MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
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What we know (and don't know) about economic growth in New Zealand

Strategic Policy Branch

WORKING PAPER 16/01

New Zealand Government

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Key points

New Zealand's economy has performed well in recent years

Economic growth has been faster in New Zealand than in most other Organisation for Economic Co-operation and Development (OECD) countries in recent years. In particular, employment is high. Wellbeing is also high, although a considerable income gap with the top half of the OECD remains.

This report brings together evidence from New Zealand and offshore about the factors likely to be relevant to New Zealand's continuing strong growth performance.

New Zealand has above-average policy settings but below-average productivity performance

New Zealand has high numbers of hours worked, high employment participation and favourable policy settings which predict that incomes should exceed the OECD average by 20 per cent. But New Zealand's income levels are more than 20 per cent below the OECD average. Low income levels largely reflect relatively low productivity growth in New Zealand.

A number of characteristics are related to productivity performance

New Zealand has certain ***characteristics or stylised facts*** which are inter-related and likely to be positively or negatively related to its productivity performance:

- A dynamic business environment with relatively high levels of firm and job entry and exit, which should lift productivity by encouraging the reallocation of resources to their most productive uses.
- Relatively high and rising levels of tertiary qualification attainment, which is associated with productivity growth.
- Very high levels of migration relative to other countries. Migration is associated with exporting and innovation.
- The small size of the economy and distance from world markets, which limit the scale economies available to businesses domestically, make it more difficult to trade, invest and gain access to new technology, and increase transportation costs.
- A firm size structure where very large (productive) firms are scarce. More firms become small, old firms rather than grow.
- An industry structure which contributes to productivity in New Zealand being more than a third lower than in Australia. Industry structure accounts for around 30 per cent of the gap, compared with *within-industries* productivity differences accounting for 70 per cent.
- Similar to other countries, a wide productivity dispersion within industries. This is important as the OECD argues that growth will increasingly depend on the diffusion of technologies and knowledge from the most productive firms globally, to the most advanced nationally and to laggards. However, a wide and widening dispersion is common to many countries, and there is limited evidence available about New Zealand's comparative performance.
- Relatively low levels of investment in business R&D. There is much overseas evidence that R&D lifts productivity in both the R&D-performing firm and spills over to the rest of the economy, but little New Zealand firm-level evidence about the returns to R&D.
- A high relative cost of capital, with high average long term interest rates compared with other OECD countries.
- Indications of low levels of competition in some parts of the economy.
- Relatively low levels of trade intensity. Trade encourages specialisation, increases competition and allows firms to expand their markets and achieve economies of scale.

The strength of the evidence base varies, but the combination of size and distance, low investment in R&D and industry structure are important reasons for our performance

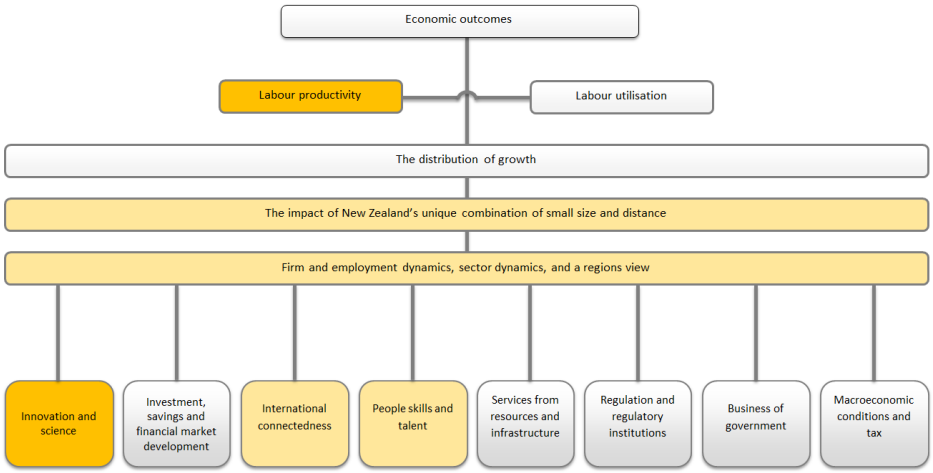
Areas where there is ***reasonably strong evidence about the causes*** of New Zealand's productivity performance include:

- In general, innovation is a key driver of productivity growth.
- A range of other factors, such as skills development and internationalisation, are also linked with productivity growth.
- Reasons for New Zealand's productivity performance include:
  - the effects of size and distance on firm performance and internationalisation (particularly trade)
  - its low levels of investment in R&D
  - its industry structure.

There is ***less or weaker evidence*** about which of the characteristics above are *underlying* drivers of productivity performance. For example, low levels of investment in R&D partly reflect size, distance, industry structure and firm size structure. There is also weaker evidence about the specific contribution to productivity growth of capital markets, government activity (including regulation) and some of the other potential determinants of economic growth identified in this report.

The evidence suggests some areas of focus

The diagram below identifies the potential determinants of economic growth around which this report is structured. Stronger shading indicates broad areas where there is stronger evidence about their contribution to economic growth in New Zealand. In general, policy actions are already focused on these areas.



There are gaps in our knowledge

This report identifies a number of gaps in our evidence base. Some of the gaps where the contribution to productivity performance are less well understood require further research. Some which are better understood and where government already plays an active role require evaluation.

Areas of focus for MBIE's medium-term research reflect some of these gaps and are:

- **business and employee innovation** – a key driver of productivity growth
- **regulation** – where MBIE plays a key role, and there are important gaps in our knowledge
- **competition** – which is linked to innovation, and there are important gaps in our knowledge
- **overcoming size and distance** – integral to New Zealand's productivity performance story.

Potential policy implications

The causes of New Zealand's productivity performance are multi-faceted and reflect the interplay between many things. While research helps indicate where priorities might be, policy advice needs to make more nuanced judgements. Notwithstanding this, the evidence in this report suggests the following policy implications, which are largely already taken into account:

- Policies in relation to innovation, the diffusion of new technologies and knowledge at the productivity frontier, and the reallocation of resources to the most productive firms are (increasingly) important for productivity growth in general.
- For New Zealand, narrowing the productivity shortfall will likely involve some combination of higher productivity growth within industries and a general shift in economic activity toward higher productivity industries. Such a shift should be market-led, but potential roles for government include setting the ground rules such as competition policy and general business regulation, removing constraints to growth at a sectoral level, and addressing market failures. Narrowing the shortfall will also likely involve continued investment in R&D and skills.
- New Zealand's productivity growth could also be lifted by improving our performance in some specific areas. These include trade and integration in global value chains.

1. Introduction

Purpose

What we know (and don't know) about economic growth in New Zealand brings together and summarises the core empirical evidence or set of stylised facts about the causes of economic growth, how the benefits of growth are shared across different parts of the New Zealand population, and why, over some periods of time, New Zealand has not kept pace with the income growth of economies at a similar stage of development (e.g. per capita incomes in the Organisation for Economic Co-operation and Development (OECD)).

While the aim is to get as close as possible to understanding the underlying causes of growth, this is only achievable with varying degrees of confidence. In some areas the evidence is more robust, timely, well established, New Zealand-based or closer to identifying causation than in others.

This report is a summary of the major and influential empirical literature. It is not a full or comprehensive literature review. It is presented with the intention of being updated on a regular basis as the Ministry continues to develop its collective understanding of economic growth in New Zealand.

The report is a "living document" in that it is updated regularly. This present version is the second version.

The document was created with two main purposes in mind:

1. To serve as a means of storing a summary of MBIE's collective knowledge about economic growth in one place; MBIE works with others to contribute to government's collective knowledge.
2. To inform MBIE's medium-term research goals.
3. To inform future versions of *The MBIE Story,* MBIE's Business Strategy and resource allocation.

This report provides an underlying evidence base for MBIE's policy and strategy. The main audience for the report is therefore MBIE staff. There is some public good value to the information contained in the report, and so other audiences include individuals and organisations interested in economic growth.

2. The importance of economic growth and wellbeing

Improved wellbeing

This paper considers the evidence on economic growth through a lens whereby improvements in wellbeing are taken to be the ultimate goal of public policy. Wellbeing is determined by more than average income, economic growth or gross domestic product (GDP) per capita. Wellbeing is influenced by a broad range of material (e.g. income, housing, and jobs) and non-material (e.g. environmental quality, trust, education, and health) factors. The extent to which any changes in wellbeing are dispersed across the wider community is also of importance to the assessment of outcomes for different groups.

Nonetheless, a growing economy remains a key means of delivering higher wellbeing for New Zealanders. For example, a well-performing economy typically creates more jobs, a wealthier population can afford to purchase better healthcare, and a healthier population means more people can participate in the labour market.

Recent New Zealand evidence supports the conventional wisdom that extra income improves wellbeing, but also that per capita incomes should not be the sole basis for assessing the merits of alternative public policies (see for example Grimes et al. 2012).

Indeed New Zealand ranks very highly in many non-material measures of wellbeing. In the OECD Better Life Index 2015 edition (cited in OECD 2015a), New Zealand ranks higher than the OECD average across all 11 components except “income”, indicating a striking ability to deliver good life-quality outcomes despite lower incomes.

Strengths of using income per capita as a focal point

Income per capita is still a core measure of material wellbeing. It is a long-standing, internationally comparable and well-understood measure of economic growth. Income per capita also has an important indirect relationship with non-material measures of wellbeing.

Income per capita is a very broad measure. The two major components that contribute directly and positively to growth in income per capita are increases in productivity (more income per hour worked) and labour force participation (more people in work and/or more hours per person). These components are important objectives or outcomes for a broad range of government economic and social policies.

As well as looking at the overall direction of change, this report analyses the distribution of income and labour force participation among key demographic groups across the population. This gives important insights into how wellbeing is shared in New Zealand now and how it is likely to be shared in the future.

Weaknesses in using incomes as a measure of wellbeing

Income per capita has some major and acknowledged weaknesses, even as a measure of material wellbeing. These can create substantial problems in some areas of public policy. In such instances, it is important that the merits of public policy are not assessed solely on the basis of their contribution to income growth.

One major weakness is that income is a flow measure rather than a stock measure such as accumulated wealth or capital. For example, income per capita does not measure a country’s physical capital stock including infrastructure. Consequently, when natural disasters such as an earthquake strike a country, the contraction in a country’s accumulated capital stock is not well captured by income measures as they only measure current output flows. This is despite the fact

that it may take many years for the capital stock to recover to original levels. Under these circumstances income measures should ideally be complemented with stock measures of physical capital as a way of assessing the long-run economic impact of the disaster.

Income growth also fails to capture the value of a country's natural capital such as the atmosphere, freshwater, coal, oil, gas, soil, fish stocks and biodiversity. Some of the environmental services that are derived from this natural capital are partially included in income measures (such as forest production) but others are not or are only indirectly included (such as biodiversity). Similar issues pertain to human and social capital.

By not adequately accounting for these stock measures, income per capita misses aspects of the sustainability of economic growth and/or does not help identify risks that may affect future wellbeing. Supplementing per capita incomes with other measures to identify intergenerational or inter-temporal impacts will be important in many areas of policy.

Furthermore, income per capita when measured by GDP focuses on all domestic production (which includes production by firms with substantive foreign ownership) rather than that where the benefits accrue to New Zealand residents only. Where the income accruing to residents and non-residents begin to diverge and/or are central to assessing the merits of a policy, more detailed analysis of the policy should incorporate measures of Gross National Income as well as GDP. Relevant policy areas might include foreign direct investment and migration. The rise of globally-fragmented value chains also makes the measurement of economic activity within a country more difficult (Coyle, 2014).

Income per capita also only includes market activity. So it misses non-market activity, such as voluntary work or unpaid household work such as childcare.

Many economists now argue that GDP has become increasingly misleading as the amount of information and entertainment offered at zero price grows (for example, Wikipedia and YouTube). In addition, the intangible benefits brought by ICT and the internet – such as better matches, timeliness and convenience – are poorly measured by GDP (Brynjolfsson and McAfee, 2014; Coyle, 2014).

There can also be wide divergences between GDP and other outcomes such as household income. For example, Taranaki has very high GDP per capita, but household incomes sit around the national average (NZIER, 2014).

Demographic changes can also affect the relevance of GDP per capita as an indicator of lifetime wellbeing. As the population ages and a larger proportion of New Zealanders move into the (low income) retirement phase of life, average incomes are pulled down.

Alternative measures of wellbeing

The limitations of income per capita as a measure of wellbeing have led to the development of various living standards indices. These include the United Nations "Human Development Index"[1] and the OECD "Better Life Index"[2] which take account of non-material factors such as health, education and the environment, as well as material ones.

In New Zealand, a new measure of material wellbeing based on household consumption has been developed by Grimes and Hyland (2015a). The measure is heavily influenced by the thinking of Stiglitz, Sen and Fitoussi – that consumption and wealth should supplement income in measures of material wellbeing. This is based on the view that consumption reflects current wellbeing, and

[1] See http://hdr.undp.org/en/content/human-development-index-hdi

2 See http://www.oecdbetterlifeindex.org/

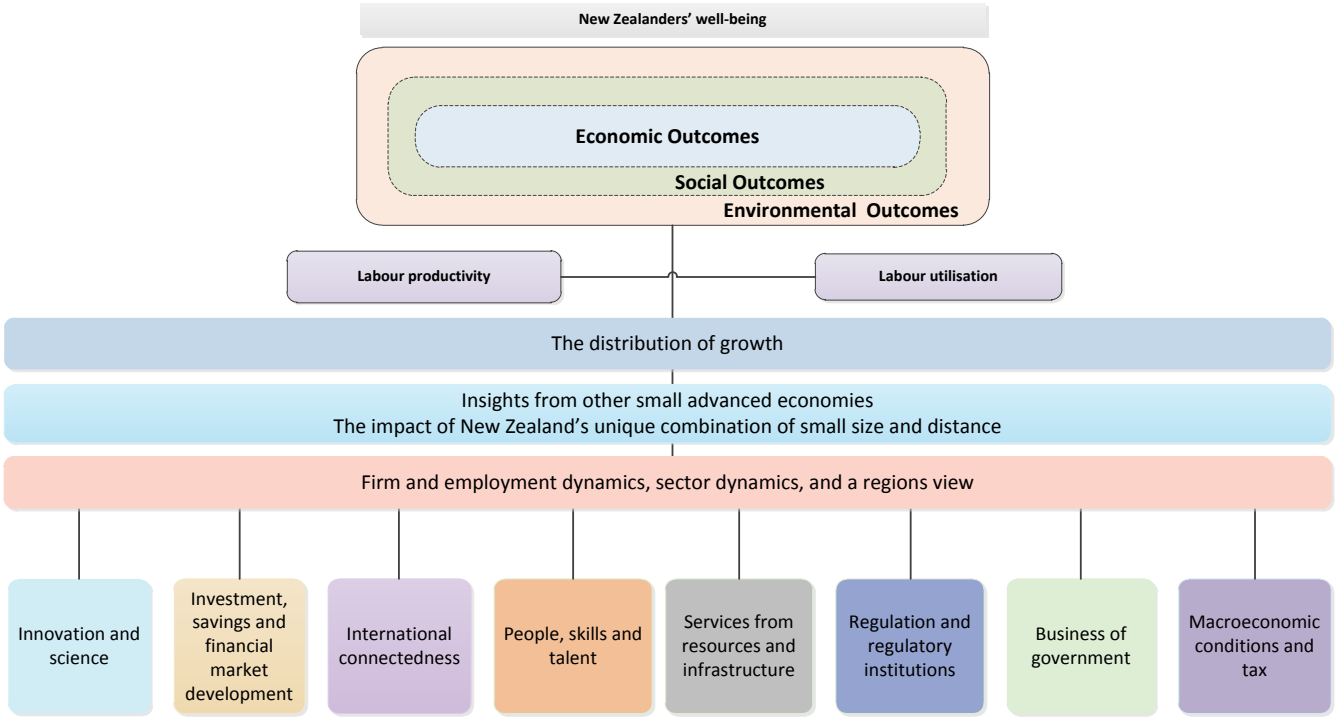
wealth determines possible future consumption. New Zealand had the third highest material living standards in the world in 2012, based on this new measure.

The determinants of economic growth and wellbeing

Figure 1 provides a framework for understanding the determinants of economic growth and wellbeing in the New Zealand context. The framework is a modification of the framework presented in the document *Economic Development Indicators 2011* (Ministry of Economic Development et al. 2011). The top part of the diagram shows that economic growth can be broken down into two broad components – labour productivity[3] and labour utilisation[4]. Labour productivity can in turn be broken down into capital intensity[5] and multi-factor productivity (MFP)[6]. So economic growth can come from growth in inputs (such as labour and capital) or from producing more with the same inputs (productivity growth).

Wide "bars" represent cross-cutting perspectives on growth, while the "buckets" below represent specific determinants of growth. With the exception of macro-economic conditions and tax, which largely lie outside of MBIE's focus, these bars and buckets are examined chapter-by-chapter. While the diagram's treatment of growth provides a useful starting point for how to think about the economy, in reality the economy is much more complex with significant linkages between these determinants.

Figure 1: Determinants of economic growth and wellbeing



[3] Labour productivity is the amount of output produced from each unit of labour employed.

[4] Labour utilisation reflects the proportion of the total population of working age, the proportion of the working age population in the labour market, the unemployment rate, and the number of hours worked per person employed. Essentially, adding more labour – in the form of people or hours – into the production process increases output per capita and hence average incomes.

[5] Capital intensity – or capital deepening – is the amount of capital available per unit of labour. Increasing capital intensity typically improves labour productivity as workers have more capital to use in the production process.

[6] MFP reflects the efficiency with which a combination of productive inputs is used to produce output. As such, it is often considered a proxy for broad technological advances, and potentially includes factors such as improvements in management and production processes, increased scale, skill accumulation and improvements in the effectiveness with which labour is combined with capital.

3. Overview of growth: growth studies, the impact of size and distance, and the distribution of growth

Economic growth in New Zealand has been strong in recent years compared to other OECD countries. New Zealand has high levels of labour utilisation but its productivity performance is poor. Productivity growth and innovation will increasingly be a source of future economic growth. Size, distance and industry structure account for some of New Zealand's productivity gap. Other factors include New Zealand's low investment in R&D, strong ability to draw in low-skilled workers to the labour force, and within-industry productivity differences. Inequality has been relatively stable in recent years, although like other countries, New Zealand experienced a deterioration in a number of inequality measures in the 1980s and 1990s.

New Zealand's economy has performed well recently, but incomes still lag behind the OECD average

Economic growth has been faster in New Zealand than in most other OECD countries in recent years – around three per cent per annum over the period 2012-14 (OECD, 2015a). In its latest economic survey of New Zealand, the OECD comments that New Zealand has one of the highest living standards in the OECD, and stands out on health status, social connections as well as civic engagement and governance. But as noted earlier, New Zealand lags behind the OECD average in terms of income per capita.

New Zealand's income per capita is more than 20 per cent below the OECD average, despite high numbers of hours worked and favourable policy settings that would predict GDP per capita exceeding the OECD average by about 20 per cent (de Serres et al. 2014). The gap in income per capita occurred in the mid-1970s through to the 1990s, and since the early 1990s has broadly stabilised (OECD, 2015a).

Much of this income gap is explained by low growth in New Zealand's labour productivity (Meehan, 2014).

New Zealand is noteworthy among OECD countries in that it was relatively close to US labour productivity levels in 1950, but fell further behind over time. New Zealand was the only one of 14 countries whose gap in labour productivity compared with the US increased over each of five periods – 1950, 1972, 1995, 2004 and 2013 (OECD, 2015b).

In 2009, labour productivity in New Zealand was more than a third lower than in Australia. Thirty per cent of this gap is explained by differences in industry structure and 70 per cent by differences within the same industry (Mason, 2013). When the gap was decomposed in a different way, 57 per cent was due to differences in MFP levels, 39 per cent to differences in capital intensities and three per cent to differences in skills. This indicates that New Zealand's productivity shortcomings relative to Australia owe more to comparatively inefficient use of capital and labour inputs than to lower levels of physical capital intensity.

The Productivity Commission has described New Zealand's productivity performance since the late 1970s (Meehan, 2013). In summary, after the immediate onset of economic reform in the mid-1980s, New Zealand businesses cut back on employment, which increased the amount of capital available per worker and the volume of output produced per hour of work. From the mid-1990s, employment bounced back, marking the beginning of a sustained period of strong employment growth. Growth in the amount of capital available per worker was relatively modest over the late 1990s. MFP growth, however, improved considerably over this period, leading to reasonable labour

productivity growth up until the onset of the Asian financial crisis, a drought in 1999 and the dotcom slump in the early 2000s. Over the 2000s, as in a number of other OECD countries, labour productivity growth fell in New Zealand, primarily as a result of poor MFP growth.

The OECD has undertaken a key study (de Serres et al. 2014) which explores the "productivity paradox", which identifies some of the main reasons for New Zealand's under-performance and provides highly stylised facts which should be treated as order of magnitude only.[7] Its modelling suggests that, of the 27 percentage point gap in total factor productivity (TFP)[8] between New Zealand and the OECD average:

- up to 15 percentage points (i.e. around half the gap) is estimated to be due to the effects of New Zealand's **size and distance** on firm performance[9]
- between three and 11 percentage points is estimated to be due to **low levels of investment in research and development (R&D)**
- around three percentage points is estimated to be due to New Zealand's **better-than-average integration of low-skilled workers**, meaning that more low-productivity workers contribute to the New Zealand economy than is the case for many other countries.

Overall labour utilisation is already high and is unlikely to be as substantial a source of growth as it has in the past because future growth in labour supply is expected to be low. In 2013, New Zealand had the eighth-highest level of labour force participation out of 47 OECD countries.[10] The total labour force will grow at a much slower pace as the baby boom generation leaves the labour market in greater numbers, and is expected to start declining by 2025.

However, in 2014, labour participation rates among Māori and Pasifika were roughly three and seven percentage points lower than among New Zealand Europeans. This indicates that opportunities for improved participation do exist (MBIE, 2014a).

In summary, New Zealand's size, distance, industry structure, low levels of investment in R&D and high integration of low-skilled workers appear to be some of the reasons for New Zealand's poor productivity performance.

The impact of size and distance

Although the relative downward slide in New Zealand's GDP per capita compared with other countries was arrested in the wake of the economic reforms, there has been no strong evidence of any subsequent long-run catch-up. In part, this may be attributable to the role played by economic geography and agglomeration (McCann, 2009). There are also highly likely to be advantages from small scale and distance as well as the disadvantages discussed below. For example, small countries tend to be more agile and cross-border biosecurity risks can be more easily contained.[11] In any policy analysis these advantages need to be weighed against the disadvantages discussed below, but which have not been extensively researched to the best of our knowledge.

The New Zealand economy's small size and distance from world markets create barriers to economic growth by limiting the scale economies available to businesses domestically and by making it more difficult to trade, invest and gain access to new technology. The types of economies of scale that might be affected include those:

[7] The study is based on an augmented-Solow model which has widely been used to explain differences across countries in income levels and growth patterns. It uses a panel data set comprising 20 countries and 30 years of observations.
[8] TFP and MFP are broadly interchangeable, although there is a subtle difference between what they may include.
[9] Size and distance were based on market and supplier access measures.
[10] Source: OECD (2015), Labour force participation rate (Total) (indicator) retrieved from https://data.oecd.org/emp/labour-force-participation-rate.htm.
[11] http://www.landfallstrategy.com/wp-content/uploads/2012/03/Small-countries.pdf.

- internal to a business (for example a business purchasing inputs at volume discounts; or spreading fixed costs over larger production runs)
- external to a business (for example input suppliers being able to specialise more in larger markets; or workers with industry-specific skills being attracted to locations with a wider range of employment options).

The adverse effects of geographical isolation on labour productivity are viewed as being greater in the cases of New Zealand and Australia than for any other advanced economy (World Bank, 2009; Bouhol et al. 2008). For example, it is estimated that Australia and New Zealand face international transport costs for goods that are on average twice as high as those faced by countries in Europe (Golub and Tomasik, 2008, cited in de Serres et al. 2014). The relevance of transport costs and access to large international markets has most likely increased due to the development of global value chains, in which the range of activities involved in bringing a product or service to market is globally fragmented. New Zealand had the lowest participation in global value chains among 33 OECD countries in 2005 (OECD, 2015b).

OECD estimates for both countries suggest that distance reduces labour productivity by more than ten per cent (Guillemette, 2009). International Monetary Fund (IMF, 2013) estimations also imply that some 50 per cent of the labour productivity gap between New Zealand and the OECD average can be attributed to geography alone. This is exacerbated in the case of New Zealand, which lacks the economies of scale associated with a larger domestic market, including larger and more diverse cities.

Within the US, it is estimated that eliminating the effect of distance (regional trading costs associated with distance) across US states would result in an aggregate GDP gain in the order of 126 per cent. The authors interpret this as the upper bound on the extent to which advances in shipping and other transportation technology can eventually contribute to value added. In contrast, reductions to other internal trade barriers would only increase GDP by 11 per cent (Caliendo et al. 2014). Assuming that within-country trade is easier than across-country trade, this suggests that the effects of distance may be even greater in New Zealand.

Consistent with this there is tentative evidence that a lack of economic scale, along with the transaction costs associated with distance from markets, contribute to the relatively higher price of goods and services in New Zealand when compared against 43 OECD-Eurostat countries (Falvey et al. 2014; Gemmell, 2014).

As globalisation increases, world economic activity is becoming more concentrated (not less) in dense areas of economic activity. Popular cases which illustrate this point include the growing density of economic activity in Silicon Valley, the Boston biomedical corridor, and the increasing concentration of global financial services activity in a handful of very large cities such as New York and London (or more locally Sydney, Melbourne and Hong Kong).

Recent OECD research highlights a number of areas that could generally contribute to "reducing effective distance". These include ICT and internet use, reducing unnecessary restrictions to international trade, investment and transport services, and more generally ensuring that product market regulations (PMR) encourage competition and investment. However, while ICT has theoretically reduced New Zealand's geographic disadvantage in services trade, many services still require local knowledge, physical contact, and a commercial presence in the client country (de Serres et al. 2014).

Global trends

Globally, research on growth has identified the following (Jones and Romer, 2009):

- Markets are expanding as a result of globalisation in all forms (people, ideas, and trade) and urbanisation.
- There is much more variation in growth rates among poorer countries than in richer ones. This is driven by increases in the rate of "catch-up" growth by some poorer countries.
- Differences in productivity are the biggest source of differences in income growth across countries. Differences in labour and capital inputs explain less than half of the enormous cross country differences in per capita GDP.
- Human capital (as measured by levels of educational attainment) continues to rise.
- Demand for skilled workers continues to outstrip supply, leading to sustained wage increases over time.

These stylised facts are important because they highlight the central role of innovation, human capital and technological change to understanding growth and also position growth more within the amenable scope of government policy.

The role of innovation is also highlighted in a major study which the OECD has undertaken about the future of productivity (OECD, 2015b). The motivation for the study was a concern that productivity growth has slowed in many OECD countries even before the recent global financial crisis. Over the period to 2060, the OECD's projections suggest that GDP per capita will slow in most countries, although a rising share of fast-growing non-OECD economies in global output should dampen the slowdown at the global level. The OECD's projections also suggest that growth will increasingly depend on improvements in MFP. This reflects continuing investments in innovation, as well as the dissemination of new discoveries made at the technological frontier.

Distribution of growth

While overall participation in the labour force in New Zealand is high, certain groups struggle to participate fully, including low-skilled males and disengaged young people, who are likely to enter the welfare system and stay in it for long periods of time. Making economic growth more inclusive is one of the three key recommendations in the OECD's latest economic survey of New Zealand (OECD, 2015a).

Providing the incentives to work, innovate and invest is important for motivating people, entrepreneurs and investors, and is likely to result in some degree of inequality. However, excessive income inequality can harm economic growth (Stiglitz, 2012; Cingano, 2014). A lack of income mobility can affect economic growth by providing a disincentive for entrepreneurship and investment in skills.

Disposable income inequality in New Zealand increased from below the OECD average in the mid-1980s to above it in 2011 (OECD, 2015a). Over the period 1985 to 2008, New Zealand saw the second largest increase in inequality after Sweden among 17 OECD countries (OECD, 2011a). The increase in inequality occurred in the late 1980s to the early 1990s, and since then it has remained either constant or has fallen slightly (Ball and Creedy, 2015). Within New Zealand, sizable income gaps for Māori and Pasifika minorities have not improved – between 1990 to 2011 these remained relatively flat at around 75 per cent (Māori) and 72 per cent (Pasifika) of the Pakeha/European equivalised median household income (OECD, 2013a).

While the OECD argues "there is no consensus on the sign and strength of the relationship [between inequality and growth]", the IMF argues that there is a "tentative consensus in the growth literature

that inequality can…reduce the pace and durability of growth".[12] In this context, one recent OECD working paper found a negative impact on New Zealand's growth from rising inequality in the 1990s (Cingano, 2014).

In terms of income mobility, New Zealand has had a similar experience to other countries such as Australia, the UK, the USA and Germany (Carter et al. 2014). That is that in the short term a large proportion of incomes change but over a short distance, while in the long term, there is substantial movement. Over the period 2002-2010, over 60 per cent of the population changed income decile group between one year and the next, but the movements tended to be to adjacent income groups rather than long distance. Over an eight year period, there is substantial change in both absolute and relative income, with only 22 per cent staying in the same income decile group.

There is evidence of a divergence between labour productivity growth and wage growth. This is exhibited in a falling labour share of income. This is a long run international trend, which New Zealand has seen too. The labour income share in New Zealand fell by 8.5 percentage points from 1978 to 2010 (Conway et al. 2015a). The fall occurred in the early 1980s and in the 1990s, and since 2002 the labour income share has broadly stabilised. The decline was spread across a number of industries: manufacturing; electricity, gas, water & waste; information, media & telecoms and agriculture. In contrast, more labour-intensive industries – such as the wholesale; retail and accommodation & food industries – have generally seen some gains in the labour income share.

Theories about what may be driving this include (Conway et al. 2015a):

- the skills-biased impacts of modern technologies – which sees technology being used to substitute for low-skilled workers on the one hand and complement high-skilled workers on the other (see Chapter 8)
- internationalisation of production, which has increased the supply of low- and middle-skilled workers
- changes in policies and institutions which have altered the balance of bargaining power across the owners of labour and capital.

Relative – as well as absolute – levels of incomes can affect wellbeing. The "Easterlin paradox" purports that a proportionate increase in incomes among citizens *within a country* leaves all welfare levels unchanged. A recent study (Grimes and Reinhardt, 2015) found that *between country* income differentials also affect subjective wellbeing. In New Zealand, comparisons with Australia are likely to be pertinent.

[12] Ostry, Berg and Tsangarides (2014), *Redistribution, Inequality, and Growth*, IMF staff discussion note 14/02. This study found a negative and statistically significant impact on growth and is one of the studies included in the OECD's literature review.

Gaps / Questions

- **Which drivers of growth are the most important (from the following sections)? How does this differ by sector? Where is the evidence strongest?**
- **What are some of the positive contributions to economic growth of being small and distant?**
- **What strategies are firms using to address distance? To what extent can ICT (or other strategies) overcome the effects of distance?**
- **Is government doing anything to stimulate reallocation that will affect the labour income share?**
- **What is the relationship between economic growth, inequality and income mobility in New Zealand? What do we know about the causes of inequality? How do they manifest in New Zealand – how does inequality vary by ethnic group, and to what extent is there a group of people on sustained low incomes?**

4. Cross-cutting perspectives

New Zealand has relatively high rates of firm entry and exit, which can help direct resources to their most productive uses. But surviving firms tend to stay small rather than grow. This may reflect low barriers to firm entry and a lack of competition. To narrow New Zealand's productivity shortfall with respect to the OECD average will likely involve some combination of higher productivity growth within industries and a general shift in economic activity toward higher productivity industries.

The dynamics of firms and jobs

Firm dynamics can play an important role in fostering economic growth. High-performing incumbents and successful entrants capture market share at the expense of less-productive firms. This leads to an improvement in allocative efficiency as resources (such as labour, capital and land) are drawn away from shrinking and exiting firms and directed by the market towards more productive uses. Differences in the level of allocative efficiency may have implications for the level and growth of productivity (Haltiwanger et al. 2014).

The dynamics of firm entry, firm exit, and resource allocation, also reflect competitive pressures in the economy. In general, competition can stimulate innovation and productivity growth, as entrepreneurs are presented with incentives to try out new and better ways of doing things.

The extent to which technologies and knowledge diffuse from the most productive firms globally (i.e. global frontier firms), to the most advanced firms nationally (i.e. domestic frontier firms) and to laggard firms, shapes productivity growth (OECD, 2015b). The gap in productivity growth between the global frontier and other firms has been rising across OECD countries in recent years. The gains from diffusion highlight the importance of policies that facilitate the reallocation of resources to the most productive firms. These policies include ones aimed at increasing labour market flexibility, and ones to ease the setting up and closing of businesses, including bankruptcy regulations which do not overly penalise failure. As discussed in later sections, New Zealand tends to perform relatively well in these policy areas.

In New Zealand, convergence to the domestic frontier is found to be statistically and economically important, indicating a tendency for technology to diffuse from high- to low-productivity firms (Conway et al. 2015b). There is little evidence currently available about New Zealand global frontier firms. But assuming New Zealand has relatively few of these firms, the widening productivity gap between global frontier firms and other firms internationally suggests New Zealand may be at danger of falling further behind.

There is also limited information about New Zealand's productivity dispersion compared with that in other countries. Devine et al (2013a) find that New Zealand's productivity dispersion is relatively wide compared with other countries. Fabling and Sanderson (2014) find the opposite when they exclude micro-enterprises from the analysis. More generally, the latter authors urge caution when making international comparisons of productivity dispersion as the underlying data can vary significantly in its omission or inclusion of certain types of firms, often the very small firms or working proprietors.

Reallocation plays an important role in productivity growth

Productivity growth in New Zealand is mostly driven by within-firm productivity improvement in the very short term, but in the longer term reallocation and selection play a vital role (Devine et al. 2012).

A recent study (Maré et al. 2015) found that the contribution to productivity growth (MFP) made by reallocation varies depending on the timeframe over which the transition is observed. Using an 11-year window, and looking within industries, both entrant and exiting firms made a positive contribution to productivity growth over the period 2001-2012. In contrast, within-industry reallocation from more-productive to less-productive continuing firms made a negative contribution to productivity growth.

Over single-year periods, new entrants made a smaller average contribution, with a negative average contribution from exiting firms. In contrast with the 11-year transition group results, continuing firms made a positive contribution to MFP growth. In addition to the within-industry reallocation, reallocation from less-productive to more-productive industries also contributed to productivity growth.

These findings show some of the complexity around reallocation and firm dynamics. Further research would be valuable – for example over alternative time periods – to explore these issues further.

New Zealand has a dynamic business environment

Firm entry and exit – the closure of typically poorer performing firms and the emergence of new entrants – is an important element of New Zealand's recent productivity growth. New Zealand has relatively high rates of firm entry and exit. In a typical year about 40,000-50,000 new firms are created, amounting to about ten per cent of all firms, while a similar number close down. Analogously, New Zealand also has high rates of employment churn: about 250,000 jobs are created, and a similar number destroyed, each year. New Zealand's average annual job reallocation rate (the sum of the job creation and job destruction rate) was 28.1 per cent between 1997 and 2004. This rate of job reallocation was similar to some other OECD countries with relatively high rates, such as the US (28.3 per cent) and the UK (30.1 per cent) out of a small set of OECD countries (Statistics New Zealand, 2010).

There has been recent concern about the (slowing) pace of firm churn in New Zealand and elsewhere (see for example OECD, 2015b). In New Zealand, after a high of 70,000 annual business start-ups in 2004, the pace of firm births fell for nine consecutive years. In 2014, the rate rose moderately again to its highest level since 2009, though still well below a decade prior. Firm deaths have also declined recently, with 2014 recording the lowest annual number of closures in at least 14 years (Statistics New Zealand, 2015a).[13]

There are few very large firms in New Zealand

While survival and growth is associated with improvement in productivity, New Zealand's economic geography creates obstacles to firms in reaching large size. This means that firms may fail to exploit economies of scale and, at least initially, be unable to compete on an equal footing in international markets with similar firms from countries with more favourable conditions (Productivity Hub, 2014). Indeed, compared to other small advanced economies, New Zealand has a scarcity of very large firms. It is noteworthy, however, that small and medium entities' (those with 49 or fewer employees) share of total employment in New Zealand sits close to the international average, indicating that moderately large firms are nevertheless well represented in the economy (MBIE, 2014d).

Firms tend to stay small rather than grow…

Recent research has sought to use large administrative micro-datasets on firms to better understand firm growth. One approach has been to focus on the firms that grow the fastest (be it by sales or

[13] This is based on economically significant enterprises and includes some with no employees i.e. "shell" companies.

employment). A large share of firms do not grow at all and, in many countries, between 30 and 50 per cent of firms either shrink or shutdown in any given year.

The literature on "high-growth firms" highlights the surprisingly over-proportionate share of new jobs and new output that is accounted for by a small number of very rapidly growing firms. While these firms can be large and also old, they are predominantly found to be small and relatively young. Fast growing firms can be found in all sectors, and are not concentrated or over-represented in the high-technology space (Obeyesekere, 2014). However, there is a growing consensus that rapid growth is not predictable in advance (limiting ex-ante targeting of policy), nor is it persistent (challenging the case for ex-post support), potentially leaving policy with little scope for action (Obeyesekere, 2015).

Recent cohort studies that control for differences in firm age have found that a large share of net job creation is attributable to a small share of the smallest firms (Meehan and Zheng, 2015). However, the focus on smaller firms is challenged by evidence that older SMEs seem to account for a large share of net job destruction, and that the majority of start-ups tend to be economically marginal, undersized, poor performance enterprises. Other recent approaches to disentangling the effects of size and age have found that age is more important, with young firms being most responsible for net job creation and also exhibiting favourable persistence in their growth performance (Cheung and Brooke, 2015; Haltiwanger et al. 2013; Coad et al. 2015).

So it appears that firm age rather than size is a key factor in job creation and growth. In other words, what happens after firm entry is crucial – young firms should grow rapidly or exit (i.e. "up-or-out") but not linger and become small, old firms. But looking at average employment of firms that have been around for at least ten years, New Zealand firms tend to have among the smallest firm sizes among the OECD (Criscuolo et al. 2014). This up-or-out dynamics may reflect barriers to up-scaling related to geographical remoteness and small market size (OECD 2015b). The result may be that good business ideas may have trouble rising to the top and bad or outdated ones may persist. Better understanding the reasons for New Zealand's "up-or-out" dynamics appears to be important.

...which is related to competition

Competition, more broadly, is an essential ingredient of healthy business dynamics. Despite a general picture of high churn and dynamism in the New Zealand business environment, there is also some evidence of low levels of competition. It is well established that smaller economies are characterised by relatively high industrial concentration and the presence of few-firm oligopolies. In New Zealand's case this is further exacerbated by geographic distance from major global centres of economic activity (Evans and Hughes, 2003). Given these challenges, policies aimed at raising competition forces by lowering barriers to international trade are paramount. Regulations which increase transaction costs at the border for both exports and imports are likely to be more damaging for NZ than other OECD countries.

Recent research on New Zealand finds that:

- The productivity of New Zealand firms within the same industries varies considerably. One study which looked across a range of industries found a ratio of about eight to one between the labour productivity of New Zealand firms at the top of the distribution (90th percentile) compared with those at the bottom (10th percentile); this compared to a ratio of about five or four to one in some other countries (Devine et al. 2013a). Another study which focused on manufacturing firms found a ratio of 2.5 between the MFP of New Zealand firms at the 90th percentile compared with those at the 10th percentile, and that the ratio fell to 1.8 when micro enterprises were excluded (Fabling and Sanderson, 2014). The inclusion or otherwise of micro

enterprises affected whether New Zealand's productivity dispersion is higher or lower than that in the US.[14]

- International research typically shows that markets with denser activity have higher lower-bound productivity levels, higher average productivity, and less dispersion (as heightened competition is one of the mechanisms that can induce firms to take costly productivity raising action or to exit).
- A new measure of competition (profit elasticity, or the sensitivity of profit to a marginal increase in cost) indicates New Zealand has low competition compared to a limited number of other countries such as the Netherlands and Finland (albeit greater levels of competition than Portugal) (Devine et al. 2013b).
- Low aggregate trade intensity is also consistent with this picture (and this is empirically supported by lower average profit elasticity in tradables, i.e. higher intensity of competition than non-tradables).
- New Zealand firms are less responsive than Australian firms to changes in the relative costs of capital and labour (Hall and Scobie, 2005, cited in Productivity Hub, 2014).
- New Zealand has a high level of industry concentration, although this does not necessarily mean that outcomes for consumers are harmed (Evans and Hughes, 2003).
- Competition is relatively weak in the finance and insurance; rental, hiring and real estate; retail; and professional, scientific and technical industries (Productivity Commission, 2014a).

This apparent contradiction (high levels of dynamism combined with indications of low levels of competition) is suggestive of low barriers to entry for new businesses (which is consistent with the ease of setting up businesses in New Zealand), occurring alongside some barriers to competition between medium-larger firms. This appears to be likely in a small dispersed national market such as New Zealand's where firms may be operating close to or below minimum efficient scale, although this idea needs testing.

The Productivity Commission (2014a) has suggested several ways that New Zealand's regulation could be improved in order to better promote competition. These include measures to decrease search and switching costs, reducing screening of foreign direct investment (FDI), better-focussing of occupational regulation, and sharpening competition law, particularly around determining whether a firm is taking advantage of market power.

Sector dynamics and economic structure

During the last century, major changes have occurred to New Zealand's industry structure. As in most other OECD countries: the share of agriculture in GDP has declined for the last 80 years; the share of the goods-producing industry has been declining for about 20 years; while the share of services has expanded. However, New Zealand does continue to have a much larger share of primary-sector value added relative to comparator OECD countries (Ministry of Economic Development et al. 2011). New Zealand also has a relatively large proportion of co-operatives and state-owned enterprises (SOEs).

Industry composition is important for economic growth

Sectors such as ICT, manufacturing and, more generally, those that are more trade- or competition-exposed, tend to exhibit higher productivity growth (Steenkamp, 2013). However, the majority of New Zealand's economic activity does not fall within these areas.

[14] The authors make a more general point – that care needs to be taken in international comparisons.

While New Zealand and Australia are both severely affected by geographic isolation, New Zealand's labour productivity was a third lower than the latter in 2009. This is partly due to industry structure: 30 per cent of the gap can be attributed to a larger share of New Zealand jobs being based in industries that tend to have systematically lower levels of productivity such as agriculture and food and drink manufacturing. This means that if New Zealand were to have the same industrial composition of total employment as seen in Australia, a significant part of the labour productivity gap would not exist. The remaining, and much more substantive, 70 per cent of the gap with Australia is due to poorer productivity performance within the same industries (Mason, 2013). Similar results were found when comparing New Zealand to the UK (Mason and Osborne, 2007).

Looking at changes to economic structure, between 1990 and 2005, New Zealand exhibited structural change that was productivity-detracting, with employment moving towards industries (such as retail and wholesale trade) with below-average labour productivity levels and growth rates (and subtracting about 0.4 percentage points from labour productivity per annum). This phenomenon was common to, but to a lesser extent in, most OECD countries. Industries that had faster labour productivity growth which, by definition, were achieving rapid reductions in the labour inputs required per unit of output, did not expand fast enough to be able to compensate for their less intensive use of labour and maintain their share of total output (Meehan, 2014; Productivity Commission, 2014a).

In contrast, New Zealand's changing industry composition has been found to make a positive contribution to *MFP* growth over the period 2001-12 (Maré et al. 2015). The difference between this finding and that of Meehan (2014) is likely due to the different productivity measures used (MFP in the former and labour productivity in the latter). The results of these two studies are not directly comparable; measures matter.

Some debate about role of natural resource in economic growth

As noted earlier, the primary sector is over-represented in New Zealand GDP compared to comparator OECD countries. The natural resource sectors and their role in promoting economic development has been a source of considerable academic debate. Empirical research on the matter has been inconclusive (van der Ploeg, 2011). Many empirical studies (such as Sachs and Warner, 1995) find that resource-rich economies grow more slowly than other economies. This literature, which characterises the implications of strong resource sectors growth as a "resource curse", argues that there are a range of associated issues that can slow long-term growth, such as appreciation of the real exchange rate, macroeconomic volatility from resource price movements, and de-industrialisation.

However, other economists (such as Lederman and Maloney, 2008) have found little evidence of a resource curse. Some have questioned the underpinnings of some of the channels through which the resource curse was assumed to operate. For example, some have expressed doubt about the long-standing argument that the terms of trade for countries that export resources decline over time compared with exporters of manufactured goods. Others have questioned the idea that long-term productivity growth is necessarily slower in the resources sector than in other sectors such as manufacturing. For example, Larsen (2004, cited in Lederman and Maloney, 2008) argued that "Norwegian oil is a high-technology sector which we may assume has much the same positive spillover effects as manufacturing is supposed to have." The same has been argued for forestry in Scandinavia. Moreover, appropriate taxation and sovereign revenue management policies aimed at capturing value from a resource boom could be used to dampen the corresponding macroeconomic volatility.

It is suggested that resource-driven economies (specifically in the case of petroleum and minerals) should consider reframing their economic strategies around three key imperatives: (i) effectively developing their resources sector; (ii) capturing value from it; and (iii) transforming that value into

long-term prosperity through more sustainable and productivity-raising investments (McKinsey Global Institute, 2013).

Services account for a growing share of GDP in New Zealand, as elsewhere

The transition towards a service sector economy is a standard phenomenon as countries develop and it usually follows an initial phase of industrialisation. New Zealand's economy is today dominated by service sectors, which accounted for around 70 per cent of GDP in 2011;[15] while primary industries accounted for eight per cent, and goods-producing industries (which include manufacturing, construction and utilities), 22 per cent. The government, education and health sectors, which fall under the broad definition of services, made up around five, five, and seven per cent of GDP in the March year 2015, respectively. Factors like the ageing population, which increase the demand for aged care and health services, suggest that the service sector will continue to account for a large share of the New Zealand economy.

A large part of services production is comprised of local service industries such as legal services, education, health and hospitality. Firms that are located closer to their customers and are more focused on the local market tend to have lower labour productivity than those which trade over longer distances (Conway and Zheng, 2014). Firms in the services sector have also been found to have slower convergence speeds to the domestic productivity frontier than firms in the primary and goods-producing sectors (Conway et al. 2015b). In other words, low-productivity service firms are less likely than firms in other sectors to improve their productivity by learning from better-performing firms in their industry.

A strong case has been made that the expansion of such industries is primarily a natural consequence, rather than a driver, of economic growth. This is because productivity in these sectors does not change much. In the long run, salary growth requires productivity growth – which is driven by innovative firms. Innovative firms are high-tech or high-skill (knowledge based) firms that typically operate in traded sectors.

Shifting to more complex knowledge-intensive products and services may lift growth

Recent research points to a relationship between economic development and the complexity of an economy's production base (Hidalgo et al. 2007). In today's economy, the production of most goods and services (products) relies on a considerable base of knowledge and capabilities (K&C).

Firms can more easily leverage the K&C involved in the production of an economy's current product space in order to advance into the production of related products (i.e. those that require similar sorts of expertise). This can lead to path dependency in the economic structure of an economy. As knowledge and capabilities accumulate and deepen, an economy is able to produce things that are increasingly complex, with a greater degree of "knowledge intensity". New Zealand's large primary sector, and its relatively advanced agricultural science capabilities today, may stand as an example of such sectoral path dependency and subsequent specialisation, given the country's previous historic role as a major agricultural provider for the United Kingdom. New Zealand's strongest revealed comparative advantage is still largely in processed and unprocessed products from the food and fibre sectors (Nesbit, 2013).[16]

This iterative process of learning and capability development is closely tied to the economy's development and it has been argued that it may even play a role in driving it; with what matters for economic development being not what a country produces but how it develops its capabilities to

[15] This may be due in part to firms contracting out services which were previously undertaken in-house such as legal and accountancy services.

[16] New Zealand has a comparative advantage when its share of world exports for a particular product is greater than its share of total world exports.

move to increasingly complex products. This has been the basis for recommendations by some that countries should make aggressive leaps into sectors that lend themselves to skills and knowledge acquisition, as well as greater product diversification (Yildirim, 2014). It has been argued that the acquisition and diffusion of knowledge is the most important public good, particularly for manufacturing, and that this justifies shaping industrial policies to promote them (Stiglitz and Greenwald, 2014).

The Māori economy

Looking at the Māori economy helps clarify the characteristics of Māori economic development, including what is distinctive. While there is no agreed definition of the Māori economy, it can be useful to think about in three parts: households/whānau; education and labour force outcomes; and entities/enterprise.

Māori households face ongoing disparities, with a relatively higher proportion of income drawn from transfers, and lower net savings, than households in the general population (Te Puni Kōkiri, 2013). The 2013 census results indicated 28 per cent of Māori own or partially own their own home, compared with 50 per cent of the general population (Te Māngai Penapena Pütea – Financial Literacy and Savings Partner Working Group, 2015).

Education participation and achievement for Māori are improving, particularly participation in early childhood education and attainment of NCEA Level 2, although the progression of Māori into study at NZQF Level four or above is both static and significantly lower than the general population (Ministry of Education, 2015). Employment for Māori has increased since 2009, with more Māori workers in skilled occupations. The unemployment rate has fallen, but nonetheless remains twice as high as the rate for all ethnic groups (MBIE, 2014b).

The third category, entities/enterprise, encompasses Māori self-employed (14,900 in 2013), Māori employers (6,900 in 2013), and Māori collectives (973 in 2015, made up of trusts, incorporations, post-settlement governance entities and other collectively-owned enterprises). There is relatively little statistical information on Māori self-employed and employers, particularly the latter, and the extent to which Māori-owned SMEs differ from other SMEs is debated. However, anecdotal evidence indicates that Māori collectives may have a distinctive outlook (based on cultural values, include sustainability and intergenerational land ownership), and sometimes challenges in governance and management capability. These factors may make it difficult to attract capital, and potentially cause lower asset productivity.

The heavy concentration of Māori assets – particularly those held by Māori collectives – within the primary sector makes improved primary asset productivity and regional economic development important to the Māori economy. Regional economic development also matters because of the relatively large proportion of Māori who live outside the main cities. Regional opportunities identified as having particular potential for Māori economic development include honey, forestry, aquaculture and improved land utilisation[17].

Outside primary industries, other industries in which Māori assets are concentrated are tourism, manufacturing, construction and property services (Te Puni Kōkiri, 2013).

[17] Regional growth studies, see http://www.mbie.govt.nz/info-services/sectors-industries/regions-cities/regional-growth-programme.

A regional view of economic growth

Agglomeration leads to productivity benefits such as knowledge spillovers

In addition to operating internationally, the effects of size and scale play out within countries. Prosperous countries tend to be built around large affluent agglomerations or concentrations of economic activity. Entrepreneurship and innovation tends to be systematically higher in cities and more densely populated regions. Agglomeration and clustering can result in external economies of scale.

The effects of agglomeration are well supported by evidence: an area in New Zealand with a ten per cent higher effective density has firms with productivity that is 0.69 per cent higher (Maré and Graham, 2009). Agglomeration benefits are predominantly seen in the growth of Auckland and, in a narrower sense, in the productivity premiums of Auckland's Central Business District and airport corridor.

However, there is some evidence of decreasing returns to agglomeration. The high population density regions of Canterbury, Wellington and Auckland are less responsive to *changes* in density than less dense regions (Maré and Graham, 2009). This shows the difference between average and marginal changes, and is an important finding as it potentially leads to different policy responses. In this case it implies that raising density may have a bigger marginal effect outside Auckland, although Auckland's large scale may still dominate the aggregate benefit of a policy designed to increase density. There are also policies that might directly increase the elasticity (responsiveness) of New Zealand's cities to these kinds of scale effects e.g. through more efficient public transport.

Agglomeration theory suggests the productivity effects result from:

- efficient sharing of indivisible facilities (e.g. infrastructure) and risks (e.g. labour market), and gains from variety and specialisation (production and consumption)
- better matching (higher quality, more frequent) between employers and employees, buyers and suppliers, partners in joint projects, and entrepreneurs and financiers
- better learning about technology, market changes, and organisational changes.

The third point above is especially crucial for knowledge-intensive industries where knowledge spillovers across firms are critical to the success of clusters, and the innovativeness and competitiveness of their broader industries. Spillovers such as these, where the market value of knowledge is not wholly captured by the firms that initially hold it, are a key rationale for policy interventions in support of knowledge intensive sectors and activities.

Knowledge is subject to significant home-bias, with analysis of patents revealing that inventors are twice as likely to cite other inventors living nearby, than those from other cities. Even in the twenty-first century, people continue to learn from, and draw upon knowledge from, those who are geographically closest to them. This is partly because informal interactions between firms and employees of different firms can be important for the learning and idea generation process (that is, in addition to formal interactions) – and both informal and ad hoc interactions are considerably facilitated by geographical proximity. Similarly, the presence of academic "stars" has a significant effect on the location and success of bio-technology companies in the US (Moretti, 2012).

While location is important for knowledge-intensive organisations, geographic proximity between organisations is neither a necessary nor sufficient condition for learning and interactive innovation to take place (Balland et al. 2013). We see this, for example, in the experience of cities. Cities that initially appear to be similar, with similar population and economic densities, can experience very different subsequent fortunes as small differences become magnified, and success generates more success (and vice versa). This has to do with the importance of innovation ecosystems. Being in a city is insufficient – what matters is being around those engaging in similar, complementary innovative

activities and having an environment that facilitates knowledge spillovers (Moretti, 2012). This is said to be behind significant divergences in the prospects of US cities.

This has implications for path dependence in New Zealand. In particular, it means that regions without an innovation cluster will find it difficult to start one or to "catch-up" to those that do. Furthermore, policies aimed at attracting domestic firms to specific regions that lack such localised factors may often constitute a zero-sum game for the economy as a whole, with subsidies often exceeding the social benefits of a firm's relocation to a particular region (Moretti, 2012). Attracting an innovative firm from overseas to New Zealand using such subsidies may, however, still have a national benefit.

Regions differ in terms of their levels of economic activity, growth and resilience

There is evidence of significant regional variations in New Zealand. For example, in 2013, GDP per capita ranged from $34,000 in Gisborne, to $74,000 in Taranaki (MBIE, 2014c). Variation can occur even within the same sector. For example, pay in both the finance and retail sectors is notably higher in Auckland than in the Waikato (NZIER, 2014).

NZIER (2014) modelling suggests that almost 90 per cent of the variation in regional growth can be explained by:

- A common national factor (such as exchange rates) which tend to have the biggest impact outside of main centres.
- An urban factor, which reflects the nature of urban centres' specialisation in highly-skilled jobs.
- A natural resource factor, which reflects growth driven by commodities.

Regional size matters for economic stability. Regions with small populations tend to be influenced by national economic trends, but are more vulnerable to shocks to their specialisations. In contrast, regions with larger populations tend to be more stable and capable of generating growth from within (NZIER, 2014).

Given Auckland's size within New Zealand, plus the presence of three major universities within the city, the success of Auckland is particularly important for knowledge-intensive industries and for economic growth. However, given the small size of New Zealand's population, there may be limits to the extent to which agglomeration externalities can be exploited, as these externalities rely on access to a large pool of skilled workers for example (de Serres et al. 2014).

The importance of the agricultural sector to New Zealand exports, and the spread of its natural resources, means that other regions (and connecting infrastructure) beyond Auckland will continue to play an important role in the New Zealand economy. There are also important clusters of economic growth beyond Auckland – particularly around innovation and the primary sector.

Caliendo et al. (2014) find that productivity changes in specific sectors and regions can be propagated throughout the economy. When a region exhibits a positive productivity shock, those regions closest to it tend to benefit the most, with the effect decreasing with distance due to transportation costs and other distance-related barriers to economic exchange. Knowledge spillovers may be partly responsible for such flow-on benefits.

In conclusion, growth differences across regions reflect differing compositions of economic activity (e.g. industry and resources), differing rates of input growth (e.g. demographic changes) and dynamic effects (e.g. knowledge spillovers).

Gaps / Questions

- **To what extent do innovative practices diffuse across firms (in the same industry) in New Zealand? What are the barriers to diffusion (e.g. too much/too little competition)? What is the link between firm churn and innovation in New Zealand and how does it compare internationally?**
- **Does New Zealand have any global frontier firms, and what is their role in the economy? How does this affect our ability to participate in global value chains?**
- **Do firms with persistent growth exhibit shared characteristics?**
- **Why does New Zealand have such few large firms?**
- **What factors are inhibiting New Zealand's "up-or-out" (young firms growing rapidly or exiting) firm dynamics?**
- **Are there any unnecessary barriers to resource reallocation?**
- **What evidence is there that firms in New Zealand can't reach minimum efficient scale?**
- **What does the sectoral structure of economic activity in New Zealand mean for our ability to quickly move towards higher productivity activities?**
- **Is New Zealand effectively developing its resource sector, maximising the value from it and transforming that value into long-term prosperity?**
- **Is within-industry productivity more dispersed for New Zealand firms than for firms in other countries?**
- **Within industries, would more competition be better for productivity in New Zealand? Can we do anything about it?**
- **What effect does the size of New Zealand firms have on their propensity to remain in New Zealand?**
- **To what extent do Māori SMEs differ from other SMEs?**
- **What is the impact of co-operatives and SOEs? Are these governance structures a reason that large firms have not performed particularly well?**
- **How confident are we that the marginal returns to agglomeration are higher in less dense regions? If so, what is causing the low marginal returns e.g. in Auckland?**

5. Innovation and science

Innovation is a key determinant of economic growth. New Zealand's innovation rate is around the OECD average. New Zealand ranks highly in terms of broad institutions and performs well in trademarking. It performs less well in terms of some inputs to innovation (especially business expenditure on R&D) and outcomes (e.g. MFP growth). There are gaps in our knowledge about the impacts of R&D and innovation in New Zealand. In particular, it is important to understand the returns to R&D at the firm level, and the role of the public science system in firm innovation.

The importance of innovation

Innovation is the dynamic and uncertain process through which firms generate new economic value by creating, adopting, and adapting knowledge into new or improved products and services, operational processes, organisational and managerial processes, and approaches to marketing, in pursuit of profits.[18] In broad terms, innovation leads to productivity growth and new products and services. R&D is one of the inputs to innovation.[19]

Knowledge and ideas are non-rival (one firm using an idea does not preclude another from using it) and only partially excludable (firms can generally protect their intellectual property for only short periods). This means that the initial costs incurred in developing ideas do not get reincurred as the ideas are used by more and more firms. This is the property that makes ideas and knowledge an engine of growth and can result in increasing returns to scale (Jones, 2005, cited in de Serres et al. 2014).

The OECD believes that productivity growth will increasingly depend on the extent to which new technologies and knowledge diffuse from global frontier firms to national frontier firms and then to laggards (OECD, 2015b). Recent New Zealand evidence on this diffusion process is discussed in section 4.

It has been argued that innovation and knowledge-based capital are becoming increasingly critical to production, given the widespread adoption of ICT as a general-purpose technology throughout the economy (Brynjolfsson and McAfee, 2014). Furthermore, increasing globalisation, international competition and technological change have significantly raised the economic return to innovation (Moretti, 2012). However, there is some uncertainty around the potential of ICT to continue to propel growth, with commentators somewhat polarised on this point (see for example OECD, 2015b).

Recent international research estimates that for each new high-tech job in a US city, five additional jobs are created in local goods and services in the city over the next ten years. This compares to an estimate for traditional manufacturing of 1.6.[20] The difference is a result of the higher wages earned

[18] The OECD's "Oslo Manual" defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations" see http://www.oecd.org/sti/inno/2367580.pdf.

[19] The OECD's "Frascati Manual" defines R&D as "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications" see http://www.oecd-ilibrary.org/docserver/download/9202081e.pdf.

[20] This study uses multiplier analysis to examine the direct and indirect effects that demand shifts in the traded sector induce in the rest of the local economy. High-tech jobs have relatively large multiplier effects because they command higher earnings, and higher-income households tend to spend a larger fraction of their income on personal services. The analysis also includes general equilibrium effects on local prices. See Moretti and Thulin (2013) for multiplier estimates for a small advanced economy (Sweden) and a discussion of how these relate to typical estimates for the USA.

in innovative sectors, along with the clustering effect that is prevalent in innovative industries – in which one firm locating in a city attracts another (Moretti, 2012).

Innovation in New Zealand

The Global Innovation Index (2015) (based on moderated expert review and data analysis) has New Zealand ranked at 15th out of 141 economies for innovation. New Zealand's highest rankings were in the broad categories of institutions (5th) and market sophistication (8th), and lowest rankings were in business sophistication (26th) and knowledge and technology outputs (20th).

In 2013, 46 per cent of businesses performed some sort of innovation, a figure unchanged from 2011 (Statistics New Zealand, 2014). There are some areas of relatively low innovation compared with some other countries (process innovation and organisational innovation) and areas where innovation is a little higher (marketing methods and product innovation). Overall, New Zealand sits close to (albeit below) the OECD median for innovation (MBIE, 2014d).

Innovation in New Zealand is most strongly associated with firms that have larger shares of high-skilled or relatively new employees. Firms with a higher proportion of high-skilled migrants are more likely to perform product or marketing innovation. In addition, firms with a larger proportion of high-skilled New Zealanders that have recently returned from overseas are more likely to innovate in terms of product and organisational innovation. This research has so far been based on simple correlations between innovation inputs and outputs rather than on establishing causal relationships (McLeod et al. 2014).

New Zealand is inevitably a net importer of ideas. Innovating firms are more likely to engage internationally (51 per cent in 2011) compared with non-innovators (27 per cent) (Statistics New Zealand, 2012). Product innovations are far more likely to be new-to-New Zealand (46 per cent) than new-to-world (17 per cent). Foreign knowledge has important "spill-in" effects. That is, it allows and encourages firms to make greater use of other externally generated knowledge, and it explains much of New Zealand's growth in agricultural productivity. This highlights the importance of improving innovation diffusion from offshore (Hall and Scobie, 2006). "Absorptive capacity" intuitively seems important to a country like New Zealand, as the vast majority of the world's research is done elsewhere.[21] However, there is limited New Zealand evidence available about absorptive capacity.

R&D, patenting and trademarking are widely used measures of innovation although they are narrow in that they are inputs into – or at best intermediate forms of – innovation.

New Zealand has one of the lowest rates of total R&D in the OECD, driven by one of the lowest shares of private R&D (de Serres et al. 2014). The OECD estimates that New Zealand's weak R&D investment could account for around 40 per cent of the productivity gap between New Zealand and the OECD average (see section 3).

Low R&D investment is consistent with our industry structure (approximately 50 per cent of the gap coming from a New Zealand sector mix that is biased toward low-R&D intensive sectors) but also partly owing to low R&D within industries (the other 50 per cent) (Mazoyer, 1999; Di Maio and Blakeley, 2004). Other explanations include New Zealand's distance from world centres of economic activity and firm size (the high number of self-employed workers) (Crawford et al. 2007, cited in Productivity Hub, 2014). This does not indicate that there is no problem – as New Zealand's industry

[21] Absorptive capacity is the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends.

and firm size structure is at least partly a result of past R&D expenditure and an increased rate of growth would almost certainly require structural change.

One area of promise in R&D investment has been in the computer services sector. Between 2012 and 2014, these businesses increased their R&D spending by 40 per cent, compared to four per cent growth for New Zealand business R&D as a whole.[22]

Relatedly, New Zealand performs relatively poorly in regards to patenting, but performs better at trademarking, which has grown by 30 per cent over the last decade (de Serres et al. 2014; MBIE, 2014g). In 2014, New Zealand had only two of the World's top 2500 companies ranked by R&D spending.[23]

R&D expenditure and intensity in New Zealand firms have been found to be only weakly correlated with innovative output (Wakeman and Le, 2015). There is higher persistence among firms in the input measures – particularly, doing R&D and filing patents – than in the innovation output measures. In other words, individual firms tend to undertake R&D and file patents year-after-year, whereas they implement innovations more sporadically. The set of R&D-active firms is quite concentrated, while the set of firms that generate innovation is much more distributed across the population. In combination, these results imply that there are paths to innovation other than investing in R&D.

Innovation links between New Zealand's private and public science sectors are mixed and could be stronger. Business survey information suggests that this may not be as critical to success as a firm's own level of R&D. However, with the exception of the United States, the majority of studies find a degree of complementarity between public and private sector research activity (Dowrick, 2003). (MBIE, 2014f). So there is a need to better understand the contribution of public research organisations to firm innovation.

MFP provides a proxy of the outcomes from innovation, as it captures technological change, as well as a number of other factors. New Zealand's MFP performance has been poor in recent decades (see section 3).

The returns to R&D

R&D is an important input into the larger innovation process that encompasses all activities necessary to generate economic value from a new idea. However, it can often be easier to quantify the resources allocated toward R&D and this has led to much analysis of the associated returns.

Internationally, it is well established that there are high returns (often 20-30 per cent) to private R&D, as well as productivity spillovers to other firms and the rest of the economy (one study estimates social returns at 38 per cent) (Griffith et al. 2004, cited in de Serres et al. 2014; Johnston et al. 2007, cited in Productivity Hub, 2014; Moretti, 2012). The stock of R&D has also been found to make a significant contribution to productivity levels (Westmore, 2013). Another study reviewed the literature on the returns to R&D at both the firm, industry and country level, finding that in general the returns to R&D are strongly positive and higher than those for ordinary capital, and the social returns are even higher (Hall et al. 2009). The high social returns to private R&D may justify government R&D support, as without it, R&D activity would not be at socially-optimal levels

[22] See: http://www.stats.govt.nz/browse_for_stats/businesses/research_and_development/ResearchandDevelopmentSurvey_MR2014.aspx

[23] Includes Companies for which R&D data is publicly available. Fonterra was ranked 543 and Fisher and Paykel Healthcare was ranked 1,694. See http://iri.jrc.ec.europa.eu/scoreboard14.html

(Moretti, 2012). This payback tends to be non-linear: firms need a critical mass of R&D before productivity benefits arise.

The evidence on the returns to public R&D is less robust due to significant empirical and methodological difficulties (causality, sector specificities, multiple benefits, identification of users, complex transfer mechanisms, international spillovers, and interdisciplinary output), but this often finds positive effects too. The international literature suggests that publicly-funded research increases the stock of knowledge, creates human capital and absorptive capacity, facilitates and improves private sector R&D, leads to innovation and develops networks and stimulates social interaction. For example, an OECD report in 2005 found that domestic public R&D had a positive impact on productivity in 12 of 16 countries (OECD, 2005, cited in Hall and Scobie, 2006).

One New Zealand (industry level) study about the returns to agricultural R&D from 1927 to 2001 found domestic knowledge, both private and public, was positively associated with productivity growth, generating an annual return of 17 per cent over the period. Another study of nine industries found publicly provided R&D had no impact on productivity (Johnson et al. 2007).

Unfortunately, there are few available firm-level studies on the impacts of R&D within New Zealand. Given the country's unique economic geography, caution should be exercised in drawing inferences from the international literature and there are reasons to believe that the returns to R&D for New Zealand firms may be lower than in other countries. Understanding the returns to R&D (and innovation) at the firm level is an important gap in our knowledge base.

Innovation and science policy

The level of private R&D is not beyond the influence of policy. There is good international evidence that both market-based instruments that leave firms to decide which R&D activities to fund and direct subsidies improve R&D expenditure (see, for example, Edler et al. 2013 and Westmore, 2013). The majority of existing cross-country studies find that market-based instruments are effective in explaining business R&D with a long-run elasticity around one (Westmore, 2013). In other words, on average, one dollar of funding eventually induces one dollar of recorded private R&D spending.

There is more mixed evidence about whether government support for R&D contributes to increases in long-term productivity. One study found that innovation policies achieve their objective of increasing private sector innovation (as proxied by R&D expenditure and patent counts). However, it found no evidence that such policies have a direct effect on aggregate productivity growth (Westmore, 2013).

Another meta-study found that while both market-based instruments and subsidies generally have a positive net impact on the amount of R&D performed, the evidence about the effect that this has on outputs (such as patents or new products) is more mixed. It found little evidence about the effect of government R&D support on productivity, or whether it has long-lasting effects on firm R&D behaviour. It also found that the success of R&D subsidies depends heavily upon the method of implementation and policy stability (Edler et al. 2013).

A New Zealand study found that capability-building grants have positive productivity effects when targeted at firms that are capability building, that are small, and that have not previously undertaken R&D, but not otherwise (MED, 2011).[24] More recent work by Jaffe and Le (2015), found that R&D grants increase the likelihood of filing patents and introducing new goods and services. In particular,

[24] It is important to note that this 2011 study only reviewed the impact of the R&D grants that operated between 2002 and 2008. Therefore these findings are not applicable to the new R&D grants (such as R&D Growth Grants) introduced in 2013.

receiving a R&D grant almost doubled the probability that a firm introduced goods and services that were new to the world.

There is a strong rationale for government investment in basic research, as the returns to this type of research tend to be uncertain, long term and diffuse. In New Zealand, the Marsden Fund is one of the main funding mechanisms for basic research. A recent study found that the Marsden Fund is successful in increasing the scientific performance (publication and citation performance) of researchers (Gush et al. 2015). However, the selection process used in the Fund does not appear to be effective in discriminating among second-round proposals in terms of their likely success. This study demonstrates it is possible to evaluate the impacts of even basic research at least in terms of scientific impact.

Another important outcome of public research funding is the building and maintenance of scientific and technical capability in New Zealand. There is evidence that you have to do research to absorb the research results of others (Cohen and Levinthal, 1989). In addition, local capability is required in order to tailor international innovations to address specific preferences and circumstances of New Zealand.

Consistent with our low levels of business R&D, New Zealand's direct and indirect government support for business R&D is low compared to the OECD (though it is relatively high as a share of business R&D).[25] Nonetheless the OECD argues that the scope for innovation policies to account for New Zealand's R&D gap is likely to be limited. New Zealand performs better in terms of levels of public research and intellectual property settings. However, it is still low compared to countries we would like to compete with. Low levels of business R&D may be better explained by limited integration with large foreign markets (de Serres et al. 2014).

Exporting, access to finance, access to human capital and a number of other factors are also found to influence business R&D spending (Becker, 2013). The evidence for some of these other factors tends to be more mixed than for market-based instruments and direct subsidies, especially in relation to government policies such as public R&D and IP protection. There is some qualitative evidence that New Zealand firms face financing and human capital constraints when seeking to commercialise their innovations internationally (Wakeman, 2013).

[25] http://www.oecd.org/sti/rd-tax-stats.htm#business

Gaps / Questions

- **To what extent has ICT driven growth in New Zealand?**
- **What are the returns to R&D and innovation in New Zealand? Are firm-level returns to R&D lower in New Zealand compared with other countries? Do returns vary by firm size, age, industry or product structure (e.g. commodities vs. niche high-technology products vs. services)?**
- **What is the role of public research organisations and funding in firm innovation? What are the mechanisms which lead to impacts (movement of ideas and staff, supporting firms' ability to absorb foreign ideas etc)?**
- **How successful is New Zealand at channelling resources to innovative and high-growth firms? How does resource reallocation (or barriers to it) impact on the incentives to innovate/invest in productivity-enhancing technology?**
- **How do different firms understand R&D as part of their wider business strategy? How do firms' experiences with R&D influence future behaviour?**
- **What is the return on investment to public spending on R&D (including funding public research organisations and public support for private R&D)? What is the optimal level of public investment in R&D?**
- **How can public policy better support firms' abilities to absorb foreign ideas?**

6. Investment, savings and financial market development

There is little available evidence about the role of capital markets in New Zealand's economic growth. New Zealand has capital markets which are in line with our size and stage of development. While some aspects of the capital markets are under-developed the capital markets are generally well functioning. Average long term interest rates in New Zealand are relatively high. Recent regulatory changes are starting to improve the performance of capital markets. New Zealand's saving rate is low, but investment is around the OECD average.

Links to economic growth

Economic growth and financial market development go hand in hand. Efficient capital markets stimulate growth by channelling scarce investors' funds to their most productive uses, while economic growth generates wealth which deepens capital markets and encourages financial market innovation. The cross-country literature suggests that a higher level of financial development – defined as deeper and more liquid financial markets, together with a more developed banking system – helps promote longrun economic growth (see for example Laeven, 2014, cited in Rosborough et al. 2015). Conversely, economic growth can promote financial development. The evidence suggests that the direction of causality can run both ways (Levine, 1997).

There is little New Zealand-specific evidence about the contribution of capital markets to economic growth.

Capital markets

There are suggestions that under-developed financial markets and low capital intensity are negatively affecting productivity in New Zealand (e.g., Cameron et al. 2007; Dupoy and Beard, 2008; Mazur and Alexander, 2001; Hall and Scobie, 2005; Mason and Osborne, 2007, all cited in Productivity Hub, 2014). New Zealand has a comparatively small share market capitalisation relative to GDP (World Bank, 2014). Stock market capitalisation is around 40 per cent of GDP, less than half that of Australia but similar to that of China and Germany (Rosborough et al. 2015). In the private capital markets, the private equity segment appears robust, as does angel investment. The venture capital market is small and struggling; although most other advanced economies too are struggling to establish viable venture capital markets.

There are likely to be a number of reasons for these under-developed financial markets, including New Zealand's industry structure. Co-operatives – which typically are not publicly listed – are common worldwide but are more common in the industries that make up a large proportion of the New Zealand economy (Capital Market Development Taskforce, 2012a). New Zealand also has a relative lack of the very large companies that could increase share market capitalisation.

New Zealand's capital markets are thin and illiquid by international standards, and this is one factor contributing to the relatively high cost of capital. Interest rates in New Zealand have been persistently higher than in many other countries (OECD, 2013a).

However, there is evidence suggesting our capital markets are relatively well functioning. For example, firms say that by and large they have access to the capital they need. In 2014, 81 per cent of businesses looking for capital said that they were able to access equity finance on acceptable terms (down from 85 per cent in 2013), and 91 per cent could access debt finance (up from 90 per cent) (Statistics New Zealand, 2015b). In 2013, New Zealand was ranked 9th out of 148 countries on ease of access to loans (Schwab, 2013).

New Zealand's equity and bond markets have grown in size and depth in recent years (Rosborough et al. 2015). There have been significant reforms to capital markets regulation (Financial Markets Conduct Act) that have modernised financial markets settings and opened up new capital-raising options (e.g. equity crowdfunding) and new markets (e.g. NZX's NXT market). The KiwiSaver scheme has contributed to an increase in the demand for domestic equity in portfolio holdings.

Despite this, the size of New Zealand's capital markets remain small and underdeveloped by international standards, and the banking system continues to dominate funding for New Zealand firms. The Reserve Bank of New Zealand concludes that the relatively small size of New Zealand's capital markets simply reflect the small size of the economy: some economies simply lack scale to support a flourishing capital market (Rosborough et al. 2015).

Savings and investment

There is a wide confidence band for developed economies on the empirical relationship between saving rates, GDP levels and growth rates (Treasury, n.d.). Nonetheless there are some particularly pertinent issues for the New Zealand economy. New Zealand's net national saving rate has improved since the global financial crisis but it is still one of the poorest in the OECD, driven by a low private savings rate (MBIE, 2013a).

Low saving is likely constraining domestic capital market depth and has an impact on the exchange rate and the current account of the balance of payments. Low domestic savings leads to domestic investment being substituted with foreign investment, increasing the demand for the New Zealand dollar. In 2013 the IMF estimated that the exchange rate was about 15 per cent higher than levels that would be associated with a sustainable external balance (IMF, 2013). Relative to other OECD countries, New Zealand had a high average long term interest rate between 2000 and 2012 (OECD, 2013a). A high interest rate also encourages foreign investment in New Zealand financial assets, putting upwards pressure on the value of the dollar.

However, recent analysis that capitalises the future value of expected government superannuation payments into households' assets reduced the apparent degree of this "skewing" (MBIE, 2014f).

Foreign capital is not a perfect substitute for domestic savings: savers are biased to investing in their home country and, as a result, total savings tend to correlate with investment across countries (Capital Market Development Taskforce, 2012b). Internationally this correlation has decreased over the last few decades but still exists. There is limited evidence for New Zealand specifically; although some evidence suggests New Zealand is relatively well integrated into international capital markets (Boyle, 2009).

The stock of FDI in New Zealand stands at about 46 per cent of GDP, but is heavily concentrated in the financial and insurance services sector. FDI is a more stable source of investment than shorter-term sources such as foreign debt and portfolio flows, as it represents a longer-term commitment by investors in the performance of a firm, and is less prone to volatility during economic shocks. In addition, foreign investment increases the diversity of risk sharing options available for both firms and investors, supporting efficient capital markets to best match the needs of those parties.

It is likely that home-bias at least remains an issue for particular types of investment; for example, for small start-ups (venture capital firms and other forms of private capital are likely to invest relatively close to home to reduce monitoring costs) and for medium-sized firms (for example, many Australian superannuation funds have a mandate to invest only in the top 200 ASX-listed firms or global funds, and the latter do not invest in our relatively small public companies) (Davis, 2009).

In this context, modelling suggests that increased savings could lead to a lower cost of capital and an additional increase in GDP of four per cent over 15 years[26] (NZIER, 2010).

There may be other factors limiting the ability of firms to find the debt and equity financing they require. Anecdotal evidence (from NZTE programmes, as well as elsewhere) suggests that firms can struggle to be investment ready: that is, they are typically uncertain about the type of finance they require, how to prepare for and attract investment, and how to manage debt.

New Zealand's gross fixed capital formation as a percentage of GDP is around the OECD mean (OECD, 2014a). More specifically, private non-residential investment has also been similar to the OECD median since 1990. This is important for New Zealand's growth prospects, since private sector investment in capital equipment is associated with improved firm productivity and profitability and new physical capital tends to be more productive than old. When compared to Australia, however, New Zealand firms' physical capital investment is relatively low in most sectors. This is, to an extent, a direct result of our low TFP and relatively high interest rates (Mason, 2013).

As noted in section 3, New Zealand investment performance is unlikely to account for much of New Zealand's productivity gap (de Serres, 2014).

Gaps / Questions

- **What changes to capital markets would increase their contribution to New Zealand's economic growth?**
- **Do co-operative governance structures in the private sector constrain growth through a lower propensity to seek external capital?**
- **Are businesses being matched with capital efficiently? Is it possible to accelerate the deepening of capital markets for small to medium sized innovative firms?**
- **Will increased savings lead to increased investment in New Zealand firms? What impact will KiwiSaver have on national savings and investment? What are the gains from increasing the saving rate?**
- **What is the effect on growth of New Zealand's high cost of capital?**
- **To what degree are problems in the ability of firms (particularly small to medium sized innovative firms?) to find debt and equity financing due to their failure to be investment ready?**

[26] This modelling requires holding the main impacts on economic growth constant, ignoring any dynamic effects that might result.

7. International connectedness

International flows of trade, investment and people offer substantial economic benefits to the New Zealand economy. Labour and capital are highly mobile between New Zealand and the rest of the world, with low regulatory barriers to their mobility. Migration has a small positive effect on New Zealand's international trade. FDI is an important source of capital in New Zealand. A key issue for New Zealand is our low trade intensity. This is likely to be a major constraint to growth, as firms which are exposed to international competitors tend to be more productive. Exporting firms are more productive even before they start exporting. This suggests that policies should balance effort between the early stages of enabling firms to become innovative, and towards productive keen-to-export firms, and exporting per se.

Migration

Migration affects economic growth through a number of channels (see section 8). In terms of international connectedness, migration can affect international trade in goods and services, foreign direct investment, and flows of ideas and knowledge. These relationships are bi-directional – migration affects other forms of international interaction and vice versa. The mechanisms include: immigrant preferences creating demand for goods and services from the home country; a lowering of transaction costs due to immigrants' knowledge of their home countries' markets, business practices, and laws; personal networks facilitating trade (Hodgson and Poot, 2011; Fry 2014).

In New Zealand, there is strong evidence that migration boosts international trade. However, as in the other areas of immigration impact (see section 8) the effects are small (Hodgson and Poot, 2011). The relationship (not necessarily causal) between immigrant characteristics and aspects of internationalisation by firms include the following (Sin et al. 2014):

- Firms that employ a higher fraction of high-ability foreigners (and therefore a lower fraction of high-ability natives) are more likely to export.
- The proportions of foreign employees are correlated with many other types of international engagement by firms.
- Employees from Australia, the Pacific and Europe (but not Asia) are positively correlated with firm exporting.
- The probability that a firm earns income in a given (developed) country is more correlated with its fraction of employees from that country than with its total fraction of foreign employees.

Trade

Exporting provides a mechanism through which New Zealand could, in principle, increase output in high-productivity industries. However, in practice this export-led shift has not occurred, and growth in real non-tradable output has outstripped growth in real tradable output since the mid-2000s (Treasury, 2012, cited in Meehan, 2014). New Zealand's share of external trade (exports and imports relative to GDP) is well below that of similar-sized, high-performing OECD countries, despite relatively strong capital and labour flows and very low levels of restrictiveness of service imports (de Serres et al. 2014). New Zealand also ranks lowest out of 38 countries in terms of its participation in global value chains (OECD, 2013d, cited in de Serres et al. 2014). A substantial part of the explanation for this is New Zealand's small size and distance which increase the costs of transport and accessing new markets etc.

New Zealand's low trade intensity is a major constraint on productivity. Trade is a powerful driver of productivity growth, as it allows for efficiency gains from specialisation and economies of scale (de

Serres et al. 2014). At the same time improved market competitiveness enables exporters to grow and gain market share, while causing weaker firms to shrink. This reallocation effect is beneficial, because on average exporters have higher productivity, faster productivity growth, undertake more innovation, and conduct more R&D. Similar mechanisms apply for increasing competition from exports and imports, although the effect of imports has been researched less.

The productivity premium associated with exporting is evident in New Zealand (New Zealand exporters are 51 per cent more productive than non-exporters (Iyer et al. unpublished) and many other countries. The premium also enables New Zealand exporters to grow larger, pay higher wages and invest more in physical capital. Most medium-term export growth will come from existing large firms (Bell and van der Scheer, 2013).

Another clear finding, both internationally and in New Zealand (Fabling and Sanderson, 2010), is that the correlation between exporting and productivity largely reflects selection rather than a causal impact of exporting on productivity. Exporters are already productive before they begin to export, although they may invest and grow more productive when gearing up to export. As these exporters expand, they draw in more domestic inputs, often leading to reallocations away from less-productive domestic firms, thereby raising aggregate productivity. From a policy perspective, these findings imply that policies focused on *enabling* firms to export, rather than encouraging exporting per se, are likely to be the preferred objective.

The extent to which exporting stimulates productivity growth through exposure to new ideas (e.g. one firm's experience creates spillovers for other New Zealand firms) is not entirely clear. New Zealand evidence shows spillovers from exporting are strongest for firms in the same industry (Saravanaperumal et al. 2011). Both the activities of incumbents and new entrants seem to provide a demonstration effect for potential entrants into new countries and new products (Fabling and Sanderson, 2009). While learning effects are documented in international literature they appear to be conditional on both the specific characteristics of the exporter and the destination export market involved, rather than pervasive.

More positively, exporting has been found to be related to innovation and R&D. This results from exposure to new ideas and competitors, increased returns to investment in R&D, and increased revenues (which increase the internal financial resources available to the firm for such investment). In New Zealand, firms that export, innovate more, even after controlling for firm size, with innovation increasing with the number of countries exported to. However, this relationship is mainly confined to exporters of manufactured goods. Innovation levels are found to be highest among those firms that have recently entered a new export market, or began to earn overseas income in the previous two years. Only certain export destinations (primarily the Americas) are correlated with increased innovation. These relationships are not necessarily causal, because it may be, for example, that it is innovation that drives exporting (Sin et al. 2014).

As noted earlier, exporting is more likely to occur in firms with a high proportion of employees that previously worked for another exporter, and in those with a higher proportion of high-ability foreign staff. The probability that a firm exports to a specific developed country is related to the fraction of employees from that country (although only for some nationalities). These relationships, while not causal, suggest that the experience and specialised knowledge of employees may be relevant to firms' decisions to engage internationally (Sin et al. 2014).

Exporting is affected by exchange rate fluctuations. As expected, a rise in the value of the New Zealand dollar reduces the probability that firms export and the value of export receipts (Fabling and Sanderson, 2015). New Zealand firms which export to a greater number of countries, which export to Australia, and with greater product differentiation are less sensitive to exchange rate fluctuations (Sin et al. 2014).

Investment

New Zealand's capital markets are highly integrated with Australia and more integrated with Asia-Pacific countries than Europe or North America. No compelling evidence exists of a particular or unique segmentation problem (where investors would price only country-specific risks). However, home-bias in investment decisions is likely to still exist, particularly with regard to certain types of investments (see chapter 6). New Zealand enjoys a wide range of investment interest from overseas investors and such investment is broad based (KPMG, 2015).

Inward foreign direct investment (FDI) is another mechanism for increasing international connections. New Zealand's FDI sits above the OECD average as a proportion of GDP, although it is comparable to that of other small advanced economies (OECD, 2014b). Our FDI is heavily biased towards the financial sector (32 per cent), given that our bank capital is included in FDI stock. Foreign-owned firms are on average more productive than exporters and domestic firms. Nonetheless, the overall benefits of inward FDI are less certain than for exporters.

Firms with FDI are among the largest employers in New Zealand – around 20 per cent of employees work for firms with FDI (which comprise about two per cent of firms overall), and about half (47 per cent) of our large firms (with over 100 FTE) are firms with FDI. Employment expansion is also greater in firms which have been acquired by foreign owners than in similar firms which remain in New Zealand ownership (Fabling and Sanderson, 2013). In New Zealand, workers at foreign-owned firms earn a starting wage that is about 14 per cent higher than workers in domestic firms (Maré et al. 2014). After controlling for firm and worker characteristics, this foreign premium falls to between 2.7 and 3.5 per cent. There is also evidence of slightly higher wage growth for those in foreign-acquired firms (average wages increase between two and eight per cent more than similar non-acquired firms (Fabling and Sanderson, 2013)). However, there is no evidence that workers retain this premium when they return to working for a domestic employer. This suggests that domestic firms do not value the experience gained at foreign firms because it is too specialised or firm-specific (Maré et al. 2014).

While firms that attract FDI tend to be highly productive, there is on average no productivity gain, as foreign investors pick high-productivity firms and their investment does not seem to spur further gains. Similarly, there is no evidence of upstream or downstream productivity spillovers from FDI to firms in the same industry (Fabling and Sanderson, 2013; Doan et al. 2014, cited in Maré et al. 2014). For the current stock of FDI, the links between foreign firms and New Zealand firms do not appear to be strong (other than with upstream suppliers). In addition, there are negative spillovers to other firms in the same industry where foreign penetration is increasing.

However foreign ownership still provides benefits. These include the opportunity for workers to earn higher incomes during the period of employment. Foreign investment also impacts on earnings by shifting the overall composition of the firm population towards higher-paying firm types (Maré et al. 2014). In addition, recent evidence identifies increased skill acquisition by New Zealand employees of foreign-owned firms as a mechanism which transmits positive spillovers. Foreign investment can provide critical mass to sustain a vibrant industry made up of both New Zealand and foreign-owned firms and a range of supporting firms (Treasury, 2015). Furthermore, both FDI and outward direct investment (ODI) are positively correlated with innovation (Sin et al. 2014).

ODI, relative to GDP, is far lower in New Zealand compared to other developed countries (OECD, 2014b). Although the underlying causes for this are unclear there is likely to be a link to low trade intensity. ODI is known to follow on from exports according to the international literature. New Zealand firms which engage in ODI tend to out-perform other firms in terms of their export propensity (NZIER, 2009). As well as being low, our ODI has not grown consistent with a rapidly globalising world. Most of New Zealand's investment abroad is to Australia (55 per cent) and from

our manufacturing sector (41 per cent). ODI may improve business practices in domestic firms who dealt with companies with foreign investments (NZIER, 2009).

Gaps / Questions

- **What are the most effective interventions for enabling firms to become exporters?**
- **What are the barriers to more ODI? Would changing New Zealand's trade intensity or industry structure lead to a change in the level of ODI?**
- **What are the effects of import-intensity on New Zealand markets?**
- **What is the cause for New Zealand being bottom of the rankings on global value chains?**
- **How can New Zealand derive greater beneficial spillovers from FDI i.e. what are the necessary pre-conditions?**

8. People and skills

New Zealand has high labour force participation rates. The scope to lift participation rates much further is likely to be limited. So growth will increasingly come from improvements in labour quality. New Zealand performs well in terms of pre-school education and tertiary qualifications, but less well in terms of secondary qualifications and tertiary education wage premiums. Immigration rates are high in New Zealand, and have modest positive economic impacts overall. There is growing evidence of the importance of management practices to growth; New Zealand's performance in terms of management practices is mixed. Persistent skill shortages may be constraining economic growth, as firms reporting skill shortages tend to be better performers. Technical change is a key driver of persistent skill shortages.

Education, skills development and economic growth

As noted in section 2, economic growth can come from growth in inputs or from productivity growth. Over the last few decades, the labour force participation rate (i.e. labour input) in New Zealand has consistently been higher than the OECD average; in 2014, the rates were 69 per cent and 60 per cent respectively.[27] There is likely to be limited scope to lift it further, although some opportunities do exist among specific demographic groups whose participation rates are relatively low (see section 3). The remainder of this section therefore focuses mainly on labour quality and skills rather than labour force participation.

There is good empirical international evidence for the wider economic benefits of education and skill development. The importance of labour quality to productivity growth has been found in both country-level studies (see Temple, 2001 for a review) and firm-level ones (see Syverson, 2011). Foundation skills (particularly those acquired in early childhood education and school) appear to lead to broad social and economic benefits (Cunha, Heckman, and Lochner, 2006). In general the earlier, and the more foundational the skill, the bigger the social and economic impact (see for example Office of the Prime Minister's Science Advisory Committee, 2011).

In New Zealand, rising levels of educational attainment (i.e. attaining qualifications compared to no qualifications) are likely to have contributed to productivity growth in recent years. It is estimated that about half the rise in labour productivity between 1988 and 2005 was associated with rising educational levels (Szeto and McLouglin, 2007). At the other end of the spectrum, the integration of low-skilled workers into the labour market accounts for three of the 27 percentage points of New Zealand's productivity gap as estimated by the OECD (de Serres, 2014) – see section 3.

Qualifications are usually used as a proxy for skills in empirical studies. An alternative measure of skills derived from earnings has been used in a recent New Zealand study of the relationship between productivity and changing skills levels (Maré et al. 2015). The measure picks up a broader range of worker attributes beyond qualifications – closer to what might be defined by labour economists as human capital, including the benefits of work experience. The study found that MFP growth over the period 2001-12 was higher than previously thought once labour input was adjusted for skills. This is because employment growth was accompanied by a *decline* in the average skills of workers, contrary to the trends observed in skills measures based on formal qualifications. So, compared with what was previously thought, more of output growth was attributed to productivity growth rather than growth in input.

[27] Source: OECD (2015), Labour force participation rate (Total) (indicator). doi: 10.1787/8a801325-en (Accessed on 15 October 2015).

The study also found that employment growth from 2001-12 drew in workers with lower-than-average skills. Rather than output growth being lowered by the drop in labour quality as might be expected, continuing firms were more than able to maintain output growth. In contrast, output changes for new and exiting firms reflected lower labour quality. The findings imply that continuing firms are flexible enough to adapt to changing labour quality. The study could be extended to include the standard qualifications measure of skills, to examine the relative contribution to output growth of qualifications and the new skills measure, and the interaction between changing qualification composition and firm dynamics.

Education and qualifications

Participation at **pre-school education** in New Zealand is in the top third of OECD countries; around 87 per cent of three year-olds and 94 per cent of four year-olds in New Zealand were enrolled in centre-based early childhood education in 2012 (compared with the OECD average of 70 per cent and 84 per cent respectively) (Scott 2014).

PISA[28] results show New Zealand has above average but declining performance in mathematics for 15 year-olds, high levels of top performers, but also increasing levels of low performers, and a higher level of socio-economic inequity in maths performance (Scott 2014).

Like other countries, the share of New Zealand school leavers with a foundation level of **upper-secondary education** is improving. For example, the proportion of 18-year-olds attaining NCEA Level two increased from 74 per cent in 2011 to 81 per cent in 2014.[29] The share of New Zealand school leavers with an upper-secondary education remains below the OECD average (Scott 2014). In 2012, 69 per cent of New Zealand students entering into initial upper secondary level study (i.e. Year 11) had completed a Year 12-equivalent or higher qualification after three years, and 74 per cent had completed one after five years (below the OECD average of 72 per cent and 87 per cent respectively) (Scott, 2014).

Compared with other countries, young New Zealanders are more likely to leave school sooner, and work, or go on to further education, or enter further education when they're older (Scott, 2014). But New Zealand also has a relatively large proportion of 15 to 19 year-olds neither in employment nor education (NEET). At 8.7% in 2012, the NEET rate in New Zealand for this age group was better than in 2009, but still higher than the pre-recession rates and above the OECD average (7.2%).[30] Overall this means that a relatively smaller proportion of young New Zealanders leave school and move directly into tertiary study compare with other countries.

Despite improving performance, a significant proportion of young New Zealanders still leave school without gaining upper secondary school qualifications (“the long tail of underachievement”); this also exists in a number of other countries. The net result is that New Zealand has a relatively large proportion of the working population without upper secondary qualifications (24 per cent of 25 to 64 year olds in 2012 which is slightly above the OECD average).

New Zealand has a relatively large proportion of **tertiary qualified** adults. With 41 per cent of 25 to 64 year-olds, and 47 per cent of 25 to 34 year-olds with a diploma or higher in 2012, New Zealand was ranked in the top ten OECD countries (Scott, 2014). New Zealand’s performance is especially

[28] Programme for International Student Assessment.

[29] Ministry of Education NCEA Qualification Attainment: https://www.educationcounts.govt.nz/statistics/schooling/senior-student-attainment/ncea-attainment/ncea-qualifications-attainment. Accessed on 16 October 2015.

[30] As at March 2016, the NEET rate in New Zealand for 15 to 19 year-olds was 8.8 per cent – see http://www.mbie.govt.nz/info-services/employment-skills/labour-market-reports/labour-market-analysis/labour-market-report.

strong at certificate and diploma level (vocational) tertiary qualifications. In terms of degree level or higher qualifications, New Zealand ranks in the middle of the OECD.

In the United States, the university premium for wages has doubled since 1980. Moretti (2012) argues that in the United States, rising inequality has been driven by demand for skilled workers rising faster than the supply over the past three decades.

The **wage benefits** of having a tertiary qualification in New Zealand are not as large as in other countries. In 2012, New Zealand had the lowest differential among 33 countries in terms of the relative earnings of workers with a tertiary qualification compared with those with an upper secondary one (OECD, 2014e).[31] Higher levels of tertiary education have "not delivered the productivity dividends that some might have expected (i.e. the size of the impact has not been as great as expected). This is demonstrated through our continued weak aggregate productivity performance, through our low returns to qualifications relative to other countries (although being tertiary qualified still lifts a person's wage it does not do this as much as in other countries), through concerns about youth transitions and inactivity, and through the small apparent wage premia that many people appear to receive from tertiary education" (Carroll, 2014).

A recent New Zealand study (Tumen et al. 2015) considered the labour market returns of a level one to three or level four certificate programme. It found these programmes had a positive impact on the employment of low-qualified school leavers for those who completed a qualification. But the programmes had only a small impact on participants' level of earnings, after controlling for their employment status.

While Māori and Pasifika tertiary attainment rates have been rising, they are not catching up to those of other ethnicities. Pasifika people are enrolled in tertiary study at the same rate as other ethnicities, but are over-represented in lower level qualifications, with implications for earnings potential (NZIER, 2013). This disparity in education outcomes flows through to performance in the job market. For example, Pasifika are half as likely as those of European descent to work in highly skilled occupations, and average weekly incomes for those in work are 22 per cent below the average for all ethnicities (NZIER, 2013). Māori and Pasifika suffered disproportionately following the start of the GFC-induced recession, reflecting their generally lower educational attainment, and the greater vulnerability of low-skilled jobs during downturns. Likewise, their likelihood of being in NEET is much higher.

Promoting human capital development of Māori and Pasifika is critical for achieving the government's social and economic goals. Lifting the educational performance of Māori and Pasifika is more than just an equity consideration. Making improvements in foundational skills for the "long tail" and continuing to improve tertiary outcomes are likely to be important for productivity.

In New Zealand, indicators suggest that it is *unlikely* that there is a general shortfall of people with degrees in the workforce. The average wage gap between employees aged 25-64 with a bachelor's degree and employees with upper secondary school qualifications (but no tertiary qualification) is fairly low when compared with the OECD[32] (Productivity Hub, 2014), and has remained fairly stable over the past 15 years. Another indicator, the proportion of bachelor's degree holders who work in managerial, professional or technical occupations, declined slightly over the last 20 years. This is

[31] Scott (2014) examines some of the possible reasons for New Zealand's performance in terms of wage premiums from tertiary education, including measurement issues. New Zealand is one of only a handful of countries with a one-year upper secondary qualification. New Zealand's relatively higher qualified upper secondary-qualified group acts to reduce comparative returns.

[32] However Zuccollo et al. (2013, cited in Productivity Hub, 2014) note that around half of the gap in the wage premium between New Zealand and the OECD average could be attributed to measurement differences.

consistent with relative equilibrium (although there are other possible explanations for this trend) (Papadopoulos, 2013a).

These indicators suggest that New Zealand does not have an undersupply of workers with degrees. However the fact that a large increase in the supply of qualifications has not resulted in deterioration in our wage premium over time suggests that New Zealand does not have an oversupply of qualifications either. When available, the 2013 results from the OECD's Survey of Adult Skills may provide insights into whether New Zealand is over-skilling or not.

In conclusion, New Zealand performs relatively well in terms of pre-school education and tertiary qualifications compared with other OECD countries. It performs less well in terms of secondary qualifications and the wage premium from tertiary education.

Skill shortages and skill gaps

The small scale of the New Zealand economy and its geographic spread makes it likely that the skills matching process operates in thinner labour markets than in other countries. This makes it more likely that some firms will have difficulty recruiting and retaining specialised skills.

A large proportion of businesses with vacancies report difficulties when recruiting. In 2014, for example, the proportion of recruiting businesses that reported severe difficulties was 20 per cent for managers and professionals; 18 per cent for technicians and associate professionals; 24 per cent for tradespersons and related workers; and eight per cent for low skilled occupations.[33]

Recruitment difficulties in New Zealand are persistent across the business cycle, with many of the same firms reporting year-on-year hiring difficulties even in the face of large changes in demand and labour market conditions. Firms reporting hiring difficulties are also more likely to have characteristics associated with superior economic performance – being exporters, foreign-owned, larger, overseas direct investors, and R&D performers. These results suggest that technical progress may create persistent skills shortages for a subset of jobs over long periods of time (Fabling and Maré, 2013).

Occupational skill shortages usually have multiple causes. Recent work on skill imbalances in the ICT industry, for example, finds that while enrolments in degree-level ICT courses have grown in recent years, the supply of ICT professionals is negatively affected by high rates of emigration and high rates of movement into non-ICT occupations (Papadopoulos, 2013b). Poor linkages between the education and business sectors also make it difficult for tertiary education providers to prepare students for careers in ICT. Employers also report that graduates often do not have the skills they require, particularly non-technical skills. The industry is making extensive use of immigration work visas to address its skill needs, with around 4,000 work visas approved for ICT occupations each year on average (Papadopoulos, 2013b).

Recruitment difficulties impose costs on affected businesses. An inability to recruit people with skills that are key to a firm's operation or expansion can constrain sales, output and productivity. Evidence of adverse firm-level impacts has been reported in (a small number of) studies conducted overseas. However, there is little empirical evidence on the extent to which recruitment difficulties are having a significant impact on New Zealand's sectoral or aggregate growth rates.

[33] Data downloaded from Statistics New Zealand on 3 November 2015 http://www.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/BusinessOperationsSurvey_HOTP2014.aspx

Qualitative evidence shows that firms use a range of responses and adjustment mechanisms – such as overtime, use of contractors, and overseas recruitment – to deal with recruitment difficulties (Statistics New Zealand, 2014).

In conclusion, technical change – discussed further below – seems to be a key driver of persistent skills shortages within specific occupational areas.

Migration

Migration affects economic growth through a number of channels, including the volume and structure of supply of skilled workers, the demand for output, the way firms produce goods and services, and the scale effects of changes in population size. So it affects both the supply side and the demand side of the labour market. Historically, New Zealand has one of the highest immigration rates among developed countries (Bedford and Poot, 2010, cited in Hodgson and Poot, 2010).

There has been strong growth in net migration in recent years. In 2014/15, a net migration gain of 58,300 people occurred, the highest net gain ever recorded (MBIE, 2015). The growth in temporary immigration has been a feature in recent years – in 2011, temporary migrants comprised just over half of the recent immigrant population in New Zealand (Merwood, 2013).

In theory immigrants may either complement or substitute native workers. There is little empirical support for the hypothesis that migrant inflows displace either the New Zealand born or earlier migrants with similar skills in the areas in which migrants are settling (Hodgson and Poot, 2011). No adverse employment effects from immigration overall, and positive earnings effects, were found in a more recent New Zealand study (McLeod and Maré, 2013). One overseas study even found that increasing the number of immigrant engineers actually leads to higher wages for native-born engineers because immigrants help creative ecosystems to flourish (Kremer, 1993, cited in Brynjolfsson and McAfee, 2014).

However, the economic integration of immigrants takes quite a long time. Once immigrants are in New Zealand for more than 10-15 years, their labour market outcomes are predominantly determined by the same success factors as those for the New Zealand born (Stillman and Maré, 2009).

The human capital brought by immigrants has a positive but fairly small impact on economic growth across OECD countries (Boubtane and Dumont, 2013, cited in OECD 2014d). Similarly, modest positive economic impacts from immigration are found in New Zealand (Fry, 2014). Fears about negative economic impacts such as net fiscal costs, lower wages, and increasing unemployment find very little support in the available empirical evidence (Hodgson and Poot, 2011). Immigration is likely to have some modest benefits for innovation in New Zealand, although causation is not established (McLeod et al. 2014).

Immigration is likely to contribute to positive scale effects in New Zealand. Positive productivity spillovers have been found in firms operating in locations with high-skilled workers, and with high population density (Maré and Fabling, 2011). In particular, firms providing local services were more productive in locations with large shares of immigrants and new entrants.[34]

In conclusion, immigration appears to make a small positive contribution to economic growth in New Zealand. However, given recent changes to migration patterns and trends – strong growth in net migration especially temporary immigrants – it would be useful to replicate some of the studies

[34] "New entrants" are people new to the area (both regional and international migrants).

above with more recent data to test if the findings still stand at the margin compared with the average.

The effects of technology on jobs

Technology can drive productivity improvements, create higher skilled jobs and increase living standards. However, it can create persistent skill shortages and, if certain demographic groups are particularly susceptible to change, less inclusive growth.

Two alternative hypotheses about the impact of recent technological changes on firms' labour demand have been identified: "skill-biased technical change" or "skills upgrading" holds that technological change is gradually raising the demand for skilled workers and reducing the demand for the less skilled; "polarisation" or "hollowing out" asserts that technological changes have been increasing the demand for both high skilled workers and low-skilled service workers, while reducing the demand for workers with intermediate levels of skill (Dixon, 2014).

Skill-biased technical change occurs when changes in technology favour those with certain skill-sets. For instance, the falling cost of computing has made cognitive non-routine tasks more productive; those with special skills can earn much more than would otherwise be possible. At the same time, ICT has had the effect of merging markets, leading to "winner-takes-all" scenarios, in which the first-mover or best provider of a good or service has the opportunity to win more customers. ICT also allows items (such as software) to be replicated millions of times at little cost, making it feasible for a small set of suppliers to satisfy the enormous combined demand of more closely-merged markets.

This has implications for the workforce because technology can both augment the work of those with complementary skills (e.g. jobs that require a high level of creative intelligence) and act as a substitute for routine work (Brynjolfsson and McAfee, 2014; Moretti, 2012; Frey and Osborne, 2013). This process can also create new jobs by making the price of goods and services cheaper, thereby freeing up income for spending elsewhere and increasing consumer demand for a broad range of goods and services. Overall, it is estimated that 47 per cent of US employment faces a high risk of being replaced by automation over the next few decades (Frey and Osborne, 2013).

Some polarisation has occurred in the both the US and the UK since 1990, is the consensus of the international literature (Dixon, 2014). However, the most prevalent long-run shift in OECD countries is growth in the proportion of skilled (largely professional and managerial) occupations (Handel, 2012, cited in Dixon 2014) i.e. "skill upgrading".

In New Zealand, changes in labour demand are best described as "'skill upgrading", rather than the more extreme "polarisation" (Dixon, 2014). Between 1991 and 2011, there was a large expansion in the relative share of higher-paid and higher-educated occupations. This was at the expense of employment in less-skilled occupations, and particularly those closer to the middle of the pay/education distribution than those at the very bottom (Dixon, 2014).

Overall, a key consideration is whether skills supply and demand are changing more or less together. As noted above, recent New Zealand evidence (Fabling and Maré, 2013) suggests that technical progress may create persistent skills shortages for a subset of jobs.

Management

The effect of management skills on productivity performance has not been widely studied. Syverson (2011) notes that "perhaps no potential driver of productivity differences has seen a higher ratio of speculation to actual empirical study". However, researchers are starting to fill this gap. At the country level, average per-country management scores are strongly correlated with GDP per capita (Bloom et al. 2014). At the firm level, Bloom et al. (2014) examined the extent to which firms

monitor employee activity, set appropriate targets, and reward high performance in 33 countries. Higher-quality management practices were found to be correlated with several measures of productivity and firm performance, including labour productivity, total factor productivity, firm size, return on capital, sales growth, and the probability of survival. There is also a positive correlation between firms that score well on Bloom et al.'s (2014) management study and those that score well in terms of work-life balance and family-friendly measures (Bloom et al. 2014).

Modelling suggests that management differences account for about one quarter of the difference in TFP between the US and other countries (Bloom et al. 2014). It can also account for about one third of the productivity gap between the top and bottom tenth per centile of firms in the US and UK (Bloom et al. 2013, cited in Bloom et al. 2014).

Better management is positively correlated with more intense competition and negatively correlated with family ownership/primogeniture (Bloom et al. 2014). In developing countries (such as China, India and Brazil), average productivity is constrained by a "large left tail" of poorly-managed firms. In India, a randomised trial that introduced good management practices to textile firms raised the productivity of the treatment group by 17 per cent in the first year and led to those firms opening new factories (Bloom et al. 2013).

In New Zealand, a robust causal relationship is found between human resource management practices (a number of variables including management engagement with staff, level of autonomy granted to non-management employees and performance measurement and reward) and firm performance (productivity, staff retention and human capital of workers) (Fabling and Grimes, 2009). Manufacturing, services and other sectors all are found to benefit from adopting high-performance work practices. Specifically in New Zealand's manufacturing sector, it is estimated that productivity could be boosted by up to ten percentage points if the quality of management was made to match that observed in the US (Bloom et al. 2012, cited in de Serres, 2014).

There is mixed evidence about New Zealand's performance in management practices relative to other countries. In 2013, New Zealand came in 13th place for management practices (many of the 20 countries ranked below us are "developing'), and has a slightly higher GDP per capita than would be predicted by its management score (Bloom et al. 2014). The standard deviation for management practices is relatively low. While there are few high-performing firms in New Zealand, there are also relatively few very low-performing firms. Multinational firms with a presence in New Zealand score notably better in terms of management than local firms, with an average score of 3.2/5 versus 2.6/5 for local firms (Bloom et al. 2014). Another study (Green et al. 2011) found that New Zealand firms have weak people-management skills compared to other countries.

In conclusion, there is growing international and New Zealand evidence about the positive relationship between management practices and productivity performance, including that the relationship is causal.

Gaps / Questions

Returns from skills to individuals, firms and New Zealand

- What is the relative contribution to output growth of qualifications and the new measure of skills derived from earnings?
- What are the micro-economic returns including spillovers to individual firms and/or groups of firms (sectors) from increasing qualifications of their employees (tertiary and/ or non-tertiary)? How much did the increase in qualifications add to macro-economic growth?
- What are the marginal returns from different types of skills e.g. foundation skills, generic skills, and science, technology, engineering and mathematics (STEM) skills?
- Why are the returns to individuals so low for some programmes of tertiary study – particularly sub-degree level?
- What are the effects of recruitment difficulties and persistent skill shortages on economic growth?
- What is the effect of the large proportion of working-aged people with low levels of educational achievement on economic growth?

Migration and government policy

- What is the effect of migration on firm productivity?
- What are the economic conditions or structural features to maximise the returns to immigration?
- Are there cost-effective ways to decrease settlement time into the New Zealand labour market by new immigrants?

Low skilled and skill utilisation

- How do we raise the skill levels of individuals who belong to groups that are traditionally low-skilled?
- How well do we utilise the skills we have?
- What is government's role in addressing management weaknesses?

Technology

- What government policies or interventions are likely to be cost-effective responses to occupational skill shortages?
- What role do firms, individuals, and government have in response to skill-biased technical change?

9. Services from resources and infrastructure

Natural resources and infrastructure are important inputs to economic activity. New Zealand has abundant natural resources. New Zealand ranks reasonably well (and is improving) on some international indices about infrastructure. Areas of strength in rankings include air transport infrastructure and ICT use. New Zealand also has one of the fastest rates of change in high- and average-speed internet connections. Areas where New Zealand ranks lower include gross capital formation, mobile phone subscriptions and the affordability of ICT. Inelastic housing supply is a constraint in some locations, notably Auckland. Productivity levels and growth in the construction industry are low.

Infrastructure

Infrastructure is an enabler of economic activity. The availability, reliability, timeliness, and efficiency of the resulting services support business activities across the economy while also affecting the cost of production. A majority of empirical studies report positive effects of infrastructure development on productivity and long-run growth rates. Inadequate levels of infrastructure investment can lead to bottlenecks in the economy which lower the returns to other forms of investment, thereby constraining that investment and limiting the prospects for growth. However, given diminishing marginal returns, excessive infrastructure investment has no added value and may also detract from growth by drawing scarce capital away from more productive investment.

Recent cross-country research shows that every ten per cent increase in infrastructure provision increases output by approximately one per cent in the long run (World Bank, 2010). However, empirical estimates of the magnitude of infrastructure's contribution to growth vary considerably across studies. This is possibly indicative of asset-quality issues, complementarities with other production factors, compositional differences in the types and uses of infrastructure, non-linearity due to the network character of infrastructure, and larger policy and institutional factors that need to be better understood.

As a small country with a dispersed (but highly-urbanised) population, high-quality infrastructure is especially important for New Zealand because of:

- the large agricultural share of output combined with primary sector requirements for efficient transport networks to shift goods from the farm gate through any processing, and on to ports or airports
- the impact of a dispersed population, including the distance between our main population centres and where our electricity is generated; this requires a long and efficient transmission grid.

The Global Innovation Index (2015) has New Zealand ranked at 20th out of 141 economies for infrastructure, up from 26th in 2013. But it identifies gross capital formation (66th) and energy use per unit of GDP (82nd) as particular weaknesses in infrastructure. We perform relatively "better" on electricity output (15th), ICT use (15th) and government's on-line services.

The 2015-2016 World Economic Forum's (2015a) Global Competitiveness Report gives New Zealand a ranking of 28th out of 141 economies for perceived quality of overall infrastructure[35], up from 43rd in 2013-14. New Zealand rates in the top 20 for perceived quality of air transport infrastructure

[35] However, this relies on a relatively narrow set of measures and the methodology can bias against countries with small populations.

(18th) and port infrastructure (20th). We perform less well on mobile telephone subscriptions (74th). However, the scores are similar to the average among other small advanced economies (with the exceptions of poor rankings in railroad infrastructure and mobile phone subscriptions). Excluding measures that use absolute numbers (which make all small economies look bad), the same is the case when comparing against the OECD as a whole (Schwab, 2013).

The national average real electricity price fell by about a quarter between 1979 and 1993, but by 2009 had risen again to be about the same as it was in 1979. Perceived quality is relatively low. The US$/MWH cost of electricity for industry is below the 2011 OECD average (US$74 vs US$124) and above average for households (US$212 vs US$174) (International Energy Agency, 2013). New Zealand has an energy intensity per unit of GDP that is slightly above the OECD average.

New Zealand has the fourth-highest road traffic intensity per unit of GDP in the OECD and the third-lowest motorway network density as a percentage of land-area. New Zealand's total road network length per person is longer than the OECD mean,[36] but similar to other countries with relatively sparse and geographically dispersed populations. Between 2000 and 2007, road traffic volumes per 1000 population remained relatively constant. Notwithstanding this, capacity constraints have been identified in key parts of New Zealand's transport networks and there are opportunities to improve investment allocation and demand management (National Infrastructure Unit, 2015). In mature economies with established transport networks, the benefits from improved transport infrastructure are likely to be greatest when focusing on congestion and bottlenecks.

ICT

ICT is a disruptive technology that allows for the transformation of existing business models and entirely new ways of undertaking economic activity. ICT infrastructure investment and use of ICT by businesses has been found to be important for productivity growth in the US in particular. This has come both from spectacular productivity growth in IT-producing industries as well as more modest changes in ICT-using industries. Productivity in the latter has come from a number of sources, including higher product prices as a result of ICT-enabled customisation, and more efficient manufacturing processes.

However, connectivity and the availability of new technology alone is only part of the equation; uptake of ICT, the transformation of business practices, and the provision of workforce training are critical if the full benefits of ICT investment are to be realised. For instance, the lack of productivity growth in Europe has been shown to be partly due to relatively poor ICT investment by firms. In New Zealand, there is some evidence of systematically lower ICT investment by firms than in other English-speaking countries. However, investment rates have increased and in 2009 the share of ICT in total non-residential investment was among the highest in the OECD (de Serres et al. 2014).

In terms of basic adoption of ICT, New Zealand firms appear to be doing reasonably well. In 2012, 97 per cent of economically significant firms used computers, 96 per cent used the internet, and 69 per cent had a website. However, according to the 2015 Global Information Technology report (World Economic Forum, 2015b), New Zealand ranks 101st in the world (143 countries) in terms of ICT affordability, 19th in terms of business usage of ICT and 26th in terms of economic impact of ICT.

This notion is supported by research which found that New Zealand businesses making *high use* of internet services are six per cent more productive than the average firm in their industry (Sapere, 2014). A follow-up study found that some of the largest modelled economic gains from greater use

[36] Kilometre of road per person is probably a measure of limited usefulness.

of ICT come from sectors that – as a whole – are less likely to make high use of ICT or to report positive ICT outcomes: construction; and agriculture, forestry and fishing (Sapere, 2015).[37]

When looking at the speed of internet technology, in the World Economic Forum's 2014-15 Global Competitiveness Index, New Zealand ranks 30th in the percentage of connections above four megabits per second (Mbps), 43rd in connections above 10Mbps and 39th in connections above 15Mbps. In the December quarter of 2014, New Zealand's average internet speed was 43rd in the world (and almost identical to that of Australia). However, New Zealand's prospects do appear to be improving, having one of the fastest rates of change in users with higher-speed and average-speed connections (National Infrastructure Advisory Board and National Infrastructure Unit, 2015).

Natural resources

New Zealand is wealthy in natural resources. The World Bank (2011) estimates that New Zealand ranks 8th out of 120 countries and 2nd out of all OECD countries in natural capital per capita; we are outranked only by petroleum-exporting countries.

Similarly to infrastructure, natural resources can contribute to productivity through enabling other economic activity in downstream industries (such as processing/refining and creating intermediate goods or value-added products). Greater energy availability may enhance the competitive position of a large number of energy-intensive industries (depending on the impact on exchange rates) through lowering energy tariffs. Water availability allows for a number of economic uses.

Extraction can also be a highly productive exporting industry in its own right. NZIER modelling indicates that a large petroleum find could result in $1.5 billion of export revenue in an average year of production, raise GDP by 1.2 per cent, and raise gross national disposable income by 0.77 per cent (accounting for offshore payments and excluding exploration, development, and de-commissioning activity) (MBIE, 2012).

In addition to export receipts and royalties from production, the discovery of a large offshore oil field would require development expenditure in the order of $2.5 billion over a five-year period. A major gas field would require in the order of $6 billion expenditure in development.

Royalty income yet to be received from existing production facilities in Taranaki could be worth $3.2 billion. New production from future discoveries could generate royalty income equivalent to a $5.3 billion (in June 2010 prices) – and up to $9.5 billion if exploration activity accelerated by 50 per cent over the next 10 years.[38]

Treasury modelling indicates that the impact of a large oilfield is unlikely to change New Zealand's terms of trade substantially. However, should there be a discovery of large enough magnitude to affect our terms of trade and create the risk of a natural resource curse, the literature suggests that optimal policy responses could include (Treasury, 2013a):

- limiting the flow-through of higher tax and royalty revenues into government spending, for example, by use of a sovereign wealth or stabilisation fund
- undertaking structural reform that will facilitate sectoral adjustment, improve the business environment for the non-commodity sector, and contribute to improvements in their productivity (this would help offset the relative loss in their competitiveness)

[37] Sapere (2015). Identifying sectors of the economy for more effective use of ICT, [MBIE internal].
[38] http://www.mbie.govt.nz/info-services/sectors-industries/natural-resources/oil-and-gas/petroleum-expert-reports/assessment-future-royalty-income.

- ensuring effective financial regulation and supervision in order to safeguard against credit booms and asset bubbles that may arise from the temporary boost to domestic incomes.

Coupled with company tax, the government receives about 42 per cent of a petroleum company's accounting profit, and this has the potential to be used to stimulate other productivity-enhancing activity or investments (such as in health, education, business development).

Although offshore deposits of phosphates and methyl hydrates have some potential (the former potentially $0.2 billion, the latter unlikely to be commercially realisable in the short/medium term), the focus is on oil and gas due to the potential for significantly higher returns under current market conditions. Stocks of other natural resources have been valued by Statistics New Zealand in the past; most of this work is now dated and could usefully be revised.

Mining, while not employing many people, generates a disproportionately large contribution of GDP per employee. Over 2000 to 2005, mining activity returned an annual average of $360,000 of GDP per employee and a total economic output of $700,000 per employee (McDouall Stuart, 2009). This compared with total industry averages of $63,000 and $142,000 respectively. The highly localised nature of mining industry activity means that the impact on regional GDP per employee can be considerably larger. While the relatively high benefits per employee of mining sector activity are broadly recognized, some caution should be exercised when interpreting these gross GDP figures. The high levels of foreign ownership and investment in the mining sector mean that, when taken at face value, the benefits to New Zealand will be somewhat overstated.

The New Zealand petroleum fiscal regime is highly competitive against comparator countries, based on data from producing fields. New Zealand is ranked as the fourth-most fiscally attractive jurisdiction between 1998 and 2007. An evaluation of the $47 million of public expenditure on seismic data acquisition and use (targeted to increasing levels of exploration activity) was largely positive (Asia-Pacific Economic Cooperation, 2015). Changes in 2013 to confidentiality protections for data acquired by speculative seismic companies have seen a significant increase in data acquired and marketed on a non-exclusive basis by such companies.

In 2009, New Zealand ranked fourth among OECD countries for volume of fresh water per capita – and third for water abstraction per person (Treasury, 2013a). However, New Zealand's water productivity, or GDP per cubic metre of water withdrawn, is lower than the OECD average. In large part, this poor performance is attributable to the large role of agriculture in our economy and the relatively high intensity of water inputs within this sector. We currently extract less than five per cent of our freshwater resource, primarily drawn from surface waters and lack sophisticated tools for efficient trade and transfer of water to its most productive uses. While New Zealand has very substantial freshwater resources, concerns exist that the quality and availability of this water is deteriorating at the regional- and catchment-level.

New Zealand's natural resource depletion relative to income has consistently stayed below the OECD average in recent decades, indicating that we are relatively efficient at using our resource base in realising improvements to our living standards (Treasury, 2013a).

The OECD reports our intensity of use of forestry resources is around average.[39]

[39] http://www.oecd.org/site/envind/newzealand.htm.

Housing, building and construction

Housing plays a key role in individual and community health, family stability and social cohesion. A responsive housing market facilitates labour market mobility, allowing people to move to take up job opportunities, thereby enhancing productivity.

Housing affordability is a function of income, house prices and the costs of home ownership, or rents and income in the case of rental affordability. House prices in turn reflect the demand for, and supply of, housing, which are influenced by a range of factors. These include population and demographic changes, incomes, interest rates, house price expectations, availability of housing land, planning and building regulations and construction costs.

At the macro level, New Zealand has a relatively high rate of investment in housing compared to financial assets. Investor speculation has contributed to house price increases (Department of Prime Minister and Cabinet, 2008). Treasury (2013b) argues that this in part derives from the fact that the long-term returns on housing have outpaced almost all other asset classes. The lack of a tax on capital gains in our system incentivises investment in housing over other forms of asset classes. Actual cash yields on rental properties are low and the expectation of capital gains fuels much of the demand for rental property (Productivity Commission, 2012; Auckland Council, 2011).

If the real cost of housing (be it housing stock, new builds or rentals) rises faster than real incomes, then households' disposable income net of housing costs, reduces over time, meaning that less income is saved or invested. High growth in house prices can also lead to speculative investments in the housing market which can contribute to macroeconomic instability from boom-bust cycles. Such speculative activity also diverts resources away from productive assets. House price growth in New Zealand has been high by global measures (but not exceptional – similar to the UK and Australia) (MBIE, 2014e).

The fact that the real value of New Zealand's housing stock has risen significantly over the past decade suggests that there may be supply issues. Locations in the US with relatively inelastic housing supply have tended to experience greater real increases in housing prices, and boom for longer periods of time. Sanchez and Johansson (2011) found New Zealand's elasticity of supply for housing to be "intermediate" relative to others countries. Supply is less elastic than in the US, Canada, Japan, and some Nordic countries, and more elastic than most European countries. In any given year, new supply adds only about one to two per cent to the stock of housing (Productivity Commission, 2012).

For these reasons, the Reserve Bank placed a temporary "speed limit" on high loan to value ratio (LVR) residential mortgage lending in October 2013, restricting banks' new lending at LVRs over 80 per cent to no more than ten per cent of total residential mortgage lending. The policy had an immediate dampening effect on housing market activity and house price inflation, and facilitated a strengthening in bank balance sheets (Skilling, 2015). However, since late 2014, upward pressure on the housing market has re-emerged, predominantly in Auckland, posing renewed risks to financial stability.

A New Zealand-wide view disguises some regional variation, such as the more inelastic supply in Auckland (Grimes, 2007). There is some evidence that immigration exacerbates pricing pressures in such inelastic markets (Fry, 2014). Estimates of house price increases resulting from a one per cent increase in population, vary from 0.2 per cent to more than ten per cent (McDonald, 2013).

Land prices contribute to growth in house prices. Over the past 20 years, section prices have grown faster than house prices. In 1987, land costs constituted 22 per cent of the total cost of a house. This has now risen to around 45 per cent nationally, and around 60 per cent in Auckland (Productivity Commission, 2015). Between 2002 and 2007 alone, there was a 115 per cent increase in median land prices across New Zealand (Watson, 2013), which suggests that land prices influence house

price inflation and that there is inelastic supply where people want to live, particularly within Auckland. Because land is abundant in New Zealand, it is likely to be policy and planning practices that are constraining the supply of residential land (Watson, 2013; Productivity Commission, 2012), although physical constraints also render much land unsuitable for residential development (Auckland Council, 2011).

A recent inquiry into housing land use by the Productivity Commission (2015) supports the idea of poor policy and planning practices. The Commission identified a "wedge" between local and national interests. It found many opportunities to improve land use regulation in cities facing the greatest demand for housing, and that clearer central government expectations are also needed.

Interest rates are another major driver of house price growth. Strong international credit growth drove demand-side pressure on the housing stock over the 2000s (Productivity Commission, 2012; Lovering, 2014). This has continued into the 2010s, with easy access to credit through an increasing number of high-LVR loans during 2012 (Watson, 2013). High LVRs, and greater access to credit generally, are associated with high price volatility, since it makes it easier for investors to take leveraged positions in the housing market (Andrews et al. 2011; Maclennan, 2008). Low levels of interest rates have recently contributed towards demand growth by allowing households to service larger mortgages and thus pay higher prices for housing (BRANZ, 2013; Watson, 2013; Lovering, 2014; Andrews et al. 2011).

The construction industry is a large sector in the New Zealand economy, employing eight per cent of New Zealand's workforce and accounting for six per cent of GDP (MBIE, 2013c). As such, its productivity has a sizeable impact on economic growth. This is a concern as, although construction sectors tend to exhibit relatively poor productivity in other countries, this is particularly the case in New Zealand.

Productivity growth has been relatively low over the last 20-30 years within the local construction industry (Productivity Commission, 2012; DPMC, 2008; MBIE, 2013c) – 0.8 per cent per annum in the construction sector compared with 1.5 per cent on average for the economy as a whole over the last 20 years (MBIE, 2013d). The local construction industry has the second lowest growth rate in labour productivity and TFP of all New Zealand's "measured sector" industries over the last 30 years. Labour productivity has grown at an average annual rate of 0.4 per cent per annum, while there has been a small decrease in TFP (BRANZ, 2010). Productivity growth is about half the rate of the Australian sector, contributing to a 13 per cent productivity difference between the Australian and New Zealand construction sectors (MBIE, 2013d; Eaqub, 2013) although New Zealand is middle-of-the-pack compared to OECD countries.

Low productivity growth in construction productivity is linked to a large proportion of small firms and highly volatile demand relative to the economy as a whole (and more volatile than the international norm for construction). This leads to low rates of investment in skills, innovation and capital, and a reliance on labour input growth to deliver higher sector output (MBIE, 2013c; MBIE 2013d; DBH, 2010; Productivity Commission, 2012; CSG, 2013; CENZ, 2010).

Gaps / Questions

- **How do factors such as asset quality, other production inputs and network characteristics affect infrastructure's contribution to economic growth?**
- **How should intangible assets be measured and what role do they play in productivity and market power?**
- **When and how does ICT infrastructure in New Zealand complement and/or substitute for face to face contact?**
- **Has investment in ICT by New Zealand firms led to productivity growth? How can the economic impact of ICT be increased?**
- **What role can infrastructure spending play in lifting productivity, and what role can government play in encouraging firms to maximise the returns from this investment?**
- **How significant are natural resources to total input in New Zealand? Is the omission of natural inputs in productivity measurement affecting our understanding of productivity?**
- **What are the barriers to more efficient and productive use of available fresh water?**
- **How do industries perform in relation to eco-efficiency measures and what barriers are there to adoption of environmentally sustainable technologies?**
- **What are the key mechanisms for making housing supply more elastic?**
- **What are the key mechanisms for increasing the productivity of the construction and building sector?**
- **How does the housing market affect macro stability? How do migration, the labour market and housing markets relate to each other?**

10. Regulation and regulatory institutions

Regulation is essential for the proper functioning of economies and societies. New Zealand performs well on many international indices of regulatory performance, broad policy settings and institutions. This advantage is not as strong as it once was because other countries have been improving their institutions. Deeper inspection by the Productivity Commission also reveals some areas of weakness, and New Zealand is criticised for instability and inconsistency in its regulations. In combination, these factors suggest that broad international indices are of limited use for decision-making purposes. Instead, new methods such as those which assess the impacts of individual regulations are needed to inform policy decisions.

The importance of good regulation

Regulation, when implemented well, underpins markets, protects the rights and safety of citizens, and their property, and assists the efficient and equitable delivery of public goods and services (OECD, 2011).

Particular types of legislation – for example, contract and commercial law, competition law and financial market regulation – are fundamental to the effective operation of markets. Good regulation of infrastructure networks is also critically important, as it can help to address an enduring lack of effective competition due to natural monopolies (Australian Productivity Commission, 2014, cited in Productivity Hub, 2014). Similarly, trust in property rights and a lack of corruption are important for growth. Recent literature indicates that markets operate most effectively when there are strong rules and effective enforcement. The downside of strong rules is that they can constrain innovation and responsible risk-taking, as well as add excessive compliance costs.

There is evidence that the quality of regulation is linked to economic growth and productivity. Many studies use relatively simple indicators of the regulatory environment. These studies tend to find a negative correlation between the restrictiveness of national regulations and growth rates for a number of economic indicators (OECD, 2011). In a study of 76 countries, Loayza et al. (2004) find a significant negative causal relationship between economic growth and overall regulation.[40]

However, context matters and performance tends to be domain specific. Results may depend on a range of factors such as the system of regulatory governance, institutional frameworks, and regulator capability. This makes it difficult to draw "one-size-fits-all" lessons for specific countries (OECD, 2011). The importance of context and the effects of a dynamic business environment is emphasised in recent theories about enforcing regulations (see for example Black and Baldwin, 2007).

Regulatory practices and performance in New Zealand

The New Zealand regulatory sector includes about 200 regulatory regimes, with more than 10,000 people working in regulatory-related jobs (Productivity Commission, 2014).

[40] The authors construct an index of the severity of regulation in seven main areas of a firm's activity subject to regulation: entry, exit, labor markets, fiscal burden, international trade, financial markets, and contract enforcement. The date sources for the indices include: Doing Business (The World Bank Group), Index of Economic Freedom (The Heritage Foundation) etc.The authors find similar results when testing separately against for labour market and product market regulations too.

New Zealand performs reasonably well in terms of broad policy settings. It has modern, if not world-leading, institutions and policies in many areas (Guillemette, 2009). Given New Zealand's generally favourable policy settings, it is estimated that GDP per capita should be 20 per cent above OECD average rather than 20 per cent or so below (Barnes at al. 2011, cited in de Serres et al. 2014). New Zealand also scores well in the *Doing Business* reports. In 2015, it was ranked 2nd in terms of ease of doing business (World Bank, 2015).[41] This is the same ranking as 2014, but marks a decline from 2006, when we ranked first.

While New Zealand is notable for having regulatory systems that score highly on many international measures of quality, it is also the subject of criticism for instability and inconsistency in its regulations (Productivity Commission, 2014).

In addition, New Zealand has lost ground in recent years. At the end of the 1990s, New Zealand was considered to be a leader in implementing far reaching liberalisation across the economy. More recently, New Zealand's regulatory environment is considered to have become slightly less conducive to competition. At the same time, most other OECD countries have continued reforming, with the net effect that New Zealand is no longer at the forefront of product market regulation (PMR) but, instead, around average (Conway, 2011).

In 2013-14, the New Zealand Productivity Commission undertook an inquiry into the country's regulatory institutions and practices (Productivity Commission, 2014). Overall, it found that while New Zealand's regulatory system cannot be described as broken, it is "muddling through". The Commission's findings included the following.

- The production and implementation of effective regulation in New Zealand is undermined by limited resources and Parliamentary time.
- In the development of new regulations, mandated tests for quality and public interest have been found to not be binding, leaving the door open for approval of substandard regulation.
- The lack of regular and detailed reporting about the state of New Zealand regulators and regulation is a key gap in the current regulatory management system. Monitoring is both a key link, and the weakest link, in the current accountability system.
- In many cases, existing legislation was outdated or not fit for purpose.
- Capabilities in effective regulatory implementation need to be developed and maintained.
- Higher-level oversight, management and ownership of the overall regulatory system are warranted.

This report made this assessment based on a variety of quantitative and qualitative analysis. It did not provide direct overall quantitative evidence of this holding back economic growth.

Product market regulation

PMR refers to the rules that shape how a business conducts its activities at all stages of its lifecycle; from the very early stages of start-up, through to operations, scale-up and exit.

The OECD's PMR index measures the extent to which regulatory settings are competition-friendly[42]. In 2013, New Zealand was ranked equal 5th in the OECD. This marks a decline from 2nd in 2003,

[41] *Doing Business* uses the following indicators of good practices: 1. Making it easy to start a business, 2. Making it easy to deal with construction permits, 3. Making it easy to obtain an electricity connection, 4. Making it easy to register property, 5. Making it easy to get credit, 6. Protecting investors, 7. Making it easy to pay taxes, 8. Making it easy to trade across borders, and 10. Making it easy to resolve insolvency.

[42] Further discussion of competition in New Zealand can be found in Section 4.

although our absolute score has improved slightly over this period and most countries have very similar scores (OECD, 2014c). Modelling suggests that boosting New Zealand's ranking on the PMR index could increase potential GDP growth by 0.2-0.3 percentage points (OECD, 2013a). However, New Zealand's economy has tended to underperform relative to its ranking on this index, suggesting further PMR improvements are unlikely to lead to growth. The PMR index has also been shown to have particular flaws in how it measures regulation.

There have been some suggestions that New Zealand's PMR regime is characterised by a degree of inconsistency in the extent to which policy settings are supportive of competition (Conway, 2011).

Labour market regulation

Labour market regulation largely refers to the parameters about how employers contract for the service of labour and any requirements that must be upheld in an employer-employee relationship. Common examples of regulation include: employment protection legislation, which provides conditions on the hiring and dismissal of workers; minimum standards of employment, such as the minimum wage, conditions of work (hours of work, rest breaks and holiday entitlements); and rules around collective bargaining and the operation of unions. The various regulations have different impacts on the labour market and may not be efficiency maximising. Regulation aims to balance a flexible and productive labour market with certain principles that are important to society, such as providing some employment protections for workers.

There is a reasonable amount of evidence supporting the role that flexible labour market regulation plays in promoting labour utilisation. Such regulation enables businesses to adapt to changing conditions, to grow, and to be competitive internationally. Flexibility increases labour force participation and helps to underpin a dynamic labour market.

There is a general consensus that the current employment relations framework promotes flexible arrangements and a high degree of labour market dynamism. For example, in 2013 New Zealand had the least restrictive protection of permanent workers against collective and individual dismissals of 43 countries (OECD, 2013d). The current flexibility in the system has contributed to New Zealand having some of the highest levels of labour force participation and dynamism in the OECD. This flexibility in labour regulation is supported by complementary policies such as the comparatively low tax wedge[43] in New Zealand which is the lowest among developed countries. This ensures that disincentives to working are kept to a low level.

There is mixed evidence as to the impact on productivity of changes in the stringency and quality of labour market regulations. A loosening of labour standards will raise labour utilisation rates, but this often can be accompanied by an initial reduction in labour productivity, as lower-skilled workers enter the workforce and labour-intensive industries expand.[44] However, the impacts of more flexible labour regulation are broader than just lower barriers to labour market entry, and can affect human capital formation, adjustment rates for firms, adoption of new technology, the willingness of entrepreneurs to experiment with new ideas, and the incidence rate of high-growth firms.

For example, Haltiwanger, Scarpetta and Schweiga (2010) find strong and robust evidence that increasing hiring and firing costs through stringent regulations can hinder the speed of adjustment for firms and, in turn, the corresponding pace of job reallocation. This ultimately affects productivity. Based on OECD evidence, it is suggested that an easing in New Zealand's regulation of professional

[43] The difference between the amount paid by the employer and that received by the employee.

[44] However, this need not be the case if utilisation is raised by drawing skilled individuals back into the labour force. An example of this might be through increasing old-age participation through changes in social norms, workplace flexibility or aged-pension eligibility.

services and level of employment protection could increase how responsive firm investment is to patenting (de Serres et al. 2014; Griffith and Macartney, 2010). Other work finds that stronger protection can encourage employers – particularly smaller firms – to adopt efficient business processes that improve performance, or to invest in human capital. On the latter point, an empirical study of labour protection and productivity across 16 European economies noted that: *"it seems likely that shorter term jobs and lower employment tenures discourage investments in skills, while labour regulation, which sustain long term relationships, may present some advantages and would seem to be preferable to short-term arrangements in collaborative relations and bargaining governability"* (Damiani and Pompei, 2010).

Empirical studies are increasingly using employee- or firm-level data to assess the impact of regulations. For example, Hyslop and Stillman (2011) estimated the impact of the 2008 minimum wage reform in New Zealand on the labour market outcomes of 16 and 17 year-olds by using a comparison group of 20 and 21 year-olds. The reforms led to a 28.2 per cent increase in the effective minimum wage for 16 and 17 year-old workers. The study found that this (large) increase in the effective minimum wage had a negative effect on the employment rates of 16 and 17 year-olds. The study also found no significant effect on the unemployment of 16 and 17 year-olds, because employment losses occurred among students who were combining study with part-time employment.

This mixture of findings suggests a dual impact of stricter employee protection: the promotion of longer-term commitment versus a reduced ability for firms to adapt, with the balance of the outcomes not necessarily being clear or certain. Various cross-country studies have found moderate net effects in both directions.

Gaps / Questions

- **How do we better assess regulatory strengths / weaknesses?**
- **What do we know about the effectiveness of removing regulations compared with improving the quality of regulations?**
- **How can we generate more insights about the impact of particular kinds of regulation on productivity including by sector?**
- **How does economic geography shape the impact of regulation in terms of firm incentives, dynamics and performance?**
- **What is the relationship between regulatory regimes and industry/firm structure?**
- **How do shocks in regulatory settings impact on firms' decisions to invest in workforce development and capital over the short and long-term?**
- **What impact do labour market regulations have on skills formation and productivity?**

11. Business of government

Government is a major participant in and shaper of the New Zealand economy. Efficiency (the relation between inputs and outputs i.e. productivity) and effectiveness (the relationship between outputs and outcomes) are important dimensions of performance. New Zealand ranks highly in the World Bank's Government Effectiveness Index, a perceptions-based measure of the quality of regulation, regulatory institutions etc. Most international evidence which compares New Zealand's performance focuses on efficiency. This evidence suggests New Zealand's performance is around average compared with OECD countries. Public sector productivity growth in New Zealand has been slower than in the market sector in recent decades. There would be gains from improving government performance, for example by increasing efficiency via more competition.

The role of government

Government has an essential role in modern societies and consequently public expenditure accounts for a large share of GDP. Government's involvement in the economy takes many forms, including as a producer and procurer of goods and services, a regulator of markets, an arbiter of equity and redistribution, and a quasi-coordinator of broad economic strategy. Government provides or is involved in health, education, research funding, national security, public order and safety, transport, infrastructure, parliamentary governance and administration and more. It also necessarily goes to market to procure people, goods and services, in order to deliver on these responsibilities.

However, government can also have negative effects on the economy. Raising taxes can have distortionary costs and transfer payment can create disincentives. By competing for the same scarce resources, government activities can crowd out relatively more productive activities of the private sector.

General government expenditure (and similarly for revenues) accounts for about 40 per cent of GDP.[45] This places it among the bottom third of OECD nations with the smallest government sectors. While the size of government is one consideration, the quality of expenditure is also important.

Public expenditure may boost growth

While market distortions and crowding out are valid concerns, a large part of the business of government might be characterised as being complementary to the activities and productivity of the private sector. In laying down important institutions and resolving coordination problems, government may provide a basis for future growth.

A number of recent studies have found evidence of a connection between certain types of government expenditure and aggregate economic growth. Looking at OECD countries, Barbiero and Cournède (2013) found that government spending on health, education and transport raised long-term growth, while spending on housing held it back. Gemmell, Kneller and Sanz (2015) looked at a sample of OECD countries and found that reallocating existing government spending towards transport and communication, and education, and away from social welfare, had a robust positive long-run effect on per-capita GDP.

There is also an extensive international literature on the link between government services (including the service flow from public infrastructure) and private sector productivity. Aschauer (1989) argued that economies require a core stock of public infrastructure (e.g. streets, highways,

[45] This includes central and local government expenditure – see https://data.oecd.org/gga/general-government-spending.htm.

sewers and energy facilities) and that the provision of these can help explain productivity growth in the private sector. Related arguments include, for example, that public provision of health and education services raise human capital and labour productivity, or that the public administration of the legal system ensures that property rights can be enforced and so market transactions can be reasonably trusted. Pereira and Andraz (2005) used a dynamic model to look specifically at public investments in transport infrastructure in Portugal. They found high rates of return, at over 15 per cent, and that this investment crowded-in private investment, raised labour productivity, and had a strong positive effect on output.

There is little New Zealand-specific evidence about the link between aggregate government activity and economic growth.

New Zealand's recent history of public sector reform

New Zealand underwent a substantive phase of public sector reform during the 1980s and 1990s (see Atkinson, 1997, for a concise discussion). An important pillar of these changes was a switch to competitive commercial-like delivery of what were formerly government-provided services; replacing government controlled monopolies and imposing accountability to the taxpayer through performance-based contracts for the use of public money. Government agency budget processes were modernised and made more transparent (e.g. mandating private sector accounting principles). Heads of agencies were placed on fixed-term contracts and given greater autonomy over the operations of their agencies (removing some of this discretion from Ministers). Government price and quantitative restrictions were unwound. State sector wage bargaining was decentralised.

Many of the principles that underpinned these reforms are still considered valid today, and there is strong (though not universal) international evidence for particular parts of the programme - such as the creation of quasi-independent state-owned enterprises - having a positive impact on efficiency. It is noteworthy, however, that the era of reforms may not have delivered the economic dividends that its proponents had anticipated. While it is difficult to be sure of the counterfactual to today's economic performance in New Zealand, it was certainly hoped that the reforms of the 80s and 90s would raise productivity growth and return the country to among the top half of OECD incomes.

The performance of New Zealand's public sector

Largely due to the broad and varied nature of government activities, public sector productivity can be difficult to measure. The last decade has, however, seen some empirical progress on the matter, including with increasing attention to quality adjustment. A number of less robust measures of government efficiency and effectiveness can also be used for cross-country comparisons.

In terms of efficiency, labour productivity growth in the New Zealand public sector has been poor in recent decades, growing at an average of only 0.2 per cent per annum over 1996-2014, compared with the market sector at 1.5 per cent (Productivity Commission, forthcoming). These rates lag slightly behind those seen in Australia over the same period.

International evidence on the efficiency of the health and education sectors that shows New Zealand ranks in the middle at best. Summarising across a few studies, Barrios and Schaechter (2008) find that New Zealand's education spending efficiency tends to fall within the interquartile range among OECD countries. Afonso et al. (2003) rank New Zealand 11th and 21st out of 23 countries for education and health sector efficiency, respectively. Joumard et al. (2010, cited in Treasury, 2011) found New Zealand to be about average for health efficiency, with significant scope to improve in certain areas. Productivity data on New Zealand's health and education sectors reinforces these findings. The Productivity Commission (forthcoming) found that labour productivity growth over 1996-2014 was 1.1 per cent per annum for health, -1.4 per cent for education, compared with 0.6 per cent for central government. Education sector productivity has fallen in almost every year since

1996, and productivity in the health sector is no higher today that it was in 2001. These findings are important, given the contention that government activity in these areas may be linked to economic growth.

In terms of effectiveness, New Zealand ranks highly against the World Bank's Government Effectiveness Index, a perceptions-based measure which encompasses the quality of regulation and regulatory institutions, the performance of the bureaucracy and civil servants, and the administration of justice. Analysis by Jonker (2012) of public sector performance ranked New Zealand 6th on public administration and 12th on overall public performance, out of 28 countries. Afonso et al. (2005) placed New Zealand 2nd on public administration and 18th overall, out of 23 OECD countries. The same authors group New Zealand together with France, Spain, Portugal, Italy and Greece as among the least effective and least efficient public sectors. A further study found New Zealand to be relatively efficient in tax collection and processing (Dunleavy and Carrera, 2013). Otherwise, most evidence of effectiveness comes from evaluations of individual policies and programmes.

Improving government performance

Despite this lack of measurement and focus on public productivity, there are a number of established mechanisms for encouraging public sector efficiency. Theory and evidence support increasing competition (typically through competitive procurement), and this has led to gains in areas such as health and education in some countries (though, it is not obvious if this is true for New Zealand). In many cases, however, improvements as a result of increased competition can be incremental, owing to the presence of monopolies and resistance within electorates to provider change (Dunleavy and Carrera, 2013).

Approaches for raising productivity also include those that take effect internally in organisations, such as the direct adoption of management techniques and technology from the private sector. Evidence of success is limited (due to a lack of research and evaluation) but they are thought to be particularly effective where close public counterparts exist to competing private organisations (Dunleavy and Carrera, 2013).

Procurement

The size of government procurement activity in New Zealand – around $39 billion per annum (MBIE, 2014) – means the way that the government undertakes its procurement can have significant economic benefits or costs. Not only can it reduce costs while realising better value for money for agency spend, good processes make it easier for business to interact with government resulting in efficiency gains and improved productivity.

The literature indicates that procurement can actively influence business growth by:

- encouraging increased scale of operation because of aggregated demand, setting higher standards (Arrowsmith, 2010) and encouraging productivity improvements
- attracting new businesses to the market (including overseas businesses) who may bring new technology and skills
- providing experiences for businesses in working with large and complex systems which can be used to leverage further growth and export activity
- helping businesses access capital by providing a signal of investment readiness for investors and encourage foreign direct investment.

In terms of fostering innovation, the business of government can be used as a launch pad for innovative goods and services that are not yet available on a large scale commercial basis. Public

procurement can also lead to improvements, new capabilities and innovation in mature markets. However, there is little evidence available of the effectiveness of government procurement in fostering innovation.

Governments may look to open access for domestic businesses into foreign public procurement in order to grow exports. This can be achieved by negotiating trade agreements that include government procurement commitments. These agreements seek comparable treatment and consistency in market settings.

Gaps / Questions

- **What contribution does government activity make to economic growth in New Zealand?**
- **What are the causes and effects of low productivity growth in the public sector, and how can it be improved?**
- **Is there evidence that links improvements in government service delivery to business productivity?**
- **Is there evidence that procurement policy can be used to foster innovation and new markets?**

12. Conclusion

New Zealand has above-average policy settings but below-average economic performance.

Narrowing the productivity shortfall will likely involve some combination of higher productivity growth within industries and a general shift in economic activity toward higher productivity industries.

The New Zealand economy has a dynamic business environment with strong institutions and openness extending across trade, investment and labour flows.

This does not guarantee extensive competition or strong productivity growth. Strong productivity growth also requires investment in innovation including R&D, new technology, and capital markets that support innovation, skills and infrastructure.

With respect to these drivers of growth and productivity, New Zealand is generally good at:

- integration in international labour markets
- attracting FDI
- general intermediation in capital markets for firms
- education and workforce up-skilling
- the utilisation of natural resources and urbanisation.

The New Zealand economy needs to strengthen:

- linkages with the rest of the world via trade, outward direct investment, gaining more spill-overs from FDI and integration in global value chains
- some aspects of innovation, competition and management capability
- some aspects of capital markets and saving rates
- the proportion of people getting foundation qualifications
- housing affordability and construction productivity
- some elements of infrastructure and the management of freshwater resources.

New Zealand's performance in relation to the business of government is mixed. Further exploring the use of procurement for innovation purposes may be beneficial.

A strategic investment approach to the evidence base for economic growth policy could help reduce the gaps and uncertainty about what causes growth or the lack thereof in New Zealand.

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