

NEW ZEALAND
PRODUCTIVITY COMMISSION
Te Kōmihana Whai Hua o Aotearoa



Achieving New Zealand's productivity potential

Research Paper 2016/1

November 2016

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PRODUCTIVITY GROWTH FOR MAXIMUM WELLBEING

The New Zealand Productivity Commission:

Achieving New Zealand's productivity potential

Date: November 2016

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ISBN: 978-0-478-44043-0

Acknowledgements: This paper would not have been possible without the underlying research and insights provided by the core Economies & Research Team at the New Zealand Productivity Commission: Patrick Nolan, Lisa Meehan and Guanyu Zheng (Fish). The contributions of Simon Wakeman and Grant Scobie during their time in the team are also gratefully acknowledged. The paper has also benefited from feedback and contributions from colleagues at the Productivity Commission, particularly Murray Sherwin and Graham Scott. Feedback from colleagues at MBIE and the Treasury are also gratefully acknowledged. The paper has also benefited from feedback on presentations at the OECD, MBIE, Treasury, the Reserve Bank and Victoria University of Wellington. Thanks also to Zoe Pushon and Mona Yaghoubi for outstanding research assistance. All remaining errors and omissions are my own.

Disclaimer: The results in this paper are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI), managed by Statistics New Zealand. The opinions, findings, recommendations, and conclusions expressed in this paper are those of the author, not Statistics NZ or the Productivity Commission.

Access to the anonymised data used in this study was provided by Statistics NZ under the security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organisation, and the results in this paper have been made confidential to protect these groups from identification and to keep their data safe.

Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the [Privacy impact assessment for the Integrated Data Infrastructure](#) available from www.stats.govt.nz.

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes.

Any person who has had access to the unit record data has certified that they have been shown, have read, and have understood Section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

Information on the Productivity Commission can be found on www.productivity.govt.nz or by contacting +64 4 903 5150.

Abstract

Productivity growth has slowed across most OECD economies since the mid-2000s. While important aspects of New Zealand's economic performance have improved over this period, productivity growth is still comparatively low. This continues a long-run trend of poor productivity in New Zealand, which is the key reason why average incomes are still below the OECD average notwithstanding recent strong growth. Given that framework policy settings are often regarded as fit for purpose, this long-run track record has puzzled international and domestic economists for decades. The apparent disconnect between policy and performance naturally raises questions about the broad policy directions and institutions necessary to close New Zealand's still-substantial productivity and income gaps relative to leading OECD economies. In an effort to provide some answers, this paper outlines the extent and nature of New Zealand's long-run productivity underperformance and the broad economic reasons why lifting productivity has proven to be so difficult. On the basis of this diagnosis, the paper sketches out broad areas of policy reform that would help improve long-run growth in productivity and incomes. In some respects, this represents a new reform challenge with a focus on investing in the assets necessary to fully benefit from the important changes taking place in the global economy.

"All theories are partial; reality is complex."

Ha-Joon Chang

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Foreword

This paper outlines reasons why New Zealand has generally struggled to lift productivity over the last four decades and the broad areas of policy reform that would help in turning that around. It draws on recent research on New Zealand's productivity and aims to give a more comprehensive and policy-relevant account than has been possible previously. This paper presents a detailed analysis of the issues while a shorter and more accessible version is available in the Overview.

Much of the analysis highlighted in this paper is done by looking at firms using Statistics New Zealand's state-of-the-art Longitudinal Business Database. This approach puts firms at the centre of the analysis and broadens our understanding beyond what is possible with more traditional approaches using aggregate and industry-level data. As such, the approach taken in this and supporting research papers provides a fresh perspective aimed at better understanding the reasons for low productivity among New Zealand firms. A summary of the insights this research agenda has delivered is given in the Productivity Hub's publication "*Getting under the hood: recent firm-level research on productivity in New Zealand*".

As well as diagnosing New Zealand's underperformance, the paper also sets out a broad reform agenda that would help improve productivity. The suggested reform is based on the analysis of New Zealand's productivity track record in the context of significant changes in technology and the global trading environment. In addition to these broad policy considerations, the Commission's inquiry work provides more detailed analysis and policy recommendations around a number of the issues raised in this paper.

From the outset, it is important to emphasise that New Zealand has a distinct mix of characteristics that make it a challenging economy to analyse and understand. Because there is no single economic theory to explain New Zealand's poor productivity performance, the paper brings together different perspectives that collectively offer insights into the underlying causes of slow productivity growth and the associated policy challenges.

Because some important aspects of New Zealand's productivity story have yet to be researched in detail, there are limitations in some of the analysis and conclusions offered in this paper. As the research agenda being undertaken through the Productivity Hub¹ and elsewhere continues to provide relevant insights, the broad productivity story outlined in this paper will be updated and improved. Accordingly, this paper should be thought of as a 'living document' that will be revised from time to time as further knowledge on the causes of, and cures for, New Zealand's poor long-run productivity performance becomes available.

By highlighting areas in which our understanding is limited, the paper also provides useful input into the future research agenda of the Productivity Commission and its Productivity Hub partners. By the same token, by setting out a big picture framework for considering the underlying reasons for New Zealand's poor productivity performance and the connection to policy, the paper also highlights broad policy areas that would benefit from future inquiries by the Productivity Commission.

Much of the analysis in this paper is derived from research undertaken at the Productivity Commission outside of its inquiries. This non-inquiry work meets the Commission's obligations under the New Zealand Productivity Commission Act 2010 to improve and promote understanding of New Zealand's productivity issues. More detailed accounts of this underlying research are available in the supporting Working Papers and Research Notes on the Productivity Commission's website. In large part, this research has been undertaken by current and past members of the Economics & Research Team at the Commission: Lisa Meehan, Patrick Nolan, Guanyu Zheng (Fish), Simon Wakeman and Grant Scobie.

¹ The Productivity Hub is a partnership of public sector agencies that aims to improve the contribution of policy to improving productivity growth by connecting people, shaping research agendas and sharing research. The Hub Board is made up of representatives from the Productivity Commission, the Ministry of Business, Innovation and Employment, Statistics New Zealand and the Treasury. More information on the Productivity Hub is available at <http://www.productivity.govt.nz/research/productivity-hub>.

Key points

- Productivity growth is about creating more value by making better use of a country's resources. It is the most important source of income growth and has an important bearing on people's wellbeing.
- While average income growth has been strong over recent years, New Zealand's long-run productivity performance continues to underwhelm, particularly in parts of the services sector. This poor long-run productivity performance is the key reason why average incomes are still below the OECD average, notwithstanding recent strong growth.
- The pace at which new technology and ideas diffuse into New Zealand and spread across firms is an important key to lifting productivity. However, because technology diffusion is a 'sticky' process the reallocation of productive resources from low to high-productivity firms is also crucial.
- New Zealand's leading frontier firms have mostly had a weaker productivity performance than global frontier firms in the same industry, indicating poor technology diffusion into the economy. There are also weaknesses in technology diffusion within the economy and the allocation of resources across firms detracts from aggregate productivity, especially in some service industries.
- International connection facilitates technology diffusion and efficient resource allocation. However, geographic distance and a high real exchange rate restrict some forms of international connection and many New Zealand firms are focused on small, insular domestic markets.
- Reflecting small markets, New Zealand firms are small in international comparison and competition is weak in parts of the economy. Accordingly, firms do not grow much and there are many small, old firms in the economy, consistent with poor resource allocation and a lack of 'up or out' dynamics.
- New Zealand is a capital-shallow economy, in part reflecting relatively high long-run real interest rates, small uncompetitive markets and expensive capital equipment. Investment in knowledge-based capital (KBC) is also weak, which restricts the ability of firms to absorb new technology.
- The global trading environment is changing in important ways, with some prospective areas of comparative advantage becoming less constrained by distance and firm scale. This suggests a growing window of opportunity for New Zealand firms to engage in new ways internationally.
- The Government's Business Growth Agenda (BGA) is targeted at key areas and has the potential to help build comparative advantage. New insights on firm-level productivity could help inform the BGA to improve international connection and investment in physical and knowledge-based assets.
- The return on investment in innovation and science could be improved by a greater focus on thematic platforms where New Zealand firms have a proven track record and a good chance of global visibility. Stronger connections across parts of the innovation system and firms could encourage diffusion.
- The skills system influences the economy's ability to acquire and absorb new knowledge and win the race between education and technology. A strong focus on high-skilled migration and the housing market could alleviate skills mismatch and improve resource allocation more generally.
- Lifting competition in the services sector would improve resource allocation and help build comparative advantage in new potential areas of international connection.
- Strong regulatory stewardship is critical in ensuring that the stock and flow of regulation is consistent with higher long-run productivity growth. Overall, policy needs to improve the flexibility and resilience of the economy, with an emphasis on adaptation and making the most of important changes in the global economy.

1 Introduction

“...nothing contributes more to the reduction of poverty, to increases in leisure, and to the country’s ability to finance education, public health, environment and the arts.”

Blinder & Baumol (1993, p. 778)

Productivity growth is about creating more value by making better use of our resources. Improvements in productivity allow a given quantity of output to be produced using fewer resources or more and better output to be produced from the same resource base. By lifting national income, strong productivity growth allows countries to enjoy higher material living standards, including improved health and education services. Productivity growth also enhances some of the non-material influences on wellbeing, including the time available for leisure and the quality of the environment.

By delivering ‘more for less’, productivity improvements are a key driver of sustainable income growth and the most important source of cross-country differences in per capita incomes. But a society can also lift incomes by working harder – that is, by increasing hours worked per person – or by getting higher prices for its exports in international markets. In New Zealand, the labour market has been one of the most successful in the OECD at lifting employment and the terms of trade has, until recently, been elevated. As a result, since the beginning of the Global Financial Crisis, per capita income growth in New Zealand has been among the strongest in the OECD.

In contrast to an impressive labour market performance – and notwithstanding a lift in the 1990s following economic reform – New Zealand’s productivity performance has been relatively weak over recent decades. This is the main reason why per capita incomes are still below the OECD average, despite strong recent growth. With natural limits to labour force participation – especially in the context of population ageing – productivity will become increasingly important in driving income growth. Accordingly, a key economic challenge facing New Zealand is to successfully transition from a development model based on working more hours per capita to one based on generating more value from time spent at work.

With this objective in mind, this paper outlines key impediments to lifting New Zealand’s productivity along with some broad policy considerations that would help improve performance. From the outset, it is important to acknowledge that New Zealand – with low population scale and density and extreme geographic isolation that limits access to international markets – is not a typical OECD economy. While the international evidence is still clearly relevant, these distinctive features imply a New Zealand-specific aspect to understanding and improving productivity.

This adds to the challenge of lifting productivity – getting policy right in a small and isolated economy is more difficult than in larger or better-connected economies in which competition is more robust for a given regulatory stance. Indeed, while successive governments have improved many aspects of New Zealand’s policy and institutional settings, the productivity payoff has generally been disappointing. So while lifting productivity is a challenge in all economies, it is a particularly difficult one in New Zealand.

The productivity assessment offered in this paper is undertaken against the background of a global economy that is changing in important ways and facing a number of challenges. Skill-biased technological change, globalisation, population ageing, and rising environmental pressures are all becoming increasingly important. In isolation, each of these trends would raise difficult policy issues. In combination, they present a formidable policy challenge and the way in which governments respond will shape the future prosperity and wellbeing of their citizens (OECD, 2014).

With rapid technological change and globalisation putting a premium on skills, flexibility, openness and receptiveness to new technology, the challenge of lifting New Zealand’s productivity is different in some respects to what has been faced previously. For example, New Zealand’s economic reforms from the mid-1980s were in response to obvious policy weakness that contributed to serious economic underperformance. Whereas the mid-1980s reforms enabled productivity-enhancing economic

restructuring, the current challenge is to lock in dynamic gains from ongoing changes in technology and new opportunities for international connection. In many ways, this is a more difficult economic challenge to understand and respond to. In addition to these important new challenges, some perennial concerns also remain. For example, how can policy facilitate scale and competition in a small and remote economy to improve resource allocation across firms?

Against this background, the paper proceeds as follows. Section 2 sets out a framework for understanding the economic forces that influence firm productivity. This is derived from the OECD's work on *The Future of Productivity* that highlights technology diffusion into and throughout the economy and the reallocation of resources from low- to high-productivity firms as key drivers of aggregate productivity (OECD, 2015a). This Section also briefly outlines the productivity implications of improvements in technology and changes in the international trading environment, including the rise in Global Value Chains and international trade in services.

Section 3 outlines New Zealand's productivity performance. To provide important context, it begins with a brief description of the drivers of recent strong growth in average income in New Zealand. The analysis of New Zealand's productivity performance starts with a brief look at the aggregate and industry-level data before assessing productivity dynamics at the firm level to give a more granular and dynamic view of the economy. This shows an underperformance by New Zealand's frontier firms relative to global frontier firms in the same industry, indicative of weak international technology diffusion into the New Zealand economy. It also highlights limited technology diffusion within the domestic economy and issues with the allocation of productive resources across firms.

Section 4 digs into the broad underlying reasons for slow productivity growth in the market sector of the New Zealand economy. It highlights the negative productivity implications of small and insular markets and weak investment leading to a capital-shallow economy. In turn, the underlying causes of low investment in the types of assets that facilitate technology adoption and catch up – such as innovation and managerial capability – are also investigated. As well as small markets, this highlights the impact of New Zealand's real interest rate premium and associated appreciation pressures on the real exchange rate.

Section 5 focuses on the role of policy in responding to New Zealand's productivity challenges. Because productivity is the outcome of an extremely complex and adaptive system, there is no one solution to lifting it – unfortunately governments cannot simply use policy to 'dial up' a particular productivity growth rate. Instead, lifting productivity requires coordination across a number of policy areas to push the myriad of underlying influences on productivity in the direction of higher living standards. With markets and technology constantly changing, the policy considerations outlined in this Section emphasise resilience to change and the need to channel the benefits of change into and throughout the economy to lock in recent fast growth in income.

Brief concluding remarks are offered in Section 6.

2 The drivers of firm productivity growth

Section highlights

- The diffusion of new technologies and business practices from the most productive firms globally to the most advanced firms nationally and then on to lagging domestic firms is a key driver of productivity growth. Because this is a 'sticky' process, productivity growth also depends on the extent to which resources are reallocated from low- to high-productivity firms.
- Knowledge-based capital (KBC) – which encompasses a whole range of assets including branding, database development, product design, inter-firm networks, research and development (R&D), organisational know-how, etc. – is becoming increasingly important in driving productivity growth and facilitating technology adoption by lagging firms.
- While productivity growth for firms at the international frontier has been strong, lagging firms have struggled to lift productivity, indicative of a general slowdown in technological diffusion. This could reflect 'winner takes all' dynamics, greater importance of tacit knowledge or insufficient investment in KBC by lagging firms.
- By allowing firms to tap into the world's technological frontier, international connection is an important key to lifting productivity via technology diffusion. For firms in small economies, international connections also allow for market expansion and greater specialisation and scale, while also improving overall competitive pressures.
- The global trading environment is changing rapidly from a linear system connecting producers and consumers in different countries into a complex and sprawling producer network. This is apparent in the rise of Global Value Chains, international trade in services, and rapid growth in cross-country flows of data and people.
- Efficient resource allocation depends on low barriers to high-productivity firms growing and low-productivity firms shrinking and exiting. As well as market size, inappropriate regulations that weaken competition or restrict the growth of cities can have a negative impact on resource allocation. Skills mismatch and low social mobility also weaken productivity growth via poor resource allocation.

Since the seminal work of Robert Solow (1957), growth accounting has been the primary methodology used to assess the contribution of different productive inputs to economic growth and so calculate the rate of productivity growth as a residual. Over subsequent decades, this methodology has been the workhorse of productivity analysis, including previous work on the New Zealand economy (see, for example, Blyth, 1961; Lawrence & Diewert, 1999; Philpott, 1966). This work has proved invaluable in outlining New Zealand's productivity history at the aggregate and industry levels. However, it has perhaps been less successful at outlining the economic forces that have shaped that history.

More recently, with the increasing availability of microdata and computers sufficiently powerful to process it, firm-level analysis has been increasingly used to understand productivity (Doms & Bartelsman, 2000; Syverson, 2011). While noisy and imperfect, this approach puts firms at the centre of analysis in an effort to broaden understanding of the underlying drivers of productivity growth. After all, within the market sector of the economy, productivity growth is something that takes place within existing firms and through resource reallocation across firms, including firm entry and exit.

This Section presents a framework for considering the economic forces that influence productivity at the level of individual firms. This framework is based on the OECD's work on *The Future of Productivity* (OECD, 2015a). In Section 3, New Zealand's productivity is first assessed through a growth-accounting lens and then using this firm-level framework.

2.1 A firm-level framework

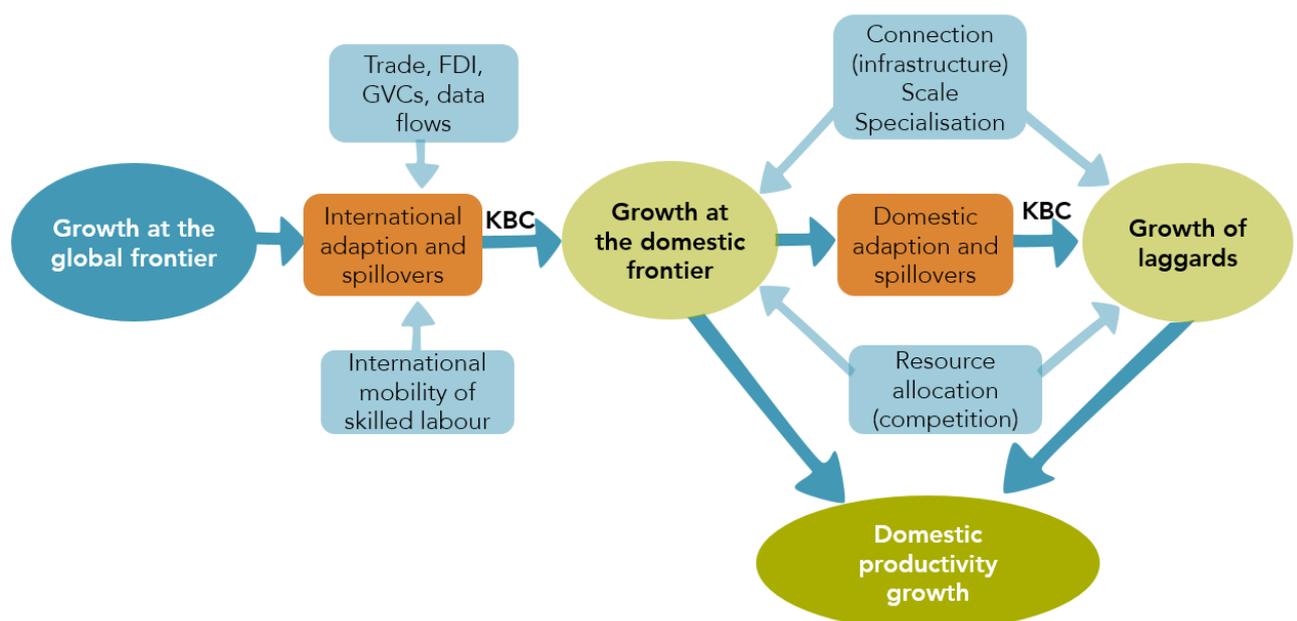
Figure 2.1 sketches out the broad economic drivers that influence productivity growth at the firm level. This illustration of the productivity growth process splits firms into one of three categories, depending on how (relatively) productive they are:

1. **Global frontier firms** – these firms are the most productive firms in their industry globally and undertake innovation that pushes out the global productivity frontier. This group comprises a small number of large and skills-intensive firms that are often multinationals and account for a considerable share of global patents and trademarks (OECD, 2015a).
2. **Domestic frontier firms** – these firms are the most productive firms in the domestic economy within their industry. Evidence indicates that these high-productivity domestic firms tend to be open to international engagement, be relatively young and are more likely to innovate (OECD, 2015a).
3. **Lagging firms** – these firms are relatively less productive in their particular industry within the domestic economy. They tend to be more focused on local markets and less influenced by developments at the international frontier (Bartelsman, Haskel & Martin, 2008; Iacovone & Crespi, 2010; OECD, 2015a).

In this view of the productivity growth process, three key forces shape an economy's aggregate productivity growth performance. First, innovations that **push out the global productivity frontier** might contribute to an economy's aggregate productivity performance, depending on the extent to which global frontier firms are domiciled in that economy. Second, the **diffusion of new technologies** from the most productive firms globally to the most advanced domestic firms and then on to domestic laggards is a critical element driving firm-level productivity growth. Third, the **allocation of productive resources** within the domestic economy – including the ability of relatively productive firms to scale up while relatively unproductive firms shrink and exit – is also a critical component of aggregate productivity growth.

In the New Zealand context, as outlined in Section 3, only a very small number of firms operate near the global productivity frontier. As such, the rest of this Section emphasises the importance of technology diffusion and resource allocation, both of which are discussed in turn.

Figure 2.1 Firm-level productivity – a conceptual framework



Source: Adapted from OECD (2015a).

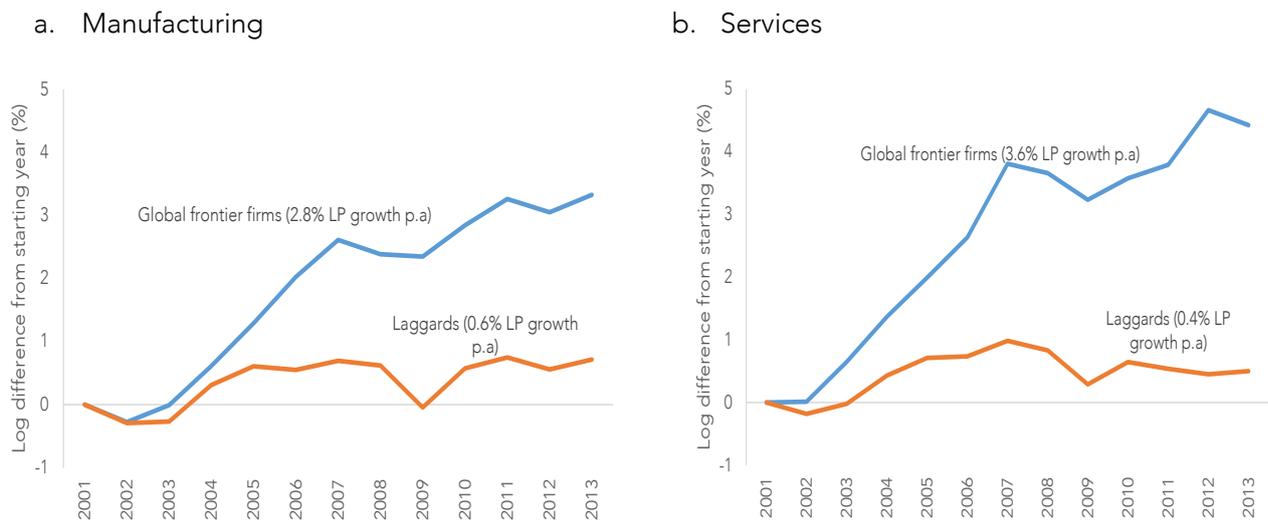
2.2 The diffusion of new technology

Firm-level data collated by the OECD shows that the world's most productive firms enjoyed robust labour productivity growth over the 12 years to 2013 – labour productivity growth in the top five percent of the most productive firms globally averaged across industries was 2.8% and 3.6% in the manufacturing and services sectors respectively (Figure 2.2). Interestingly, good productivity gains continued for global frontier firms after 2004, when aggregate productivity growth began to slow in a number of OECD economies (Andrews, Criscuolo & Gal, 2016).

Despite this rapid growth at the global productivity frontier, productivity growth in lagging firms has been much weaker at just 0.6% in the manufacturing sector and 0.4% in the services sector (Figure 2.2). This growing productivity gap suggests that lagging firms have become less effective at learning from global frontier firms and raises questions about the extent to which new technologies diffuse from high- to low-productivity firms.

This breakdown in the “diffusion machine” is particularly acute in the services sector, where the productivity gap between global frontier firms and lagging firms has grown significantly. This relatively large productivity gap in services is consistent with industry-level evidence of much weaker cross-country productivity convergence in services compared with manufacturing (Duarte & Restuccia, 2010).

Figure 2.2 Solid labour productivity growth at the global frontier but spillovers have slowed



Source: Andrews, Criscuolo & Gal (2016).

Note: Global frontier firms are defined as the top 5% of firms in terms of labour productivity levels in each 2-digit industry. All other firms are considered to be lagging firms. Unweighted averages across 2-digit industries are shown normalised to zero in the base year. The vertical axes are log point differences from the starting year. For example, frontier productivity in manufacturing is about 0.3 in the final year, which corresponds to approximately 30% higher productivity in 2013 compared with 2001. Services refers to the non-financial business services sector. The average is across Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, UK, Greece, Hungary, Ireland, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Slovenia, the Slovak Republic and the United States. The sample includes firms in 22 manufacturing and 27 service industries.

International connection is key

Notwithstanding weak diffusion from high- to low-productivity firms over recent years, the speed with which new technologies spread across international borders has actually increased (Comin & Mestieri, 2013). This reflects changes in the global trading system that have increased international connection across global frontier firms. In particular, improvements in transport technologies have increased access and lowered transport costs while international telecoms has seen vast increases in the range of available services and dramatic price reductions (Hummels, 2007; NZPC, 2012).

These developments have lowered spatial transaction costs – the extra costs incurred when suppliers and customers are not in the same location – and facilitated strong increases in globalisation and

international connection. For example, until the onset of the global financial crisis, growth in world trade was considerably faster than growth in global GDP (Figure 2.3a).

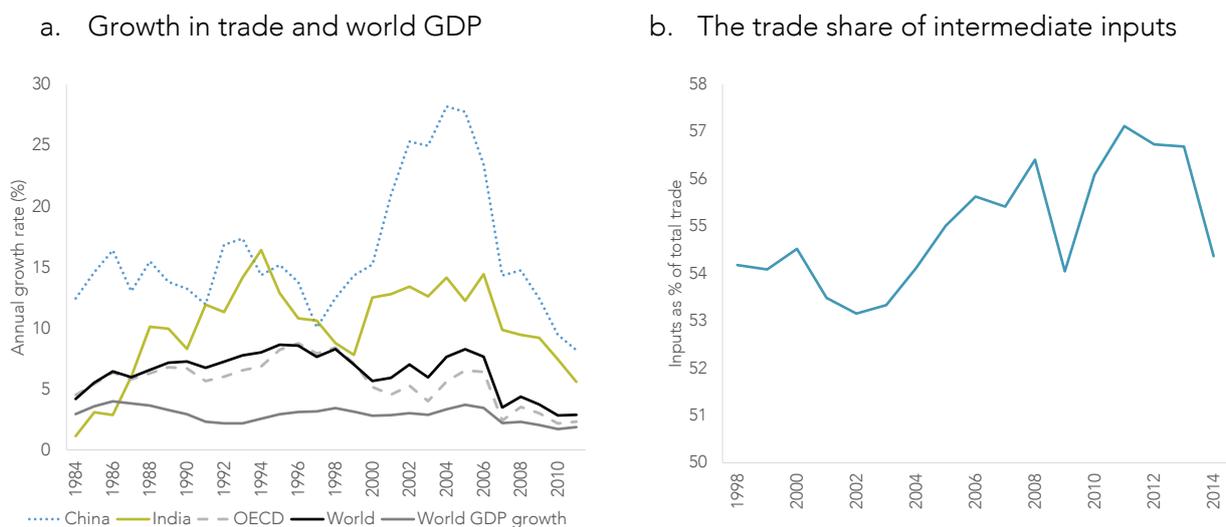
A slowly increasing share of intermediate inputs in world trade indicates that the global trading system has progressively morphed from a linear system connecting producers and consumers across borders into a complex and sprawling web of global value chains (GVCs) (Figure 2.3b). GVCs are comprised of a wide range of value-creating activities, from the development of new product ideas and basic research, design, supply of core components, assembly, distribution, retail, after-sales service and marketing activities including branding.

The global economy has also seen solid growth in services trade, which grew more quickly than goods trade over the 1980s and early 1990s (Figure 2.3c) (Meehan, 2014a). While the share of services in international trade has been broadly constant more recently, trade in commercial services – such as computer and information services, financial services and other business services – has continued to grow strongly, consistent with increased participation in GVCs by firms in these industries (Figure 2.3d).²

These changes in the global trading system have deepened cross-country linkages across firms in the manufacturing sector and opened up parts of the services sector to enhanced international connection. GVCs that involve global frontier firms and customers in advanced markets allow firms to tap into the world's technological frontier (Figure 2.1). As such, participation in GVCs is becoming increasingly important in facilitating learning and technology transfer across firms (OECD, 2013a).

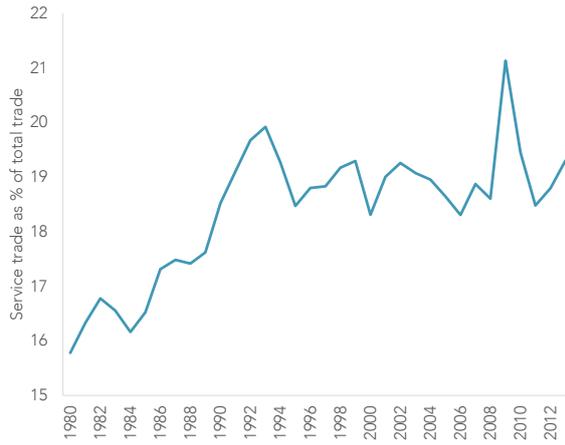
Since the outbreak of the global financial crisis in 2008, the nature of globalisation has changed with cross-country flows of trade, investment and people all slowing. In contrast, international data flows have increased dramatically since the mid-2000s (Figure 2.3f). Although much of this increase will be due to video streaming, cross-country data flows also transmit new ideas and innovation and facilitate technology diffusion (McKinsey Global Institute, 2016). This shift to a more digital form of globalisation carries important implications for who participates in globalisation and where the economic benefits accrue.

Figure 2.3 The changing nature of international trade

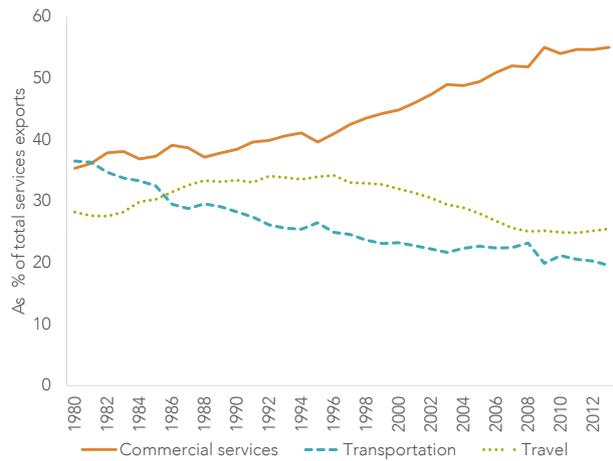


² Although a little dated, there is evidence to suggest that FDI in the services sector grew more quickly than in the goods sector at least up until the late 2000s consistent with increased international connection in services industries (Mattoo & Stern, 2008).

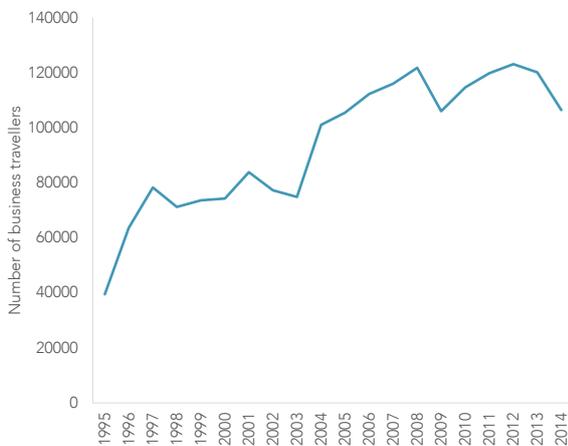
c. The trade share of services



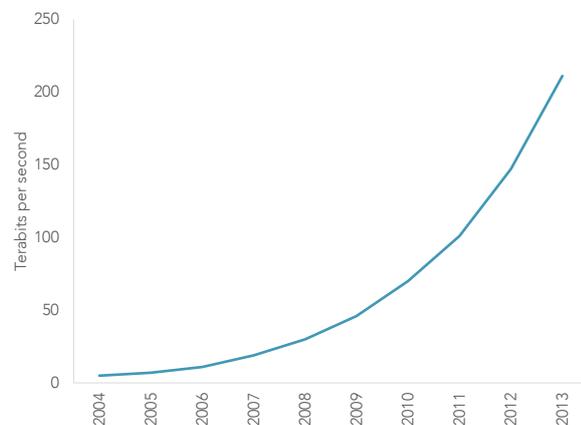
d. World services exports by type



e. Total business travellers - world



f. Cross-border data flows



Source: World Bank, World Trade Organisation

Domestic diffusion and the importance of knowledge-based capital

The learning that takes place in frontier domestic firms as a result of connection to firms at the global productivity frontier creates scope for technology diffusion to lagging domestic firms, once these technologies have been adapted to local conditions (Figure 2.1). However, as shown in Figure 2.2, productivity growth in lagging firms has weakened over the 2000s and productivity gaps have opened up, particularly across firms in the services sector. This is consistent with evidence that shows the speed with which new technologies spread across firms within the economy has slowed (Comin & Mestieri, 2013).

There are a number of possible reasons for increased 'stickiness' in technology transfer. First, as discussed in the New Zealand context below, to benefit from the current wave of new technology firms must invest in a range of complementary assets – for example software, R&D, product design, inter-firm networks and organisational know-how. Investing in this type of KBC helps firms catch up, reducing productivity gaps between the global frontier and lagging firms and economies (Griffith, Redding & Van Reenen, 2004; Vandebussche, Aghion & Meghir, 2006). If lagging firms underinvest in KBC, they are less likely to successfully adopt new technologies and capitalise on the productivity benefits they bring.

Knowledge-based capital has some important properties that distinguish it from other forms of productive capital and shape the way it contributes to economic growth (Box 1). Unlike tangible assets – such as machinery and equipment – many knowledge-based assets are, to varying extents, non-rival meaning they can be used by a number of firms at a very low marginal cost without reducing their basic

usefulness. KBC is also typically only partially excludable, meaning that its productive capability can spill over beyond its place of creation.

In combination with strong network effects, KBC can imply a greater likelihood of “winner takes all” dynamics in which one or a small number of firms make very high returns and come to dominate (Gabaix & Landier, 2008). This is most prevalent in some service industries in which ICT has increased the market reach of high-productivity firms. For instance, once a frontier firm has a strong network in place, it can be very difficult for a new entrant to dislodge them from the top spot. This market dynamic may also account for some of the widening gap between the global frontier and lagging firms in the services sector shown in Figure 2.2.

In addition to inadequate investment in KBC and winner takes all dynamics, tacit knowledge may also be becoming increasingly important as an input to production. This can include personal networks and reputations. If this type of knowledge does not easily diffuse across firms, then lagging firms might increasingly struggle to catch up to the global productivity frontier.

Cross-country differences in regulation may be another reason for the growing gap between global frontier and lagging firms. Industry-level evidence across OECD economies shows that regulation restricting competition slows the process through which best-practice production techniques are adopted by firms in industries behind the global frontier (Conway et al., 2006). As such, rapid growth in technology can amplify the negative impact of restrictive regulation, leading to divergent productivity trends in lagging economies.

For these and other reasons, new technologies do not automatically spread to all firms within a follower economy, leaving many firms to languish behind the global productivity frontier, with negative implications for aggregate productivity growth.

2.3 Resource allocation

Given the apparent “stickiness” in technology transfer from high- to low-productivity firms, the speed with which resources move from low- to high-productivity firms becomes increasingly important in driving aggregate productivity outcomes. Economies in which labour and capital flow more easily to more productive firms enjoy higher aggregate productivity growth than economies in which resource allocation is more ossified across firms.

Effective resource allocation is particularly important when technology is changing rapidly. The productivity gains from innovation are magnified when innovative firms can quickly gain market share and expand at the expense of unsuccessful competitors. Because experimentation is such a key part of innovation, dynamic high-productivity growth industries are often characterised by considerable churn of products and firms.³ In this environment, it is important that resources do not get clogged up in low-productivity firms but flow easily to more innovative firms so they can grow. The evidence suggests that economies that allocate resources more efficiently also tend to have higher returns to risky firm activities such as innovation (Andrews & Criscuolo, 2013).

The importance of market size and geography

Market size can have a significant impact on the productivity benefits from resource reallocation. In small economies such as New Zealand’s, international connection plays an important role in enhancing resource allocation by giving productive firms the room to grow while at the same time exposing unproductive firms to international competition. As well as facilitating knowledge diffusion and specialisation, international connection can also improve productivity growth through greater scale effects for domestic frontier firms and improved selection effects that weed out unproductive firms, making it less likely for resources to get trapped in low-productivity activities. Otherwise, high-

³ For example, in the United States 40% of new products are withdrawn within one year of introduction and firms adopt only about a third to a half of the new technologies they develop (Andrews & Criscuolo, 2013).

productivity firms operating in small markets risk “topping out” their market and needing fewer workers and making it more likely that resources get trapped in small, old and unproductive firms.

Related to the issue of market size, there is also a geographic aspect to enhancing the productivity impact of resource allocation. Because firms that benefit from agglomeration achieve higher productivity when clustered in cities, the geographic allocation of workers has an impact on an economy’s aggregate productivity performance. Regulatory impediments to affordable housing – such as poor land-use regulation – can detract from an economy’s aggregate productivity performance by preventing people from living in particular cities where their skills are most valued.

In broad terms, agglomeration can improve firm productivity through sharing gains from scale and specialisation; improving matching between firms and workers; and through learning based on the generation, diffusion and accumulation of knowledge (Duranton & Puga, 2004). Of course, as discussed in Section 5 in the New Zealand context, agglomeration effects vary by industry. Dramatic falls in the price of transmitting data over distance at least hint at the possibility of agglomeration benefits being less dependent on geographic clustering of firms in some areas of economic activity.

The allocation of skills and social mobility

The allocation of skills and managerial talent across firms can have important impacts on aggregate productivity growth. The extent to which people are employed in jobs that fully use their skills is an important source of cross-country differences in productivity performance (McGowan & Andrews, 2015). Because firms draw on a fixed pool of talent in the short term, skills mismatches can mean that relatively talented people get stuck in low-productivity jobs. In turn, this can constrain the growth of high-productivity and innovative firms.

Over the long term, the extent of social mobility within an economy will also influence its productivity performance. For example, impediments to social mobility that result in a high correlation between the labour market outcomes for workers and those of their parents preclude many people from exploiting their latent productivity potential (Leigh, 2013). Over the long term, aggregate productivity growth will suffer as a result.

Box 1 Defining features of intangible assets

Different classes of intangible assets share a number of features that distinguish them from other forms of productive capital, the most common are:

- **Lack of visibility:** Intangible assets do not have physical embodiment, which complicates the task of assessing the stock of a specific intangible capital based on past investment flows. For instance, depreciation rates are even harder to measure than tangibles and optimising the use of intangible capital capacity is not straightforward, not least owing to its virtual nature.
- **Non-rivalry:** Many intangible assets such as software or new product designs can be used simultaneously by multiple users without engendering scarcity or diminishing their basic usefulness. Because producing the original design of a product can involve years of research and experimentation, non-rivalry leads in most cases to high sunk costs and low marginal cost of production. The former in turn implies increasing returns to scale (that is, supply-side economies of scale), but also the need for firms to price above marginal cost so that they can recoup their initial investment costs.
- **Non-tradability:** Intangible assets used by firms are often generated internally and while some of them – for example, software and patents – can eventually be traded on organised markets, many remain inherently non-tradable, due in part to the difficulty and cost of writing “complete contracts” covering all the possible outcomes. Non-tradability entails the lack of verifiability, particularly from sources external to the firm that invests in intangibles.

- **Incomplete excludability:** In part because of their virtual nature, the property rights of many intangible assets cannot be as clearly defined and as well enforced as tangibles. Insofar as they cannot preclude others from partly enjoying the benefits of these assets, owners do not have full control and may fail to fully appropriate the returns on their investment.
- **Non-separability:** Conversely, intangible assets may have a full value that is firm-specific. This means such assets cannot be separated from the original unit of creation without some loss of value (Jensen & Webster, 2006). One way to think of it is the value that an asset might have in case of bankruptcy procedures.
- **Knowledge transferability:** The conditions under which knowledge can be transferred across firms depend partly on whether it is tacit or codified. To be transferable, tacit knowledge requires some form of embodiment, such as human capital.

Source: Andrews and de Serres (2012).

3 New Zealand's productivity performance

Section highlights

- Growth in incomes per capita have been relatively strong in New Zealand over recent years, mainly as a result of strong employment growth and, until recently, gains in the terms of trade.
- New Zealand has experienced periods of solid productivity growth and parts of the economy perform reasonably well. However, in contrast to strong employment growth, New Zealand's long-run productivity performance has been comparatively weak over recent decades.
- Overall, a growing services sector – which is occurring in many countries – is detracting from New Zealand's aggregate productivity growth performance, highlighting the importance of lifting productivity in some service industries. However, weak within-industry productivity performance is the predominant cause of New Zealand's productivity gap relative to most other OECD countries.
- The productivity performance of New Zealand's frontier firms compares poorly to that of global frontier firms in the same industry, consistent with a lack of technology diffusion into the New Zealand economy. A lack of scale opportunities for high-productivity New Zealand firms and "winner-takes-all" dynamics in some international markets may also be playing a role.
- In some New Zealand industries, the evidence indicates that lagging firms catch up towards the domestic productivity frontier. However, this is less likely in some service industries and, overall, domestic frontier firms have faster productivity growth than lagging firms.
- New Zealand's more productive firms do not always have greater market share compared with lagging firms with lower productivity. There is also some tendency for productive inputs – especially capital – to flow to relatively unproductive firms.
- There are indications that some low-productivity firms operating in local markets with weak competitive intensity survive for longer than they would in more competitive markets.

This section begins with a brief outline of the drivers of growth in national income per capita in New Zealand. It then assesses New Zealand's productivity performance from the aggregate, industry and firm-level perspectives. The aggregate and industry results are based on a growth-accounting approach while the firm-level results are based on the framework outlined in Section 2.

3.1 Productivity and income

In broad terms, higher incomes per capita can be achieved by producing more output per person or by getting higher world prices for what is produced via terms of trade improvements (Figure 3.1). In turn, lifting the amount of output produced per person in the economy can be achieved by working more hours per capita (higher labour utilisation) and/or by producing more output from each hour worked (higher labour productivity).

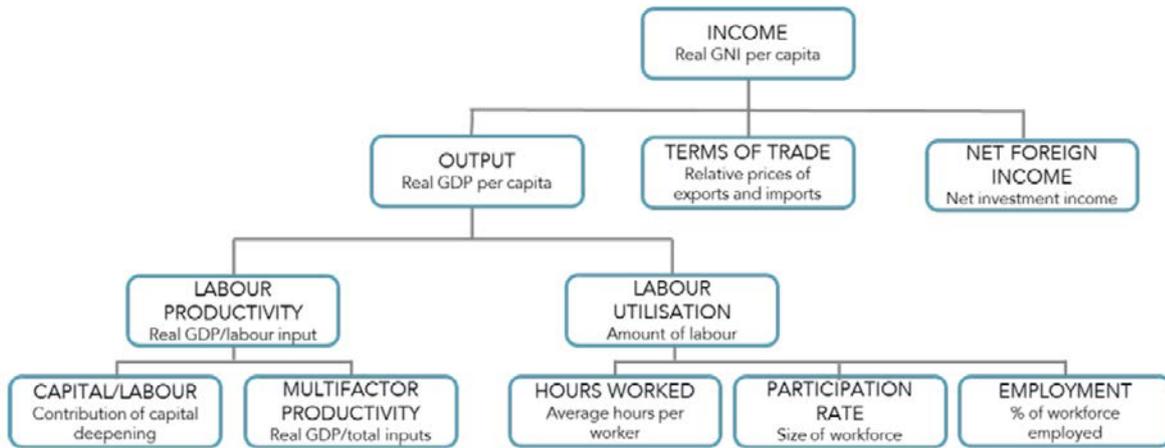
Figure 3.2a shows indices of growth in real output per hour worked and real income per hour worked. The former is a measure of labour productivity and the latter proxies the (average) real purchasing power earned from an hour at work. Over the 1990s and early 2000s, labour productivity and income per hour broadly moved together. From the mid-2000s, as the terms of trade improved, growth in average incomes per hour was stronger than growth in labour productivity. By increasing the average

value of production from an hour of work, a higher terms of trade lifted income growth above the rate of labour productivity growth.

The third line in Figure 3.2a is an index of real incomes per capita. From the early 1990s, real income per capita grew more quickly than real income per hour worked. This divergence was driven by strong growth in the number of hours worked per person, as participation in the labour market increased and unemployment fell. From the onset of the Global Financial Crisis, real income per capita in New Zealand has grown considerably more quickly than the OECD average (Figure 3.2b).

This strong contribution of growth in hours worked per capita to average incomes per capita has been a real hallmark of New Zealand’s development model – since the early 1990s, the economy has been one of the most successful in the OECD at soaking up labour, including relatively low-skilled workers.

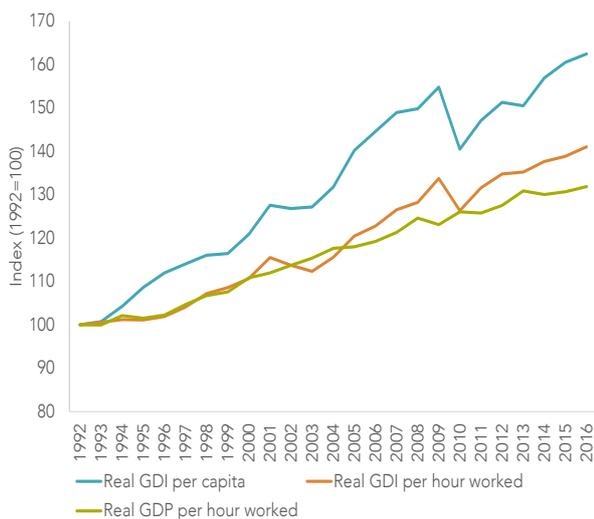
Figure 3.1 The components of gross national income per capita



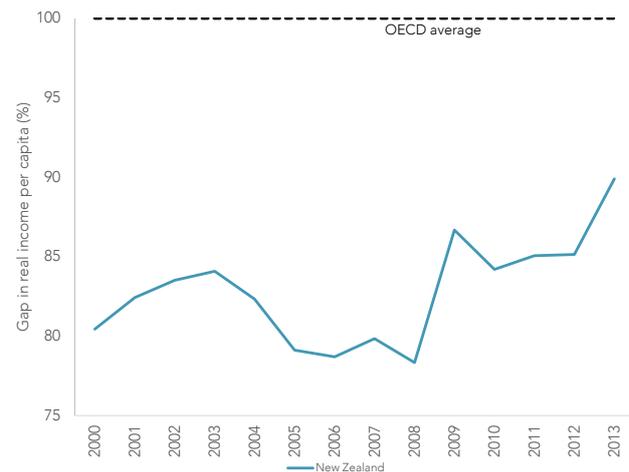
Source: Conway & Meehan (2013).

Figure 3.2 Productivity and income growth

a. Drivers of per capita income growth



b. Per capita income gap in relation to the OECD



Source: Statistics New Zealand and OECD

A trade-off between growth in employment and productivity?

While clearly very welcome, strong employment growth may be one reason for New Zealand weak productivity performance (discussed in detail below). First, productivity estimates are typically based on the *quantity* of labour used by firms to produce output. However, as discussed in Section 4, different types of labour influence a firm’s ability to adopt new technology and its performance more generally.

Accordingly, the impressive performance of the New Zealand labour market in soaking up low-skilled workers may have come at the cost of higher productivity growth.

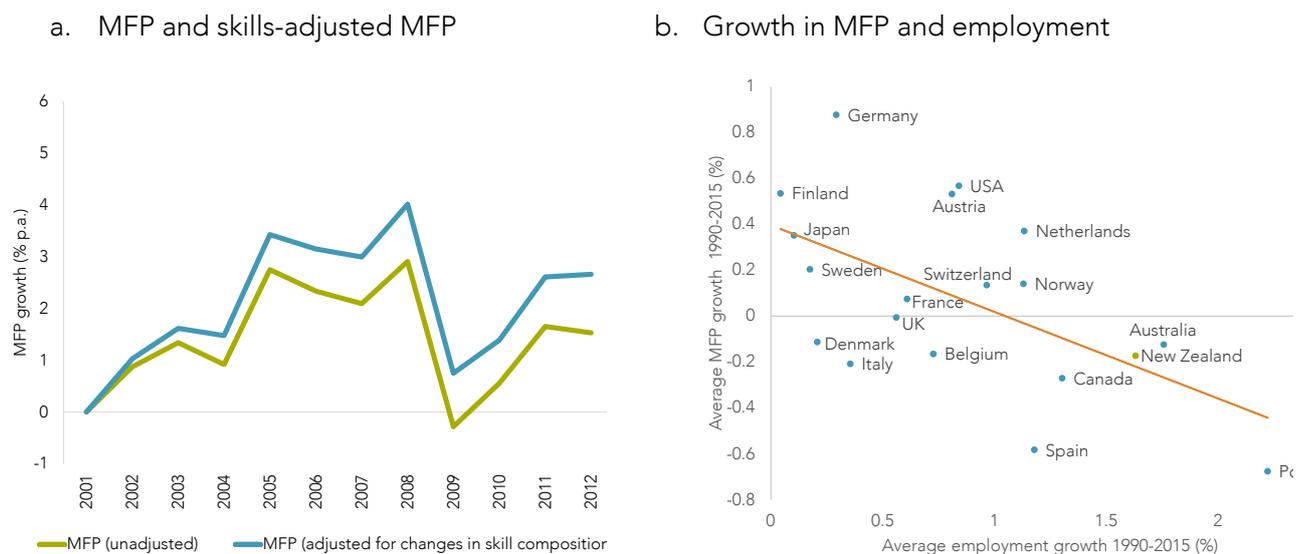
Consistent with this idea, Maré, Hyslop & Fabling (2015) find that the average *quality* of the New Zealand workforce declined slightly from 2001-2012. While average skills of existing workers increased over this period due to ageing (ie, greater experience) and rising qualifications, new workers entering the labour market had, on average, lower skills than the existing workforce.⁴ This dilution in worker quality more than offset improvement in qualifications and experience. This decrease in average worker quality is part of the reason for New Zealand's low-productivity growth – Maré et al. (2015) estimate that accounting for the decline in worker quality increases multi-factor productivity (MFP) growth by 0.1 percentage points per year (MFP is defined in Box 2) (Figure 3.3a).⁵

Second, across countries some researchers have identified a distinct negative relationship between growth in hours worked and productivity – over recent decades, countries with stronger employment growth have tended to have weaker growth in MFP (De Michelis, Estevao & Wilson, 2013).⁶ Although the economics of this relationship are not well understood, it may be that firms with abundant labour at their disposal chose not to pay the cost of adopting new technologies or reorganising production processes in ways that would ultimately improve productivity growth.

Of course, getting workers into jobs is important to improving wellbeing and testament to the benefits of New Zealand's flexible labour market. However, employment growth has a natural limit, especially in the context of population ageing. Indeed, Statistics New Zealand projections indicate that labour force participation is currently near a peak in New Zealand and is likely to decline over coming decades from around 70% currently to 64% in 2018 and 62% in 2068 (Statistics New Zealand, 2015). Although participation rates for most age groups are expected to be static or increasing, changes in the age structure sees growth in the share of older age groups where participation rates are at their lowest.

In conjunction with the link between productivity growth and higher wages, (Conway, Meehan & Parham, 2015), this indicates that a key challenge for the New Zealand economy is to transition from a development model based on labour absorption to one in which productivity improvements are more important as a source of income growth.

Figure 3.3 Productivity and employment growth



Source: Maré et al (2015): Conference Board

⁴ For example, the share of tertiary qualified workers grew from 15% to 25% while the share of workers with no qualifications fell from 19% to 14% between 2001 and 2013 (Maré et al, 2015). Over the same period, full-time equivalent employment increased strongly by around 15%.

⁵ Adjusted for quality, labour input in New Zealand grew by 13.3% from 2001 to 2012, as opposed to 15% in unadjusted terms. Slower growth in quality-adjusted labour input translates into faster growth in MFP. Specifically, MFP growth adjusted for changes in worker quality increased by an average of 0.24% per year compared with 0.14% per year for the unadjusted measure (Maré et al., 2015).

⁶ Although see Tang (2015) for a counter view.

Box 2 **Labour and multi-factor productivity**

Labour productivity estimates reflect the amount of output produced from each unit of labour employed. As such, labour productivity is relatively easy to estimate and to compare across countries, once adjusted for differences in purchasing power parity. Labour productivity is a very broad measure of productivity that does not account for the role and cost of capital accumulation and other productive inputs in increasing output. Given this, labour productivity estimates can vary considerably over time and across industries and countries as a result of variation in capital and other productive inputs.

Labour productivity can be broken down into two components. The first is capital intensity – the amount of capital available per unit of labour. Increasing capital intensity – or capital deepening – improves labour productivity as workers have more capital to use in the production process. The second component of labour productivity is multi-factor productivity (MFP). MFP is usually measured as the output produced from a ‘unit bundle’ of both capital and labour and thereby accounts for changes in capital services. As such, estimating MFP involves aggregating capital services and combining them with hours worked, which is a more difficult measurement challenge than estimating labour productivity.

MFP reflects how efficiently a combination of productive inputs is used to produce output and is often considered a proxy for broad technological advances that increase the amount of output produced from a given amount of productive input (typically labour and capital). This potentially includes a range of 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 and put to work in firms and industries throughout the economy.

Although it is convenient to consider capital intensity and MFP as distinct, they often come bundled together. For instance, a new IT system not only provides workers with increased capital, but also typically embodies more advanced technology and enables improved work processes.

3.2 **Aggregate productivity by the numbers**

Over time

Figure 3.4 shows labour productivity growth in the market sector of the New Zealand economy broken down into growth in MFP and capital intensity.⁷ From the onset of economic reform in the mid-1980s until 2000, labour productivity growth was relatively strong. Initially, this reflected increasing capital intensity as firms cut back on employment, increasing the amount of capital available per worker and the volume of output produced per hour of work. However, from the mid-1990s, employment bounced back, marking the beginning of a sustained period of strong employment growth. While this resulted in modest growth in capital per worker, MFP growth improved considerably over this period, prolonging the period of reasonable labour productivity growth.

Over the 2000s, as in a number of other OECD countries, labour productivity growth weakened, mainly as a result of poor growth in MFP. However, from just before the global financial crisis, capital intensity improved, with a beneficial impact on labour productivity growth that countered generally weak MFP growth over this period.

On the face of it, these productivity dynamics suggest that the reforms initiated from the mid-1980s delivered a levels shift in labour productivity as resources moved from low- to higher-productivity activities. Although the productivity dividend from this economic restructuring was clearly welcome, the

⁷ A much fuller review of New Zealand aggregate and industry-level productivity performance can be found in Conway and Meehan (2013).

disappointing aspect is that aggregate productivity growth subsequently fell away, indicating a lack of dynamic productivity gains.

Across countries

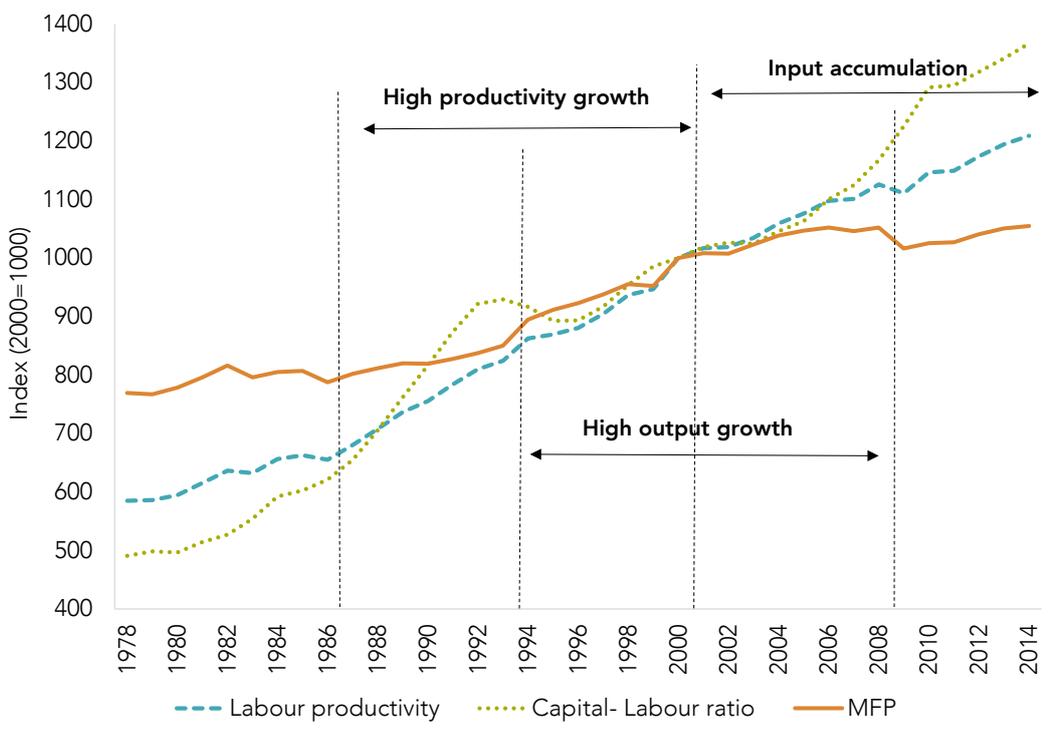
From the mid-1970s to the late 1980s, New Zealand suffered large falls in GDP per capita compared with other OECD countries (Conway & Meehan, 2013). Over the 1990s and early 2000s, while GDP growth was reasonable, fast population growth meant that growth in GDP per capita was less impressive. It was, however, sufficient to stabilise New Zealand's long-term relative decline in GDP per capita relative to other OECD economies.

As discussed above in the context of income growth, much of the improvement in New Zealand's GDP per capita relative to the OECD average from the beginning of the 1990s was the result of strong employment growth (Conway & Meehan, 2013). This reflects a labour market that has been one of the most successful in the OECD at lifting labour market participation and lowering unemployment.

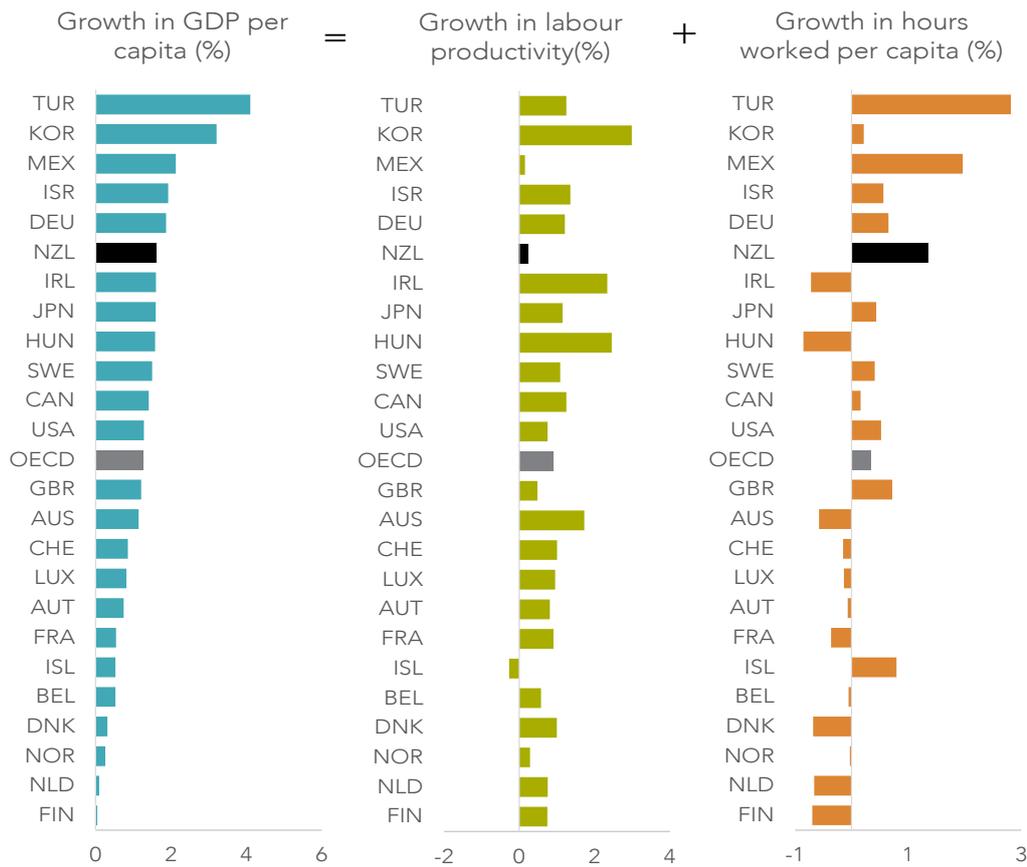
In contrast to a strong labour market performance, labour productivity suffered a long, slow decline relative to the OECD average (Conway & Meehan, 2013). This was even the case during the 1990s when New Zealand's labour productivity performance had picked up following reform. This relative decline occurred despite the emergence of a large productivity gap over the 1970s. So despite a low level of labour productivity, labour productivity growth was also consistently below the OECD average. This is unusual internationally given that lagging economies have, in principle, greater scope for growing more quickly than leading economies.

More recently, from 2009-2014, growth in GDP per capita has been above the OECD average (Figure 3.5). As is the longer-run pattern, much of this relatively strong growth in GDP per capita reflects strong growth in hours worked per capita while labour productivity growth has been below the OECD average. Nevertheless, significant gaps still remain and in 2014, GDP per capita in New Zealand was still below that of leading OECD economies. For example, it was about 20% below Australia and 40% below GDP per capita in the United States. New Zealand's comparatively poor productivity growth is the main reason for this gap in GDP per capita (Conway & Meehan, 2013).

Figure 3.4 Labour productivity, MFP and capital intensity



Source: Conway, Meehan & Parham (2015) (updated).

Figure 3.5 New Zealand's performance relative to selected OECD economies, 2009-14

Source: OECD

3.3 Industry composition and structural change

Some parts of the New Zealand economy track reasonably well from a productivity perspective. In the “former measured sector” (MS-12) – which accounts for about 60% of GDP and covers all primary and manufacturing industries along with some, but not all, service industries – both labour productivity and MFP growth have been significantly faster than at the level of the aggregate economy (Table 3.1).⁸

In comparison to the broadly equivalent part of the Australian economy, labour productivity growth in New Zealand’s MS-12 was much stronger in the 1980s, about the same in the 1990s, and considerably weaker in the 2000s (Table 3.2).⁹ Stripping out the impact of capital deepening reveals that MFP growth in New Zealand’s MS-12 was actually stronger than in the comparable part of the Australia economy over the 1980s and 1990s and about the same over the 2000s.

This indicates that while New Zealand aggregate productivity performance has generally been poor over recent decades, the picture improves once non-market and difficult to measure industries are excluded. While there are industries and firms in the difficult to measure part of the economy that perform well, poor productivity growth in parts of the services sector and the public sector play an important role in explaining New Zealand’s weak aggregate productivity performance.¹⁰

⁸ The service industries that are excluded from the “former measured sector” are: rental, hiring & real estate; professional, scientific & technical services; administrative & support services; other services; central government administration, defence & public safety; education & training; health care and social assistance; ownership of owner-occupied dwellings.

⁹ International comparisons of New Zealand’s productivity performance at a sub-aggregate level are constrained by a lack of comparable data. However, the Australian Bureau of Statistics publishes productivity numbers for a slice of the Australian economy that is the same as New Zealand’s MS-12. In its 2014 Services inquiry, the Productivity Commission recommended that Statistics New Zealand should work to include New Zealand in the OECD’s international productivity database, which would allow for more comprehensive international comparisons of New Zealand’s productivity performance at the industry and sector levels (NZPC, 2014).

¹⁰ While this paper is focused on lifting productivity in the market sector, the contribution of the public sector to New Zealand’s aggregate productivity performance is also extremely importance. As a complement to this paper, public sector productivity has also been the subject of a research stream at the Productivity Commission. See Gemmell, Nolan and Scobie (forthcoming).

In spite of a relatively good productivity performance in MS-12, growth in labour and capital inputs into this part of the economy have been relatively low and much weaker than in the equivalent part of the Australian economy (Table 3.1 and Table 3.2). This raises questions about the extent to which New Zealand's poor aggregate productivity growth reflects strong employment growth in low-productivity industries.

At the industry level, New Zealand has indeed experienced a stronger movement of employment from high- to low-productivity industries compared with the "average" OECD economy (Meehan, 2014b; Laws & Meehan, 2015). The available data, which is now rather dated, indicates that while the broad directions of structural change in the labour market are similar, the correlation between employment growth and (relative) industry productivity is more negative in New Zealand than on average across the OECD (Figure 3.6).¹¹

More detailed cross-country productivity comparisons also show that New Zealand's economic structure explains a sizeable share of the aggregate productivity gap. Mason and Osborne (2007) attribute a quarter of the New Zealand-United Kingdom gap in average labour productivity in the market sector to differences in employment structure, with the remaining three-quarters due to within-industry productivity differences. In a similar New Zealand-Australia comparison, Mason (2013) finds that differences in employment structure explain about 30% of the trans-Tasman productivity gap.

The sizeable negative contribution of industry structure holds some important insights. First, there is scope to improve aggregate productivity through strong growth in high-productivity firms and industries. With small domestic markets, this highlights the importance of international connection to allow high-productivity New Zealand firms and industries to grow. In Australia, for example, the impact of structural change has been much less negative than in New Zealand because of strong growth in the high-productivity mining industry that is focused on international markets. While New Zealand clearly has a strong comparative advantage in primary industries, ongoing growth in this part of the economy is constrained by important environmental considerations.

Second, New Zealand's relatively large negative structural-change effect highlights the importance of lifting productivity in the services sector. For a number of reasons, the services sector is likely to continue growing as a share of economic activity (NZPC, 2014). In the absence of significant productivity improvements, this would pose a threat to future productivity growth given that the services sector is more prone to poor productivity growth and resource misallocation compared with other parts of the economy (Andrews & Cingano, 2014). As discussed in detail in Section 5, improving the productivity performance of the services sector needs to be a key policy objective in lifting productivity.

Table 3.1 Sources of growth in New Zealand

	"Former measured sector" MS-11	Total economy
1988 - 2014		
Output	2.2	2.7
Labour inputs	0.2	1.4
Capital inputs	2.6	3.7
Labour productivity	2.0	1.3
Multi-factor productivity	1.0	0.6

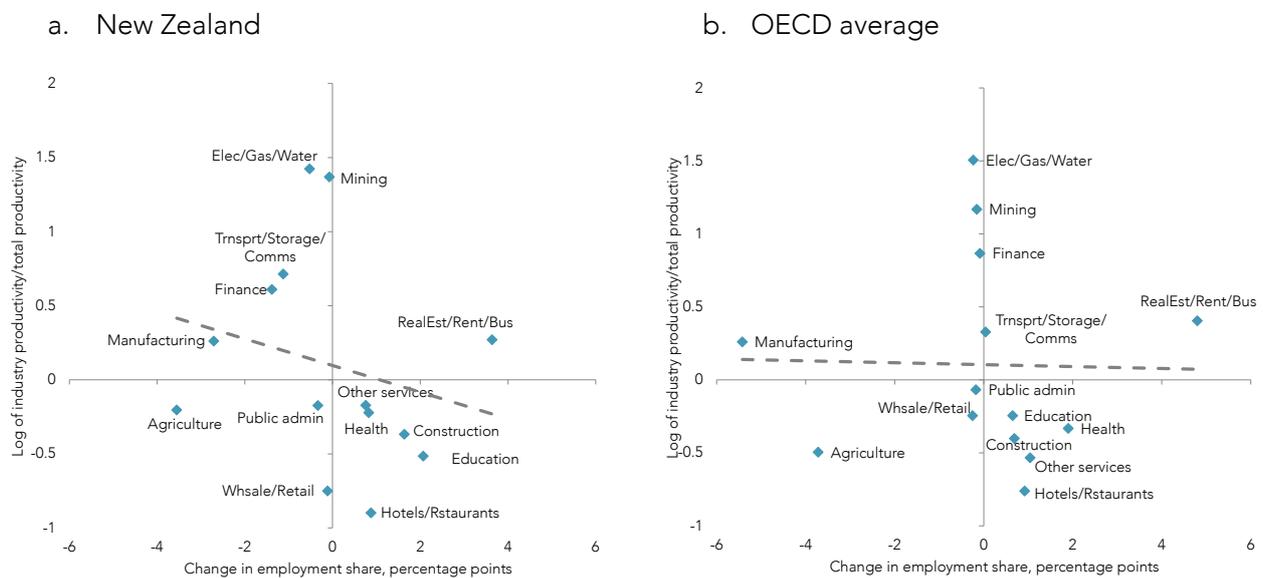
Source: Statistics New Zealand and OECD

¹¹ More specifically, like the average experience among OECD countries, manufacturing; agriculture; transport, storage & communications; utilities and mining lost employment share in New Zealand, while finance; real estate & business services; construction; wholesale & retail trade; hotels & restaurants and community, personal & government services gained employment share.

Table 3.2 Sources of growth in the “former measured sector” – a trans-Tasman comparison

	1980s	1990s	2000s
<i>New Zealand</i>			
Labour input	-0.5	0	0.8
Capital input	4.6	2	3.4
Cap deepening	1.9	0.8	1.1
Labour productivity	2.5	2.8	1.4
MFP	0.7	2	0.3
<i>Australia</i>			
Labour input	1.7	0.5	1
Capital input	4.7	3.5	5
Cap deepening	1.1	1.2	1.8
Labour productivity	1.5	2.9	2.1
MFP	0.3	1.7	0.4

Source: Conway, Meehan and Parham (2015)

Figure 3.6 Cross-industry employment shifts and (relative) productivity, 1990–2005

Source: Meehan (2014b).

3.4 The productivity of firms

While the aggregate and industry-level discussion above is useful for outlining New Zealand’s productivity history, it tells us little about the economic forces that have shaped that history. Understanding the underlying economics of New Zealand’s productivity performance requires going beyond the aggregate and industry data to look at productivity dynamics at the firm level.¹²

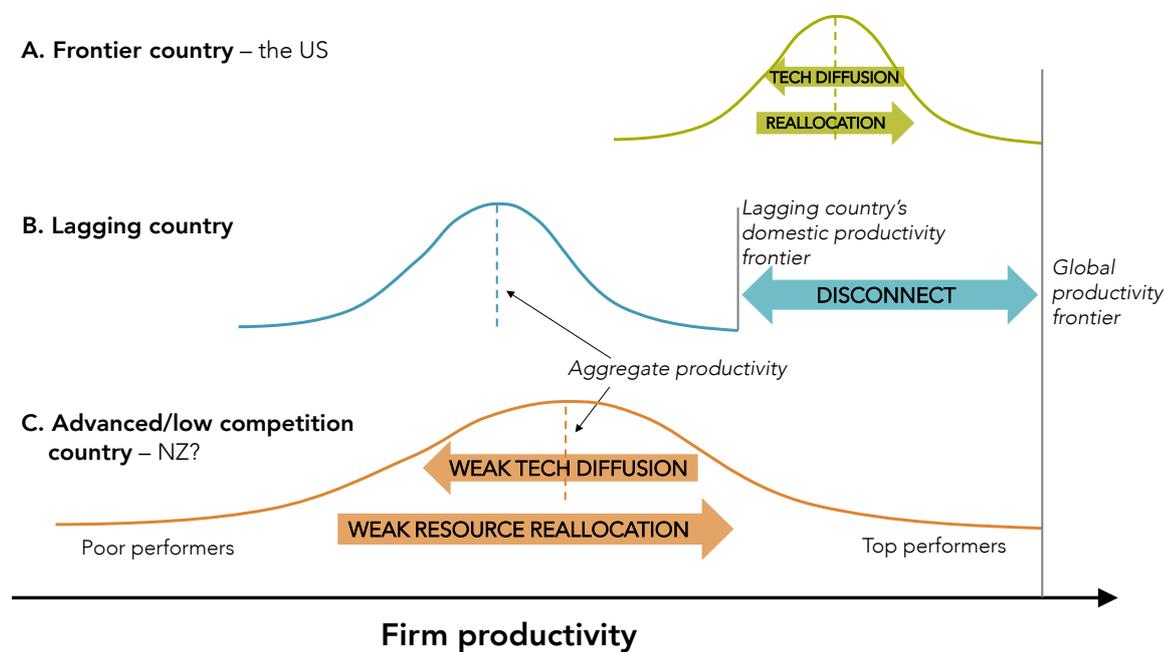
¹² There are also issues with firm-level data. For example, firm-level analysis might assume that firms within broad industries are competing with each other when the reality is that an industry is made up of a number of different segments selling different products or serving different markets.

So how does the firm-level perspective outlined in Section 2 help to diagnose the underlying causes of New Zealand's poor long-run productivity performance? The framework suggests two broad possible reasons for low aggregate productivity, a stylised representation of which is given in Figure 3.7. First, it could reflect a failure of firms operating at the New Zealand productivity frontier to catch up towards firms operating at the global productivity frontier. As elaborated on in Section 4, this disconnect could reflect limited or ineffective international connection that impedes cross-border technology diffusion.

The second broad possible reason for poor productivity growth from a firm perspective is that there may be an unusually long tail of low-productivity firms operating in the New Zealand economy. In turn, this coexistence of high and low-productivity firms could be due to weak domestic technology diffusion and/or weak market selection effects that result in many low-productivity firms surviving, thereby hindering productivity-enhancing resource reallocation.

This sub-section describes the productivity dynamics of New Zealand's frontier and lagging firms using the framework developed in Section 2 as a basis for discussion. The deeper underlying reasons for these productivity dynamics are then laid out in Section 4.

Figure 3.7 Stylised reasons for low aggregate productivity



The pull of the frontier

In the discussion above, new technology encompasses a very broad range of factors – including new knowledge and ideas – that have the potential to influence a firm's productivity performance. While the transfer of these technologies between firms is difficult to observe directly, productivity dynamics at the firm level give some indication of technology diffusion both across the border and within the domestic economy.

International diffusion

As a broad indication of international technology transfer, Figure 3.8 plots the growth in labour productivity and MFP for New Zealand frontier firms over the period 2001-2012 relative to that of global frontier firms in the same industry. Global and domestic frontier firms are defined as firms in the top 5% of the international and domestic productivity distribution in their industry respectively.

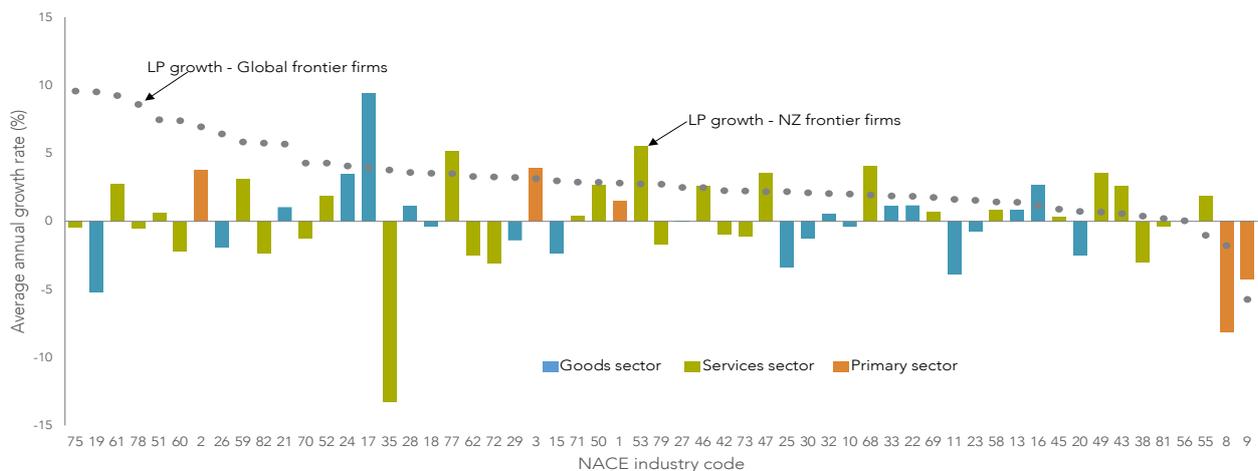
The message is that the productivity growth performance of New Zealand's frontier firms compares poorly to that of global frontier firms over the period 2001-2012. Although comparing firm productivity levels across countries is difficult, the evidence suggests that New Zealand's leading firms are, on

average, about one-third less productive than leading international firms in the same industry.¹³ However, despite this possible productivity levels gap, productivity growth in New Zealand frontier firms has been weaker than in global frontier firms in most industries. Both labour productivity and MFP growth in New Zealand frontier firms has been weaker than in global frontier firms in about four out of five industries in the sample (Figure 3.8a and b). As is apparent from the figure, growth in labour productivity and MFP has actually been negative in New Zealand's frontier firms in a number of industries.

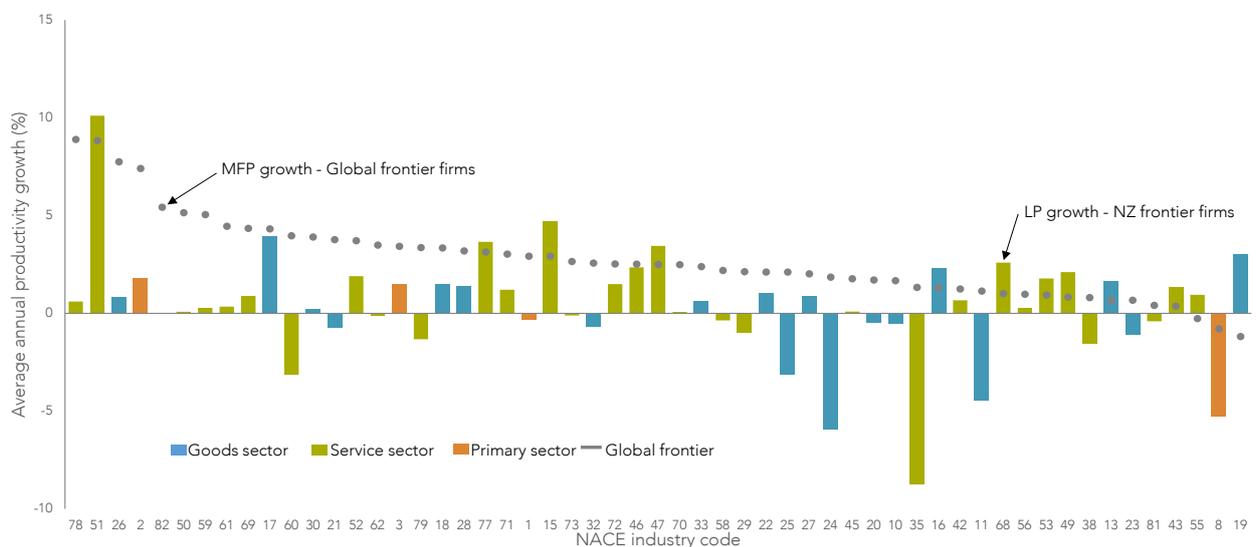
Although a few New Zealand firms operate at the global productivity frontier in their industry, the results in Figure 3.8 raise concerns about the extent to which New Zealand's most productive firms benefit from new technologies and ideas developed and used by global frontier firms.

Figure 3.8 Productivity growth of New Zealand frontier vs. global frontier firms 2001-12

a. Labour productivity growth



b. MFP growth



Source: Andrews, Criscuolo & Gal (2016); and Productivity Commission calculations using LBD.

Note: The vertical axis in Figure 3.5a shows the percentage difference in the labour productivity levels of New Zealand frontier firms in their industry vs the global frontier firms in the same industry. For all charts, the countries included in the global frontier are Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, UK, Greece, Hungary, Ireland, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Slovenia, the Slovak Republic and the United States. Industry detail is at the NACE rev.2 which can be found at

http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN&IntPcKey=&StrLayoutCode=&IntCurrentPage=1

¹³ It is important to note that comparing productivity levels across countries is notoriously difficult given uncertainty in the industry-level estimates of purchasing power parities (PPP). International growth rate comparisons are less susceptible to associated measurement errors.

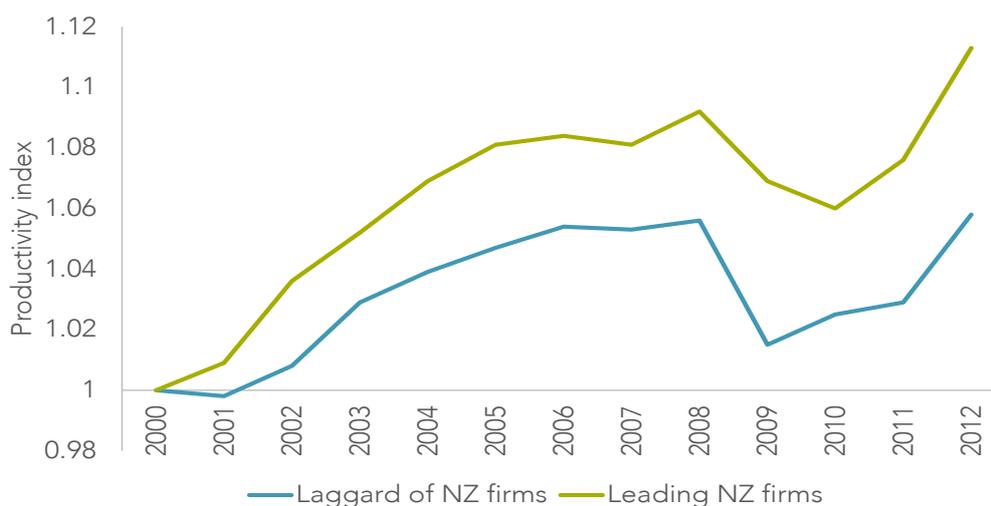
Domestic diffusion

Although the productivity growth performance of New Zealand's frontier high-productivity firms does not compare particularly well internationally, productivity growth in New Zealand's lagging firms – that is all firms with productivity levels below the top five percent of firms – is generally weaker still. This suggests that productivity gaps are opening up within the domestic economy (Figure 3.9). Overall, when weighted by employment, MFP growth for firms in the top 5% of the productivity distribution in their industry averaged 11% over the 2000s, whereas lagging firms improved their productivity by a more modest 5%.

Importantly, firm-level evidence indicates some tendency for new technologies to spill over from frontier to lagging firms in some industries within the domestic economy. Conway, Meehan & Zheng (2015) found that productivity convergence across domestic firms is significant in manufacturing industries but much slower and more likely to be statistically insignificant across firms in some service industries and parts of the construction industry. Some of these industries with weak productivity convergence account for significant shares of total employment, meaning that a considerable share of employment is in industries where productivity-enhancing technology spill overs are unlikely to occur.

This raises important questions about the extent to which lagging firms in parts of the services sector are exposed to, and benefit from, technology improvements at the domestic productivity frontier in their industry.

Figure 3.9 Annual MFP growth of frontier and lagging New Zealand firms



Source: Zheng (2016).

Note: Productivity index is set to one at the 2000 base year. For each firm category, average MFP is firstly aggregated to the industry level and then adjusted by industry composition using industry weights

3.5 Market selection and resource reallocation

While a few New Zealand firms are likely to have productivity levels close to the global frontier in their industry, the weight of these firms in the aggregate economy is very small. This highlights the point made in Section 2 that the aggregate gains from the diffusion of global frontier technologies will be magnified if productive resources flow easily from low- to high-productivity firms within the New Zealand economy.

In a static sense, New Zealand firms in the top quartile (25%) of the MFP distribution in their industry account for a disproportionately small share of total employment and capital compared with firms in the lower quartiles (Figure 3.10a). This is suggestive of long-run impediments in the process of productivity-enhancing reallocation of labour and capital within the New Zealand economy. This tendency for firms with relatively low MFP to account for a large share of workers and capital is more

apparent in the services sector whereas resources are more weighted towards higher-productivity firms in the manufacturing sector (Figure 3.10b and c).

The third column of charts in Figure 3.10 shows growth in employment and capital across firms in each quartile of the MFP distribution in their industry. In a dynamic sense, in the absence of impediments to reallocation, more productive firms should grow relatively quickly over time while less productive firms should shrink and exit. More optimistically, in both the manufacturing and services sectors, employment growth is weighted towards more productive firms, with positive implications for aggregate MFP growth. However, while capital growth in the services sector is generally weighted towards more productive firms, growth in the capital base of low-productivity firms in the manufacturing sector has been relatively strong.

Although it is difficult to pinpoint the underlying reasons, international studies have suggested that distortions in capital reallocation may, in part, reflect a banking system that favours certain types of firms and struggles to provide credit to high-productivity firms with no credit history or a lack of tangible assets to use as collateral.¹⁴

Figure 3.10 Reallocation by productivity quartile



Source: Meehan (forthcoming).

Note: The highest productivity quartile is labelled "4" and the lowest is "1". The horizontal axis for labour productivity measures the average level of productivity for firms within each quartile in the industry relative to the industry unweighted mean, summed over all industries using industry employment weights, and averaged across all years. The horizontal axis for employment share measures the share of employment in firms in each labour productivity quartile (total employment by quartile for all years and industries divided by total employment for all years and industries). The horizontal axis for employment (capital) growth share is employment (capital) growth for the quartile less total employment (capital) growth averaged over all years.

¹⁴ For example, OECD (2015d) notes that net lending in the UK decreased in the aftermath of the GFC. Banks were increasingly reluctant to write-down non-performing loans made to unprofitable firms while lending to young but productive firms (that were less likely to have a credit history or collateral) decreased. For southern European economies, Gopinath et al (2015) suggests that the decline in the real interest rate, often attributed to the euro convergence process, led to a decline in MFP as increased capital flows were misallocated towards firms that had higher net worth but that were not necessarily more productive.

4 Why New Zealand firms underperform

Section highlights

- New Zealand's generally poor long-run productivity performance outlined in Section 3 reflects three broad features of the New Zealand economy:

Weak international connection and small insular domestic markets

- Despite New Zealand being relatively open on paper, only a small share of New Zealand firms engage in global markets through trade and foreign investment links. Limited international connection largely reflects the impact of distance in combination with an overvalued real exchange rate.
- The challenge of remoteness to major foreign markets is compounded by New Zealand's small and insular domestic markets. Firms in parts of the services sector are most likely to operate in small local markets insulated from competition and learning opportunities and with little opportunity or incentive to scale up.
- As well as restricting scale, New Zealand's small domestic markets and geographic isolation restrict the impact of competition on resource allocation. Competition is important for driving efficient resource use and innovation that sustains productivity growth over time.
- Small and dispersed markets impact on firm growth. Firms start small and survivors remain relatively small, consistent with a lack of "up or out" dynamics.

Low investment and a capital-shallow economy

- The New Zealand economy is capital-shallow, which may reduce the diversity of New Zealand's exports and productivity performance. Weak business investment is partly due to a high cost of capital, expensive investment goods and small markets.
- In turn, a high cost of capital reflects high long-term interest rates. This suppresses investment and contributes upward pressure to the real exchange rate, exacerbating the difficulties New Zealand firms face in connecting internationally and encouraging resources into the relatively unproductive "non-tradables" part of the economy.
- The underlying causes of high interest rates are not particularly well understood but may be related to persistent excess demand pressures in the economy. In turn, these pressures could be driven by strong population growth and low savings in combination with low long-run productivity growth.

Weak investment in knowledge-based capital

- While little is known about investment in KBC in New Zealand in general, R&D and managerial capability – both of which are important in facilitating technology diffusion – are weak.
- Access to international markets is associated with productivity-enhancing innovation. A lack of international connection coupled with small domestic markets most likely lowers the return on investment in R&D, which may partly explain New Zealand's poor performance in aspects of innovation.

The analysis presented in Section 3 raises important questions about the productivity dynamics of New Zealand firms. First, the generally poor productivity performance of New Zealand's frontier firms compared with global frontier firms suggests issues with the incentives these firms face to adopt new technologies developed at the global technology frontier. The "diffusion machine" may also be

ineffective within the domestic economy given weakness in the extent to which lagging New Zealand firms catch up to New Zealand frontier firms in the same industry. Issues with the reallocation of resources from low-productivity to high-productivity firms also detracts from aggregate productivity growth. Some of these issues are more acute in parts of the services sector.

As touched on in Section 2, a large body of literature has identified a number of reasons for sustained productivity differences across firms, despite the expectation that technology diffusion and market selection would equalise firm productivity over time. On the supply side, differences in management capability, R&D and investment patterns are important (Doms & Bartelsman, 2000). Demand-side factors – such as imperfect product substitutability, due to geographic segmentation, and intangible factors such as consumer-producer relationships – may also play a role (Syverson, 2004; Syverson, 2011). Although much of this literature focuses on within-country productivity variation, these factors are also likely to be relevant in understanding large and persistent productivity differences across countries (Andrews et al., 2016).

This section looks at some of these issues to drill into the deeper causes of weak technology diffusion and poor resource allocation across New Zealand firms. It begins with a look at the extent to which New Zealand firms are integrated into large markets, both internationally and domestically. Weak or ineffective international connection would lead to geographic market segmentation and a “technology disconnect” between New Zealand’s frontier high-productivity firms and global frontier firms consistent with the productivity dynamics outlined in Section 3. Within the domestic economy, firms focused on small insular local markets are less likely to be exposed to the new technologies and competitive pressures that facilitate productivity-enhancing reallocation.

Weak technology diffusion across New Zealand firms could also arise from low investment, particularly in KBC such as management capability and innovation. As discussed in Section 2, investment in KBC is necessary in spurring the adoption of new technology by firms some distance behind the domestic productivity frontier. Accordingly, this section looks at broad trends in investment spending by New Zealand firms before focusing on their investment in KBC, particularly in innovation and managerial capability. Both of these are critical to the diffusion of new technology. The section also outlines a number of plausible reasons why investment, including in KBC, and capital intensity are low in New Zealand.

4.1 Small insular markets

International (dis)connection

As discussed in Section 2, international connection is critical to improving productivity through exposure to global frontier technologies. While the beneficial impact will depend on the type of international connection, good empirical evidence indicates that a country’s speed of productivity convergence increases with trade openness (for examples, Johansson et al., 2013). These beneficial impacts of trade openness arise through a number of channels, including increases in effective market size, increased knowledge flows and tougher product-market competition that encourages productivity-enhancing reallocation.¹⁵

The benefits of international connection are particularly important in small economies. Small domestic markets mean weak competitive pressures and limited scope for productive firms to grow and benefit from scale effects. The investment necessary for firms to build capital and innovate may also be less forthcoming in a small domestic market. It follows that the smaller an economy, the more internationally connected its firms need to be to reap the numerous benefits that come with larger and more competitive markets.

It is well accepted that distance from large global markets works against international connection and negatively impacts an economy’s productivity performance. Indeed, a key finding in the trade literature is that “gravity-type” variables – including distance – have an important impact on cross-country trade

¹⁵ See, for instance, Crespi, Cricuolo and Haskel (2008); Duguet and MacGarvie (2005) on trade and knowledge flows; Melitz (2003); Melitz and Ottaviano (2008); Melitz and Trefler (2012) on trade and competition; and Schmookler (1966); Acemoglu and Lin (2004) on trade and effective market size.

and investment flows. For example, Boulhol and de Serres (2008) find that remoteness from international markets detracts as much as 10 percentage points from GDP per capita in New Zealand and Australia. Further, de Serres, Yashiro and Boulhol (2014) estimate that weak international connection accounts for over half of New Zealand's productivity gap relative to the OECD average.

Somewhat counterintuitively, the negative impact of distance on international connection may have increased over recent decades as a result of changes in the global economy outlined in Section 2 (Disdier & Head, 2008; Berthelon & Freund, 2008). Given the importance of tacit knowledge and face-to-face contact, the rewards to proximity may have increased, resulting in knowledge-intensive and high value-added activities increasingly taking place within large cities. Through the lens of economic geography, McCann (2009) argues that lower spatial transaction costs have made it more difficult for New Zealand firms to access international markets, with negative implications for economies of scale and scope.

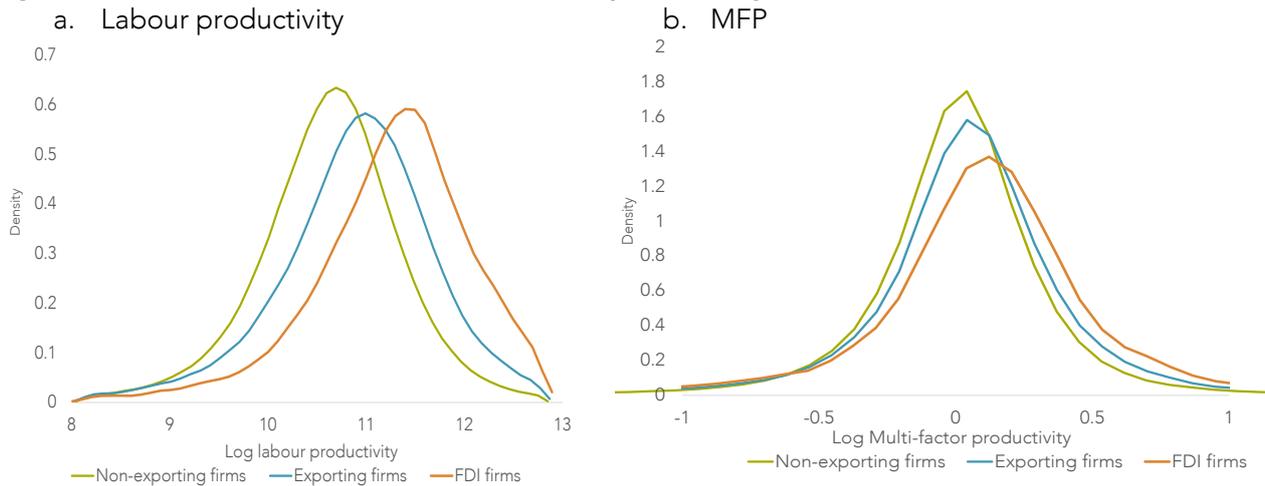
The rise of global value chains (GVCs) may have also added to the difficulties New Zealand firms face in accessing international markets and benefiting from international connection. Because GVCs often involve rapid back and forth trade in intermediate inputs across production stages, they can require intensive interaction and just-in-time delivery, all of which become more difficult as the distances involved increase. As a result, there is often a strong regional component to GVCs. Given the diffusion of new technology now often takes place through GVCs, this again raises concerns about the extent to which New Zealand firms are able to benefit from international engagement.

The characteristics of New Zealand's internationally engaged firms

Much firm-level analysis over recent years has revealed that firms trading internationally typically perform better than firms focused solely on domestic markets. Across a range of countries and industries, exporting firms tend to be relatively larger, more productive, more skill and capital-intensive, and pay higher wages than firms focused on domestic markets (Bernard, Redding & Schott, 2007). These differences often exist before exporting begins.

New Zealand firms that export or are owned by foreigners tend to be more productive than domestically-oriented firms (Fabling & Sanderson, 2013; Fabling & Sanderson, 2014). For both exporting and foreign-owned firms, the distributions of labour productivity and MFP are right-shifted compared with domestically-focused firms (Figure 4.1). Firm-level evidence outlined in Conway, Meehan and Zhang (2015) indicates that exporting and foreign-owned firms also tend to experience faster productivity growth compared with firms focused on domestic markets, consistent with the idea that international trade facilitates learning.

As well as being more productive, New Zealand's internationally-engaged firms are also typically much larger than domestically-focused firms. In 2012, exporting firms employed an average of 20 people compared with three people in non-exporting firms. Foreign-owned firms are larger again, employing just over 100 people each on average. The relatively large size of internationally-engaged firms is consistent with the idea that by increasing market size, international connection improves resource allocation by allowing relatively productive firms to grow and make the most of scale economies.

Figure 4.1 International connection and firm productivity

Source: Productivity Commission calculations using LBD

Note: The figures show the distribution density of labour and multi-factor productivity for different types of firms. The bottom and top 1% of firms have been dropped for confidentiality. Labour productivity is calculated as value add/hours worked

International connection is difficult when firms are small and distant

New Zealand's remote location increases the costs of engaging internationally, contributing to limited international connection by New Zealand firms.¹⁶ As well as the cost of distance, firms also need to overcome a number of other hurdles before they can operate in international markets. Because international trade entails a number of fixed costs, small local firms can struggle to get started in international markets (Melitz, 2003). New Zealand's combination of large distances to international markets and the small scale of domestic firms conspire to make international connection a formidable challenge that results in a serious lack of international connection.

Trade flows

Given the added importance of international connection for firms operating in small domestic markets, there is a clear negative cross-country correlation between economic size and trade intensity (measured as imports plus exports as a share of GDP) (Figure 4.2a and b). In the case of New Zealand, trade intensity is well below trend in both the goods and services sectors. Indeed, of the countries included in Figure 4.2, the intensity of international trade in New Zealand is the lowest among countries of a similar or smaller size.

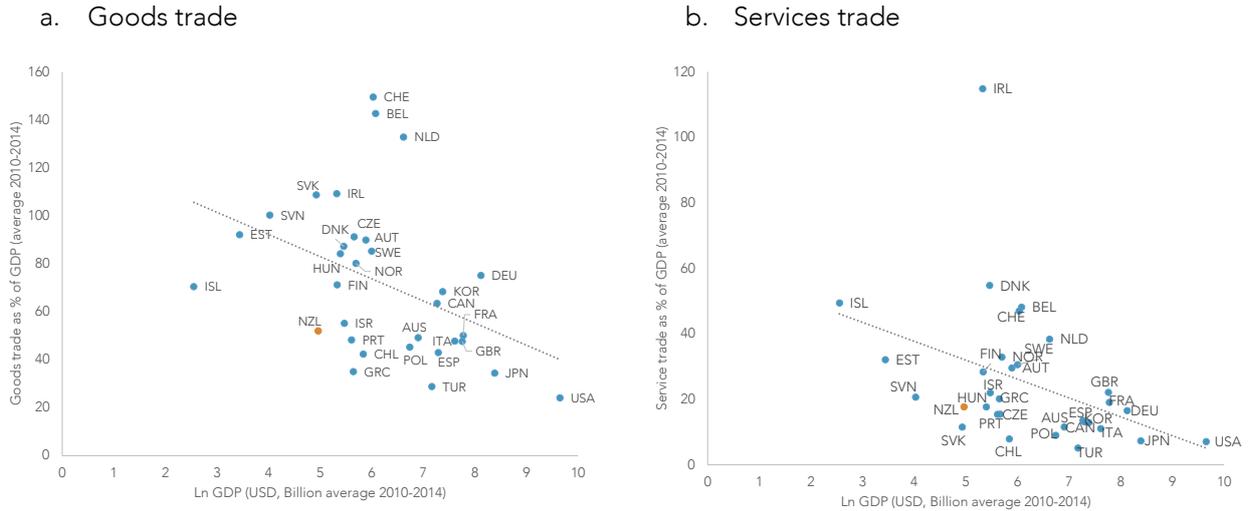
Trade exposure is particularly low in the New Zealand services sector (Figure 4.3). The intensity of services exports increased up until 2000 but has declined more recently whereas services imports as a share of services GDP has been in slow decline since the 1980s. On the face of it, this suggests that competitive pressures through trade flows are low and declining in the services sector, with negative implications for productivity growth. Trade intensity in the goods sector increased in the three decades to 2000 but has been broadly flat since (Figure 4.3a).

Reflecting weak intensity of international trade, the share of New Zealand firms that export is quite low at about 8% (Figure 4.4). Because exporting firms are relatively large, the share of employment working in exporting firms is higher at around 35% of total employment. Consistent with generally weak trade intensity, New Zealand firms do not generally participate in GVCs – the share of value add in New Zealand gross exports that comes from foreign firms in the form of intermediate inputs is among the lowest and slowest growing in the OECD (Figure 4.5).

On balance, this weak trade performance is a key aspect of New Zealand's poor long-run productivity performance. It suggests that although New Zealand performed reasonably well when international trade was a carefully managed bilateral process within a colonial system, the economy has not adapted well to the sprawling network that international trade has since become.

¹⁶ For example, the costs of transporting goods to global markets are, on average, around twice as high for New Zealand firms compared with those faced by firms in European countries (NZPC, 2012; de Serres, Yashiro & Boulhol, 2014).

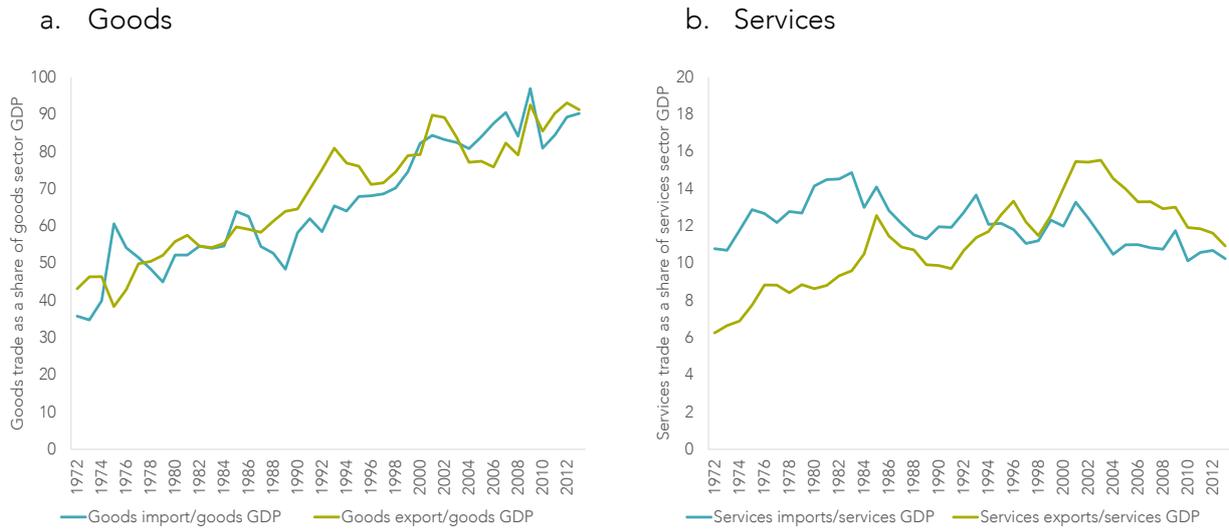
Figure 4.2 New Zealand has low trade intensity for a small economy



Source: OECD

Note: Trade intensity is measured as (exports plus imports) divided by GDP.

Figure 4.3 Trade intensity by sector over time

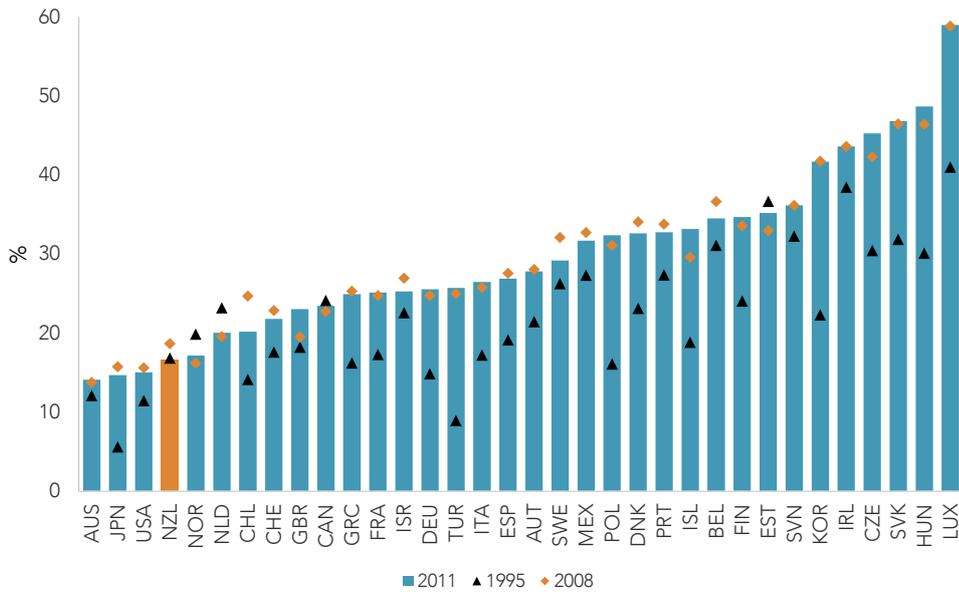


Source: Statistics New Zealand

Figure 4.4 Exporting and foreign-owned firms - firm and employment share



Source: Productivity Commission calculations using LBD

Figure 4.5 The share of foreign value add in domestic exports

Source: OECD

Investment flows

Because services trade often requires a commercial presence, foreign direct investment (FDI) plays an important role in exposing the services sector to international competitive pressures and learning opportunities. So as well as improving market access and being an important source of funding, FDI can also create stable links between economies that facilitate the transfer of productivity-enhancing technology to domestic firms (OECD, 2013a). However, as with technology transfer in general, this is by no means guaranteed.

Over the 1990s, the stock of FDI in New Zealand – at around 40-50% of GDP – was high in comparison to other OECD economies (Figure 4.6a). Since then cross-border investment flows increased markedly as globalisation deepened over the late-1990s and 2000s. At the same time, FDI in New Zealand remained broadly constant as a share of GDP and is now around the OECD median.¹⁷ In the 12 years to 2012, the share of foreign-owned firms has been relatively stable at about one percent while the share of employment that works in these firms has fallen slightly to just under 20% (Figure 4.4).

As discussed above and shown in Figure 4-1 foreign-owned firms operating in New Zealand tend to be more productive than domestic firms in the same industry. However, there is little evidence of technology transfer from high-productivity foreign firms to lower-productivity domestic firms. Using different empirical techniques, Doan, Maré and Iyer (2015) and Conway, Meehan & Zheng (2015) both found little evidence of substantial positive productivity spillovers from foreign-owned firms to local firms.

This New Zealand-based evidence contrasts with international studies showing that the presence of foreign-owned firms improves aggregate productivity by stimulating competition and encouraging domestic firms to adopt new technology. For example, Griffith, Redding and Simpson (2006) found that increased foreign presence in the United Kingdom is correlated with productivity growth in domestic-owned firms in the same industry. While foreign-owned firms still make a direct positive contribution to New Zealand's productivity performance, the lack of productivity spillovers to domestic firms is concerning.

Outward direct investment (ODI) as a share of GDP in New Zealand is among the lowest in the OECD (Figure 4.6b). With the stock of FDI much larger than the stock of ODI, the share of New Zealand GDP that is repatriated overseas as profits from foreign-owned firms is considerably greater than the GDP-

¹⁷ On the basis of a rigorous integration of the data, Wilkinson and Acharya (2013) argue that New Zealand has been left behind in the international growth of cross-border investment since the mid-1990s.

share of overseas-earned profits that is repatriated back to New Zealand. As such, the gap between the value of output produced in New Zealand and the national income of New Zealanders is relatively large in international comparison.

Data flows

Growth in international trade and cross-border investment flows have both declined since the onset of the global financial crisis. This may not necessarily signal a slowdown in the process of globalisation. Instead, given changes in the global trading system discussed above, globalisation may be entering a new phase in which international connection is increasingly defined by cross-country flows of data (McKinsey Global Institute, 2016).

Between 2005 and 2012, international bandwidth usage increased by almost 40 times as digital flows of commerce, information, searchers, video, communication and intrafirm traffic have surged (Figure 2.3). In New Zealand, the extent of digital connection to the rest of the world is relatively low on a per capita basis but has grown at a reasonable pace since 2006 compared with other OECD countries (Figure 4.7).

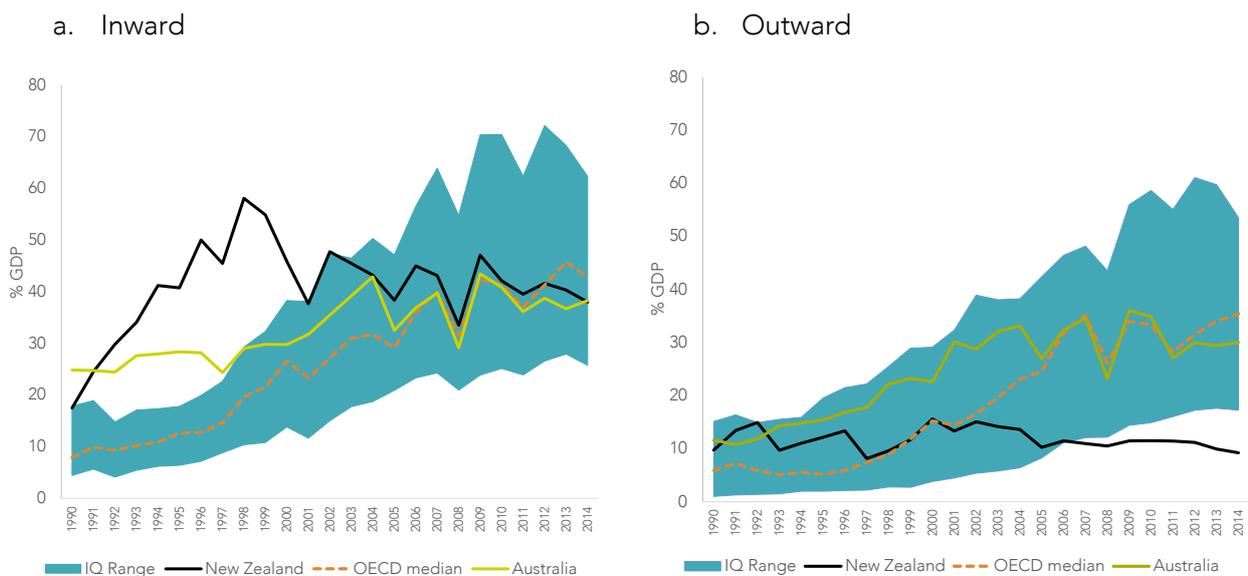
People flows

New Zealand's international connection via people flows is relatively high. Compared with most other countries, a comparatively large share of workers in the New Zealand labour market were born overseas while the New Zealand diaspora is among the largest in the world (in per capita terms). In addition, although business travel relative to employment is well below the OECD average, it has grown reasonably strongly over the last couple of decades (Figure 4.8).

Summary

Although New Zealand is relatively open in that regulatory barriers to trade and other forms of international connection are comparatively low (Conway, 2011), the economy is poorly connected through trade and investment links while the extent of international data connection is also comparatively weak (but growing). In contrast, international connection through people linkages is relatively strong. Confirming these results, in a cross-country comparison of the extent of international connection, McKinsey Global Institute ranked New Zealand well below the OECD average in all forms of international connection with the exception of people flows (Figure 4.9).

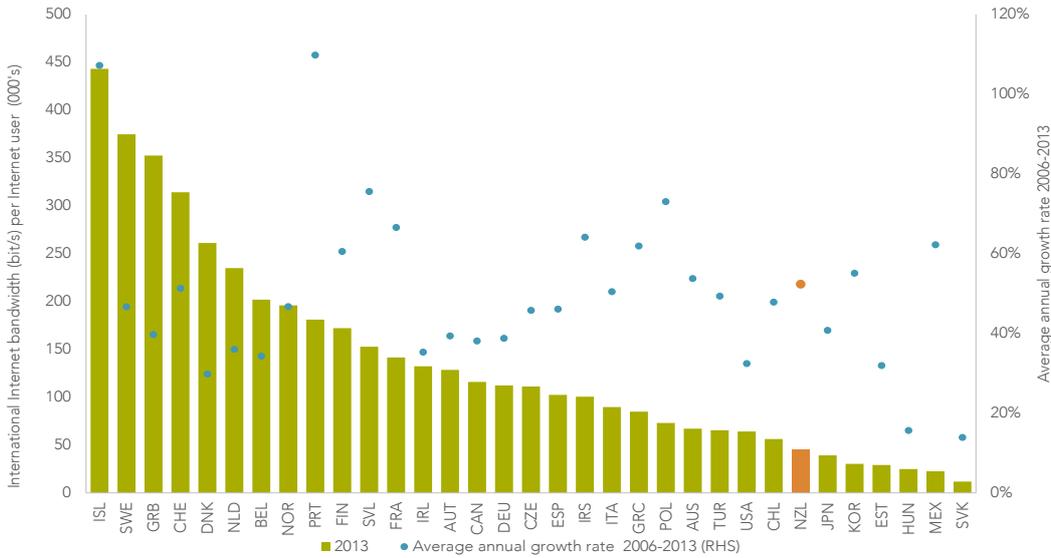
Figure 4.6 New Zealand's stock of FDI in international comparison



Source: UNCTAD

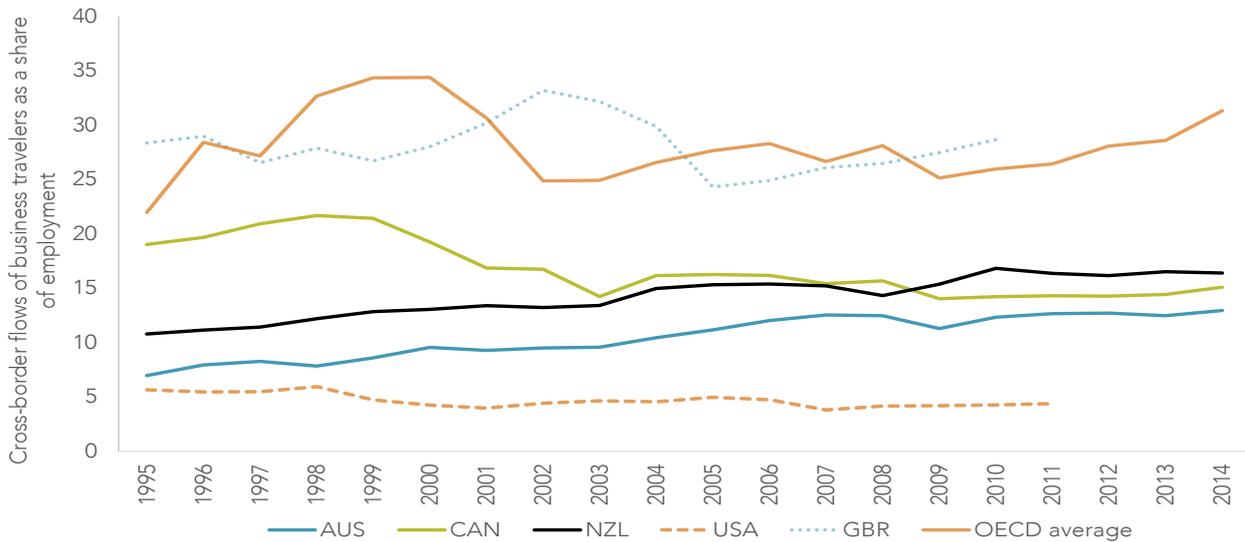
Note: The shaded area is the range of OECD countries from the 25th to 75th percentile (inter-quartile range).

Figure 4.7 International internet bandwidth



Source: World Telecommunication Indicators Database

Figure 4.8 Cross-border business travellers



Source: World Tourism Organisation (2016)

Figure 4.9 New Zealand's connectedness index country ranking relative to the OECD, 2014



Source: McKinsey Global Institute (2016)

Note: The MGI Connectedness Index ranks 139 countries based on inflows and outflows of goods, services, finance, people, and data. For each country, it takes into account the size of each flow relative to GDP or population (flow intensity); it also considers that country's share of the global total within each type of flow (McKinsey Global Institute, 2016).

Domestic connection

The challenge of remoteness to foreign markets and weak international connection is compounded by New Zealand’s small domestic markets. Although not well understood, the geographic segmentation of domestic markets and the feedback effect on firm selection and technological diffusion may be particularly important in New Zealand – a long, thin, mountainous and sparsely populated country in which infrastructure provision to link regional economies can be challenging.

Conway and Zheng (2014) used data on the geographic location of firms and their down-stream customers to calculate an indicator of the extent to which firms sell their output in local versus national markets. The results show that firms in most services industries and construction are more likely to be focused on the local market in which they are situated whereas firms in primary and good-producing industries are more likely to sell their output across larger markets at the national level (Figure 4.10).

Firms focused on local markets tend to be relatively small with few or no employees (Conway & Zheng, 2014). They are, however, relatively numerous and some services industries with a predominantly local focus account for a significant share of employment. For example, firms in the one third of industries with the greatest local (as opposed to national) focus collectively account for an estimated 45% of employment (Figure 4.10). There is also evidence that these locally-focused firms face limited competition, are unlikely to export and are dispersed across the country, reflecting the spatial distribution of their customers. In contrast, firms with more of a national focus face greater competition and are more likely to export and be based in Auckland, particularly if they produce tradable services (Conway & Zheng, 2014).

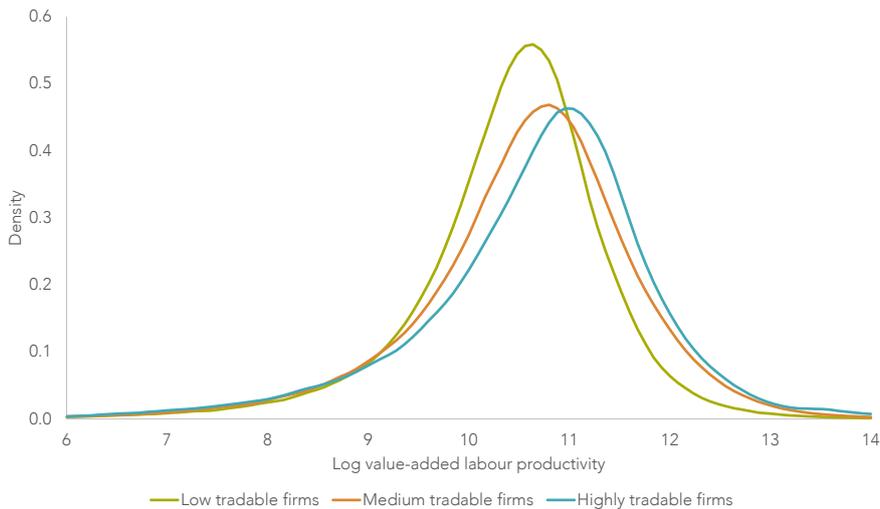
Firms that are more focused on the local market in which they are located also tend to have lower productivity than firms with a national focus (Figure 4.11). As with international connection, this link between a firm’s reach into national markets and productivity reflects the potential learning that comes from engagement with higher-productivity firms, along with the scale and competition benefits that larger markets provide. As a result, many New Zealand firms focused on their local market may not feel the pull of the domestic productivity frontier, which might be a key underlying reason for the lack of diffusion within the New Zealand economy documented earlier in Figure 3.9.

Figure 4.10 Domestic tradability index by industry



Source: Conway & Zheng, 2014

Note: “Domestic tradability” is an indicator of the extent to which firms sell their output to customers located in different geographic markets. It is derived from data on firm location and input-output linkages. The width of the columns represents the employment share of the industry.

Figure 4.11 Productivity distribution across firms by tradability class

Source: Conway & Zheng, 2014

Note: The figure shows the distribution density of labour and multi-factor productivity for firms in different “tradability” categories.

4.2 Small firms facing weak competition

Firm scale, churn and growth

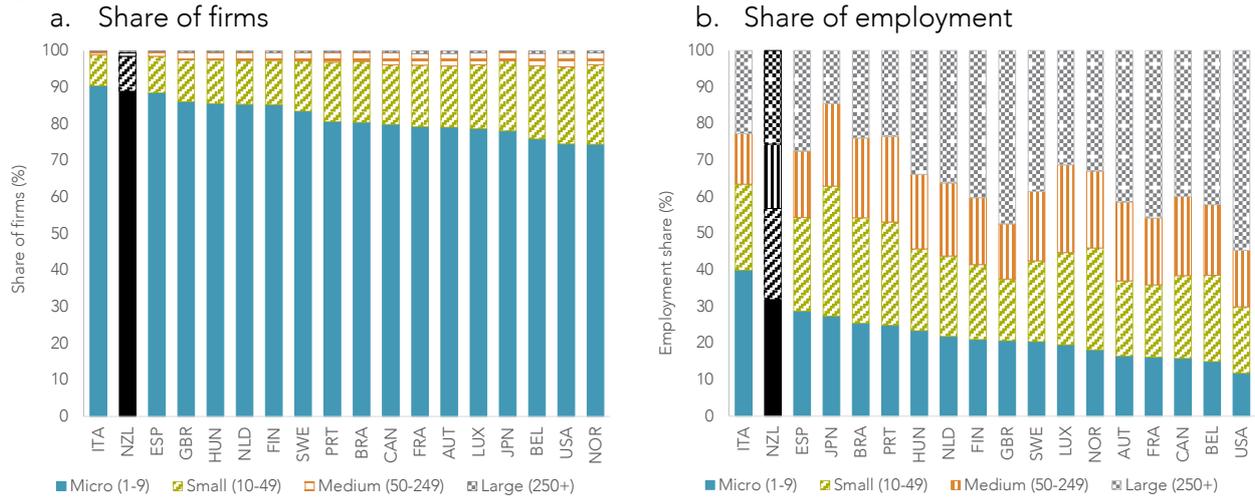
Because the size of the market affects the size of constituent firms, New Zealand firms are small in international comparison (Figure 4.12). For example, firms employing fewer than 50 people account for around 98% of New Zealand firms and well over half of employment. In comparison, only 30% of employees in the United States work for firms in this size category. At the other end of the size distribution, firms employing over 250 people account for 25% of New Zealand employment compared with 55% in the United States (Crisuolo, Gal & Menon, 2014). New Zealand’s largest firms are also generally small in comparison to the largest international firms in the same industry.

As well as being small, new firms entering New Zealand markets also grow slowly on average. The within-firm employment growth that does occur is driven by a small number of high-growth firms and a large number of firms do not grow much at all. In particular, while the smallest new firms account for a disproportionately large share of net job creation in New Zealand, this contribution involves just a fraction of these smallest firms (Meehan & Zheng, 2015).

In larger or better-connected economies, competitive forces encourage high-productivity firms to expand and low-productivity firms to contract and exit, making low or zero growth less likely. So although the links between competition and resource reallocation are not well understood in New Zealand, it is possible that generally weak employment growth among small incumbent firms reflects weak competition and impeded “up or out” dynamics.

This effect is likely to be more relevant for small firms operating in small localised markets. For example, although firm churn rates – defined as entry plus exit as a share of total firms – are about average in New Zealand overall, they are higher in urban centres compared with secondary urban and rural markets (Figure 4.13a and b). In any case, because firms are born small and are more likely to stay small compared with new firms in other countries, New Zealand has one of the highest concentrations of small old firms in the OECD, particularly in parts of the services sector (Figure 4.14).

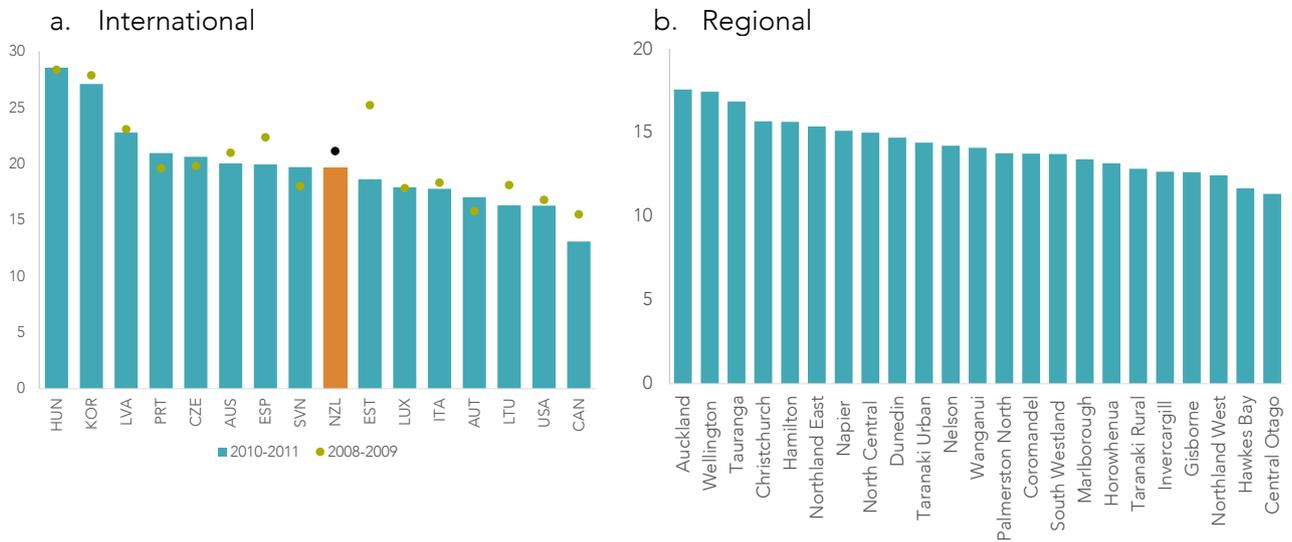
Figure 4.12 Firm size



Source: Criscuolo, Gal and Menon (2014)

Note: Sectors covered are manufacturing, construction and non-financial business services.

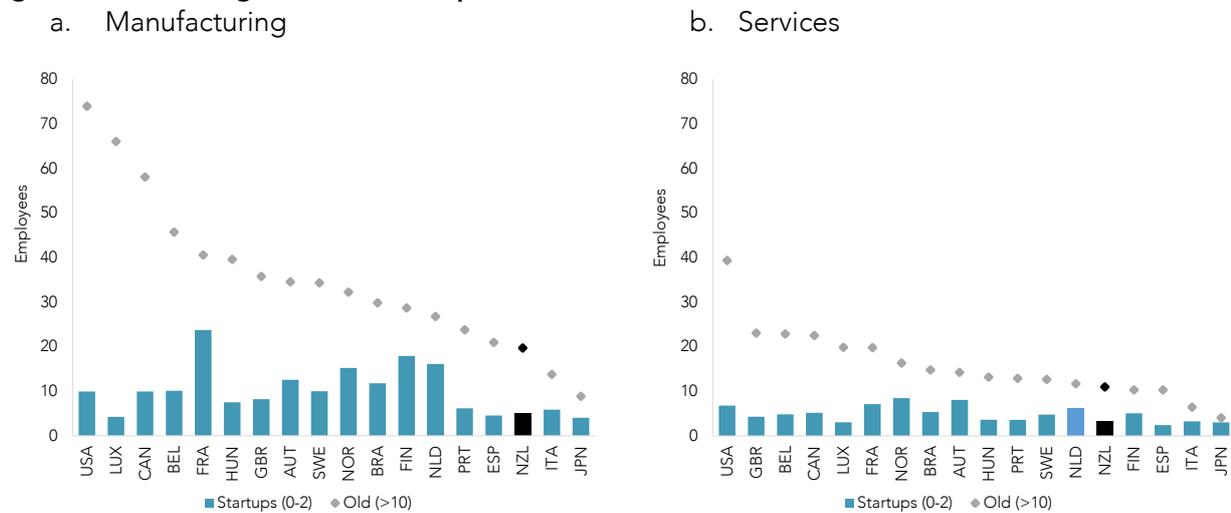
Figure 4.13 Firm churn rates - an international and regional comparison



Source: OECD and Productivity Commission calculations using LBD

Note: Churn rates are for the total market sector.

Figure 4.14 Average size of start-ups and old firms



Source: Criscuolo, Gal and Menon (2014)

Note: The graph reports the average size of start-up firms (from 0 to 2 years old) and firms more than 10 years old, as the average over the available years. Sectors covered are manufacturing and non-financial business services.

Competition

Various measures of competitive intensity indicate that competition is particularly weak in some New Zealand service industries. In its inquiry into lifting productivity in the services sector, the Productivity Commission (2014) found that firms in this part of the economy charge prices that exceed costs to a greater extent than firms in the goods-producing sector.¹⁸ Using an alternative 'profit elasticity' measure of competition, MBIE (2016) also found that some service industries are less competitive than goods-producing industries. As discussed above, barriers to competition in parts of the services sector include a prevalence of small and insular local markets that allow low-productivity firms to survive for longer than they would in a more competitive environment.

Although it is difficult to compare the extent of competition across countries, New Zealand firms do not display the same 'up or out' dynamics as firms in larger or better-connected economies.¹⁹ Again, this highlights the possibility of productive resources being trapped in small and unproductive firms operating in regional markets. In addition, as outlined in Section 3.4, the diffusion of new technology within the domestic economy is also relatively weak in service industries in which firms are more likely to be locked into small and insular regional markets.

4.3 New Zealand is a capital-shallow economy

Productivity growth requires investment

Investment is a key ingredient for productivity growth. By adding to the stock of capital workers have at their disposal, investment directly lifts labour productivity growth by allowing workers to produce more from their time at work. Although it is convenient to consider capital intensity and MFP in isolation, investment can also indirectly increase labour productivity through spillover impacts on MFP – new technologies are often embedded in new capital equipment.²⁰ As such, low productivity growth and low capital intensity are, to some extent, different sides of the same coin and lifting MFP typically goes hand-in-hand with more capital per worker.

Cross-country differences in capital per worker are not just about different approaches to producing the same output. In conjunction with access to different technologies, the availability of different types of productive inputs has a big impact on an economy's areas of comparative advantage and specialisation (eg, Heckscher et al., 1991; OECD, 2011). For example, across OECD countries, higher capital intensity is associated with higher exports, particularly exports of capital-intensive products (Johansson & Olaberria, 2014).²¹ So New Zealand's low trade intensity and lack of export diversity is most likely linked to low capital intensity.

Business investment is weak

Although measuring the capital stock is challenging, investment rates give at least an indication of capital deepening. At first glance, with the exception of the early-1990s recession and fall out from the Asian financial crisis around 2000, total investment as a share of GDP in New Zealand has broadly tracked around the OECD median (Figure 4.15a). Residential investment has been strong from the mid-1990s while government investment has picked up from low rates in the 1990s to be a little above the OECD median since the early 2000s (Figure 4.15b and c). The GDP-share of non-residential business investment has been slightly below the OECD median (Figure 4.15d).²²

¹⁸ The service industries where price-cost margins were found to be particularly high are: professional, scientific and technical services; rental, hiring and real estate; and finance and insurance.

¹⁹ Note, however, that MBIE (2016) compares the extent of competition in New Zealand industries with that in Finland, the Netherlands and Portugal using the same empirical approach. This shows that while manufacturing industries are often the most competitive within economies, the manufacturing sector in New Zealand seems to face less competition than in some other countries. Specifically, compared with New Zealand, competitive intensity in the manufacturing sector was higher in Finland and the Netherlands, and slightly lower in Portugal.

²⁰ For instance, a new IT system not only provides workers with increased capital, but also typically embodies more advanced technology and enables improved work processes.

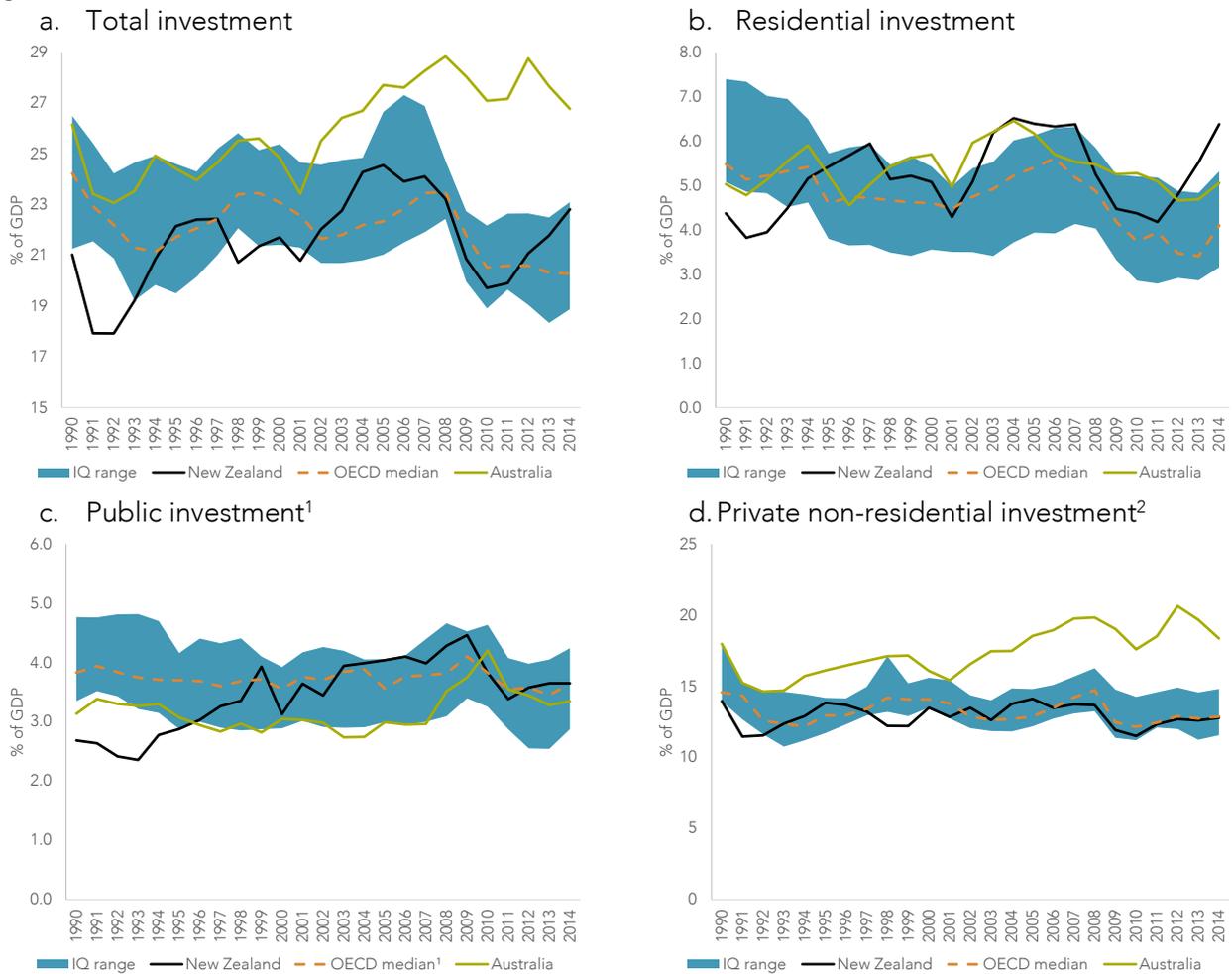
²¹ For example, across the OECD, a country that is capital-rich (say at the 75th percentile of the cross-country distribution of capital per worker) will export around 12% more of all products compared with a country at the median position of capital per worker. However, capital-intensive exports can be around 25% higher (Johansson & Olaberria, 2014).

²² Note that non-residential business investment is calculated as a residual and is prone to significant measurement error.

Measuring non-residential business investment as a share of GDP may understate weakness in capital intensity – the amount of capital available per worker – in the New Zealand economy. With GDP per capita below that of the leading OECD economies, the investment share of GDP will translate into weaker investment per person in New Zealand compared with countries with higher GDP per capita. New Zealand’s relatively fast population growth also means that a given investment share of GDP is spread across more new entrants to the labour market compared with economies with slower growth in labour force participation.

These rough indications of below average capital deepening in the business sector are borne out by more rigorous analysis. In a detailed productivity comparison of the New Zealand and Australia economies, Mason (2013) found that the amount of capital available per hour worked across market industries in New Zealand was almost 40% below the Australian level and that this lack of capital intensity accounted for 39% of the trans-Tasman gap in labour productivity.²³ In a similar productivity comparison of New Zealand and the United Kingdom, capital per worker in New Zealand was 47% below that in the United Kingdom in 2004 (Mason & Osborne, 2007).

Figure 4.15 Investment relative to OECD countries



Source: OECD

Note: The shaded area is the range of OECD countries from 25th to 75th percentile (inter-quartile range). 1. Excludes investment by public enterprises. 2. Includes investment by public enterprises.

²³ At the industry level, New Zealand firms have invested considerably less in capital than their Australian counterparts in 19 of the 24 industries included in the study. Of the five industries in which capital per hour worked is higher in New Zealand, the utilities industry (electricity, gas and water) is the only significant user of capital equipment.

What explains low business investment in New Zealand?

High real interest rates

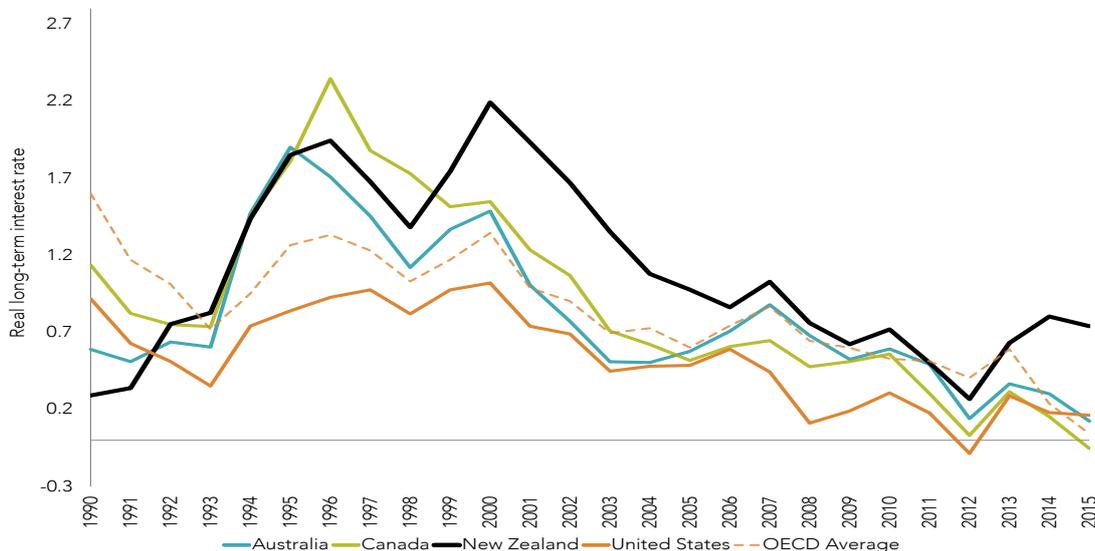
Capital shallowness in the New Zealand economy reflects a number of factors. First and foremost, long-term real interest rates are unusually high in New Zealand. While short-term real interest rates often diverge across countries, large and persistent divergence is much more unusual at the long end of the curve (Conway & Orr, 2002). In New Zealand, both real short- and long-term interest rates have been considerably above comparable real rates in other OECD economies for some time and with no sign of convergence. For example, 10-year real interest rates on New Zealand Government bonds have been 100-200 basis points above the OECD median for a number of decades (Figure 4.16).

The cost of capital faced by firms is influenced by a number of factors, including the composition of their assets, the way in which investment is financed (for example, debt versus equity) and the characteristics of the marginal investor. However, all else being equal, higher real interest rates increase the cost of financing capital investment for firms. For example, consistent with high real interest rates, Hall and Scobie (2005) found that the cost of capital faced by New Zealand firms exceeded the OECD average from 1976 to 2002, the entire span of the New Zealand data available at the time.

As well as suppressing investment by increasing the cost of capital, high real interest rates also contribute upward pressure on the real exchange rate, adding to the already substantial difficulties New Zealand firms face in exporting.²⁴ For example, Fabling and Sanderson (2015) found that a 10% increase in a bilateral exchange rate reduces exports to the destination market by about 3% in firms that are already exporting to that country. A currency appreciation of this size also results in a slight reduction in the probability of new firms entering that market.

So a high real exchange rate encourages resources into the low-productivity non-tradable part of the economy that produces output for New Zealand's small and insular domestic markets. In conjunction with the impact of distance, an overvalued real exchange rate relative to fundamentals is an important reason for New Zealand's disappointing export performance and contributes to negative structural change and poor resource allocation in the economy.²⁵

Figure 4.16 Long-term real interest rates



Source: OECD

Note: The real long-term interest rates have been calculated using five-year moving averages of inflation rates and the long-term nominal interest rates. The OECD average has been calculated using the available OECD countries real long-term interest rate. Greece has been excluded from the average.

²⁴ Note that real interest rates would not necessarily suppress investment if they were high because of a strong productivity performance. However, this is clearly not the case in New Zealand. In theory, interest rates influence the exchange rate through an uncovered interest parity condition that sees the exchange rate appreciating to equilibrate expected returns. Alternatively, the exchange rate appreciation may occur as demand shocks put upward pressure on the price of non-tradables relative to the price of tradables (which are set in world markets).

²⁵ Note, however, that a high real exchange rate should, all else equal, facilitate outward direct investment (ODI) by New Zealand firms. However, as shown in Figure 4.6b, New Zealand's ODI performance has been persistently weak compared with other OECD economies.

The underlying cause of high real interest rates

Real interest and exchange rates are key relative prices in the economy that have a critical impact on productivity growth via firm performance and resource allocation. However, there is some debate about the underlying reasons for high long-term real interest rates in New Zealand and the appropriate policy response is contested.

A shortfall in domestic savings relative to investment is the starting point for some explanations of high real interest rates. Net national savings have averaged just over 4% of GDP in New Zealand since the early 1990s, which is among the lowest in the OECD (Figure 4.17a). Although national savings are low, as outlined in Figure 4.15a above, total investment as a share of GDP has been around the OECD average. As such, there is a considerable and persistent shortfall in domestic savings relative to investment needs (Figure 4.17b).

With a shortfall in domestic savings, fulfilling New Zealand's investment needs means borrowing the savings of foreigners. This reliance on foreign savings translates into a significant current account deficit that has persisted over a number of decades (Figure 4.17b). Over time, this cumulates into a sizeable international debt burden – although it has improved somewhat over recent years, New Zealand's net international debt has hovered between 70–80% of GDP since 2004 (Figure 4.17c and d). In contrast to other similarly indebted countries, a high proportion of this debt is held by the private sector whereas net Government debt is relatively small.

New Zealand's high international debt and ongoing borrowing requirements may have led to international lenders charging a risk premium for holding New Zealand-based assets (Dupuy & Beard, 2008, Cameron et al., 2007). Although this may have been the case when New Zealand's international debt was predominantly the result of poor fiscal policy decisions, it is less likely to be the case now. Reddell (2013) also argues that if a risk premium was the main driver of high real interest rates, then the real exchange rate would be relatively weak compared with fundamentals, whereas it is often described as overvalued relative to fundamentals.

An alternative explanation for New Zealand's real interest rate premium and elevated real exchange rate is that the economy has been subject to a series of prolonged aggregate demand shocks that drive a wedge between domestic and world real interest rates. This macro imbalance explanation contends that a high real interest rate acts as a rationing device that reconciles elevated demand pressures with the economy's more limited supply capacity (Reddell, 2013). By deterring investment and diverting resources into supplying domestic markets, a high real interest rate and associated real exchange rate pressures bring balance to the economy. Importantly, persistent excess demand is the underlying cause of the interest rate premium and not the actions of the Reserve Bank, which simply aims to achieve price stability.

This macro imbalance explanation for the real interest rate premium is consistent with a number of unusual macro features of the New Zealand economy:

- **First**, the real exchange rate has remained broadly constant over a number of decades despite New Zealand's long-run productivity underperformance. Normally, countries with a weak relative productivity performance should see the real exchange rate adjust downwards.²⁶ In New Zealand's case, it might be that persistently high real interest rates have offset the impact of a poor long-run productivity performance on the real exchange rate.
- **Second**, New Zealand's negative net international investment position has remained relatively large in spite of an improved fiscal position and poor long-run productivity growth. Normally, improvements in Government debt and a poor productivity performance should both move the current account in the direction of deficit to surplus. In New Zealand's case, persistent excess

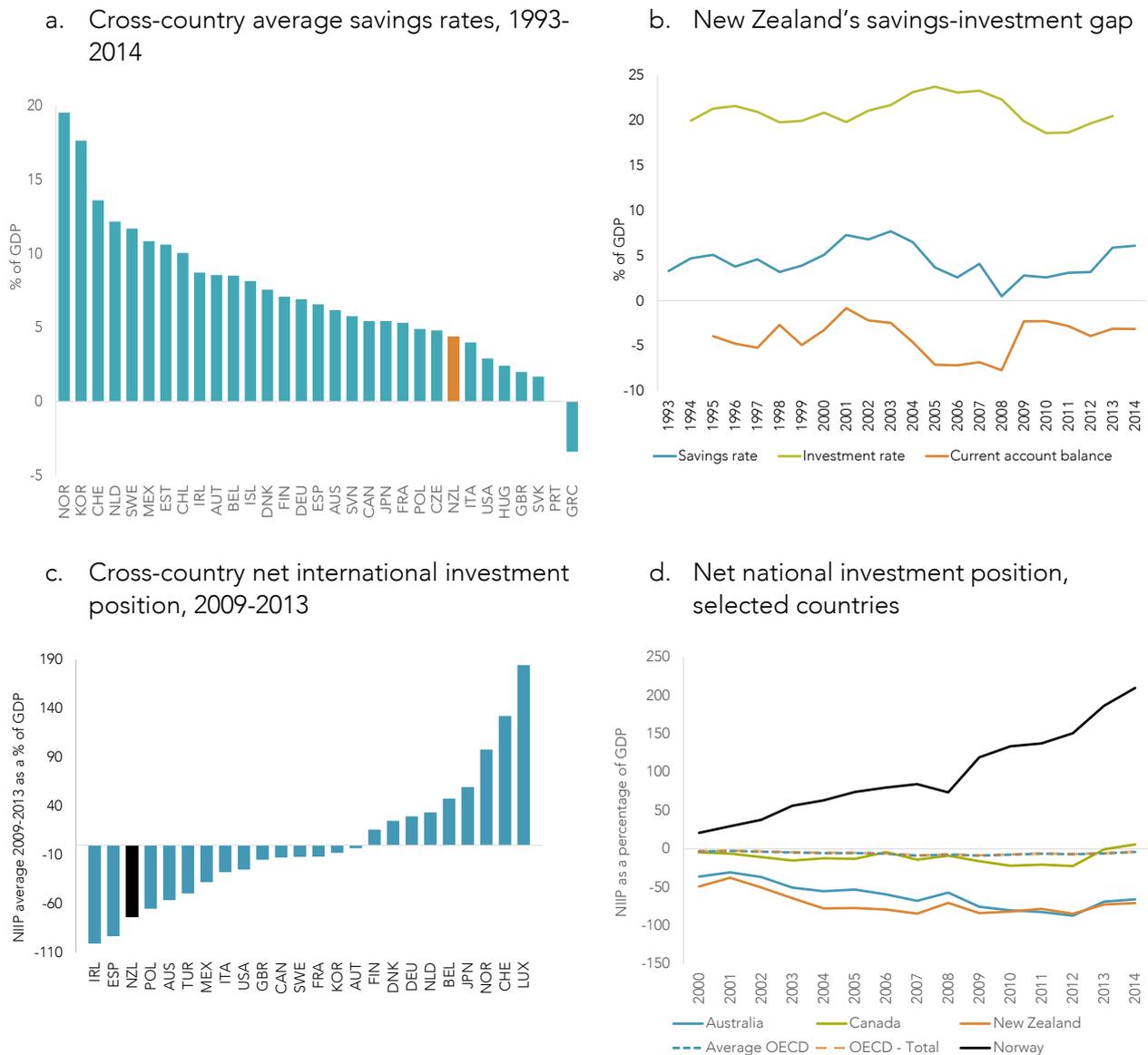
²⁶ In particular, the Balassa-Samuelson hypothesis posits that there should be a relationship between the real exchange rate and a country's relative productivity performance – countries with a weak relative productivity performance should see a low or falling real exchange rate. While there does in some circumstances seem to be a connection between exchange rates and productivity over time internationally (Taylor & Taylor, 2004), this has not been the case in New Zealand. On standard measures, New Zealand's real effective exchange rate has been roughly flat, on average, over 50 years, in spite of a substantial deterioration in the economy's relative productivity (Reddell, 2013).

demand may have offset the impact of a generally healthy fiscal position and poor productivity. In this case, instead of being an underlying cause of the real interest rate premium, the current account deficit and high international debt are, instead, symptomatic of a macro imbalance.

- **Third**, the macro imbalance explanation for the real interest rate premium is consistent with strong demand pressures into the non-tradables part of the New Zealand economy and poor resource allocation outlined above. Despite a poor productivity performance, real output growth in non-tradables has outstripped growth in real tradable output since the mid-2000s and inflation in this part of the economy has been persistently high (New Zealand Treasury, 2012). Persistent excess demand pressure is also consistent with a relatively high share of investment going into housing since the mid-1990s (Figure 4.15b above).

The obvious question is what is the root cause of New Zealand’s macro imbalance? Reddell (2013) argues that high inward migration has led to persistent excess demand in the non-tradable sector of the New Zealand economy and is a key source of the real interest rate premium. Others – such as Treasury (2010) – have traced the source of this macro imbalance to low savings by New Zealanders. Of course, both these factors may be playing a role.

Figure 4.17 Selected macro indicators



Source: OECD, IMF, Statistics NZ

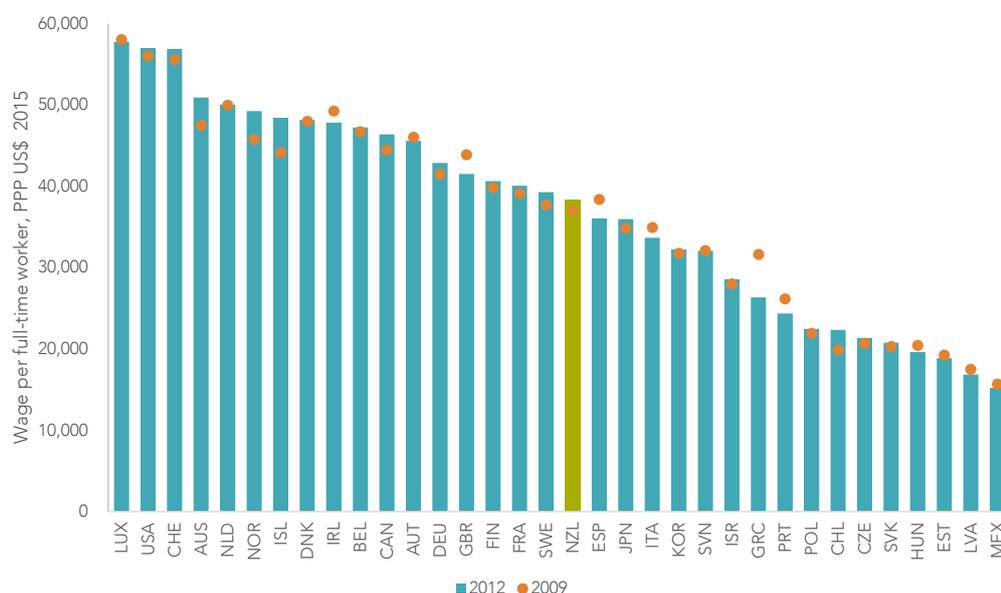
Small markets, expensive capital equipment and moderate wages

While a high real interest is clearly very important, there are other possible underlying reasons for low investment by New Zealand firms. Low investment may also reflect scale issues in that small firms operating in small and insular markets may have insufficient sales volumes to justify significant capital outlays. Instead, these firms may choose to operate with lower capital intensity compared with firms serving larger more open markets. This possible link between market size and capital intensity is consistent with recent work showing that international trade not only improves resource allocation, but also increases the return on capital by convincing potential investors that a project has a better chance of reaching a market of the size necessary to fully exploit the returns to scale (de Serres, Yashiro & Bouhol, 2014).

In addition, the off-the-shelf cost of investment goods is also high in New Zealand compared with other OECD countries. Using the International Prices Comparison data, Gemmell (2014) reported that the price of investment goods in New Zealand is around 19% higher than the OECD average and 15% higher than in Australia. The price of machinery and equipment is 12% and 5% higher than the OECD average and Australia respectively while the cost of non-residential construction is estimated to be 22% above the OECD average. While the reasons for this high off-the-shelf price of capital are not well understood, a weak productivity performance in the construction industry – which has a relatively poor productivity level and growth rate – may be part of the explanation.

While high real interest rates compared with other OECD countries and elevated off-the-shelf prices push up the cost of capital for firms, the cost of labour in New Zealand is relatively moderate (Figure 4.18). This mix of high real interest rates, small firms and markets, expensive capital and moderately-priced labour encourages New Zealand firms to invest relatively little in capital and instead take on additional workers.

Figure 4.18 Real wages, New Zealand vs. the OECD



Source: OECD

Notes: In 2015 constant dollars, USD PPP

4.4 Investment in knowledge-based capital could be stronger

Investment in some types of capital is particularly beneficial for productivity growth, with recent research highlighting the importance of knowledge-based capital (KBC) in facilitating innovation and the propagation of new technologies. Given its distinctive characteristics (Box 1), the positive impacts of KBC can be greater than for more traditional assets. For example, the private returns to R&D are estimated to be around 20-30% on average, which is considerably higher than the estimated returns on investment in physical capital. As well as beneficial productivity impacts, this high rate of return on

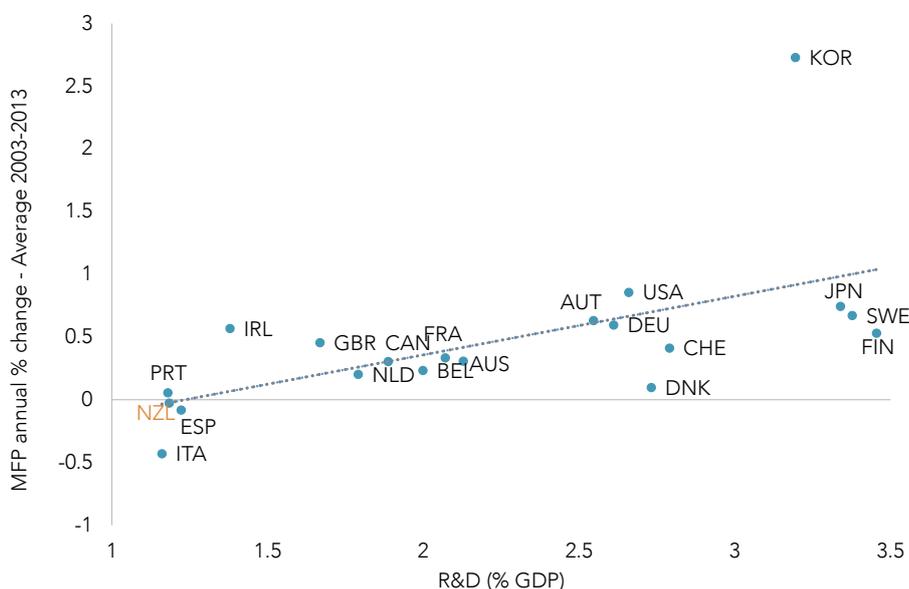
investment in KBC may also partly reflect higher risk premiums (Wieser, 2005; Hall, Mairesse & Mohnen, 2010). Given increasing returns and knowledge spillovers, the social returns to spending on R&D and KBC more generally can be significantly higher again, but are difficult to measure accurately (Sveikauskas 2007; Bloom, Schankerman, & Van Reenen 2013).

Investing in KBC is important not only for global frontier firms but also to facilitate technology adoption in lagging firms. Again using the example of R&D, because aspects of new technology are not easily codified, lagging firms need to do some R&D to successfully adopt them into their production processes (e.g., Griffith, Redding & Van Reenen, 2004; Hall, Mairesse & Mohnen, 2010; Westmore, 2013). With R&D being important for both frontier and lagging firms, cross-country differences in business investment in R&D appear to be linked with differences in productivity growth across economies (Figure 4.19).

As well as R&D, firms must also invest in other types of knowledge-based assets if they are to successfully adopt and benefit from new technology. First, innovation is a far broader concept than R&D and covers new and improved products and processes as well as organisational change, improved marketing and new business models. Second, to make the most of new technology, firms need to reinvent many aspects of their operation – including service design, software development, organisation change and marketing. In this context, managerial capability is also a key ingredient in the successful adoption of new technology.

While data on KBC is relatively poor in New Zealand, the available evidence suggests that low investment in KBC may be an important reason for New Zealand's poor productivity performance. In particular, an OECD paper published by the Productivity Commission estimated that as much as 40% of New Zealand's productivity gap compared with the OECD average is attributable to weak investment in KBC (de Serres, Yashiro & Boulhol, 2014).

Figure 4.19 R&D and MFP growth across OECD countries, 2003-13



Source: OECD

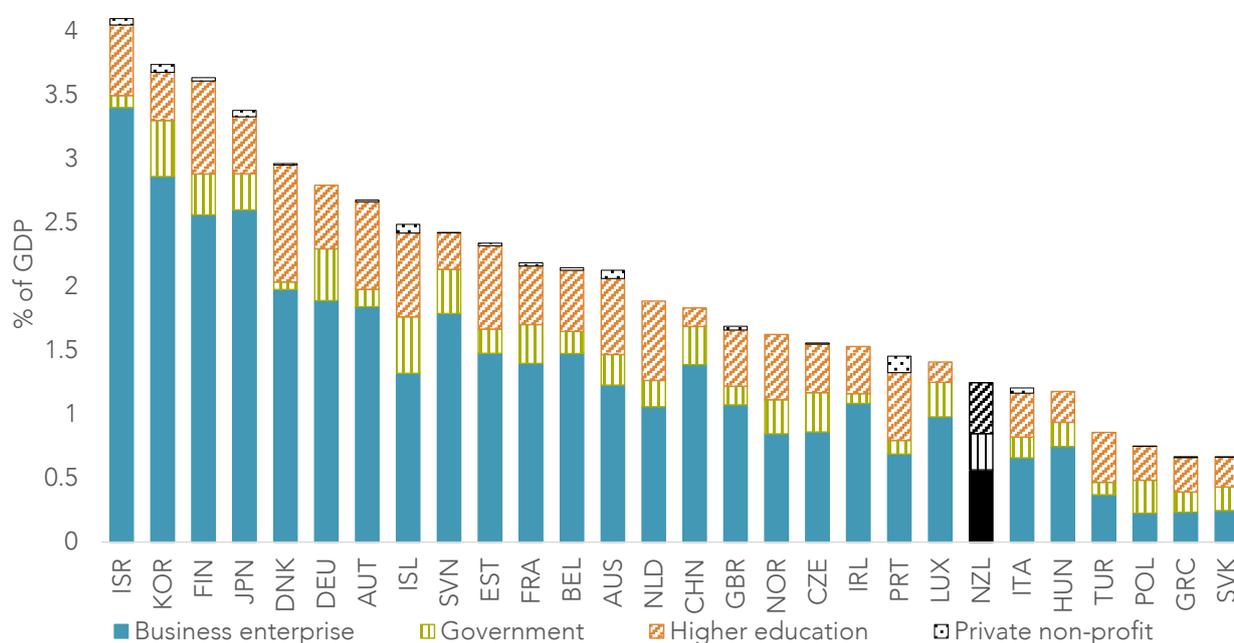
New Zealand firms could do better with innovation

New Zealand firms do not perform particularly well in important aspects of innovation. Most obviously, public and private investment in R&D is among the lowest in the OECD as a share of GDP (Figure 4.20). In addition, survey measures of different aspects of innovation indicate that innovation outputs – such as the introduction of new products and processes – have been declining over recent years whereas innovation inputs have been increasing (to 2011) (Table 4.1). On the face of it, this hints at declining productivity in the New Zealand innovation system until recently.

In addition to low investment in R&D, a comparatively large share of business R&D is done by smaller New Zealand firms while larger firms invest relatively little (OECD, 2015b). Although this OECD result may simply reflect the lack of large firms in New Zealand, underperformance by New Zealand's larger firms is also apparent in survey data on other aspects of innovation. In particular, although larger firms are more likely to introduce new products, the percentage of sales from new goods and services is higher on average across smaller firms (Table 4.1). As well as smaller firms, younger firms are more likely to innovate than older firms, consistent with international evidence showing that new innovations are often brought to market by new firms (Table 4.1).

A comparatively poor innovation performance by larger firms is consistent with the growing productivity gap between New Zealand frontier firms and global frontier firms identified in Section 4. This raises important questions about the ability of New Zealand frontier firms to successfully adapt and benefit from new frontier technologies developed in global markets.

Figure 4.20 Investment in KBC (looks low in NZ – particularly R&D) (2013)



Source: OECD

Table 4.1 Patterns of innovation in New Zealand across time and by firm characteristics

	Innovation inputs		Innovation outputs		
	R&D intensity (R&D expenditure as % total expenditure)	R&D activity (% of firms engaged in R&D)	Sales from new goods & services (% all sales)	Introduced new goods & services (% of firms)	Introduced new organisational processes (% of firms)
Average rate (% of firms)	0.1	7.8	2.7	19.3	22.5
Time trend	Increasing (until 2011)	Increasing to 2011, then decreasing	Decreasing over time	Decreasing over time	Decreasing over time
Size	Highest among SMEs	Increasing with size	Decreasing with size	Increasing with size	Increasing with size
Age	Decreasing with age	Invariant with age	Decreasing with age	Decreasing with age	Decreasing with age

Source: Wakeman & Le (2015).

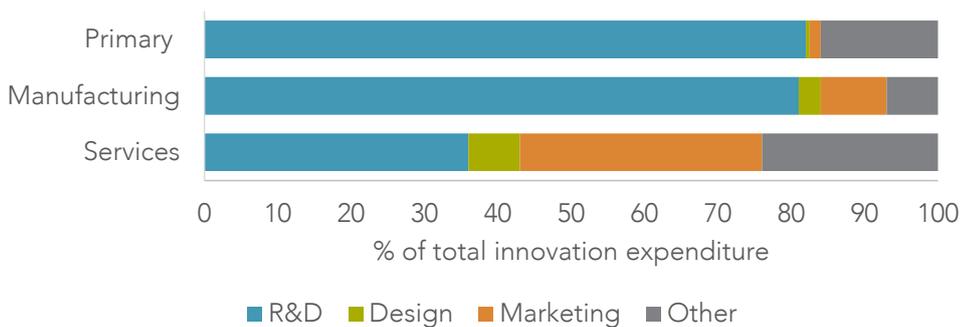
ICT use is looking up

The intensity with which R&D is used in the innovation mix varies markedly across sectors. While R&D activity accounts for about 80% of overall innovation expenditure in both the primary and manufacturing sector, its share of innovation expenditure in the services sector is only 35% (Figure 4.21). With the services sector accounting for a large and growing share of employment and value add, this suggests that formal R&D may be becoming relatively less important as part of the economy's innovation mix.

Instead, ICT has been a key input for innovation and productivity growth in the services sectors of OECD economies. For example, in the United States over the 1990s, ICT adoption in the retail industry – and the changes it brought to supply chains – had a far greater impact on productivity than the growth of the computer industry itself (NZPC, 2014).

In New Zealand over recent years, the uptake of ICT has been among the highest in the OECD as a share of investment and of GDP (Figure 4.22 a and b). However, as with investment in general, the uptake of ICT per new entrant to the labour market in New Zealand is further down the OECD rankings (NZPC, 2014). In any case, relatively strong investment in ICT hints at the potential for future productivity improvements, particularly in the services sector, provided firms are prepared to make the most of this technology.

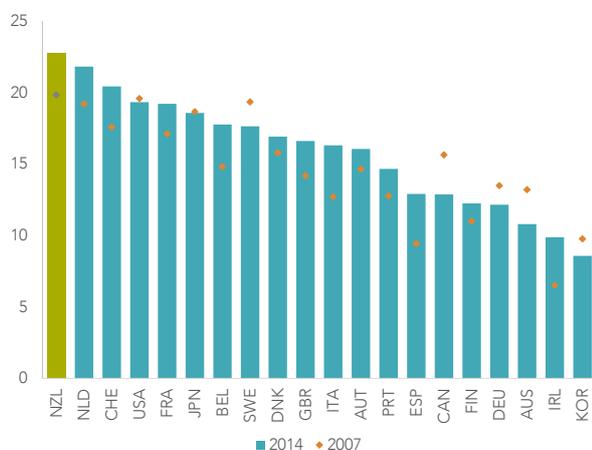
Figure 4.21 Innovation spending by type and sector



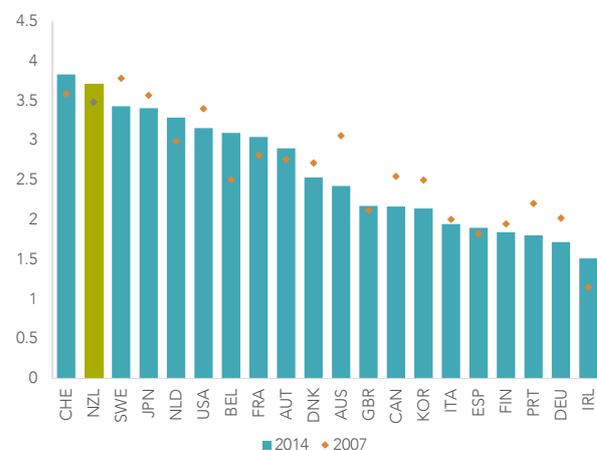
Source: Wakeman (forthcoming)

Figure 4.22 ICT investment

a. Share of ICT investment in total investemtn



b. Share of ICT investment in GDP



Source: OECD

Note: ICT investment is measured as a percentage of total non-residential gross fixed capital formation. Data for Australia, Ireland, Japan, Portugal, Spain, Switzerland and New Zealand reported for 2014 correspond to 2013.

What is holding back innovation?

There are a number of possible reasons why New Zealand firms spend relatively little on R&D and could be doing better in other aspects of innovation. Weak R&D investment could reflect the industry structure of the New Zealand economy, which has a comparatively low share of traditional R&D-intensive industries (Crawford et al., 2007).²⁷ Likewise, the makeup of New Zealand exports, which are skewed towards raw food products, is also not typically associated with innovation. However, R&D spending within industries in New Zealand is also low internationally, meaning that industry structure is a partial explanation for weak R&D spend (Di Maio & Blakeley, 2004; Mazoyer, 1999).²⁸

A high cost of capital and weak connection to large international markets as a result of economic geography and a high real exchange rate may dampen the incentives firms face to innovate and commercialise new ideas (Crawford et al., 2007). As with investment in general, firms operating in larger markets are more likely to have the sales volumes necessary to justify the high fixed costs of innovation, thereby improving the chances of successfully commercialising new ideas. Indeed, in the case of trade liberalisation, improved access to international markets stimulates innovation and investment in new technology (Bustos, 2011).

Low business R&D and weakness in other aspects of innovation may also reflect sparse networks of researchers and innovative firms in New Zealand. Successful innovators are often surrounded by others at the top of their game in ecosystems centred on large firms or dense agglomerations of small firms (or some combination). This allows firms to benefit from spillover effects and is an important reason why innovation output and knowledge spillovers increase with city size and density. With Auckland a relatively modest sized city by global standards, the high share of small firms in the New Zealand economy may be insufficiently compensated for by the presence of a large local market or a large and dense urban environment (McCann, 2009).

This supply-side explanation for weak innovation is consistent with evidence of limited connection between research institutions and firms in New Zealand. For example, as a rough indicator of connection between academia and industry, the number of academic papers cited in the patents that are granted to New Zealand firms is relatively low in international comparison (Figure 4.23).

This idea that small firms and markets suppress innovative activity via demand and supply side effects is consistent with the characteristics of innovative New Zealand firms. In particular, Wakeman and Le (2015) find that innovation and international connection tend to go hand-in-hand. Across most measures of innovation, foreign-owned and exporting firms have higher innovation rates – including R&D intensity – than firms focused solely on domestic markets (Table 5.2).²⁹ This is consistent with international evidence showing a strong relationship between exporting and innovation at the firm level (eg, Eberhardt, Helmers, & Yu, 2011).

Some forms of international connection may be more beneficial than others in encouraging innovation by New Zealand firms. Sin et al. (2014) found that New Zealand firms that export to the Americas are more likely to innovate whereas those exporting to Asia are not. In addition, while exporting raw goods is not conducive to firm-level innovation, the export of manufactured goods or services is found to be strongly correlated with innovation.

As well as being more likely to innovate, internationally connected New Zealand firms are also more likely to improve their productivity as a result of innovation. Wakeman (forthcoming) found that New Zealand firms that export or invest in offshore markets are more likely to improve their productivity as a result of some types of innovation compared with firms focused solely on domestic markets (Figure 4-

²⁷ R&D-intensive industries internationally include pharmaceuticals, IT equipment, medical, precision and optical equipment.

²⁸ It may also be the case that differences in the sub-industry structure of the New Zealand economy works against strong R&D spending.

²⁹ This correlation between exporting and innovation does not provide evidence for causality and lacks a framing theory featuring heterogeneous firms. Recently, however, there has been a great deal of theoretical and empirical progress on this issue. Lileeva & Trefler (2010) show theoretically and empirically how the market-expanding effects of international integration causally encourage firms to innovate. Verhoogen (2008), Bustos (2011); and Aw, Roberts, & Xu (2011) assess other interesting channels through which trade promotes firm-level innovation.

24). This weak productivity dividend from innovation by domestically-focused firms is probably an important reason why these firms underperform in some aspects of innovation.

To summarise, it would seem that the extent of the market has a big impact on the innovation performance of New Zealand firms and the productivity benefits that flow from that innovation. As such, the economic forces that restrict international connection by New Zealand firms may also be an important part of the reason for low innovation.

Figure 4.23 Scientific publication cited in patents, 2011-2015

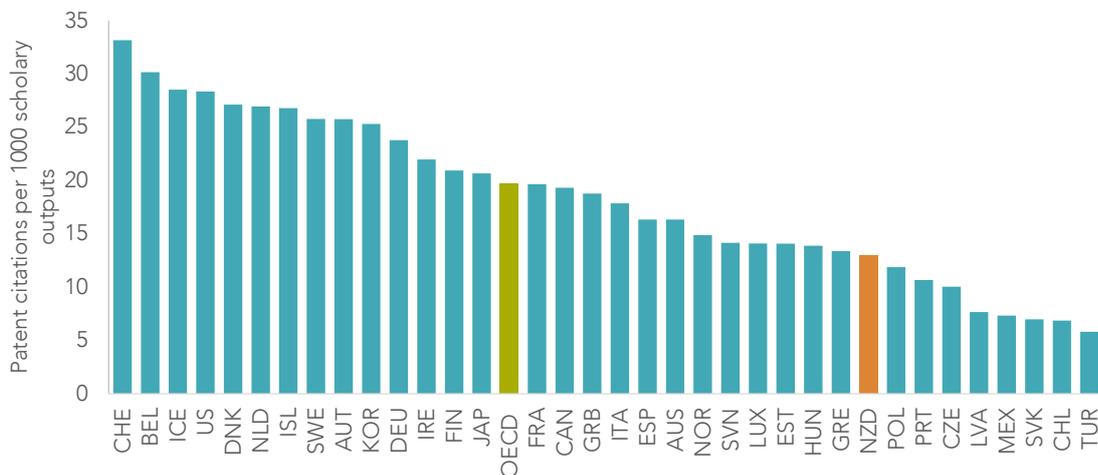
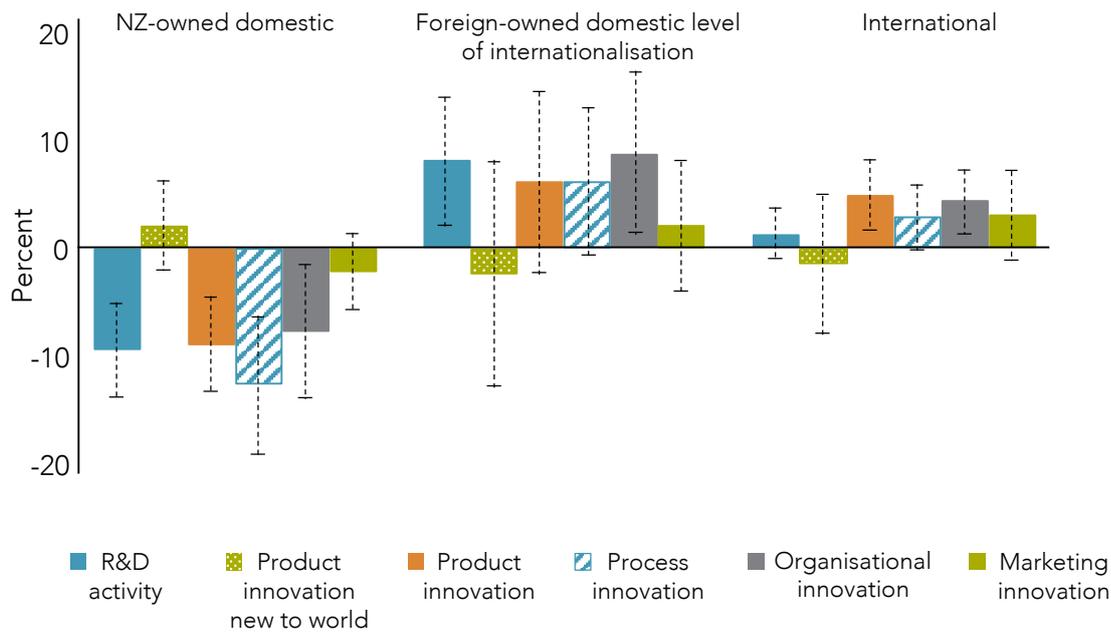


Table 4.2 Innovation rates by firm type

	Exporting		Foreign Owned	
	Yes	No	Yes	No
Product innovation	32	17	26	19
Process innovation	25	16	18	18
Organisational innovation	28	22	25	23
Sales from new products	5	2	4	3
Registered a trademark	5	2	4	3
Filed a patent	1	0	0	0
Engaged in R&D	19	1	10	8
R&D intensity	60	6	52	11

Source: Wakeman & Le (2015)

Figure 4.24 The productivity impact of innovation by firm type

Source: Wakeman (2016).

Note: Chart shows difference in predicted change in MFP over three years for various innovation types by the firm's extent of international connection. The results for each innovation type are generated from a separate OLS regression in which the change in MFP from year 0 to year 3 is regressed on the innovation measure in year 0 interacted with the international connectivity variable.

4.5 Benefiting from technology requires smart adaptive firms and workers

The successful commercialisation of new ideas is about translating knowledge into growth. This is not a straightforward mechanical process but instead involves a complex interaction of elements from within and outside the firm.³⁰ This can be a daunting challenge for firms, particularly those with a large existing asset base and workforce with a particular set of skills configured to work in a particular way. For example, benefiting from ICT depends on firms having sufficient managerial capability to adapt firm processes and structures to make the most of this technology. As a case in point, the comparatively large productivity dividend from the roll out of ICT in the United States has been partly attributed to high managerial capability and a strong tendency towards organisational change (Bloom et al., 2012).

Management capability is key

Management capability has a big impact on productivity. Bloom and Van Reenen (2010) estimated that differences in management capability account for about a quarter of the productivity gaps between the United States and other OECD countries. Across a larger set of countries, Andrews and Westmore (2014) showed that an economy's speed of technology adoption and convergence towards the global productivity frontier depends on its overall level of management capability, along with trade openness and R&D.

Management capability also plays a role in explaining differences in firm productivity within countries – in the United States and the United Kingdom one-third of the productivity difference between firms at the 90th and 10th percentile of the MFP distributions has been attributable to managerial competence (Bloom et al., 2016). Further, evidence from randomised control trials indicate that the impact of management capability on productivity is likely to be causal (Bloom et al., 2013).

³⁰ For example, innovating firms not only generate new ideas internally but must also absorb knowledge from their environment – including from universities, customers, suppliers, and competitors.

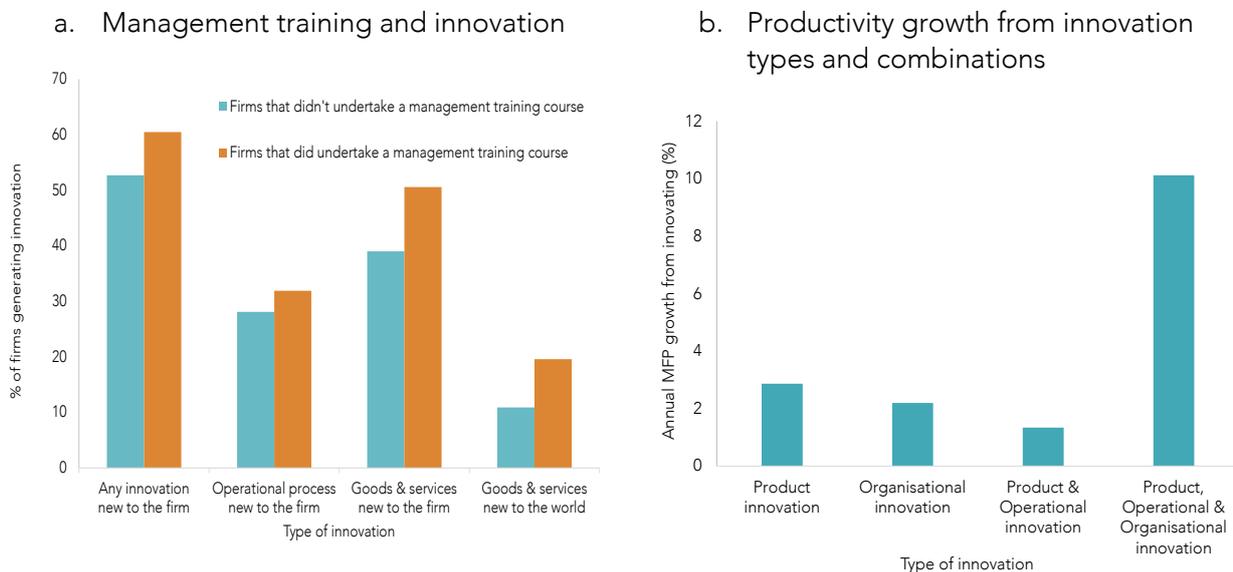
Managerial ability has also been found to be important in driving various aspects of performance in New Zealand firms. Grimes & Fabling (2014) found that firms using high-performance management practices have higher productivity growth in comparison to firms that do not.³¹ In addition, a significant share of these productivity benefits in well-managed firms flow to workers in the form of higher wages.

There is also evidence that well-managed New Zealand firms are more innovative. Jaffe and Le (2015) find that firms that complete a management programme are more likely to undertake various types of innovation (Figure 4.25a). Although this evidence was gathered as part of a robustness-check and is not the main focus of this work, it at least hints at the likelihood that improving managerial capability is associated with more innovative New Zealand firms.

Wakeman (forthcoming) found that New Zealand firms that improve their operational processes and organisational structures at the same time as innovating their products achieve faster productivity growth compared with firms that innovate in one of these areas in isolation (Figure 4.25b). In broad terms, this is consistent with the importance of an all-of-firm innovation mind set to lift the capacity of firms to absorb new technology and maximise its benefits. It would seem that to lift productivity, working on the business is just as important as developing new and improved products.

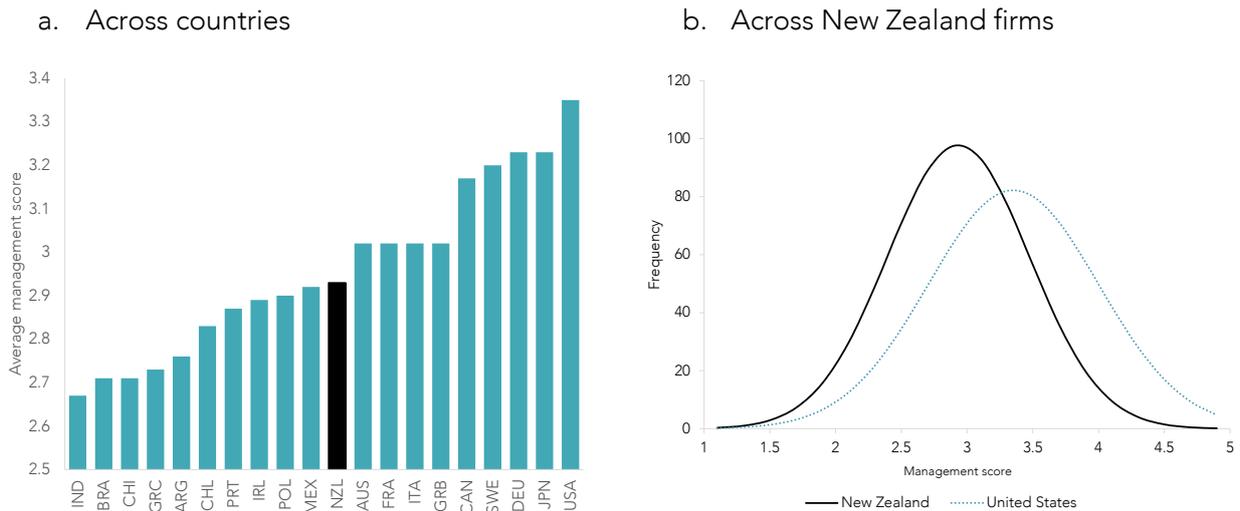
Despite the productivity benefits associated with management capability, cross-country surveys indicate that managerial quality is relatively poor in New Zealand (Figure 4.26a) (Green et al., 2011; Bloom et al., 2012).³² Multinationals and publicly listed firms are found to have superior management performance compared with privately-owned firms, family-owned firms, and cooperatives. The distribution of management quality scores reveals that although some New Zealand firms are managed as well as any in the world, there is a substantial tail of mediocre and poorly-managed firms (Figure 4.26b). This indicates that poorly-managed firms are more likely to survive in New Zealand, which is probably related to the fact that the competitive intensity in many New Zealand markets is comparatively weak.

Figure 4.25 The impact of management capability on innovation in New Zealand



³¹ The suite of management practices considered by Grimes & Fabling (2014) includes: having processes for staff consultation, clear firm values, performance reviews coupled with performance pay, room for autonomous staff decision-making and staff training opportunities.

³² While the survey was conducted across 18 dimensions of people, performance and operations management in manufacturing firms, it could provide an indication of managerial quality in services as well. By way of conformation, the 2015 IMD "World Talent Report" ranks the "perceived availability of component senior managers" in New Zealand at 19th out of 29 OECD countries.

Figure 4.26 Management quality in New Zealand

Source: Bloom et al. (2012).

Note: Unweighted average management quality score across firms in the manufacturing sector; selected countries. The overall management score is an average of responses to 18 survey questions that are designed to reveal the extent to which firms: i) monitor what goes on inside the firm and use this information for continuous improvement ii) set targets and track outcomes; and iii) effectively utilise incentive structures (eg, promote and rewarding employees based on performance). The sample is based on medium-sized firms, ranging from 50 to 10 000 employees.

The importance of skilled workers

A skilled workforce is also a key driver of an innovative economy – an economy’s capacity to discover and absorb new knowledge is critically dependant on its human capital. Skilled workers adopt innovations earlier and are associated with greater firm investment in knowledge creation (Toner, 2011). Improvements in human capital are also associated with increases in capital intensity, which facilitates the introduction of new and improved products, services, and production processes (IMF, 2016). A skilled workforce is also a key ingredient in attracting global frontier firms to, and encouraging top domestic firms to remain in, New Zealand.

Given the potential for technological change to disrupt labour markets the skills system also plays an important role in shaping the flexibility and resilience of the economy. New technologies and globalisation bring great potential for improved living standards and wellbeing but can be disruptive and do not affect all workers in the same way. While some workers find their skills fit well with new technologies, others find their jobs have been automated and that they are redundant. As a result, skills-biased technological change and related developments impact on the share of national income accruing to labour and the distribution of income more generally (Box 3).

There are some important concerns about the capability of the New Zealand skills system to respond to these serious challenges. As discussed in Section 3.1, a decrease in average worker quality is part of the reason for New Zealand’s low-productivity growth. Although qualification levels have improved over recent years, this has been more than offset by new lower-skilled workers entering the market.

There are also concerns about the performance of the New Zealand skills system, with the performance of New Zealand students in internationally benchmarked tests – such as TIMSS, PIRLS and PISA – declining over recent years. Managers of New Zealand firms with ten or more employees have also reported the second highest level of skills shortages among a selection of OECD countries (OECD, 2016a). In addition, the OECD’s Survey of Adult Skills reports that a substantial number of workers in New Zealand are employed in jobs that are a poor match for their qualifications or skills (OECD, 2016b).

While some level of skills mismatch is inevitable, higher levels can lead to negative consequences for individuals, employers and society as a whole.³³ Indeed, across countries, higher skill and qualification mismatch is associated with lower labour productivity (Adalet McGowan & Andrews, 2015). Although the impact of labour market mismatches has not been analysed in New Zealand, this suggests that improving matching in the New Zealand labour market is an important challenge.

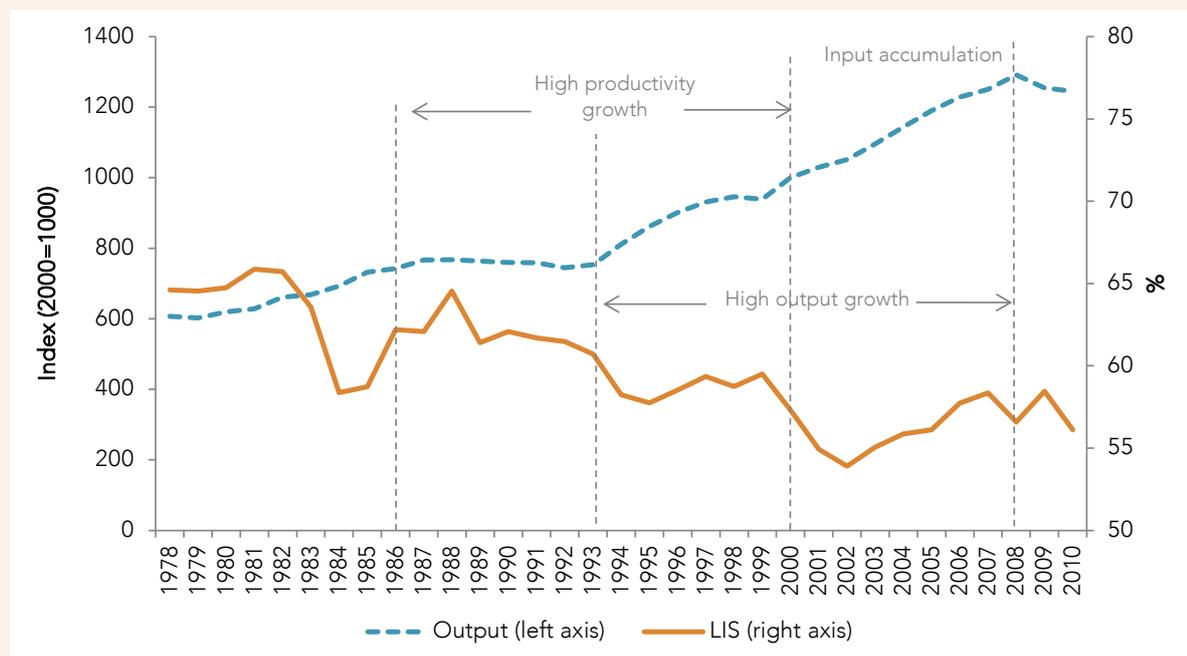
Box 3 The labour income share in Zealand

In New Zealand, there is some evidence of a general decline in the share of national income paid to workers – the labour income share (LIS) – consistent with the impact of new technology and globalisation seen in other countries (Figure 4-27). Although cross-country comparisons are difficult, this declining trend in the LIS may be less marked in New Zealand given that much of the fall occurred over three short periods. New Zealand's LIS has also increased on average since 2002, in contrast to the ongoing fall in some countries.

This could be because earlier reforms increased the flexibility and resilience of the New Zealand economy to adapt to technological shocks. Alternatively, it may also be that factors such as relatively low wages and high capital costs, coupled with small domestic markets and limited international engagement, discourage firms from investing to the same extent in new capital and technology.

Whatever the reason, the potential for new technology to disrupt labour markets is unlikely to end anytime soon. In meeting this challenge, as elaborated on below, policy should seek to improve the flexibility and resilience of the economy. The emphasis needs to be on adapting to change, rather than resisting it.

Figure 4-27 Output and the labour income share in the measured sector



Source: Conway, Meehan & Parham (2015)

³³ For individuals, field of study mismatch combined with over-qualification entails lower wages, increased likelihood of unemployment, lower levels of job satisfaction, and possibly frustration stemming from the inability to put all their skills to use in the workplace (Montt, 2015). For employers, mismatched workers are more likely to be dissatisfied with their position and this can lead to lower productivity and increased absenteeism (Quintini, 2011a). For society as a whole, mismatches entail the sunk cost of developing human capital that will not be used (although there are benefits from individuals undertaking education even if it is not put to use in the workplace) (Montt, 2015).

5 Shifting gear to higher productivity

Section highlights

- A successful New Zealand economy would be one in which income gaps relative to the leading OECD countries are steadily closing as a result of catch up in productivity. This would require more New Zealand firms to be at the global productivity frontier, better diffusion of new technologies into and throughout the economy, and greater competitive intensity to encourage productivity-enhancing resource allocation.
- The international backdrop for policy making is challenging, with skill-biased technological change, environmental pressures and population ageing becoming increasingly important. In this environment, a key policy challenge is to increase the resilience of the New Zealand economy to ongoing changes in markets and technology.
- The Government's Business Growth Agenda (BGA) is targeting key areas in which policy and performance improvements would help break the economic feedback loops that constrain New Zealand's productivity performance. Importantly, the BGA includes an annual refresh, allowing new insights from firm-level research to inform its future evolution.
- The analysis in this paper highlights the following key areas of policy focus in lifting productivity:
 - **International connection:** given a growing window of opportunity for greater international connection, trade in services and digital products should be key elements in a refreshed trade strategy. The FDI regime and remaining tariffs should also be reviewed.
 - **Innovation and science:** greater focus on thematic research platforms where New Zealand firms have a proven track record and global visibility could improve the return on investment in science and innovation and push out the New Zealand productivity frontier. Stronger connections across the innovation system could encourage diffusion.
 - **The labour market – skills, housing and migration:** the skills system influences the economy's ability to acquire and absorb new knowledge and is critical in building resilience. Improving the skill composition of migration and the responsiveness of the housing market could reduce skill mismatches and lift productivity growth.
 - **Competitive intensity (particularly in the services sector):** a key priority is to reform the services sector to build comparative advantage. This involves a range of measures aimed at increasing competition.
 - **Policy capability (regulatory stewardship):** lifting capacity to develop and implement reform – along the lines of recent improvements in regulatory stewardship – is critical. A focus on the use of evidence for policy design and monitoring would help support a policy framework that can quickly understand and adjust to new opportunities.

As discussed in Section 3, the importance of productivity growth as a source of higher incomes for New Zealanders is likely to increase over coming years. First, labour market participation is probably at its peak in New Zealand and likely to fall going forward given an ageing population. This suggests that raising average incomes through increased labour input will become increasingly difficult. Second, strong increases in the terms of trade – which contributed about 30% of average income growth over the 2000s (Conway & Meehan, 2013) – cannot always be expected.

Although lifting productivity is a difficult policy challenge, New Zealand is well placed to adapt and benefit from ongoing changes in technology and globalisation. The economy has weathered the global financial crisis in good shape, with relatively strong growth in GDP and average incomes compared with a number of other OECD economies. Although rapid population growth has played a role and growth in GDP per capita has been somewhat weaker (but still above the OECD average), the economy has good momentum and is well placed to adapt.

Productivity improvements in the market sector are ultimately driven by the actions of firms and individuals. While an appropriate policy environment improves the chances of success, the challenge of lifting productivity does not solely rest with policymakers. For example, the evidence presented in Section 3 shows that New Zealand frontier firms underperform compared with global frontier firms and that lagging firms face little imperative to lift their performance.

This raises questions about the way in which New Zealand firms are run, including around governance, strategy and management. For example, it may be that the cooperative business structure works against strong productivity improvements or that poor-quality boards result in underperformance by domestic frontier firms. Alternatively, lagging firms operating in small local markets could perhaps do more to understand new technologies being used in their industry and the potential impact on business performance. While the focus in this section is on policy improvements, these firm-level issues are also important and worth further investigation.

5.1 What would success look like?

In sketching out the broad policy considerations that would help New Zealand achieve its productivity potential, it is useful to first consider what success might look like. Most obviously, a successful New Zealand economy would be one in which the still substantial gaps in productivity relative to leading OECD countries steadily close. Growth in GDP per capita and average incomes would be increasingly driven by productivity improvements and less dependent on increases in hours worked per capita.

Increased international connection is an important prerequisite in achieving this objective. Encouragingly, as discussed in more detail below, new opportunities for international engagement are opening up around knowledge-intensive products that can be traded down fibre-optic cables. In addition, the global centre of economic gravity is also moving towards New Zealand's part of the world.

Making the most of these opportunities would see New Zealand firms increasingly integrated into high value-add parts of GVCs with fast-moving productivity frontiers. This would include global frontier firms locating activities such as research and design in New Zealand. The tradables part of the economy would grow as resources increasingly moved towards high-productivity and globally-integrated firms. Technology diffusion into the economy would improve and productivity growth in New Zealand's frontier firms would converge towards that of global frontier firms.

The diversity of New Zealand's exports would also most likely increase as exporting firms progressively developed small but high value-add niches in GVCs and became less reliant on a "grow it-box it-ship it" strategy based on the agricultural sector.

Because countries are increasingly competing for knowledge-intensive activities within GVCs, benefiting from these new opportunities for international engagement requires improvements in areas of New Zealand's comparative advantage. For example, the overall quality of the labour force would need to improve, with the skills system well integrated with the labour market and producing graduates that are well matched to future jobs. The science and innovation systems would need to be producing and commercialising new ideas and technology with opportunities for upscaling driven by high global visibility.

Capital intensity and investment in knowledge-based assets would also need to lift. As well as improved international connection, this would require a reduction in New Zealand's real interest rate premium. Lower real interest rates relative to world rates would reduce appreciation pressures on the real exchange rate, making it easier for firms to engage internationally.

In domestic markets, higher competitive intensity and well-developed firm networks would encourage information flows and technology diffusion to lower-productivity firms in regional markets. Firms and workers would continually learn from frontier firms and lift their productivity over time. In the non-tradables sector, as competition played a bigger role in resource allocation, more productive firms would grow and benefit from scale economies while poor performers would be more likely to shrink and exit.

5.2 New Zealand's policy challenges – the big picture

The combination of small size and big distance from global markets provides New Zealand with an unusual set of challenges and opportunities (Skilling, 2001; MBIE, 2016). There are, however, no inherent reasons why small advanced economies cannot be successful, it is just that their growth path is often different to that of larger economies.

Notwithstanding the debate between technological optimists and technological pessimists, the advance of new technology at the global frontier is unlikely to end any time soon and knowledge-based assets can be expected to increasingly be a key driver of enhanced productivity.³⁴ As such, policies directed at pushing out the frontier and channelling innovation into and throughout the economy are clearly important. Policy needs to be consistent with firms and workers learning from frontier firms and lifting their productivity over time. In addition, policy frameworks that promote competition and encourage resource reallocation from low- to high-productivity firms are also key.

With new technology and globalisation putting a premium on skills, flexibility, openness and receptiveness to new technology, the reform challenge is in some ways different from what has been faced previously. In broad terms, policy needs to increase the resilience of the New Zealand economy to ongoing changes in markets and technology and lock in the associated dynamic productivity gains. Getting this right requires a deep understanding of New Zealand's productivity potential in the 21st century global economy. In addition to these important new challenges, some perennial concerns also remain. For example, how can policy help scale and competition in a small and remote economy?

Policy needs to be consistently high quality

To some extent, the reasons for New Zealand's poor long-run productivity performance are self-reinforcing. For example, New Zealand firms are small because they operate in small and insular markets. This lowers their ability to learn from global frontier firms and discourages capital deepening. In turn, this restricts productivity growth, making it more difficult for these firms to connect into larger international markets - and on it goes (Figure 5.1). While there have been some areas of improvement, policy has been unable to shift the economy to a more dynamic high-productivity growth path.

This is not to say that New Zealand's broad policy settings are poor quality compared with other countries. Policy frameworks in New Zealand are often assessed as being highly supportive of productivity growth. For example, New Zealand is the top-ranked country on the overall ease of doing business and fourth out of 45 countries in the OECD's Product Market Regulation indicators that measure the extent to which policy is supportive of competition (World Bank, 2015; Koske et al., 2015). New Zealand also has a well-established monetary policy framework and relatively strong public finances.

In larger or better-connected economies, these broad policy settings would have a greater positive impact on economic performance. OECD analysis predicts that policy in New Zealand is consistent with GDP per capita about 20% above the average of advanced OECD countries, as opposed to the actual of 20% below average (when the analysis was conducted) (Figure 5.2).

There are two possible reasons why New Zealand is a clear outlier in the link between policy and performance. First, New Zealand's economic geography may amplify the negative impact of poor

³⁴ Technological pessimists – particularly Gordon (2016) – don't think much of ICT, at least compared with the likes of electricity and railways, and see incomes doubling every 100 years or so. "Technological optimists" argue we are just getting started and that average incomes can double every 30-40 years. The Productivity Commission is at the optimist end of the spectrum and see lots of opportunity for New Zealand in ongoing technological change.

policy on economic performance. While larger or better-connected economies can tolerate some policy weakness, New Zealand policymakers have no such luxury and policy needs to be consistently high quality. Second, although broad policy settings look highly supportive of productivity growth when viewed through the long-range telescopes of the OECD and the World Bank, more detailed assessments reveal room for improvement. For example, all of the inquiries done by the Productivity Commission in the past five years find considerable scope for policy improvement.

This highlights the need for exceptionally good policy settings (Procter, 2011). Importantly, outstanding policy is less about trying to control the economy and more about building resilience and adaptability. With markets and technology constantly changing, policy needs to be nimble and responsive so that firms have the flexibility to experiment and adjust to keep pace with a changing world. For example, policy that is overly prescriptive about business models or technology risks discouraging innovation and global frontier firms from operating in New Zealand.

As well as being adaptable, policy also needs to be predictable and coordinated across different areas – clear and well-designed regulations can help provide firms operating in a high-tech and highly uncertain environment with some policy clarity and certainty. Market participants need to be confident that past regulatory decisions will be respected and that future decisions will be made in ways that are consistent with precedent, unless it is clear that the previous approach was flawed in some important way. This can be a difficult balance to strike.

Getting policy right is particularly important during times of rapid technological change when poorly regulated economies lose ground as frontier countries pull ahead and productivity gaps open up (Conway et al., 2006). Based on the Productivity Commission's ongoing inquiry work, there is scope for improvement in New Zealand's policy environment to get to that point.

Figure 5.1 New Zealand's low productivity growth equilibrium

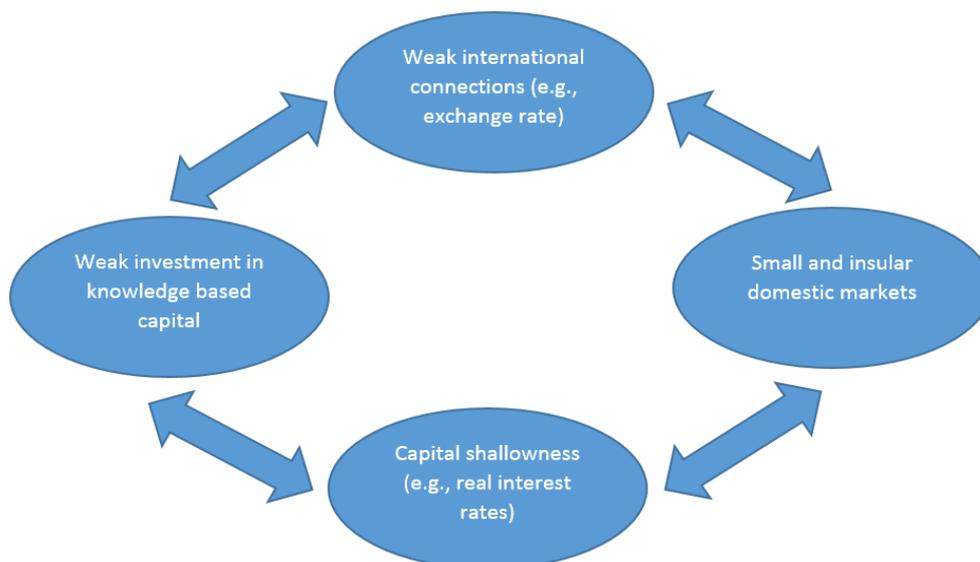
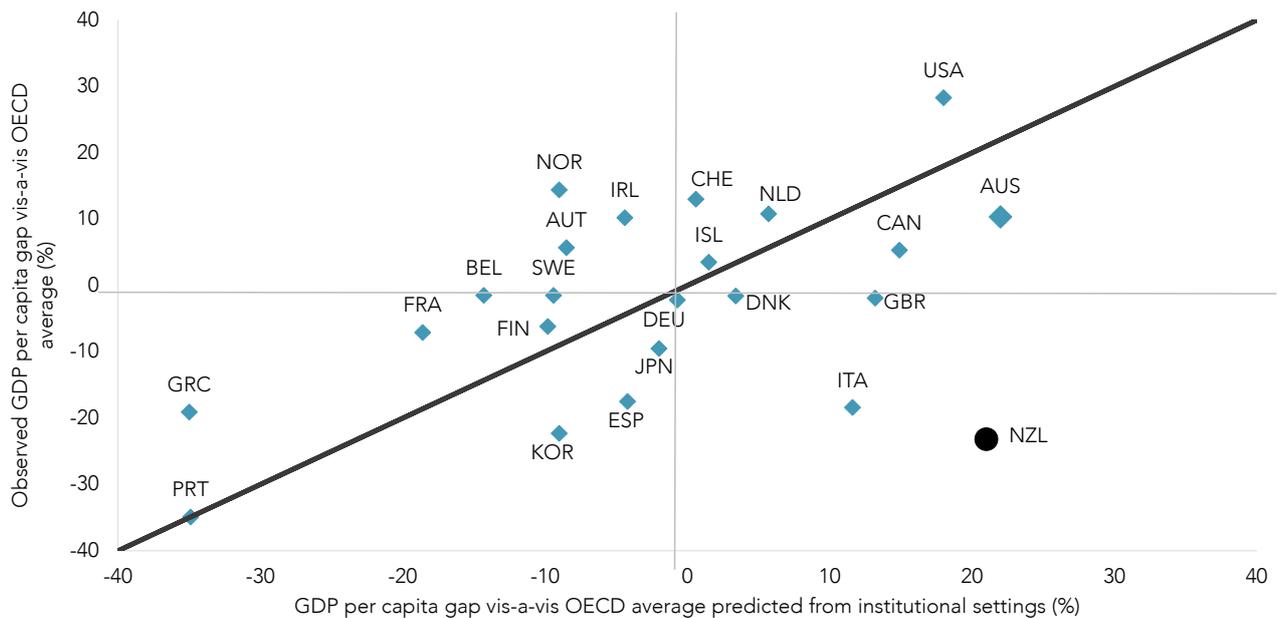


Figure 5.2 Actual gap in GDP per capita versus the gap predicted from structural policies, 2009

Source: Barnes et al., 2011

Note: The policy areas included in this analysis are: taxation; product and labour market regulation; innovation and education.

Making the most of new opportunities

A window of opportunity may be opening for firms in some parts of the New Zealand economy to engage in new ways internationally. Although the negative impact of distance on international connection may have increased overall, agglomeration effects vary by industry. Most obviously, dramatic falls in the price of transmitting data over distance have lowered spatial transaction costs to the point that firms in some service industries can connect internationally irrespective of their location. This trend is likely to continue as the line between manufacturing and services continues to blur – a process known as the “servitisation of manufacturing” – and a growing part of production is digitised and delivered remotely through fibre-optic cables.

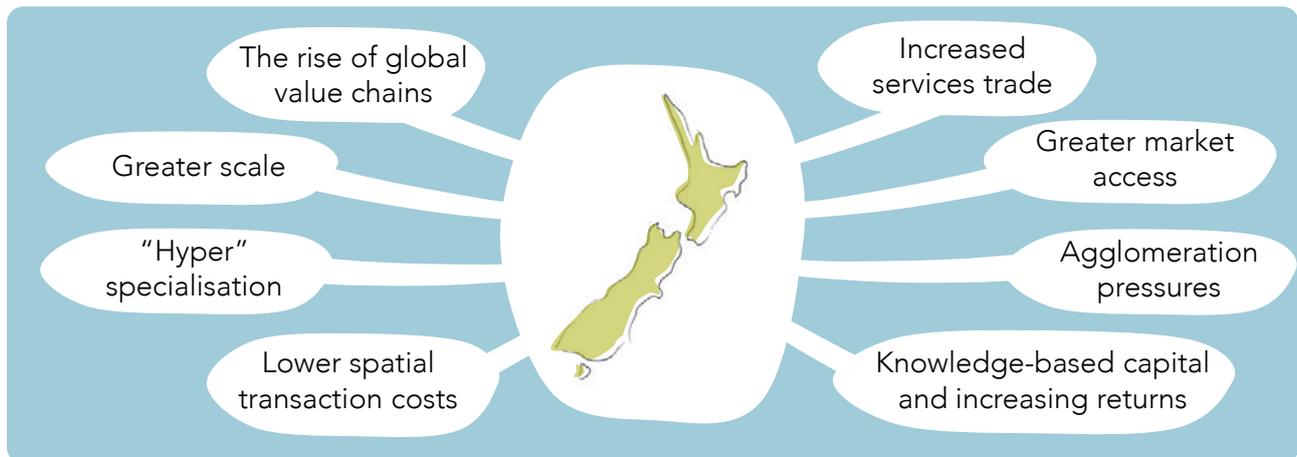
Importantly, digital services are not the same thing as e-commerce, which often just involves an electronic order for a physical product. Instead, digital services can, in principle, be marketed and delivered worldwide without any negative impact of distance. Indeed, a number of new international digital firms have rapidly increased in scale globally as digitisation allows them to overcome the restraints of national markets. As more and more services are delivered digitally, this could provide a growing opportunity for New Zealand firms.

The rise of GVCs is also allowing firms to specialise without developing a full set of underlying capabilities or being part of a domestic supply chain. For example, digital services such as cloud computing enable small firms to engage in complex digital analytics without having to invest in this technology themselves. Accordingly, increasingly narrow areas of comparative advantage in international markets are becoming less constrained by firm size and the legacy of past investment choices. This also suggests some important new opportunities for New Zealand firms to connect internationally (Figure 5.3).

These developments are consistent with some promising recent signs in the New Zealand economy. In particular, increasing export diversity and a growing high-tech sector – including strong growth in the market capitalisation of various ICT firms – suggest improved international connection by some New Zealand firms. In specific areas of economic activity, the forces that have restricted international connection by New Zealand firms may be loosening their grip. However, geography clearly still matters,

even in digital products, and New Zealand needs to develop comparative advantage in key areas if it is to attain maximum benefit from these changes in the global trading environment.

Figure 5.3 Risks and opportunities in a changing global economy



Building comparative advantage – the Business Growth Agenda

In response to these challenges and opportunities, the Government has implemented the Business Growth Agenda (BGA) with the aim of building a more productive and competitive economy. The BGA is structured around six key themes: export markets; investment; innovation; skills; natural resources and infrastructure. In addition, there are three cross-cutting themes in the BGA: Māori economic development; regional economic development; and regulation.

The BGA is targeting key areas in which improvements in policy and performance would help break the economic feedback loops that have constrained New Zealand's long-run productivity performance. Importantly, the BGA is also subject to an annual refresh that helps encourage an evaluative culture, meaning that it can adjust in response to improving knowledge of the New Zealand economy.

As outlined in more detail below, there are a number of ways in which the BGA can be strengthened to help achieve its objectives of a more productive and competitive economy. By way of a summary, Table 5.1 outlines the broad policy areas that are discussed in more detail below. The table also includes an indicative research agenda that would help build an evidence base to support any changes in policy.

Importantly, these policy considerations should not be viewed in the same way as the much more detailed policy recommendations made by the Productivity Commission in its inquiries. Instead, the intention is to outline broad policy areas in which some fresh thinking could help New Zealand firms build comparative advantage to make the most of new opportunities and improve their performance more generally. This list should also not be viewed as a complete agenda. Instead, it is based on the broad reasons for New Zealand's generally poor long-run productivity performance outlined in this paper. As knowledge of New Zealand's productivity issues improves, the list of associated policy considerations will naturally evolve.

Table 5.1 Policy considerations to improve productivity growth

Objective	Policy considerations	Research questions
Improve international connection	<ul style="list-style-type: none"> Emphasise digital products in a refreshed trade strategy Minimise “behind the border” trade barriers via improved international policy coherence (ongoing) Review tariffs and the FDI regime Reduce trade frictions at the border 	<ul style="list-style-type: none"> Assess the impact of CER/SEM on firm performance Develop understanding of promising areas for FDI
Lift the contribution of innovation and science	<ul style="list-style-type: none"> Focus on thematic research areas with high global visibility Consider other forms of innovation support (eg, prizes) Develop policies on digital technologies Encourage better links between researchers and firms Ensure policy does not overly punish failure Better match savings to productive investments 	<ul style="list-style-type: none"> Better understand the impact of innovation support on firm performance Research the impact of financial constraints on firm performance Assess to private-sector funding for innovation
Enhance labour market performance	<ul style="list-style-type: none"> Skills matching: ensure the education system is responsive to labour market trends (NZPC, 2016) Housing: ensure affordable housing in productive cities (NZPC, 2012; NZPC, 2015; NZPC 2016) Migration: target very high-skilled and well-connected migrants 	<ul style="list-style-type: none"> Better understand the impact of migration on the labour market and macro economy
Lift competitive intensity (services)	<ul style="list-style-type: none"> Reform the Commerce Act and give the Commerce Commission the power to do market studies (NZPC, 2014) Review occupational regulation with the aim of removing anti-competitive entry barriers and conduct regulation Reduce switching costs (NZPC, 2014) Remove the shipping exemption from the Commerce Act and improve the logistics chain (NZPC, 2012) 	<ul style="list-style-type: none"> Research spatial productivity and the impact of geography on competition Research the links between firm scale and competition Assess the impact of infrastructure on productivity
Build policy capability (regulatory stewardship)	<ul style="list-style-type: none"> Improve implementation of better regulatory management (NZPC, 2014) Enhance the use of evidence in policymaking 	

Notes: The list of policy considerations in this table are indicative and based on the broad constraints to lifting productivity described in the paper. The references in the table indicate policy areas in which the Productivity Commission has previously done an inquiry. The Research questions column outlines associated research projects that would provide useful input into the policy considerations. These research questions are a subset of the Productivity Hub’s broader research agenda. More details on this agenda can be found in Productivity Hub (2016).

5.3 Improving international connection

In addition to digitisation and lower spatial transaction costs discussed above, the centre of global economic gravity is also shifting towards New Zealand’s region of the world. Long-range forecasts by the OECD predict that the balance of global economic activity is likely to continue shifting away from OECD countries towards non-OECD countries – particularly Asian and African economies (OECD, 2014). As a result, non-OECD economies will become increasingly important in globalisation, with expanding GVCs and interlinkages across trade and investment partners (Johansson & Olaberria, 2014).

Major shifts in specialisation are also likely, as some emerging economies progressively move into higher value-add activities. However, given the increasing importance of knowledge, the trend of OECD countries specialising in the development of new ideas and services and away from the physical production is likely to continue. As discussed above, this implies some potential opportunities for New Zealand firms.

On paper, New Zealand is already a relatively open economy. As part of economic reform from the mid-1980s, New Zealand put in place relatively low barriers to trade that have been broadly preserved. More recently, New Zealand has made good progress in negotiating bilateral free-trade agreements with a number of countries, including China. Given limited progress in lowering barriers to trade in most other OECD countries, New Zealand continues to be one of the economies most open to trade in the OECD. However, policy settings to encourage international connection need to keep up with the changing nature of international trade outlined in Section 2.

Lifting trade intensity

Services

Reducing behind-the-border trade barriers and enhancing international policy coherence are important in encouraging the potential for increased internationalisation of New Zealand firms. Because services have been regulated in idiosyncratic ways, cross-country differences in regulation and enforcement are often large and costly for service firms wanting to establish in offshore markets (Nordås & Kox, 2009).³⁵ Regulations that are significantly different from those of international trading partners can restrict cross-border economic activity and shelter local incumbents from market entry by foreign firms.

Accordingly, regulatory cooperation and coherence is becoming increasingly important in international trade agreements and domestic policy settings. In practice, this is achieved through a variety of formal and informal mechanisms (OECD, 2013b). Because differences in implementation and enforcement are just as important as differences in underlying regulation, the focus has shifted from harmonisation measures to more flexible options, including soft-law and informal cooperation between regulators. Developing and adopting international standards is also an increasingly important part of international regulatory coherence. As a result, countries are embedded in webs of regulatory cooperation that go beyond the traditional treaty-based model of international trade relations.

Given these complexities, improving regulatory coherence and reducing behind-the-border trade barriers is more difficult than cutting tariffs and quotas and will be a long slow process. The halting progress of the Trans-Pacific Partnership and Trade in Services Agreement highlight just how difficult this process can be. However, as the global economy becomes more interdependent and multipolar, increased policy coherence and cooperation will only get more important.

Importantly, international policy coherence is not about adopting inferior or inappropriate policies developed elsewhere. Instead, it is about international efforts to minimise market segmentation across countries. To this end, New Zealand should maintain and even increase its presence in multi-country fora and international organisations to leverage its good reputation with the aim of using best-practice regulatory governance to mitigate unnecessary cross-country regulatory divergence. More widespread use of best-practice regulatory management tools would create an environment that ensures a 'race to the top' in mitigating many international coordination issues.

As well as pushing for greater international coherence of the rules, enhancing international connection should also be a key consideration in domestic policymaking. Looking outwards to assess the potential impact of domestic regulation on international connection should be a cornerstone of regulatory stewardship. For example, where appropriate, coordination with reputable international standards would continue to reduce the cost for firms operating across borders.

CER/SEM and beyond

New Zealand's Closer Economic Relations (CER) agreement with Australia is one of the deepest trade agreements in the world. Consistent with the changing nature of trade, the focus of CER has progressively evolved from merchandise trade to trade in services, business regulation, taxation and

³⁵ The border effects found in "gravity" models of international trade and investment flows most likely occur in part because a national boundary represents a frontier between two different legal and regulatory systems.

government procurement (NZPC/APC, 2012). These extensions aim to create a single economic market (SEM) in which businesses, consumers and investors operate 'seamlessly' across the Tasman.³⁶

As with public policy more generally, the impact of CER/SEM on New Zealand firms needs to be monitored and evaluated to help inform its future direction.³⁷ This would help in identifying areas in which integration works particularly well for New Zealand firms and helps in attracting high-productivity multinational firms as well as avoiding low-value areas of integration. As trade shifts to emerging markets such as Asia, a better understanding of the impact of deep international agreements on New Zealand firms would provide important input into future deep trade agreements with ASEAN countries and beyond.

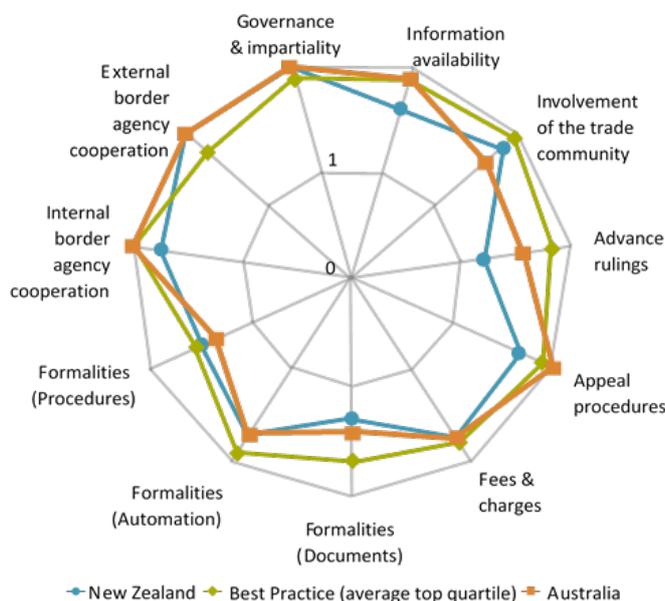
Goods

Although most imports enter New Zealand duty-free, tariffs still generate costs, including administrative costs, compliance costs, and production and consumption distortions. Some remaining tariffs may also increase the cost of intermediate inputs for firms.³⁸ For all these reasons, New Zealand's remaining tariffs should be reviewed and removed where there is a net benefit.

Onerous procedures for moving goods across the New Zealand border can also impede trade flows and have a cumulative negative impact on GVC participation. While New Zealand generally performs above the OECD average in different areas of trade facilitation, it is below best practice and Australia in a number of areas (Figure 5.4). Reducing these frictions at the border would lower the costs of doing business across the New Zealand border and contribute to increased international connection.

Of course, a lower real exchange rate would also improve New Zealand's export performance and lift trade intensity. As discussed below, this requires a deeper understanding of the causes of New Zealand's macro imbalance and associated policy responses.

Figure 5.4 Indicators of trade facilitation



Source: OECD

³⁶ While there has been good progress towards achieving this aspiration, the New Zealand and Australian Productivity Commissions in a joint inquiry identified more than 30 initiatives to promote beneficial trans-Tasman economic integration (NZPC/APC, 2012). Most of these initiatives address regulatory barriers to services trade and commercial presence, and some remaining impediments to integration in goods, capital and labour markets.

³⁷ By way of an example, Melitz & Trefler (2012) summarise studies outlining the impact of NAFTA on Canadian firms.

³⁸ In the context of GVCs, because intermediate inputs travel back and forth across borders numerous times, trade restrictions can have a cumulative impact that magnifies their negative impact on trade flows.

Improving the impact of foreign direct investment

Efforts under the BGA to lift investment include a focus on attracting high quality FDI (MBIE, 2015). New Zealand's FDI regime requires foreigners to get consent before investing in sensitive land, significant business assets or fishing quotas. Applications involving sensitive land are assessed on a number of criteria to determine if the proposed investment will benefit New Zealand. These criteria have become increasingly opaque and subject to increased scope for ministerial discretion, which adds uncertainty and cost to an already complex and non-transparent regime.³⁹

As such, reviewing the arrangements for FDI with the aim of simplifying, clarifying and reducing administrative burden would make New Zealand a more attractive destination for foreign investment. For example, it would be preferable if concerns about foreign ownership of "strategic assets" were specified and dealt with under separate explicit ownership controls. The coverage of the regime may also warrant investigation if the "business-as-usual activities" of part-foreign-owned firms – through, for example, share ownership on the NZX – are caught up in the screening process.

A review of New Zealand's foreign ownership regime would need to be based on a deep understanding of the current and potential role of foreign firms in New Zealand markets. Foreign investment should be consistent with the broader aims of lifting innovation or improving competition that lead to productivity improvements in domestic firms. Conversely, allowing multinationals to project monopoly power into New Zealand markets that already suffer from a lack of competitive intensity may be less likely to lift productivity growth in domestically-owned firms. By teasing out these issues, this review would be useful input into New Zealand's strategy for attracting international investment.

5.4 Lifting the contribution of innovation and science

As discussed in Section 4, the social returns to innovation can be high and investment in innovation – and in KBC more generally – is risky.⁴⁰ Accordingly, there is a case for government support for innovation. Contestable grants and tax credits are the two most common forms of government support for private-sector R&D. While tax incentives are usually available to all firms doing R&D, grants are more discretionary and often targeted at specific projects. Because the impacts of these two funding mechanisms differ, it is difficult to conclude which is more effective and many countries now use both (IMF, 2016) (Figure 5.5).

Governments also set broader rules that influence the extent of innovation and its economic impact. For example, intellectual property rights (IPRs) restrict the use of knowledge and can require firms to pay for using the ideas of others. Highlighting the importance of policy coordination, the education system influences the skill composition of the labour market, which impacts on innovation. More broadly, framework policies that influence technological adoption, "firm churn" and resource reallocation are also important in the innovation context.

Getting innovation policy settings right is a difficult balance to strike. For example, if set appropriately, IPRs are an important means of encouraging innovation. However, if they are too onerous, IPRs risk stifling innovation and slowing down knowledge diffusion. If firm R&D is largely driven by tax concessions, then it may not translate into new products or improved processes. By the same token, if the education system is out of step with the skill needs of the economy, then potentially high-skilled people can be channelled into the wrong activities.

Innovation policy in New Zealand

In contrast to most other OECD countries, all Government support for business R&D in New Zealand is in the form of R&D grants (Figure 5.5). Because changing the system of Government support would be

³⁹ For example, in 2010 the government introduced a new "economic interests" test and a "mitigating factor" test to increase Ministerial discretion in deciding if a proposed foreign investment involving sensitive land would be in New Zealand's economic interests.

⁴⁰ For example, Bartelsman (2013) shows that firm outcomes – such as productivity, employment and sales – all become more volatile across firms as investment in intangibles increases.

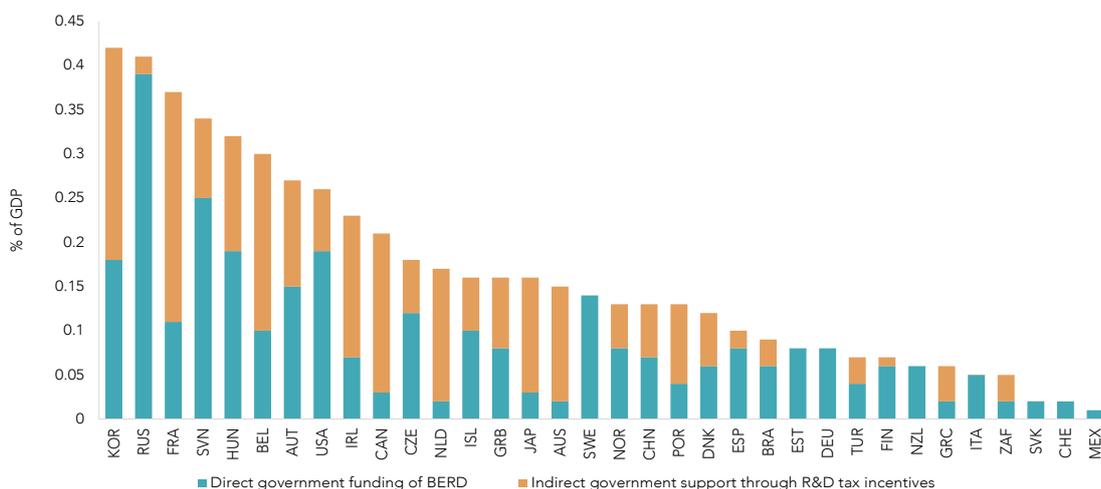
costly for firms and generate uncertain net benefits, the focus needs to be on ensuring that the current system operates to its full potential.

In large part, this comes down to its design features. For example, although the R&D grants system is relatively non-discretionary, eligibility requires firms to spend at least 1.5% of their revenues on R&D, meaning firms with modest R&D budgets are ineligible. The cost of compliance on applicant firms is another key feature of government support schemes. For example, if the burden of applying is too high, then small firms in particular are less likely to apply. However, in the New Zealand case, data on compliance costs is not available.

Another feature of Government support for business R&D in New Zealand is that it is among the lowest in the OECD (Figure 5.5). On the face of it, this suggests that greater support could yield increased innovation and productivity benefits. However, if weak innovation by New Zealand firms reflects broader considerations – such as poorly-managed firms operating in small and fragmented markets with a low return to innovation – then further R&D subsidies would be ineffective in lifting innovation.

Accordingly, a better understanding of the impact of Government support for innovation on firm performance would be extremely valuable. As well as one-off research projects (Box 4), the impact of Government support should be regularly monitored and evaluated with the aim of improving effectiveness. The growing use of microdata makes this increasingly possible.

Figure 5.5 Government support for private R&D, 2013



Source: OECD

Pushing out the global productivity frontier

The discussion in Section 4 suggests that small markets may be an important reason for low rates of innovation and a poor productivity pay-off from innovation by New Zealand firms. Accordingly, a possible strategy for addressing the innovation challenge in New Zealand is to focus on connecting to the global frontier in subsets of the product space where firms have already demonstrated strengths and have global visibility. This would increase the chances of developing a rich, dense innovation ecosystem in these areas and firms building global visibility and scale. This might entail a more active role for Government aimed at supporting thematic platforms of research, with associated investments in the national science system and building links between firms and researchers.

In addition to a sharper focus, it may also be worth considering alternative methods of supporting business innovation. For example, prizes could be offered for innovative solutions to well-defined economic and social issues.⁴¹ These kinds of alternative support mechanisms would be complementary to the grants scheme and would explicitly recognise that there is much more to innovation than R&D.

⁴¹ This approach could be used, for example, in tackling current challenges in the public sector. The costs of government services in small, low-density economies tend to be high. Innovations in health, education, transport, etc. could reduce these costs, improve the competitiveness of private-sector exporters and even be exported themselves.

These complementary support mechanisms could be especially important in the services sector where R&D spending accounts for only 35% of total expenditure on innovation (Figure 4.21).

As previously mentioned, attracting the right type of FDI is also an important way of assisting New Zealand-based firms in pushing out the global productivity frontier. This is not about subsidising multinational enterprises – the global nature of these firms carries a risk of unintended tax relief for R&D stemming from cross-border tax planning. Instead, as elaborated on below, attracting innovative frontier multinationals to New Zealand requires agile and nimble policymaking and a regulatory system that is highly responsive to changing technology.

Encouraging diffusion and reallocation

Because experimentation is a critical part of catching up to the frontier, firms need the flexibility to discover and adjust to emerging possibilities and experiment with different technologies and business models. This requires a regulatory environment that does not overly penalise failure. Because failure is an inherent part of innovation, tax and regulatory settings need to be consistent with risk taking. For example, if bankruptcy provisions overly penalise firms that are capable of starting over or if the tax system does not give due recognition for tax losses, then firms will be less inclined to innovate.

Another key to encouraging technology diffusion is building connections across the innovation system to facilitate the transfer of knowledge across research organisations and firms and leverage the intellectual property in the national science system. Given that combining different types of KBC in new and hard to replicate ways is an important source of new innovation, these types of connections and collaborations are potentially very important. However, as discussed in Section 4, there are indications that the links between research organisations and firms are relatively weak in New Zealand.

Other aspect of the economy – such as skills, standards and infrastructure – also need to be regulated in coordinated ways that are consistent with making the most of rapid technological change. For example, government policies on digital technologies – such as digital security management – are important given that many firms may be reluctant to engage in digitisation given concerns about security, privacy and other frameworks that need to be established by policy.

Matching savings to productive investment opportunities

Because innovation often involves a high level of risk, significant fixed costs, and returns that materialise only in the medium to long term, new and innovative firms may find it difficult to obtain funding. If this is the case, then credit frictions could result in resources by-passing firms with the most promising projects and going to firms with tangible capital to use as security. This would be consistent with the results presented in Section 3 suggesting that the allocation of capital in New Zealand may be out of sync with the most productive parts of the economy. Although the impact of financial constraints on firm performance are not well understood in New Zealand, these issues might be particularly acute given the predominance of small firms with limited collateral.

Capital misallocation raises important questions about the efficiency of the New Zealand financial system in allocating savings. For example, New Zealand's small venture capital and share markets may disadvantage firms with limited tangible collateral, such as those with competitive strength based on innovation.⁴² As well as developing these markets, access to new sources of financing – such as crowd funding – also need to be encouraged.

As well as undermining the ability of innovative firms to secure funding, credit frictions may also result in savers missing out on opportunities to invest in innovative, high-productivity firms. Although these investments are inherently risky, overly-protective regulations risk shutting retail investors out of this part of the market. With the share of national income accruing to capital generally increasing over recent decades (Box 3), savers need low-cost access to a range of investment opportunities and markets that match savings to investment need to work as efficiently as possible. Among other things,

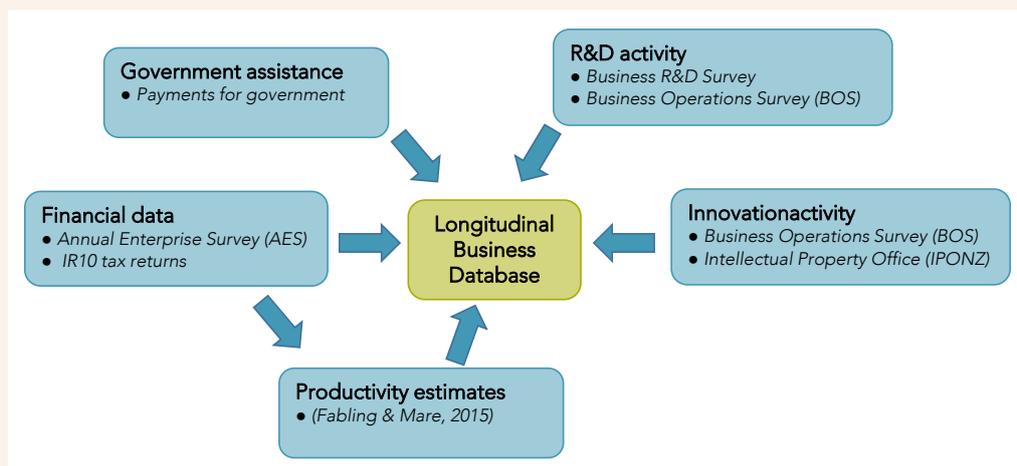
⁴² MED/Treasury (2011) shows that New Zealand's venture capital and share markets are smaller than those in similar-sized OECD economies.

improving the performance of New Zealand's financial markets may help to lift savings, and thereby reduce the real interest rate premium (Box 5).

Box 4 Monitoring the impact of Government programmes: the case of R&D grants

The Longitudinal Business Database (LBD) can be used to build an understanding of firm-level innovation. This database links information from tax records, trade data, a variety of surveys, patenting and trademark activity, and Government programmes over a number of years to create a detailed picture of the activity and performance of New Zealand firms.

Figure 5.6 Data sources feeding into Longitudinal Business Database



Source: Wakeman (forthcoming)

This detailed picture can then be used to assess the impact of government programmes, such as R&D grants. In particular, the data allows researchers to isolate the effect of the government programme on firms' performance by comparing firms that receive government support with other firms that are similar in key ways but do not receive support.

A number of studies have used this evaluative approach. Key findings include:

- MED (2011) examined the firm-level impacts of R&D grants between 2002 and 2008. It found that firms that received capability building grants experienced higher employment and sales growth in the year after the grant, and higher MFP growth four years later. They found no impact of project grants on any of their measures of firm performance, including MFP growth.
- Jaffe and Le (2015) found R&D grants increase the probability that recipient firms applied for patents during 2005–2009, but there was no positive impact on the probability of applying for a trademark. Receiving a grant almost doubled the probability of that firm introducing new goods and services to the world while the effects on process innovation and any product innovation were much weaker.
- Wakeman (forthcoming) found that grant recipients were more likely to patent and introduce new products, but not to engage in process innovation. The results suggested that after receiving a project grant recipients directed their attention away from R&D and towards product development and commercialisation.

Wakeman (forthcoming) noted a number of challenges in using the LBD for programme evaluation. In particular, any evaluation needs to account for a time delay in data becoming available, a lack of data on some variables (financial data is available for only around 50% of all firms), and imperfect matching of recipients to the Longitudinal Business Frame (eg. when grant information is matched to the wrong firm). Efforts to address these issues will make the LBD an even more valuable evaluation tool.

Box 5 **Savings and the cost of capital**

The 2015 refresh of the BGA aims to reduce New Zealand's interest rate premium to lower the cost of capital for firms. As discussed in Section 4, a relatively high cost of capital is an important reason why the New Zealand economy is capital-shallow. The associated real exchange rate pressures also exacerbate the difficulties firms face in connecting internationally.

Although this issue would benefit from deeper policy-relevant research, it is likely that New Zealand's real interest rate premium reflects persistent excess demand pressures in the economy. In turn, this raises questions about the role of strong population growth (discussed below) and/or low domestic savings as underlying causes of relatively high real interest rates.

Previous research has proposed a number of policy changes aimed at lifting savings. In 2011, as part of a package of measures, the Savings Working Group advocated changes to the tax system to remove distortions that favour housing investment and penalise interest income from basic savings products. Brook (2014) also argued that aspects of New Zealand's tax system distort savings decisions and create disincentives to save. The IMF and the OECD have also emphasised the impact of tax settings on savings. The Savings Working Group also called for the resumption of Government contributions to the New Zealand Super Fund and improvements in the efficiency of the KiwiSaver market to encourage savings by delivering low service fees for savers.

Importantly, private saving is likely to be affected by the combination of policy settings in a number of areas, including the tax treatment of savings, the design of KiwiSaver and Government-provided pensions. While the impact of policy on savings is subject to some debate, policy-relevant research aimed at understanding the savings behaviour of New Zealand firms and households could lead to policy changes that ultimately contribute to a lower cost of capital in New Zealand.

5.5 **Enhancing labour market performance – skills, housing and migration**

Matching skills to (future) jobs

By equipping people with skills and the ability to acquire skills that will be in demand in the future, the skills system is critical in winning the race between education and technology and in helping people benefit while minimising any harmful effects of new technology. This has implications for investments in higher education, basic scientific research, and partnerships between research institutes and private companies. Focus also needs to go on firms' management capability and how skills are deployed and used.

A key challenge in minimising skills mismatch is ensuring that the education sector responds to changing future trends in the labour market and the demands of more diverse learners. In its draft report into "New models of tertiary education", the Productivity Commission found that the New Zealand skills system is not good at trying and adopting new ways of delivering education and struggles to respond flexibly to changing needs (NZPC, 2016). The draft report sets out a range of detailed policy initiatives that would improve these aspects of the system.

In addition to a responsive skills system, the international literature proposes a number of policy considerations aimed at reducing skill mismatches and making the most of investments in human capital. Adalet, McGowan and Andrews (2015) found that policies that create barriers to worker mobility – such as restrictions on housing supply – are associated with higher skills mismatch. International studies also find that qualification mismatches tend to be higher among migrants – which may well be influential in New Zealand given that migrants account for a relatively large share of the labour market.

A responsive housing supply

A housing market that responds to demand pressures facilitates labour mobility and improves productivity by allowing firms access to a deeper labour market, as well as more opportunities for specialisation, innovation and technology spillovers. For workers, being able to live in places where their skills are most valued improves their incomes.

Having an adequate supply of land and development capacity for housing are key prerequisites for responsive housing markets. In its draft report into the urban planning system, the Productivity Commission identified a number of institutional, legislative, regulatory and process deficiencies in the design and implementation of the urban planning system (NZPC, 2016b). Specifically, ambiguous and broad language in the current planning laws has led to overly restrictive rules in urban areas, 'scope creep' in planning, and failures to protect the natural environment.

Draft recommendations for improvement include making a distinction between the built and natural environment and more effective guidance and clearer priorities from central government. The Commission has also highlighted the need for more responsive provision of infrastructure, including pricing and funding that reflects actual costs, use and impacts. More restrained use of land-use regulation and strengthened capability within councils and central government are also required.

In conjunction with the Commission's previous recommendations aimed at improving housing affordability, these changes would allow for greater agglomeration in Auckland and other fast-growing urban centres that would increase aggregate productivity via reallocation effects. A greater supply of affordable housing would also help reduce wealth inequality between home owners and renters and possibly encourage people to invest in other types of assets. At the margin, this might help lift aggregate savings (Box 5).

Targeting high-skilled migration

There are a number of reasons for migration into New Zealand, some of which are unrelated to improving the functioning of the labour market and the economy's productivity performance. This includes migration for family reasons, working holidays and study-to-work schemes. Migration has had a major impact on New Zealand, with around a quarter of New Zealand's current population born elsewhere, compared with a worldwide average of about three percent (Fry, 2014).

Migration aimed at temporarily filling skill gaps takes place under the essential skills and seasonal work categories (Figure 5-7a). Permanent migration for labour market purposes is based on a points-based system in which people who meet or exceed various criteria are deemed eligible for residency. Over the years, the system has been progressively amended with the aim of improving the link between migration and the labour market.

It is difficult to conclusively assess the impacts of migration on the economy. On the demand side, high migration flows can, in principle, contribute to short-term pressures in the housing market (NZPC, 2012). However, this can be difficult to prove empirically. For example, Cochrane & Poot (2016) found limited evidence of migration pushing up house prices in New Zealand whereas Fry (2014) concluded that migration – in combination with sluggish housing supply – may have had a significant effect on New Zealand house prices. More broadly, and as discussed in Section 4, Reddell (2013) argues that demand-side pressures driven by strong migration inflows are part of the reason for high real interest and exchange rates in the economy, which suppress investment and encourage resources into the low-productivity non-tradables part of the economy.

On the supply side, migration may generate small productivity increases via agglomeration.⁴³ In addition, high-skilled migrants that are well matched to jobs can also encourage technology diffusion by improving firm exports and innovation (Alesina & La Ferrara, 2005; Kerr 2008; OECD 2008; McLeod, Fabling & Maré 2014; Sin et al., 2014). A supply of high-skilled migrants may also lift productivity in

⁴³ See Australian Productivity Commission (2006) and Maré (2016) for empirical evidence on the size of the productivity dividend associated with migration.

other ways, including improvements in the skill composition of the labour market, diversity effects and knowledge transfer.

On the other hand, by increasing labour supply, migration may also limit employment and wage growth for domestic workers. This is more likely with low-skilled migrants that are substitutes for local labour, whereas high-skilled migrants are more likely to be complements (eg, Borjas, 2003; Card, 2005; Longhi et al., 2004).

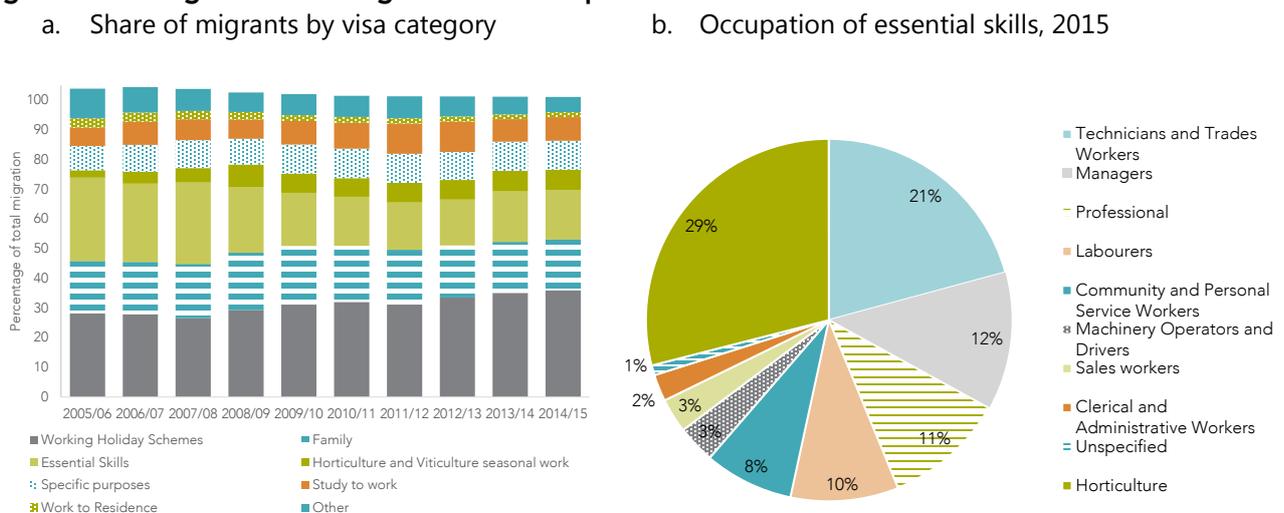
Recent evidence from the OECD's Survey of Adult Skills shows that the skill level of the total overseas-born population in New Zealand is higher than for the overseas-born population of any other OECD country (Figure 5.8). This indicates that the migration system has done comparatively well at attracting high-skilled migrants. However, migrant skills are still lower than the skills of the New Zealand-born population, suggesting that migration inflows may be part of the reason for small decreases in the average quality of workers outlined in Section 3.

There is also some evidence that a considerable share of the recent upsurge in migration may be relatively unskilled, with many recent migrants working in relatively unskilled occupations (Figure 5-7b). Within industries, migrants also tend to be relatively poorly paid and migrant employment has increased strongly in some lower-productivity industries – such as hospitality and tourism, retail trade, support services and primary (McLeod et al., 2014) (Figure 5.10).

Although up-to-date research on the impact of migration on employment and wages is lacking, it is possible that recent inflows of low-skilled migrants have restricted wage growth and the employment of low-skilled New Zealanders.⁴⁴ In turn, this would encourage a reliance on cheap labour by some firms and industries. In conjunction with any macroeconomic effects on real interest and exchange rates, this may suppress investment and productivity improvements, and work against efforts to increase the employment of lower-skilled New Zealanders.

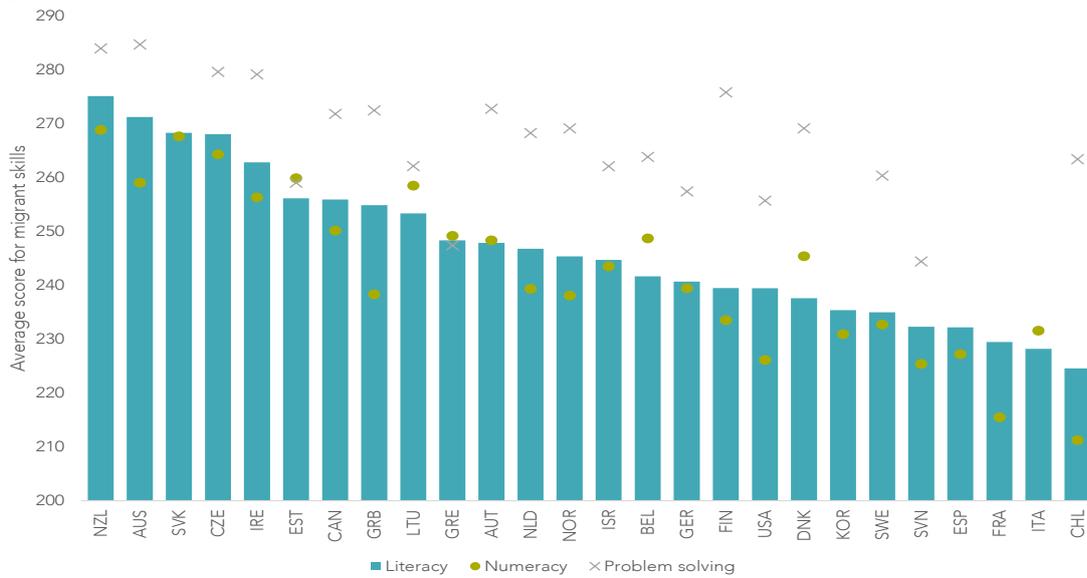
The Government's objectives around migration for labour market purposes should be clearly focused on improving the skill composition of the workforce to improve international connection and the flow of new technology into the economy. New Zealand is currently a very attractive destination internationally and policy needs to use that advantage to target very highly skilled and well-connected migrants. Any reduction in the total number of migrants coming to New Zealand as a result of this sharper focus may help address New Zealand's macro imbalances outlined in Section 4.

Figure 5-7 Migrant visa categories and occupations

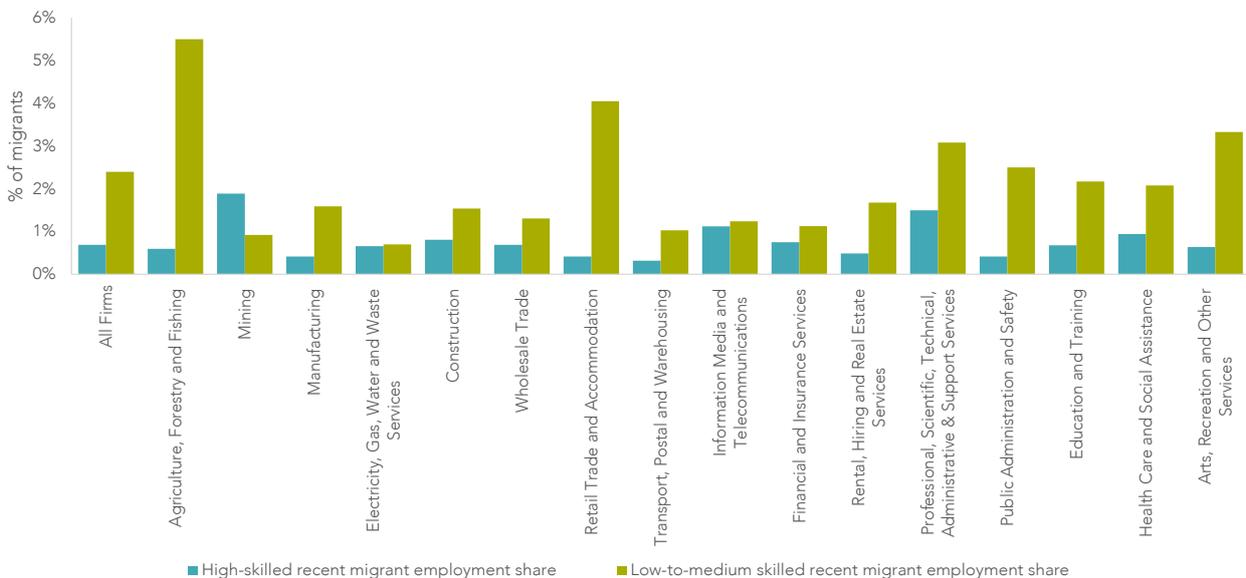


Source: MBIE (2015).

⁴⁴ Previous work has found that migration into New Zealand has limited negative effects on local employment and some positive effects on local wage rates. However, this is an aggregate result and previous New Zealand work in this area uses data from before 2011, prior to the recent surge in low-skilled migration that is not labour market tested. See McLeod & Maré (2013), Hodgson & Poot (2010), Maré & Stillman (2009), Stillman & Maré (2007), Maani & Chen (2012), Maré, Fabling, & Stillman (2010).

Figure 5.8 Migrant skill levels

Source: Ministry of Education (2016)

Figure 5.9 Employment share of migrants by skill level across industries

Source: McLeod, Fabling & Maré (2014)

5.6 Lifting competitive intensity (especially in services)

Although there is wide performance variation across different service industries, parts of the sector are dominated by small firms operating in local markets and insulated from international, and in some cases, national competition and learning opportunities.⁴⁵ As a result, the incentives to invest in ICT and KBC are weak – which slows the diffusion of new technologies – and the allocation of resources across firms is productivity detracting. Accordingly, parts of the services sector are the epicentre of New Zealand's poor long-run productivity performance.

As well as a direct impact on aggregate productivity, improving services sector performance would also lift productivity indirectly. For example, almost half the output of the services sector is used as

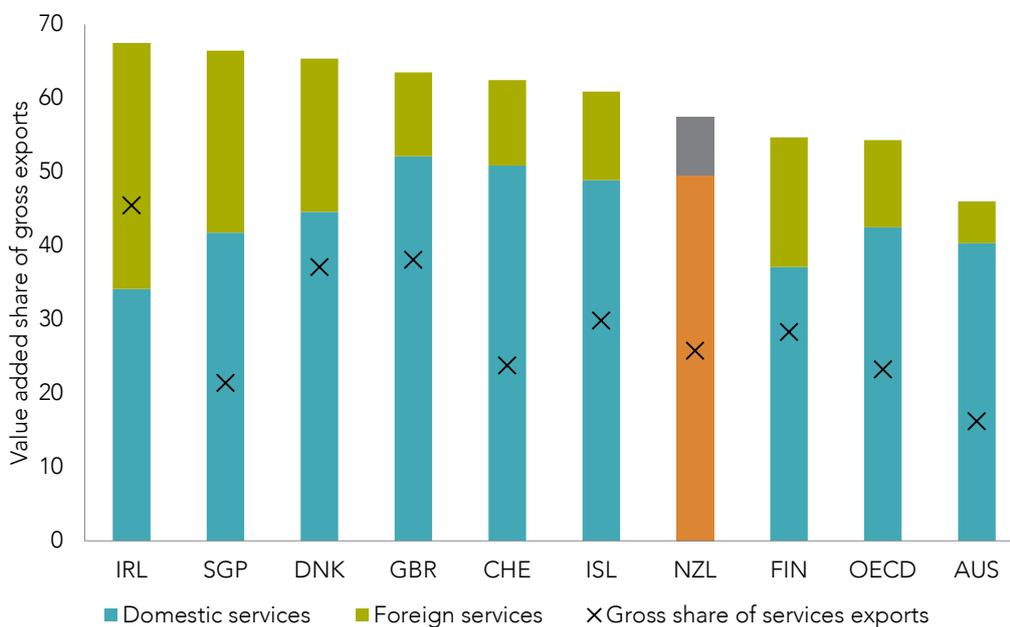
⁴⁵ The services sector is made up of a wide and diverse range of activities and there is considerable variation in its productivity performance across different industries. Indeed, service industries are among the most and least productive in the economy both in terms of the levels and growth rates of labour productivity (Conway & Meehan, 2013; NZPC, 2014). In broad terms, service industries that invest in and use ICT intensively (such as information media and telecommunications, and finance and insurance) have considerably higher labour productivity levels, skill requirements and wages. On the other hand, the distributive and person-centred service industries generally have low output for each hour of paid work, have experienced low labour productivity growth, and employ less-skilled people.

intermediate inputs by firms in the primary and goods-producing sectors and these firms combined spend about 40% more on services than they do on wages and salaries (NZPC, 2014).

Because services are deeply embodied in all products made in New Zealand, lifting the performance of the sector would improve competitiveness and international connection. While the direct contribution of services to gross exports is around 30%, the total services content embodied in New Zealand's gross exports is almost double that at 60% of total exports (Rajanayagam, forthcoming) (Figure 5.10).⁴⁶ Accordingly, ensuring that the services sector is innovating and improving its productivity is critical in improving the competitiveness of New Zealand firms operating in international markets.

A better-performing services sector could also directly open up possibilities for New Zealand firms to trade services internationally and facilitate firm participation in GVCs.⁴⁷ As discussed above, while New Zealand's remote location will always hamper international trade in goods in the absence of a sizable comparative advantage, international integration in some service industries may be becoming less sensitive to distance.

Figure 5.10 Services content of gross exports, selected countries (2011)



Source: Rajanayagam (forthcoming)

Opportunities to improve service-sector performance

The importance of the services sector is only going to grow given increasing “servitisation of manufacturing” and digitisation of production. In addition, in most OECD economies, parts of the services sector largely escaped previous reform efforts in the 1980s and 1990s and are consequently the least reformed parts of many economies (Conway and Nicoletti, 2006). Although New Zealand's economic reforms from the mid-1980s went further than in most other countries, there are still important opportunities for productivity-enhancing reform in the services sector (NZPC, 2014).

While improving international regulatory coherence is about minimising the impact of regulatory differences between New Zealand and potential trading partners, service-sector reform is an area in which domestic regulation needs to be world class to help build comparative advantage. Regulation in the goods-producing part of the New Zealand economy was once world-leading and a current challenge for policymakers is to rediscover that impetus and improve service sector regulation to the same high standard.

⁴⁶ Interestingly, the contribution of foreign services to gross exports in New Zealand is relatively small (Figure 6.6). Again, this is consistent with the description of New Zealand's services sector as relatively insular in international comparison.

⁴⁷ Indeed, strong growth in international trade in business and ICT services suggests that some services industries are already becoming increasingly integrated into GVCs.

Improving competition and its impact on performance

Lifting competitive intensity is key to improving services sector performance. While enhanced competition is important across the whole economy, the positive impacts will be especially large in services given its size and indications of weak competition in parts of the sector.⁴⁸ Increasing competition would energise market selection effects, making it less likely that productive resources – including skills and intellectual property – get trapped in lagging slow-growing incumbents and, instead, flow to innovative new entrants.

There are a number of policy initiatives that would help to increase service-sector competition. Improvements in competition law is an obvious place to start. In its inquiry into boosting services sector productivity, the Productivity Commission found that Section 36 of the Commerce Act – taking advantage of market power – is impractical and needs to be reviewed. Under this Act, abuse of dominance cases are assessed using a “purpose test” that the conduct had an anti-competitive purpose and a “counterfactual test” that the conduct could not have occurred in the absence of market power.

This approach is increasingly out of step internationally, with competition law in almost all other OECD countries focussing on whether a dominant firm’s behaviour creates demonstrable harm to consumers (OECD, 2005). Following the Harper Review on competition policy in Australia – which recommended shifting to an effects-based test of abuse of dominance – the New Zealand approach is looking increasingly unusual and unworkable.⁴⁹

Another important policy area in lifting services productivity is the reform of occupational regulation to remove entry barriers and conduct regulations that stifle competition. While occupational licensing regimes can provide important information on qualifications and experience to help customers choose a supplier, they can also impose costs.⁵⁰ In particular, applying entry restrictions or setting professional standards too high in professions – including engineering, legal, accounting and architectural services – can limit supply and restrain competition, to the detriment of consumers.

Policies aimed at reducing the costs for consumers and businesses of searching and switching between service providers could also enhance competitive intensity. For example, bank account number portability would lower the costs of switching between banks, increasing customer churn and the impact of competition on banks performance. Comparison websites, information disclosure and reasonable contract termination arrangements also all have a role to play in improving competitive intensity.

Infrastructure provision is another way in which government can influence competitive intensity in service markets by better linking small markets in New Zealand’s towns and cities, thereby improving proximity between customers and providers. In this respect, the national broadband initiative is a positive development that could help expose lagging firms operating in small local service markets to greater competitive intensity. More generally, the contribution of infrastructure to lifting productivity is not particularly well understood in New Zealand and decisions on infrastructure provision would benefit from a better understanding of New Zealand’s productivity from a spatial perspective.

Another obvious way of improving competition in the services sector is to facilitate international trade and cross-border investment in services. As discussed above, this highlights the importance of improving the framework for FDI and working towards greater cross-country coherence in regulation and standards through agreements such as the Trans-Pacific Partnership and Trade in Services Agreement.

⁴⁸ In its 2014 inquiry into boosting productivity in the services sector, the Productivity Commission found that the finance and insurance; rental, hiring and real estate; retail; and professional, scientific and technical industries appear to have less intense competition than other industries.

⁴⁹ Under the principles of the Single Economic Market, any move in this direction by the Australian authorities would need to be taken into consideration in future amendments to the Commerce Act to protect and enhance the ability of businesses to operate seamless across the Tasman. At the time of writing, the Australian government is consulting further on the option.

⁵⁰ Licensees in particular have an incentive to capture the licensing regime and use it to restrict entry to the trade or profession.

Policy reforms aimed at improving the performance of the transport and communications industries have the potential to lower spatial transaction costs to better link domestic markets and improve comparative advantage in international markets. Given the key role of logistics in globalisation and GVC participation, these industries need to perform extremely well to lower spatial transaction costs for New Zealand firms.

For example, in its inquiry into international freight transport services in 2012, the Productivity Commission recommended that collaborative arrangements between international liner shipping companies – which can be used to fix prices or set capacity limits – should no longer be exempt from competition law. In the same report, the Commission also identified opportunities for improvement across many parts of the logistics chain – from better planning of infrastructure investments, to improvements in governance structures and more productive workplace relationships.

Improving understanding on the economic impacts of competition

Much of the debate on competition in New Zealand has been from a legal perspective and very little is known about the economic impact of competition in New Zealand markets. Given signs of weak competition in conjunction with high rates of return in some parts of the economy, policy-relevant research aimed at better understanding the role of competition in the economy would be highly beneficial.

For example, the advocacy role of the Commerce Commission in promoting competition as means to enhanced economic efficiency and wellbeing could be improved. Specifically, the Commerce Commission should be able to conduct market studies without reference to a merger application or other investigation, as is the case in Australia.⁵¹ These changes would help strengthen the competition culture among policymakers and the public. For example, the ability to conduct market studies would allow the Commerce Commission to investigate potential barriers to competition in poorly performing but highly profitable industries.

Firm-level research on competition may also provide useful information that would help firms compare their performance to other firms in their industry. Because low competitive intensity most likely restricts information flows across market participants, practical research along these lines could help firms learn about productivity-enhancing technology and know-how at the frontier of their industries. In some respects, this would help in mimicking the effects of competition on New Zealand firms. Peak bodies could play a role in disseminating these kinds of research insights.

5.7 Policy capability (regulatory stewardship)

Several Productivity Commission inquiries have highlighted the need to lift the capability of public sector agencies to more effectively develop, implement and monitor Government policy. This focus on capability can also be seen in the work of the Policy Project at the Department of Prime Minister and Cabinet.

The Government has improved many aspects of its approach to regulatory stewardship over recent years. A ministerial portfolio for regulatory reform has been created to increase the political profile of the issue. A regulatory quality team has been established within Treasury and a head of the regulatory profession has been appointed within the Department of Prime Minister and Cabinet. MBIE have recently published a Regulatory Management Strategy with the aim of a more consistent approach across the regulatory system (MBIE, 2016).

With many of the elements of a good system in place, the ongoing challenge is to improve the implementation of better regulatory management to minimise the gap between good intentions and actual practice.⁵² Continued work is required to advance a system of regulatory stewardship under

⁵¹ Notably, the Harper review endorsed the use of market studies by the Australian Council for Competition Policy.

⁵² For example, although Regulatory Impact Statements (RISs) have for some time been mandatory for regulatory proposals going before Cabinet, independent reviews show that less than half of RISs are up to standard and that the quality has generally not improved since 2008 (McWha, Smith and Murray, 2015).

which Ministers and their departments are clearly accountable for the quality of regulation in their portfolios and adopt a culture of continuous improvement.

Basing policy decisions on evidence is a key part of regulatory stewardship. The increasing availability of microdata and associated research techniques has the potential to significantly improve the evidence base for policy decisions. As well as improving policy design, better use of research and data would also improve the monitoring and evaluation of policy outcomes (Box 4 above).⁵³

Encouraging the use of evidence in policy design and evaluation requires improvements in the ability of the public sector to resource and undertake or commission research. Policy teams need to be across the data and well-connected into relevant research programmes underway within the public sector and elsewhere. Likewise, the research itself needs to be relevant to policymakers needs and to be timely. This amounts to a cultural change within the policy and research communities, which takes time, political will and resourcing.

⁵³ Indeed, according to OECD indicators, ex-post policy evaluation and oversight is typically the weakest aspect of regulatory quality. Ex-post evaluation is particularly weak and often fragmented across institutions. In addition, oversight is often seen as an issue of legal quality, instead of about policy impacts and outcomes (OECD, 2015c).

6 Conclusions

This paper offers a diagnosis of New Zealand's poor productivity performance and some broad policy considerations that would help in turning it around. This diagnosis is undertaken against the backdrop of rapid technology improvements at the global productivity frontier and important changes in the global trading environment.

The paper argues that New Zealand needs to shift from a development model based on increasing hours worked per capita to one in which productivity growth plays a more important role in driving growth in GDP and incomes per capita. Of course, while higher incomes make for higher material living standards, this only matters to the extent that it enhances wellbeing. However, according to the OECD's Better Life Index, New Zealand scores well in many aspects of wellbeing but is below average on income and work-life balance, highlighting the importance of lifting productivity (Jai & Smith, 2016).

Reflecting the state of knowledge on the New Zealand economy, the analysis presented in this paper is incomplete and speculative in some areas. As the research base on New Zealand's productivity issues continues to grow, the broad story expressed in this paper will evolve as deeper insights into various aspects of New Zealand's productivity experience develop. Indeed, the knowledge gaps highlighted throughout the paper provide useful input into the forward-looking research agenda of the Productivity Hub.

The broad policy considerations for lifting productivity offered in the paper highlight the importance of regulation that promotes knowledge diffusion into and throughout the economy and increased competition to improve resource allocation. Synergistic investment in skills, innovation and organisational know-how (including managerial capability) and other forms of KBC are also important. Flexibility, openness and receptiveness to new technology are also key and carry important implications across a range of policy areas. With low productivity so entrenched in New Zealand, lifting this presents a monumental challenge for policymakers, business owners and workers. However, with the right mix of coordinated regulatory and institutional reforms, New Zealand can achieve its productivity potential.

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