suggests that each percentage point cut in the corporate tax rate causes the stock of FDI to increase by 3.3% (de Mooij and Ederveen, 2003). As the current stock of inward FDI in New Zealand is around NZD 96 billion, a cut in the corporate tax rate by one percentage point could potentially increase the stock of FDI by NZD 3.2 billion (approximately the combined market capitalisation of the 3 largest public companies in New Zealand as of November 2008). The lost revenue could be made up by raising taxes that are less detrimental to growth and that do not affect business investment as much, such as the value-added tax (see the section below on shifting the tax mix).

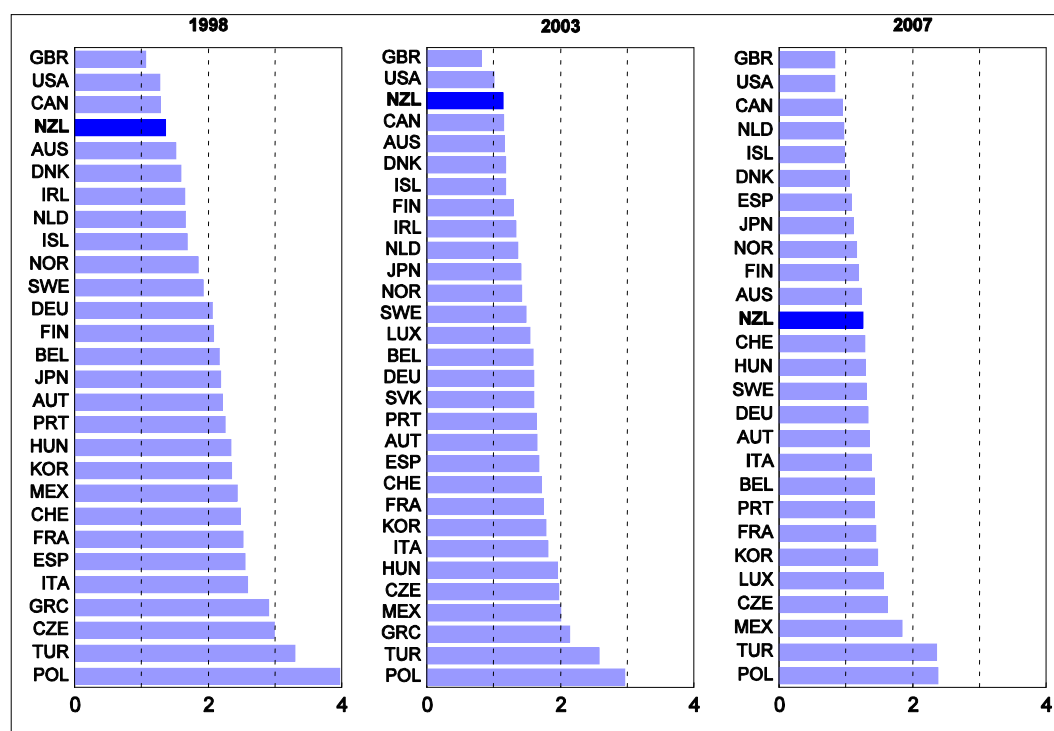
The investment relationship with Australia is worth special attention. Australia is the largest source of foreign investment in New Zealand, with about a third of the total, while New Zealand is the fourth largest source of foreign investment in Australia. As part of the two countries' efforts to create a single economic market, they should continue working towards an agreement for the mutual recognition of imputation credits in their tax treatment of foreign investment. Imputation (or "franking", as it is called in Australia) is a mechanism which provides credits against personal taxes on dividends received by shareholders for taxes paid at the company level. New Zealand and Australia are the only two OECD countries to have retained imputation systems as integral parts of their tax systems. The relief is generally restricted to company taxes paid within the jurisdiction, and foreign taxes therefore do not give rise to imputation credits. This means that there is a single layer of tax on domestic profits, but two layers of tax on foreign-source profits when they are distributed to domestic shareholders. Mutual recognition of imputation credits would remove investment biases and create long-term dynamic benefits by promoting productivity growth and international competitiveness in both countries. An efficiency case could be made for New Zealand's unilateral recognition of imputation credits, even without reciprocal action by Australia, but such a move would entail smaller benefits and a higher fiscal cost.

Create a public-sector advantage

The comprehensive market-oriented reforms implemented between 1984 and 1993 opened up the economy to foreign capital and international trade, dramatically reduced government assistance to industry, abolished agricultural subsidies, corporatised and privatised many state-owned enterprises, decentralised the employer-employee bargaining process and shifted from universal provision of social welfare to a tightly targeted system. Structural policy indicators showed the fruits of these intensive reform efforts. According to the OECD's aggregate index of product market regulation (PMR), New Zealand had one of the most liberal regulatory regimes among OECD members in 2003. To this day, it scores relatively well on some PMR sub-indicators, a situation reflected in other rankings like the World Bank's, where New Zealand scores first among OECD countries for the ease of starting a business, and second among 181 countries for the ease of doing business generally (World Bank, 2008). Deservedly then, New Zealand has often served as an example of liberalism in policymaking. Between 2003 and 2007, however, progress stalled, and in some areas appears to have reversed (Figure 9). Whereas most OECD countries continued to liberalise product markets during this period, the OECD aggregate PMR indicator shows New Zealand making no progress, so that it now scores only average among OECD countries (Wölfl *et al.*, 2009). Such results support anecdotal evidence to the effect that the previous government's philosophical orientation toward liberalisation and the benefits of free markets had shifted from that prevailing during the reform era, giving rise to a number of concerns around incentives for productivity growth.

Figure 9. Product market regulation index

Indicators scale: 0-6 from least to most restrictive



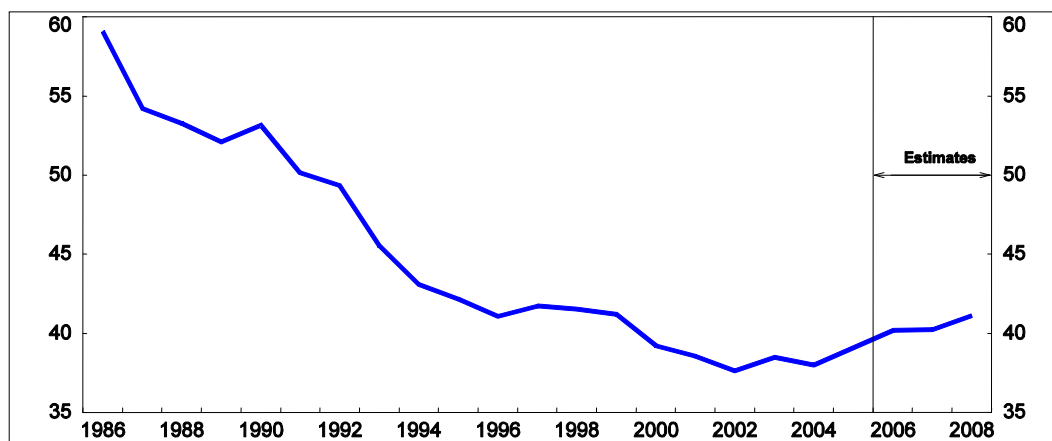
Source: OECD, Regulatory database.

Improve the efficiency of public expenditures

Starting in the late 1980s, New Zealand's ambitious reform programme was accompanied by fiscal reforms that sought to boost the quality and reduce the level of public spending. Reforms began with one of the OECD's most aggressive corporatisation and privatisation programmes which, combined with an efficiency drive, reduced the level of public spending from more than 50% of GDP in 1986 to a low of 37.7% in 2001. Since then, however, government spending has been creeping up again (Figure 10). In the last year for which data are available (2005), total government expenditures were 39.9% of GDP. Econometric evidence for OECD countries indicates that large government size may be detrimental to growth in living standards (Afonso and Furceri, 2008). This evidence shows that each percentage point increase in total government spending as a share of GDP reduces the growth rate of real GDP per capita by 0.13 percentage point per year. The recent rapid rise in government expenditures (by 2.2 percentage points in only four years) is thus a disquieting development for an economy already suffering from sluggish per capita GDP growth.

Figure 10. **Total general government expenditure**

As a percentage of GDP



Source: OECD.

Public expenditures have risen disproportionately in three areas: education, policing/corrections and health, driven largely by personnel increases and wage settlements. The former government, which actively encouraged the use of multi-employer collective agreements (MECAs), made large settlements with teachers and nurses, but wage increases in the rest of the public sector have been on par with the private sector. However, they have seldom been linked to expected efficiency or productivity gains. Also, staggered negotiations in different sectors have from time to time threatened the government with the closure of important services, but compromises have generally been reached and industrial action averted. The new government may wish to consider reducing the use of MECAs to strengthen its bargaining position. Where possible, it should also seek better information on public-sector outputs to be able to tie future wage increases to measurable productivity outcomes. The OECD has recommended giving government managers stronger incentives to identify and implement efficiency improvements through well-designed performance targets supported by robust information systems, especially in health and education (OECD, 2007c). Some actions have been taken in both of these sectors to develop performance measures. Still, the long-term drive to raise the efficiency of government expenditures should be more ambitious and cover the public sector as a whole. The goal should be to allocate spending across departments and within departments using an integrated cost-benefit framework that takes into account the likely social returns on different types of public spending, both historical and new, as well as the general

efficiency costs of raising tax revenues (more on the latter below). The new government has promised a comprehensive spending review, a positive first step that should evolve to something more systematic.

Beyond spending growth in traditional sectors of government activity, concerns around public-sector efficiency arise out of a recent spate of nationalisations that suggests the former government was backtracking on the privatisation efforts of the past two decades and expanding into areas where governments typically make poor decisions. For example, in May 2008, the government announced that it had agreed to buy back the loss-making rail and ferry assets owned by Toll New Zealand (part of Australia's Toll Holdings), which had purchased them in 2003. The terms of the deal have been heavily criticised as very poor for taxpayers, in effect amounting to a bailout of a privatised company. The government is expected to hand over responsibility for running the rail and ferry businesses to a new SOE. The railway is expected to be a loss-making venture for the foreseeable future, however, giving weight to the argument that the repurchase was an inefficient use of public money.¹² Moreover, the new rail funding does not go through the newly created New Zealand Transport Agency – charged with prioritising transport investments based on cost-benefit analysis – making it even more likely that new rail investments will be uneconomic. The objective should instead be to have a rail policy integrated with the rest of transport policy. Given the critical nature of the transport sector for overcoming geographical barriers, it is essential to promote an efficient allocation of resources within it.

The re-nationalisation of a number of enterprises in recent years, including Air New Zealand, and now these rail and ferry businesses, is a trend that goes against the tide of privatisation in developed economies since the early 1990s. At the same time, the government maintains ownership stakes in industries as diverse as power generation, banking and coal extraction. There is no fundamental economic rationale for government ownership in these sectors beyond perhaps a transitory phase. Consequently the return on capital in many SOEs is poor. In many cases the SOE model was intended to be temporary, but the assets have remained on the government's balance sheet and are not performing well. Exiting these businesses would not only improve the efficiency of public spending and potentially lead to better performance in the company or sector itself, it would send more favourable signals to foreign investors. Unfortunately, the new government has promised not to divest any SOE assets during its first (three-year) term in office, though this promise not to sell does not exclude greater private-sector participation in areas of SOE activity.

Reduce distortions in the tax system

Raising revenues imposes costs on the economy because taxes distort labour supply, saving and investment decisions, resulting in lost output value to society. The cost from tax distortions can be considerable. To the extent that research findings from the United States can be applied to New Zealand, raising an additional dollar of revenue may cost the economy approximately 18 to 24 cents (Robson, 2007; Diewert and Lawrence, 1996). That is, if taxes increase by NZD 1, taxpayers bear a cost of NZD 1.18 to 1.24: the NZD 1 in revenue and 18 to 24 cents from accompanying distortions. This additional cost, the deadweight loss, means that to be economically justified the last dollar of government spending must generate a social return of at least 18%, net of any additional administrative or production costs. It is doubtful whether many projects currently pass this benchmark test, starting with recently nationalised assets. Other recent initiatives that may imply inefficient expenditures include interest-free student loans, saving subsidies within KiwiSaver, and significant increases in health expenditures. To have a better idea, the government should support independent research to estimate the deadweight economic losses

12. Rail freight transport is basically uneconomic in New Zealand because demand tends to be for small loads over short distances, and the rail charges needed to make a profit with such a use pattern cannot match trucking costs.

associated with its tax system. It would then be in a better position to evaluate the minimum required social return on existing and new expenditures.

The efficiency with which government raises revenues in New Zealand could be improved by shifting the tax mix to raise a higher proportion of revenues *via* more efficient taxes. The relative efficiency of different taxes depends on the extent to which they alter relative prices in the economy and thus affect decisions regarding saving, investment, effort and entrepreneurship. One measure of the efficiency of a tax is its marginal efficiency cost (MEC). As suggested above, the MEC of the tax system as a whole is perhaps between 0.18 and 0.24, but this average would hide a lot of variation in the MECs of different taxes.¹³ Taxes on income and profits (the corporate and personal income taxes) distort economic activity to a greater degree than consumption-based taxes, and, as stated above, the corporate income tax is particularly harmful to growth (Johansson *et al.*, 2008). The reason is that corporate income taxes (and other business taxes) are taxes on business investment, one of the main sources of labour productivity growth, and hence of income growth. When business investment is taxed heavily, there is less of it because this form of spending switches externally to lower-tax countries (see section above on FDI), and internally to lower-tax forms of spending, which are not directly connected to productivity growth. In addition, because of the relatively thin domestic capital markets and the scarcity of domestic savings, most small businesses finance their growth through retained earnings.¹⁴ A low general corporate income tax is thus especially critical to encourage the growth of small businesses.

Worryingly then, New Zealand raises the highest share of total tax revenues through income and profit taxes (62%) among OECD countries (average of 36%), though the New Zealand figure is somewhat distorted because it is the only OECD country to have neither social security nor payroll taxes.¹⁵ Nevertheless, as the 2007 *OECD Economic Survey of New Zealand* recommended, it should increase its reliance on indirect consumption taxes, for example by raising the efficient and broad-based GST rate and lowering income and profit taxes (OECD, 2007a). Flattening the tax structure – bringing the rates of tax on various kinds of income and profits closer together – would also help improve the efficiency of the tax system. The large discrepancies between the top personal tax rate (39%), the trust rate (33%), the portfolio investment entity rate (30%) and the corporate tax rate (30%) are the sources of much tax planning, administrative waste and investment distortions. The new government has chosen to reduce the top personal tax rate, from 39% to 38% in 2009 and 37% in 2010, going some way toward flattening the tax structure, but gaps will remain large. The long-term goal should be to bring all these tax rates in line with one another at internationally competitive levels, which will require further cuts in both personal and corporate rates. On the personal tax side, thresholds should also be looked at, as failure to index them for many years has pushed up effective tax rates. The threshold for the highest personal tax rate is much lower than in Australia, for instance. The common labour market with Australia has increased the mobility of the personal tax base, so lower effective personal tax rates would help attract and retain skills. It would also help attract investment, since much of it hinges on the presence of a skilled labour pool. Other measures suggested in the 2007 *Survey* that would help reduce economic distortions and raise the overall efficiency of tax system include lowering the effective marginal tax rate associated with the Working for Families package and removing exemptions to the corporate tax base.

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13. See Robson (2007) for a non-exhaustive survey with a particular focus on New Zealand.
 14. One reason why capital markets are comparatively thin in New Zealand is that it is hard for fund managers to achieve diversification. The number of publicly traded companies is small, so investors go overseas and hedge in derivative and currency markets. These latter markets are relatively deep and liquid for their size, but not so the capital markets.
 15. There are good reasons not to lump social security and payroll taxes together with income and profit taxes. The former tend to be more efficient because of their more direct link to transfer and insurance programmes, because they often have lower or zero marginal rates (*e.g.* non-insurable earnings) and because they do not apply to capital income.

Financial market regulation

Along with reform efforts in many other areas, New Zealand substantially reformed its financial sector in the 1980s and 1990s. Beginning in 1984, it abolished interest-rate controls, floated its currency, lifted restrictions on balance-sheet structures, relaxed financial-sector entry restrictions, removed limits on foreign ownership of companies, privatised state-owned financial institutions, did away with foreign-currency borrowing restrictions and implemented an independent monetary policy with a clear inflation target. These far-reaching reforms helped bring about sustained economic growth, lower unemployment and milder inflation.

New Zealand tops the World Bank ranking for the strength of investor protection along with Singapore, but this statistic is somewhat misleading, as these rankings capture only the most basic features of legislation necessary for adequate investor protection (World Bank, 2008). Until recently, New Zealand's approach to public supervision and regulation of financial institutions had been based on disclosure and market supervision. For banks, which are mainly subsidiaries of Australian banks, the framework of well-established and rigorous requirements for bank authorisation, comprehensive disclosure regime and clear, conservative capital requirements, has proven robust. As the global financial crisis unfolds, New Zealand banks remain among the most highly-rated in the world. Weaknesses became apparent in the non-bank financial sector, however. So in 2008, the government changed the law to strengthen prudential regulation and oversight, particularly for non-bank deposit-takers.

First, the government improved consumer access to redress in the financial sector by setting up a registration system for financial-service providers and requiring that they belong to an approved dispute-resolution system. Providers are defined broadly to include banks, credit unions, building societies, managed funds, securities issuers, finance companies, foreign-currency dealers, insurers and insurance brokers. The new registry will be kept in electronic form and will be searchable by the public. Existing voluntary, industry-based dispute-resolution schemes, such as the Banking Ombudsman, and the Insurance and Savings Ombudsman, already provided access to redress for consumers, but they did not extend to credit unions, finance companies, financial advisers and some superannuation schemes.

Second, with the Financial Advisers Act 2008, the government established an occupational licensing regime for financial advisers supervised by the Securities Commission. This new regime imposes statutory conduct and disclosure obligations on financial advisers. Civil and criminal penalties are attached to the new Act.

Third, the government has decided that the Reserve Bank will become the single prudential regulator of the financial system, including non-bank deposit takers (including finance companies, building companies and credit unions) as well as insurance companies, in addition to its existing oversight role for traditional banks. Among other powers, the Bank's expanded role will allow it to require deposit takers to have a credit rating, to have a risk-management plan that they adhere to and to impose requirements relating to capital, liquidity, and related-party exposures. In the insurance sector, the Bank's role will include licensing insurers and enforcing disclosure requirements, including insurers' financial-strength ratings.

And, most recently, intensification of the financial crisis in October 2008 and Australia's introduction of a deposit guarantee scheme forced the New Zealand government to introduce its own explicit deposit-guarantee scheme. Australia and New Zealand had been the only two OECD countries without deposit insurance. The new deposit-guarantee scheme covers all retail deposits of participating New Zealand-registered banks as well as retail deposits in non-bank deposit-taking entities – including building societies, credit unions and deposit-taking finance companies – up to a cap of NZD 1 million per depositor per covered institution. Collective investment schemes (such as portfolio investment entities and

unit trusts) will also be able to claim on the guarantee provided they meet certain conditions (*i.e.* they must wholly invest in guaranteed institutions). Institutions are free to opt in or stay out of the scheme, but it is expected that all eligible institutions will participate. A premium-financed deposit-insurance system would have been preferable to a guarantee, but circumstances meant New Zealand had to quickly introduce its own scheme. At the time, the guarantee was the only choice as legislative options were not feasible. In time, this guarantee should be removed. One possibility is to move to an insurance system with full, risk-based funding.

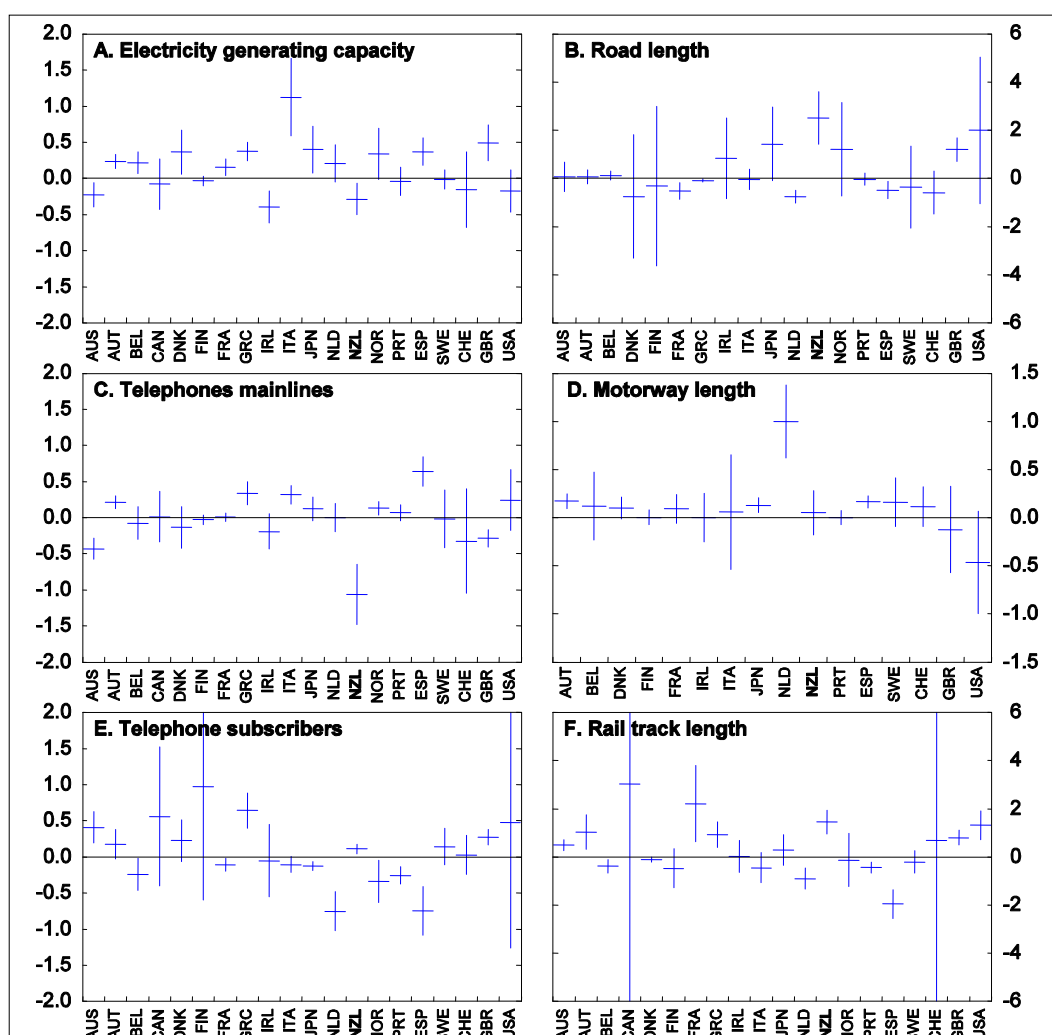
All these measures, once fully implemented, should provide greater protection to retail depositors and help them assess the soundness of different financial institutions. These extra protections and tools should bolster general confidence in the New Zealand financial sector and increase the willingness of households to save in assets other than housing.

Create an infrastructure advantage

According to the World Economic Forum's latest Executive Opinion Survey, inadequate infrastructure is the most serious barrier to doing business in New Zealand (World Economic Forum, 2008). When public expenditures were restrained during the reforms of the mid-1980s to the early 1990s, infrastructure investments were particularly affected because delayed impacts made them attractive targets for cuts. Deferred maintenance has since accumulated, and infrastructure bottlenecks are starting to show up, particularly in electricity transmission and roads in and around Auckland. Public expenditures on infrastructure have risen significantly in recent years, but it will take some years before the impact is visible. The new government also appears serious about tackling infrastructure problems, naming an infrastructure minister and setting up a new infrastructure unit within the Treasury. Infrastructure in energy, transport, water and communications is an important focus of public policy for two main reasons. The first is that these sectors rely mainly on fixed networks to deliver their services. Investments in such capital are often lumpy, irreversible and subject to natural monopoly forces. As a result, public policy is important to ensuring socially appropriate provision. The second is a strong presumption from economic theory that infrastructure investments can have positive effects on growth that go beyond normal additions to the capital stock. This is because investments in network industry infrastructure are thought to yield positive externalities on other sectors. For instance, better communications infrastructure can facilitate collaboration among workers and raise their productivity. This last characteristic makes achieving optimal levels of infrastructure in network industries especially important. Empirically, however, the link between infrastructure investment and growth has traditionally been difficult to pin down. The direction of causality is hard to determine convincingly and appears to depend on the country, sector and existing level of provision. Recent cross-country studies have used sophisticated econometric techniques to untangle these effects and have confirmed that greater provision of broad measures of infrastructure is associated with higher subsequent growth rates (Canning, 1999; Demetriades and Mamuneas, 2000; Esfahani and Ramirez, 2003). Recent OECD work also finds that the contributions of infrastructure to long-run output levels and growth go beyond normal additions to the capital stock (*i.e.* they generate positive externalities) and that they are not homogenous across countries (Égert, Koźluk and Sutherland, 2009) (Figure 11). In New Zealand's case, this work indicates that past investments in road infrastructure have yielded the greatest growth benefits.

Figure 11. Impact of infrastructure investment on living standards¹

1960-2005



1. Horizontal bars represent coefficient estimates from time-series growth regressions. Vertical bars are the 90% confidence intervals around these estimates. Because the regressions already include infrastructure investment in the variable for total investment, a positive coefficient indicates that the effect on output per capita is greater than the effect arising from a general increase in the capital stock. For further details see the source.

Source: Égert, Koźluk and Sutherland (2009).

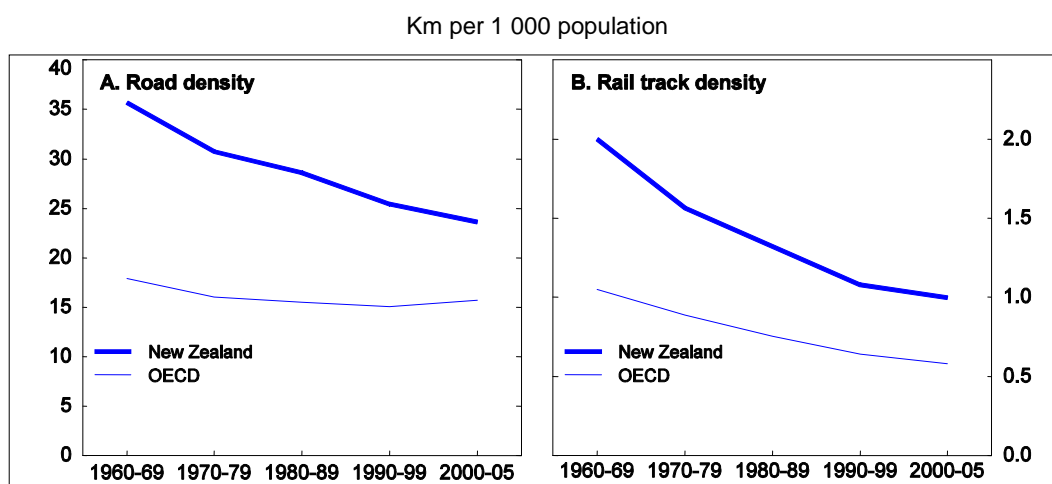
Upgrade road infrastructure

Transport infrastructure is critical to the economic agglomeration process, and the economic-geography literature makes it clear that economic agglomerations raise productivity through a number of channels, from improving linkages between firms to creating deeper labour markets. For instance, the Auckland region, New Zealand's largest and most densely populated, accounts for 33% of national employment and 40% of value added in the economy, though it occupies only 2% of New Zealand's land area. Labour productivity and wages in the Auckland region are above those in other areas of the country. Wages are around 7% higher and average personal income is around 15% higher. Even after adjusting for industry-composition effects, labour productivity is greater by 25% (Maré, 2008). When congestion and other negative externalities outweigh the productivity benefits, however,

agglomeration effects and productivity are constrained. The balance between these forces determines optimal city size and overall living standards. Transport investments that increase connectedness within and between cities and that reduce negative externalities such as congestion can therefore raise the cross-over point and boost productivity (Grimes, 2007 and 2008). This was the case for example in the United States after the construction of the interstate highway network (Fernald, 1999).

The evidence is accumulating that transport infrastructure bottlenecks may be hindering the process of economic agglomeration and dragging down New Zealand's productivity potential (The Allen Consulting Group, 2004; PricewaterhouseCoopers, 2004; Ministry of Transport, 2006). Road and rail density, though still higher than OECD averages, have been falling quickly in New Zealand, suggesting a lack of investment (Figure 12). The quantity and quality of roads in particular appear to be deficient, a situation reflected in rising congestion and higher road fatalities than in other OECD countries.¹⁶ More and higher-quality roads could potentially reduce both, in addition to their positive effects on economic growth. Indeed, the OECD work cited above on the link between infrastructure and growth finds that New Zealand is the country with the highest estimated effect of road density on economic growth across all OECD countries (Figure 11). This result reflects a high *average* growth impact from investments in the New Zealand road network since the 1960s, going beyond the normal return to capital stock increases. End-of-sample analysis suggests that the return has not fallen in recent years. Although one must be careful to extrapolate from a long-run average return into the future, the strength and robustness of the result are highly suggestive of substantial remaining opportunities for beneficial road investments. The policy reason for such high historical returns is that, with a low funding envelope relative to needs, road projects used to be financed if the estimated benefit-costs ratio was greater than four (implying a required rate of return of 50-60%). Such a high hurdle rate meant that many good projects were not funded, and the funded ones were weighted toward short-term returns. A lot more money is now being put into the National Land Transport Fund, and the benefit-cost ratio required to exhaust the fund has recently fallen significantly.

Figure 12. Transport infrastructure



Source: Égert, Kožluk and Sutherland (2009).

16. At 9.9 deaths per 100 000 people, New Zealand's road toll is higher than countries such as the United Kingdom, Sweden and the Netherlands, which have fatality rates below six per 100 000 people. Also, in one government study the cost of congestion in the Auckland area was estimated at NZD 900 million per year (Ministry of Transport, 2006).

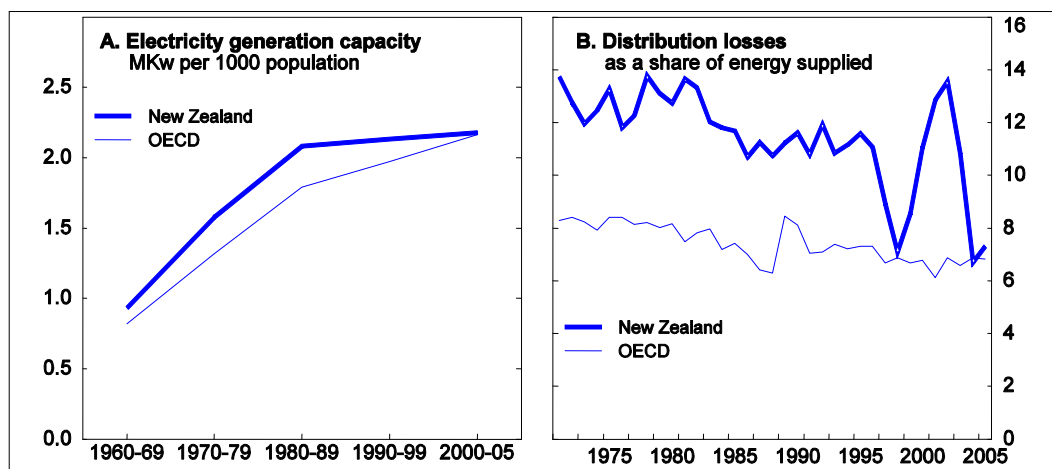
Even with high estimated average returns, it remains important to subject each individual project to a cost-benefit analysis. Starting in 2004, as a consequence of the New Zealand Transport Strategy (NZTS) as well as a number of regional transport packages, the former government appeared to move away from the cost-benefit approach in determining funding priorities. The NZTS provides strategic direction for the transport sector as a whole for the next 30 years using a large number of targets, for instance halving per capita greenhouse gas emissions from domestic transport by 2040. But the need to consider a range of potentially conflicting targets has probably led to funding some projects that have relatively low benefit-cost ratios. In particular, there have reportedly been changes made to the original scope of some projects that, had they been evaluated in their entirety right from the beginning, would likely have never been approved. It thus seems important to reinforce the “value-for-money” principle within the NZTS, so that all projects, additions included, be systematically subjected to rigorous cost-benefit analysis. It is also important not to let environmental or political considerations and objectives supersede the requirement for transparent cost-benefit evaluation.

To help reduce road-transport bottlenecks, the OECD (2008d) has also recommended adopting road-pricing arrangements, such as tolls and congestion pricing. Before undertaking investment in new capacity, it is indeed important to ensure that best use is made of existing infrastructure. Congestion charges and user fees (*e.g.* tolls) can play a key role in ensuring efficient use of scarce infrastructure and also give more accurate signals of where additional capacity may be warranted. The previous government ruled out congestion charges in Auckland, but it was increasingly looking to move beyond fuel taxes as the principal source of financing for roads and to focus on more direct user charges. The first toll road, Auckland’s Northern Motorway Extension, opened in early 2009. In some cases, implementation could be rapid as the infrastructure already exists. For instance, because there is no diesel tax in New Zealand, heavy diesel vehicles are subject to a road user charge. The equipment used to calculate road use in these vehicles could be used to introduce time-of-use charges that reflect congestion.

Upgrade electricity-sector infrastructure

Time series growth regressions for New Zealand show significant negative average returns to investments in electricity generation since 1960 (Égert, Koźluk and Sutherland, 2009) (Figure 11). This result may seem surprising, given the electricity shortages that afflicted the country during the 2008 drought period and widespread grid problems since then. Part of the explanation may be overinvestment in the past. New Zealand’s energy mix includes a large amount of reservoir hydro, and because of the geography of its rivers, it has only about 12 weeks of reservoir storage under normal circumstances. To avoid being energy-constrained – by the maximum amount of water that can be held behind its dams – it has built substantial excess hydroelectric capacity in years past, which may have led to low average returns compared to other countries. Growth in generation capacity has slowed since the end of the 1980s, however (Figure 13, Panel A). Rapid economic expansion since then, coupled with a series of low hydro inflow years since 2000, has heightened concerns about security of supply and spot-price volatility. Apart from the obvious problems that electricity shortages would present in a modern economy, price volatility and supply constraints send negative signals to potential investors. Fuelling strong investment and economic growth in the future will require matching growth in the electricity supply and confidence as to its reliability. This will require new investments in both generation and transmission.

Figure 13. Electricity infrastructure



Source: International Energy Agency and Égert, Koźluk and Sutherland (2009).

The Electricity Commission, established in 2003, is the main government body responsible for ensuring security of electricity supply, which in New Zealand can be threatened by prolonged droughts. In the event a dry hydro sequence occurs, leading to an energy shortage and rising electricity prices, the Commission has several tools at its disposal: it can run the Whirinaki reserve generating station and determine the price at which its supply is offered into the spot market; it can run a conservation campaign and/or purchase load reductions (if the system enters what is termed the emergency zone); and, as a last resort, it can initiate rolling power cuts. None of these interventions is desirable, however, as they amount to government management of energy-price risks, which blunts private-sector incentives for new generation investments. For instance, the government's operation of the Whirinaki station when the price of electricity reaches a given threshold acts as a "soft" price cap – it buffers the price when the plant is the marginal generator (International Energy Agency, 2006).¹⁷ Price capping removes a material portion of the potential returns to new plants that would come on during periods of peak consumption (likely thermal or geothermal plants). So even though Whirinaki improves the short-run reliability of supply, it undermines long-run reliability through reduced incentives for investment. Somewhat ironically, this makes it more likely that future peaking capacity will also need to be funded by government. To improve private-sector investment incentives, Whirinaki's output should always be priced at least to cover the full cost of its fuel, and ideally it should be priced at the value of lost load (the estimated spot market value of the marginal MWh not supplied). Eventually, the government should find ways to devolve energy-price risks completely to private market participants, which would include privatising current government-owned generators.

Besides insufficient non-hydro generation capacity in dry years, another risk, termed locational-basis risk, stems from geographically matching supply and demand for electricity. New Zealand's high-voltage network is a radial network; it is long and stringy as opposed to a meshed network. It also has no interconnections with other countries. These two characteristics mean that generation is not always geographically well matched with load centres. Distribution losses occur when the market operator must take higher priced power to meet demand in particular areas that lower priced generation cannot serve because of transmission constraints. Such losses have tended to be higher in New Zealand than in the rest of the OECD and spiked around the turn of the century, suggesting the presence of distribution and

17. Whirinaki supplies electricity to the wholesale market whenever prices reach NZD 1000/MWh, or NZD 200/MWh for four consecutive hours.

interconnection constraints that may also be partly to blame for recent shortages (Figure 13, Panel B). Very little had been spent for many years on upgrading the grid, but since the Electricity Commission was established in 2003, providing more regulatory certainty to the sector, grid investments have increased significantly. From less than NZD 100 million per year between 1995 and 2005, grid expenditures of more than NZD 400 million per year are planned from 2009 to 2014.

The development of liquid and transparent financial markets to hedge energy-price risk and locational-basis risk would allow the government to shift more of these risks onto private market participants and help create better incentives for private investments in both generation and transmission. For instance, exchange-based forward and futures contracts for electricity supply could be designed to force financial penalties on generators unable to meet contractual obligations, creating strong incentives to build reserve capacity. They would also alleviate incentives for vertical integration between generators and retailers. Currently, retailers cannot readily hedge price risk financially by purchasing futures contracts for power, so they can either take on the risk themselves and buy all electricity on the spot market, or they can own generating capacity outright. It is not surprising, then, that the five main generators are also the five main retailers, which has led to concerns regarding anti-competitive behaviour. Anti-competitive behaviour by generator-retailers during recent low hydro inflow years is currently being investigated by the Commerce Commission, which underlines another policy danger to investment incentives. Even if prices were sending efficient signals for optimal investment today, investors might justifiably balk at the prospect that government intervention might alter the picture in the future. For instance, investors may hesitate to commit resources to new generation in an environment where they fear the Commerce Commission could intervene and limit spot prices in dry-year periods. The very long planning horizons involved in electricity generation projects and investors' dislike of uncertainty calls for government to provide as much certainty as possible through clear, transparent and stable regulatory frameworks and policies. To this end, the government may need to provide improved guidance to the Commerce Commission so that it considers dynamic competition effects. Finally, better demand-side incentives to use electricity efficiently can help reduce loads in times of system stress and thus the likelihood of shortages. Many of New Zealand's approximately 1.9 million meters are about 50 years old and are in the process of being replaced. The new meters will enable new retail offers, greater choice for consumers and a wider range of load-management options. Getting to this point requires major revisions to metering administration, however. The Electricity Commission is currently reviewing metering arrangements with a view to updating them to reflect the latest developments in technology, services and standards.

Facilitate telecommunications infrastructure investment

One final cause for concern regarding New Zealand infrastructure is relatively limited broadband Internet penetration. In June 2008, New Zealand ranked 19th out of 30 OECD countries with 20.4 subscribers per 100 inhabitants, a little below OECD average (21.3), but substantially below leading countries, which have above 30 subscribers per 100 inhabitants. By comparison, Iceland, another relatively small and isolated country, has a penetration rate above 30. Low broadband penetration in New Zealand does not stem from low availability or affordability. Fixed-line-based broadband is available to approximately 93% of all lines, and either wireless- or satellite-based service is available to the remainder. Recent benchmarking exercises have also revealed pricing to be competitive, with New Zealand consistently ranking in the top third of OECD pricing for all broadband categories (Commerce Commission, 2008). Average broadband speeds are, however, lower than in leading countries such as Japan, Korea and Finland, so it is likely that take-up is lower in New Zealand because broadband does not provide a sufficient speed advantage over dial-up to justify the price difference. New Zealand had the sixth fastest rate of increase in broadband penetration across the OECD in the year to June 2008, an encouraging development, but substantial investments in broadband infrastructure appear necessary if it is to catch up to leading countries in terms of speed and penetration. Such investments would be undertaken by the private sector where they are commercially sensible, but regulatory uncertainty may be blunting incentives for

large-scale capital projects. The lack of regulations around evolving fibre-access monopolies and recent regulatory interventions following infrastructure investments have sent a message to investors that the government is likely to intervene after infrastructure is built to regulate pricing or other aspects of the market, thus reducing incentives to invest in the first place. The government should enhance regulatory certainty by providing more guidance to the Commerce Commission and potential investors around the regulatory framework in this sector. It can further facilitate private investments by removing existing regulatory barriers, a case in point being the Telecommunications Service Obligation (TSO, also called the “Kiwi share”). Among other mandates, the TSO obliges the incumbent telecom operator, Telecom New Zealand, to provide residential customers with a free local-calling option. By artificially subsidising dial-up internet service, this obligation may be a disincentive for broadband investments and may be delaying broadband uptake.

Create an innovation advantage

A central determinant of labour productivity growth is the rate of innovation: new ideas and technologies that improve the efficiency with which firms and workers use the capital at their disposal. Innovation is important in its own right, and it interacts with human capital on many levels. Higher skills foster greater levels of innovation and entrepreneurship and increase the ability of the economy to absorb, implement and adapt ideas generated by others. Innovative firms tend to shift the composition of their workforce toward more skilled labour through recruiting and training, and such shifts are often accompanied by higher productivity and higher wages for skilled employees (Ahn, 2001).

Total R&D spending and business R&D spending in New Zealand are both below OECD averages, and by wide margins (OECD, 2008c). Gross domestic expenditure on research and development (GERD) was 1.2% of GDP in the last year for which data are available (2005), compared to an OECD average of 2.3%. New Zealand’s GERD ratio has been at the low end of the ranking for some time and looks particularly deficient in relation to the United States (2.6%), as well as leading countries such as Sweden (3.7%), Finland (3.5%) and Japan (3.4%), or another small isolated country, Iceland (2.8%). The absence of a defence sector in New Zealand goes some way toward explaining the low rate of public-sector R&D spending, but business R&D spending is also particularly low. Only about 42% of R&D expenditure is business financed (BERD), compared to an OECD average of 69%. This means BERD is about 0.5% of GDP, less than a third of the OECD average of 1.6%. Industrial structure does not appear to be the main culprit: a decomposition of aggregate R&D intensity into an industry-intensity component and a structural component shows that the gap in overall R&D intensity between New Zealand and the OECD average is due mainly to low within-industry R&D intensities (Di Maio and Blakeley, 2004).

As the above statistics suggest, New Zealand R&D is dominated by public funding, mainly for research taking place in universities and Crown Research Institutes (CRIs). As a result, the pure research/innovation environment is relatively good, but the development and commercialisation of new ideas on the business side is fairly weak, which suggests poor linkages between public research institutions and firms. This situation is worrisome because business R&D appears to be one of the most powerful drivers of economic growth. In an earlier comprehensive econometric study of the growth performance of Member countries over the period 1970 to 2000 that looked at a variety of growth determinants, the OECD found that one of the strongest in terms of magnitude and statistical significance is BERD as a percentage of GDP (OECD, 2003). The estimated effect is remarkably strong: an increase of 0.1 percentage point in BERD intensity ultimately raises real output per capita by approximately 1.2%. The same study found no statistically significant effect of public R&D spending on growth, an important reason why policy makers should be more concerned with the development and commercialisation of new ideas than with public or even total R&D spending. This cross-country evidence is corroborated for the New Zealand case by a more recent study that found a positive impact on labour productivity from private R&D investments over the period 1962-2002, but no productivity gain from public R&D investments (Johnson, Razzak and

Stillman, 2007). This study also found that private R&D in certain industries raises output per person in the rest of the economy (*i.e.* it generates positive spillovers), but publicly provided R&D does not.

There is evidence that the combination of distance from major world centres, the high proportion of small firms, elevated rates of self-employment and the relatively large size of the agricultural sector account for most of the difference between New Zealand's business R&D intensity and those of other OECD countries (Crawford *et al.*, 2006). That New Zealand's geography would explain at least part of the low R&D activity in the country seems plausible, given other findings on the importance of geographical distance for technology diffusion cited above (Keller, 2001 and 2002). In any case, disappointing innovation statistics have led over the years to numerous calls for measures to improve the nation's performance. Despite natural factors that may militate against locating R&D activities in New Zealand, there are certainly aspects of the policy environment that can be improved. The new government has signalled it is taking a different approach to encouraging business-sector R&D by cancelling the R&D tax credit introduced in April 2008 by the previous government. It nevertheless promised to use a third of the money thus recuperated (which amounts to about NZD 100 million per year once fully implemented) to fund science. As the above discussion suggested, government policy should focus on improving the links between existing public research organisations and firms.

Ties between public-sector researchers and businesses can be fostered in several ways to facilitate the commercialisation of new ideas and thus improve the rate of return on public-sector R&D spending. One such way could be greater use of co-funding between government and industry for R&D activities. For instance, in 2008, the previous government announced the creation of New Zealand Fast Forward, a fund to finance R&D investments in the pastoral and food industries. That government committed to a capital investment of NZD 700 million over the next 10-15 years. Businesses in this industry would have been expected to match the government's commitment on an annual basis. With accrued interest, the fund was expected to grow to around NZD 2 billion over this period. An appointed board was to manage the fund's investments, with the objective of helping to connect primary-sector producers and manufacturers with scientists and researchers. The new government has indicated that it will disestablish the fund and replace it with direct annual funding for primary-sector R&D. It would be desirable for the new programme to retain some of the good aspects of Fast Forward, such as industry partnership and co-funding.

Another way to strengthen ties between public-sector researchers and firms is through the use of contestable and performance-based research funding. This type of funding already exists, with performance measured along a number of dimensions, for instance the number of journal citations, adjusted by a set of weights. But the weights could be re-jigged to give greater importance to industry collaboration, for example by directing public funding for science projects on the basis of how much private sector funding they attract. Yet another way to increase R&D linkages between the public and private sectors is to set up systems for the exchange of people between CRIs and firms. Finally, improving the co-ordination of different support systems for R&D should be on the agenda. An OECD review of New Zealand's innovation policies in 2007 mentions the fragmented system of government support to R&D and innovation as a potential R&D barrier (OECD, 2007b). A lack of coherence across a range of innovation-related policies can make it difficult to allocate public resources in a strategic manner and can result in wasteful duplication of effort and a sub-optimal scale for many support programmes.

It is important to remain realistic in aspirations for more business innovation, however. For a small country like New Zealand, which undertakes only a tiny proportion of global innovation (about 0.2% of total R&D in the OECD), the much larger share of R&D activities carried out abroad, and improvements in the ability to draw on international innovations, imply that the ultimate sources of domestic productivity growth lie increasingly abroad. Therefore, policy must go beyond domestically sourced innovation and encourage international linkages that give access to the most up-to-date technology that is available globally. At the same time, domestic activities and policies can have a significant impact on the ease of

technology diffusion. OECD work shows that having a critical mass of domestic research capabilities may be important to a country's receptivity to ideas from abroad (Jaumotte and Pain, 2005). Many of the structural policy orientations described previously would help facilitate foreign technology adoption. To mention only one, new technologies often come embodied in capital goods, so a welcoming environment for FDI and business investment is critical to upgrading New Zealand's technology base.

The adoption of new product and process innovations increasingly requires a skilled, adaptable workforce so building human resources in science and technology is important as well.¹⁸ Policies that strengthen international research mobility can keep scientists up to date with the latest developments in their field, encourages the cross-fertilisation of skills, approaches, techniques, and ideas as well as knowledge exchanges. On that score, a recent OECD cross-country comparison shows that New Zealand is relatively good at providing scholarships, fellowships, grants and other programmes to attract researchers into the country, but it has relatively few programmes aimed at giving people the opportunity to study/research abroad (OECD, 2008e). Facilitating greater "brain circulation" would strengthen New Zealand's position in the global competition for talent and encourage knowledge transfers from abroad. Other areas worthy of improvement to raise the general level of qualifications are expanding the number of countries from which degrees are recognised, educating more foreign students and keeping a greater number of them in the country after graduation, perhaps by facilitating residency for recent foreign graduates.

Create an environmental advantage

To be sustainable, economic growth must occur with acceptable environmental effects. Regulatory and economic frameworks that encourage sustainable investments and quick response to emerging resource constraints are thus critical for sustainable productivity growth. At the same time, if it is not well designed, environmental policy has the potential to hinder economic growth and quash New Zealanders' aspirations to close the prosperity gap with other countries. This delicate balance is at the heart of the debate surrounding the Kyoto Protocol and New Zealand's recently legislated emissions trading scheme.

Amend the emissions trading scheme

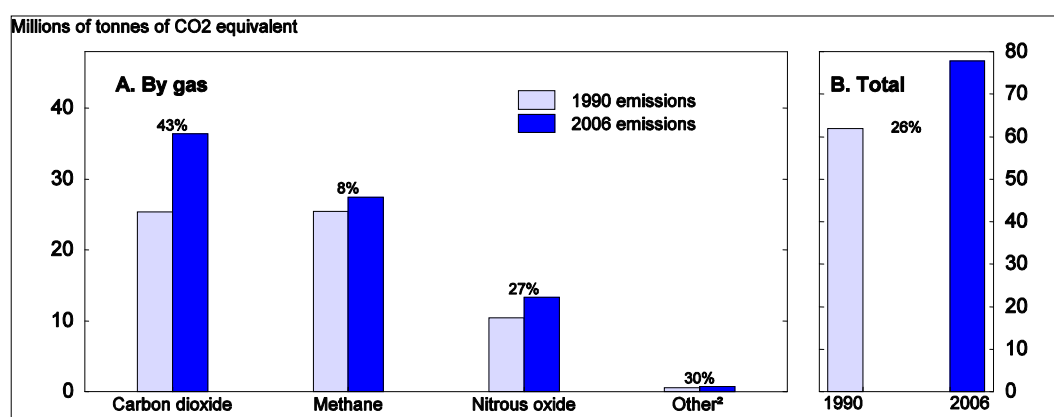
As a very small country, New Zealand's total greenhouse gas emissions (GHGs) are only about 0.3% of global emissions. Nevertheless, per unit of GDP, it is the second-highest emitter in the OECD, behind Australia, and it has the 12th highest per capita emissions in the world (Ministry of Economic Development, 2007). Moreover, its distinctive emissions profile compared to other developed countries makes it particularly difficult to reduce emissions quickly. First, about half of all emissions come from the agricultural sector, mainly from livestock. As a result, carbon dioxide makes up a smaller proportion of emissions (47%) than the developed-country average (75%), while methane represents a much more significant component (35%). Opportunities to reduce agricultural emissions are limited in the near term and uncertain going forward, as reducing methane emissions from ruminants is particularly challenging. Second, whereas most other developed countries are looking to their power-generation sectors to achieve large emissions cuts, New Zealand generates about 70% of its electricity from renewable sources (with 60% from hydro), so the scope to lower emissions in power generation is limited. Instead, the most salient opportunities for emissions savings are in energy efficiency and transport (transport accounts for about 20% of emissions). Owing to historically low energy prices, energy efficiency is generally low. For instance, many older homes have poor thermal insulation. New Zealanders also have high rates of car

18. In this regard, the efforts made by the previous government to enhance the quality and labour-market relevance of tertiary studies through the Tertiary Education Strategy for 2007-12 are welcome. The crucial change concerns the shift away from a system in which funding was based on student intake to one based on labour-market outcomes.

ownership, with one of the oldest and dirtiest car fleets in the world, and public transport is relatively undeveloped.

Nevertheless, New Zealand is a signatory to the Kyoto Protocol and so far appears intent on meeting its Kyoto commitment to reduce its GHG emissions back to 1990 levels, on average, over the period 2008 to 2012 (the first commitment period). However, the latest inventory shows that domestic emissions were still increasing. In 2006 they were about 26% higher than they were in 1990 (Figure 14). If no action is taken to reduce them, total emissions would be around 30% over target by 2012. Consequently, as of 31 January 2009, New Zealand's Kyoto liability for the first commitment period was officially estimated at NZD 549 million.¹⁹ To meet its Kyoto obligations, New Zealand's options are either to incur the cost of purchasing units on international markets to cover excess domestic emissions, or to cut emissions to reduce the liability. Either strategy is sure to impose significant economic costs. If international permits are purchased, New Zealanders bear the direct cost of the permits and the indirect costs of raising the required revenues through the tax system. In addition, the wealth is transferred overseas. If instead domestic emissions are reduced, firms and individuals will respond to the higher carbon price by changing the composition and manner of production, giving rise to adjustment costs. An ideal global climate-change policy would achieve the right balance between reducing emissions domestically and purchasing international permits, that is, it would insure that emissions reductions occur where they are least costly by integrating all trading and achieving a single world carbon price.

Figure 14. Change in greenhouse gas emissions from 1990 to 2006¹



1. Figures exclude the emissions and removals from the land use, land-use change and forestry (LULUCF) sector.
2. Includes sulfur hexafluoride, hydrofluorocarbons and perfluorocarbons.

Source: Ministry of Environment, New Zealand's Greenhouse Gas Inventory 1990-2006.

In September 2008, the outgoing Parliament passed legislation for the introduction of the New Zealand Emissions Trading Scheme (ETS). The ETS is notable because it will cover all sectors of the economy and all six Kyoto Protocol GHGs (carbon dioxide (CO₂), methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons) by the time it is fully implemented in 2013. Coverage of the different sectors will be phased in over time, with forestry having begun in 2008, stationary energy and industrial processes starting in 2010, liquid fossil fuels and transport in 2011, and agriculture, waste and all remaining sectors in 2013 (the inclusion of agriculture in an ETS would be a world first). The point of obligation in each sector has been chosen primarily on technical considerations to

19. This estimate is based on a carbon price of EUR 10 per tonne (approximately NZD 25).

facilitate monitoring.²⁰ The unit of trade will be a New Zealand Unit (NZU). Each NZU represents one tonne of CO₂-equivalent emissions. Firms that emit more than their allocated NZUs must buy extra permits; firms that emit less can sell their surplus permits. A positive effect of the ETS is that, by including forests retroactively to the beginning of 2008, it has reduced the rate of deforestation due to the conversion of forests to agricultural land. This rate of conversion was intensifying in recent years because of high commodity prices.

Risks

New Zealand's heavy reliance on emissions-intensive primary export industries exposes its economy to carbon-price uncertainty.²¹ This exposure is magnified because competitors in New Zealand's main export markets tend to be located in emerging economies that are unlikely to join a post-2012 Kyoto-like scheme in the short to medium term. Opportunities for "leakage" – economic activity moving from New Zealand to other countries to escape a higher carbon price – are thus especially high, as suggested by several studies (Palstev, 2001; Sinner, 2002; NZIER, 2008). The ETS provides assistance in the form of free permit allocations to reduce such exposure for sectors in which profits are expected to be significantly affected by a higher carbon price. Most notably, the agricultural sector will be provided with a free allocation pool equal to 90% of 2005 emissions when it is brought into the ETS. A similar allocation will be given to industrial producers. Starting from 2019, however, the free allocation pools for industrial producers and agriculture will decrease on a linear basis so as to phase out assistance completely in 2030. Giving free allocations to trade-exposed sectors means that an equivalent number of units will have to be bought on the international market for New Zealand to meet its Kyoto obligation. Even though the cost of these units will fall on the domestic economy through general taxation, this is likely to be a relatively efficient outcome, because there are cheaper emissions reductions abroad than in energy-intensive, trade-exposed sectors in New Zealand. This is unlikely to be the case when free allocations start being phased out in 2019, however. After this date, the only remaining ETS feature to limit the carbon price that emitters would bear is the link with international markets.

Indeed, from the beginning, NZUs will be "backed up" by Kyoto units to enable linkage with international Kyoto Protocol flexibility mechanisms (Clean Development Mechanism, Joint Implementation and Assigned Amount units). The price of these international units will act as a backstop on the price of domestic emissions. If reducing domestic emissions costs more than it does abroad, New Zealand emitters will be able to purchase units abroad and substitute foreign emissions reduction for domestic cuts. This feature of the ETS means that the cap is not an absolute cap on domestic emissions as companies will be free to purchase and sell units internationally. In theory, linking the New Zealand carbon market with the international carbon market is ideal, because it creates incentives to achieve emissions reductions where they are least costly, whether domestically or abroad. It reduces carbon price uncertainty relative to an ETS with no such international linkage.

Still, a great deal of uncertainty remains. In the event that international emissions reductions are cheaper than domestic reductions, a likely outcome given New Zealand's special emissions profile, the price of carbon in New Zealand would be shaped primarily by foreign political and regulatory factors, from changes in European governments' policies to the evolution of international climate-related institutions.

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20. In forestry, it will be the landowners (or forestry rights holders). For liquid fossil fuels and transport, it will be the fuel suppliers, although domestic aviation may opt in and take on obligations. For stationary energy, it will be the coal, gas and geothermal suppliers, although again large users may opt in and take on obligations. For industrial processes, it will be the end emitter. In agriculture, it will be the suppliers of nitrogen fertilisers and the meat/dairy processors. And for waste, it will be the landfill operators.
21. Primary industries (agriculture, horticulture, forestry, mining and fishing) account for about 7% of GDP and over 50% of total export earnings.

Volatility is likely, and the future price path – subject to fluctuations in an immature and fragmented market – is difficult to predict. The price of international permits does not reflect any single “right” price for carbon, and there is significant potential for misallocation of resources if firms base their long-term decisions on short-term price signals that bear only a tenuous relation to the marginal benefit of emissions reduction. Realigning the New Zealand economy to reflect an arbitrary and potentially short-lived carbon price would not constitute an efficient use of resources. An unpredictable and potentially volatile price of carbon undermines incentives for investment in directly exposed sectors, such as agriculture, but also in indirectly exposed sectors, negatively affecting the potential for future economic growth.

Reducing risks

To provide more certainty, potential price volatility could be limited through the use of a safety valve that would automatically cap the carbon price if it reaches a certain level. The interchangeability of NZUs and Kyoto units already provides a sort of safety valve, because it prevents the price of domestic emissions from rising above the international price. The question is whether the government should attempt to anchor investors’ expectations more solidly by putting in place a domestic price cap. To be effective, this measure would require an explicit, up-front guarantee by the government to provide as many permits as demanded by the market if NZUs reach a predetermined price. As long as the price remains below the safety level, the quantity cap would be binding. When it reaches the cap, however, the safety price would become binding, and the quantity of domestic emissions would rise above the cap.

The main disadvantage of a safety valve is the possibility of breaching the domestic emissions target if the price of emissions reduction becomes too high. In this case, if it is to respect its Kyoto commitment, the government would need to purchase international certificates to make up the difference, effectively transferring risks from scheme participants to taxpayers (because of the fiscal costs of buying international units at a price greater than the safety-valve price). The trade-off is therefore between guaranteeing a certain quantity of domestic emissions reductions and putting all the risks on emitters, or potentially giving up the domestic target and sharing risks between emitters and taxpayers. Given the importance of price certainty for investment planning and for the emissions-intensive sectors that are vital for continued economic growth, and given that New Zealand is already far ahead of most other countries in actually implementing policies to raise the price of carbon, the possibility of exceeding the domestic emissions cap some years in the future at some fiscal cost would seem like a reasonable risk to take in exchange for providing more certainty to industry and consequently incurring lower economic costs now.

There are other disadvantages to a safety valve, however. For this mechanism to work well, New Zealand would have to restrict the bilateral link between its ETS and Kyoto flexibility mechanisms. A domestic price cap can only work in a situation where New Zealand can buy permits from abroad but does not allow other countries to buy its permits (unilateral linkage). For the same reason, a safety valve would limit the potential for future bilateral linkages between the New Zealand ETS and those of other countries, such as Australia. International linkages are especially desirable for New Zealand because its small carbon market and the limited number of participants in it are likely to constrain liquidity. The potential for a direct bilateral agreement between New Zealand and another country or region prior to 2012 is limited, but should improve thereafter as negotiations and targets for the second Kyoto commitment period advance.

Instead of a safety valve, the New Zealand government could prevent the domestic carbon price from rising too much by adopting less stringent emission reduction targets and/or by making these targets contingent on the progress of other countries in implementing climate-mitigation policies. For example, targets could be made contingent on export-competing countries implementing emissions trading schemes similar to New Zealand’s. They could even be made contingent on the potential for new carbon markets to link with New Zealand’s to make sure that emission reductions are achieved at least cost. Measures of this type could help prevent New Zealand from being exposed to a very high international carbon price before

all of its trading partners are also exposed. An administrative tool for monitoring other countries' progress and adjusting domestic policy is already legislated in the form of five-yearly ETS reviews. According to the ETS legislation, these must consider "... the relative climate change obligations and emissions policies of New Zealand's trade competitors and trading partners". The rationale behind contingent targets and domestic policy adjustments is straightforward: the optimal level of emissions reductions cannot be known with any certainty, so the emissions target can and should be adjusted as new information and better analysis comes to light. Absorbing large economic costs now to avoid going over an arbitrary level of emissions is not desirable. Integrated climate-change and economic analysis shows that optimal climate-change policy is characterised by a low and eventually rising carbon price, but not by an absolute emissions cap (Nordhaus, 2008). An ETS that gives some assurance that the current and future carbon price can be borne by emitters without excessive economic disruption, and with an emissions reduction target that adjusts as other countries' climate policies evolve, respects these principles.

Political-economy considerations will factor into whether the ETS survives as currently legislated. While New Zealanders are undoubtedly worried about climate change, they are also justifiably concerned about their own economic well-being. No nation has demonstrated willingness to address climate change at a very high economic cost. International experience shows that a policy threatening to impose heavy economic costs will in any case not be politically sustainable. Partly in response to competitiveness concerns from several sectors, following the general election of November 2008 the incoming government formed a Select Committee of members of Parliament to review the New Zealand ETS legislation as well as wider climate change policy. This Committee is expected to make recommendations for amending the ETS by September 2009. Measures that guarantee that the cost to New Zealanders of achieving their environmental objectives will not get out of hand, possibly for reasons out of their control, would greatly improve the political prospects for the ETS.

Promote coherent policies to mitigate climate change

Once all sectors have been brought into the ETS, there are a number of regulatory programmes aimed at reducing carbon emissions that may become redundant – probably even distortive – and that could unnecessarily raise the economic cost of achieving emissions-reduction objectives. Insofar as a credible price is put on carbon, the correct incentives for abatement should diffuse through the economy to producers and consumers, whose decisions should then reflect the costs of this environmental externality. In the best of cases, additional policy instruments to reduce carbon emissions would give rise to unnecessary administrative costs. In the worst of cases, they would prevent equalisation of marginal abatement costs between emitters, leading to an inefficient allocation of resources. Some examples which have already been repealed since the ETS was legislated include the ban on new thermal electricity generation and the biofuels sales obligation (0.5% of total fuel sold in 2008 rising to 2.5% in 2012). Other measures, still in place, include the Afforestation Grant Scheme (government grants to plant new forests on previously unforested land), and the plethora of programmes and targets for energy efficiency announced as part of the Energywise Homes and Energywise Business components of the New Zealand Energy Efficiency and Conservation Strategy, including for example average fuel efficiency standards for new and used vehicles entering the fleet. With an appropriate carbon price, such policies can be justified only on the basis of market imperfections or environmental externalities not directly addressed by a carbon price (such as local pollution). These supplementary policies and objectives should all be evaluated individually and kept only if rationalised by such exceptions. Furthermore, any benefits of these programmes would have to be large enough to justify their often high implicit carbon-abatement costs. The government should reconsider the remaining GHG-abatement measures as part of its ETS and climate change policy review.

Review regional resource use plans and the Resource Management Act

Agriculture is a key industry for New Zealand, and water is a key input into agriculture, but there are signs that water use is approaching its limits in certain parts of the country. In some areas, there is a quantity problem as hydro-electric production and farming compete for its use. In other areas, there is a quality problem, as nutrient flows from intensive agriculture pollute ground water. In some cases, even if water quality is still good now, scientists know that it will deteriorate for the next 25 years (*e.g.* Lake Taupo), as nutrients from fertilisers and animals take a long time to go from soil to underground water to streams and lakes. Both problems are relatively new, however, so there is often no mechanism in place to allocate water to competing uses or to control pollution. Instead, New Zealand has a system of water consents under its Resource Management Act (RMA). In turn, water use is managed by 12 regional councils, 4 unitary authorities and the Chatham Islands Council, each responsible to develop its own resource use plan, though it must be consistent with the RMA. Passed in 1991, the RMA sought to pull together all planning/regulatory issues related to approving new projects, while eliminating jurisdictional overlap. Its fundamental principles – consultation and public participation by interested and affected parties – are still sound, but it has taken quite a long time for the national and local governments to come to grips with how to use it. The support and guidance that the national government was supposed to provide to regional councils is only now just starting to materialise.

The RMA and the water consents themselves are a critical legal infrastructure underpinning farming.²² Consents enable farmers to extract specified quantities of water for agricultural purposes (defined by maximum flow rates and by maximum volume flows over time), generally for 30 years, with possible renewal. Extracting water without a consent is illegal. Water rights, under the RMA, are attached to properties; thus when a farm is sold, its water rights are sold along with it. These consents may enable farmers to change the nature of production on their land (*e.g.* from sheep grazing to arable or to dairying), but the water rights are usually not tradable, nor can the water itself generally be sold. Technically, the RMA does allow water consents to be transferred (including sold) separately from properties, but only if regional plans allow it, and whether to allow it or not is up to each regional council. Most have not introduced the required provisions yet, mainly because water scarcity is a relatively new phenomenon. As a result, at present consents mostly reflect first-come, first-served (or “first-applied, first-granted”) rights to water for local land-owners. If a farm does not use all its entitlement in a certain period, that water is usually “lost” to the consented properties. No other property can make use of the lost water by diverting it for its own use. This system means that, broadly speaking, there are no market prices for agricultural water in New Zealand. Evidence on the implicit price farmers place on water consents (through farm sale prices and valuations) in a drought-prone region (the Mackenzie District) over a period of 19 years shows that farmers are willing to pay a premium for land that has a water consent (Grimes and Aitken, 2008). This evidence also shows that the value of consents varies according to the underlying characteristics of the property (*e.g.* rainfall, slope, drainage, location) that influence the marginal productivity of the consented water, as theory would suggest. Differing average implicit prices for water rights across properties with varying characteristics suggest that the absence of mechanisms to trade water independently of properties results in allocative inefficiency for this resource. Thus, introducing provisions in regional water plans to allow water trading appears warranted from both economic-efficiency and environmental-effectiveness standpoints. Given the high value of water to the economy – a Ministry of Agriculture and Forestry (2004) study calculated that the contribution of irrigation water to GDP was NZD 920 million in 2002/03, or approximately 0.7% of GDP – better allocation of water through market mechanisms has the potential to increase agricultural and hence overall productivity significantly.

Markets could also prove helpful in improving water quality. The rapid growth of dairying has led to an intensification of water-quality problems in many catchment areas. These problems are more than

22. This description draws on Grimes and Aitken (2008).

environmental in nature. Deterioration in the clarity of popular lakes, for example because of algae bloom due to agricultural runoffs, can negatively affect tourism, an important economic activity for many regions. The problem is immensely compounded by two facts: the first is that, as mentioned above, it can take as many as 30-40 years for nutrients used in agriculture to reach underground water and lakes, so the mechanisms put in place must be very long-lived. The second is that nutrient runoffs cannot be measured directly; they must be estimated using complicated models tailored to the specificities (*e.g.* local geography) of particular catchment areas. Once these models are in place and accepted by the concerned parties, the total flow of different types of nutrients allowed in the catchment area can be capped and trading markets for pollutants can be established.²³ Again, regional resource use plans must allow nutrient trading to occur. To this end, councils are slowly making the transition to consenting of farming emissions. But the critical issue is getting the starting point right, that is, determining the flows of nutrients that should be allowed, which requires a careful balance of environmental and commercial objectives, and presents significant practical challenges – not the least of which is getting the science behind nutrient-flow models accepted by farmers.²⁴ Without a good starting point, trading is of limited value. Because not all councils can be expected to have access to the scientific knowledge and resources required to choose the right point along this delicate trade-off, the national government has a role in filling information gaps and in giving guidance to regional councils to ensure consistent policy across the land.

Besides updating regional resource use plans to take full advantage of RMA provisions that allow trading markets for water quantity and quality, the Act itself should be reviewed to ensure that it does not create legal opportunities for unscrupulous farmers or other business owners to use environmental concerns as a tool to restrict competition. Indeed, it appears that the RMA is increasingly being used as an anti-competitive tool by vested interests, and that the problem has become serious enough to feature among possible explanations for low productivity. To take just one example, a supermarket chain has not been able to open a store in Takapuna that was completed in 2005 because it has been entangled in one legal challenge after another by another supermarket apparently unwilling to face competition in the area.²⁵ In seeking to amend the Act to restrict anti-competitive uses, the crucial trade-off is between participation and speed, that is, between allowing affected parties to launch legal contests under the Act, and ensuring speedy approval of important projects. Right now, the pendulum may have swung too far in the direction of participation: the RMA process seems to be mainly driven by courts, making it long, uncertain and costly. The overarching policy goal should thus be to reduce the time and cost associated with the RMA approval process, enabling participation once, but not repeatedly, to provide more certainty to potential investors and in particular to facilitate infrastructure investments. One way could be to reduce the scope for competitors to object on competition grounds, often thinly veiled as environmental objections. Another way could be to require “security of costs” in order to lodge appeals to regional-council RMA decisions, as currently pressure groups are able to form incorporated societies without assets in order to avoid meeting the costs of appealing. Yet another way would be limiting appeals of regional-council decisions to points of law, as is currently the case for Environmental Court decisions. The new government has formed a RMA Technical Advisory Group to assist in the drafting of a reform bill.

23. See Lock and Kerr (2007) for a discussion of how such a market could be designed for Lake Rotorua.

24. There are areas now where farmers are trying to establish markets based on consensus, but this is very challenging, given the number of participants that can be involved in the negotiations. In one area where such a market is being considered, there are more than 3 000 properties. Legal challenges to some trading projects have been before the courts for a long time.

25. The established supermarket has used zoning provisions under the Act to argue that the local road network would not be able to support traffic going to the new supermarket.

Conclusion and policy recommendations

The NZ economy is widely known in international policy circles for the very significant structural policy reforms introduced in the 1980s and 1990s. Over a period of several years, successive governments reformed the country's institutional environment by injecting heavy doses of deregulation and opening the economy to the rest of the world. These reforms had a positive impact: they made the economy more open, flexible and dynamic, and these characteristics have likely prevented greater slippage in living standards relative to other OECD countries. Yet New Zealand is also often cited as a country for which free-market reforms have not yielded the improvements in productivity, economic growth and living standards that were promised by the reformers, at least not by the magnitude that would have been expected from such an important reform programme. Part of the explanation is that in some areas, the progress achieved earlier has eroded in recent years and the focus on productivity growth has been lost. Notably, a large amount of new regulation, not always well designed and driven by a variety of different objectives, has been introduced over the past decade or so. The regulatory policy-making process should be re-centred around the objective of boosting long-term productivity growth. Concurrently, further progress could be made in several policy areas to help New Zealand overcome its small size and remoteness and make its business environment as attractive as possible. Box 1 summarises the policy recommendations that could form the core of a productivity/prosperity drive in each of these areas.

Box 1. Recommendations for structural policies to overcome geographic barriers and raise prosperity

Enhance international economic integration

- Facilitate maritime trade by emulating leading OECD countries such as Denmark, France and Finland. Cut the number of documents required to engage in trade and the number of days required to clear customs, and implement a single electronic window for the different permits and authorisations with the goal of reducing inbound and outbound shipping costs to eliminate the gap of some 25% with the leaders.
- Consider reducing local-government ownership of port assets to help bring more market discipline to the sector and to raise the return on assets. Monitor any reduction in competition following from consolidation through existing institutions.

Send positive signals to foreign investors and create a welcoming environment for foreign direct investment

- Change FDI screening requirements by transferring the onus from the investor to the government, which would have to demonstrate harm to the economy to turn down an investment proposal.
- Lower the corporate tax rate at least enough to catch up with the OECD average, and reduce gaps between the company, personal, trust and portfolio investment entity rates as fiscal conditions permit.
- Eliminate the double-taxation of trans-Tasman profits distributed to shareholders by continuing to work on an agreement with Australia on the mutual recognition of imputation and franking credits in the two countries' tax regimes for foreign investment.

Improve public-sector and tax-system efficiency

- Improve the overall efficiency of the public sector by curbing growth in public expenditures and by subjecting existing and new programmes to a cost-benefit test that cuts across government sectors and takes into account the distortionary costs of raising tax revenue. Reduce the latter by shifting the tax mix toward more efficient taxes, such as the GST.
- Limit government ownership and spending to core sectors where it has an unambiguous economic role to play. Divest government assets in other sectors, or at least allow more private-sector competition to bring market discipline to state-owned enterprises.

Upgrade infrastructure

- Make better use of existing road infrastructure by using toll and congestion charges, and ease bottlenecks with new infrastructure, particularly in and around Auckland. Make sure projects and any additions pass a rigorous cost-benefit test.
- Improve incentives for private investments in electricity generation and transmission by removing soft price caps, encouraging the creation of financial markets for hedging energy-price and locational-basis risks, and providing a clear and stable regulatory framework that takes into account dynamic competition effects. Improve the demand-side response to electricity-market conditions by encouraging greater use of metering and time-of-day electricity charges.

Foster an environment conducive to innovation and foreign technology transfers

- Improve the linkages between public research institutions and private-sector development and commercialisation activities by tying public R&D funding to private-sector funding, and explore other ways to spur greater public-private interaction, for example through personnel exchanges. Review incentives for business R&D and the co-ordination of different R&D-support programmes to make sure they work in concert.
- Expand foreign-credentials recognition to a larger number of countries and aim to educate and retain a greater number of foreign students in New Zealand after graduation by facilitating their acquisition of residency.

Amend the Emissions Trading Scheme

- To reduce New Zealand's economic exposure to greenhouse gas abatement and provide more certainty to potential investors, consider amending the ETS legislation to either put a safety valve on the price of domestic carbon emission units or make New Zealand emission reduction targets contingent on the evolution of climate change policy in other countries.
- Individually re-evaluate energy-efficiency and conservation programmes aimed at reducing carbon emissions, which may become redundant once an ETS is fully phased-in. Prominent examples include the Afforestation Grant Scheme and vehicle fuel-economy standards.

Modernise regional resource use plans and the Resource Management Act

- Implement RMA provisions in regional resource use plans to allow trading of water consents, and provide guidance and resources to regional councils on establishing targets for nutrient flows in their respective catchment areas that balance environmental quality, economic, social and cultural objectives.
- Reduce anti-competitive use of the RMA by vested interests, as well as the time and costs associated with the RMA approval process, to provide more certainty to potential investors and facilitate infrastructure investments. Consider reducing the scope for competitors to object on competition grounds, requiring "security of costs" in order to lodge an RMA objection, and limiting appeals to points of law.

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