

Can the Kiwi Fly? Achieving Productivity Lift-off in New Zealand

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ABSTRACT

New Zealand's poor long-run productivity performance has puzzled domestic economists and international observers for decades. To provide answers, this article sketches out the broad reasons why lifting productivity has proven so difficult. Against the background of ongoing changes in technology and in the global trading environment, the article also puts forward a number of high-level policy suggestions aimed at countering the economic forces that have constrained productivity, including opening the economy to new opportunities for international connection, and encouraging capital deepening, greater competition and more effective innovation. Getting this right requires a deep understanding of New Zealand's productivity track record and potential in the 21st century global economy and presents a major challenge for the New Zealand public sector.

Material living standards in New Zealand were once among the highest in the world. In 1950, GDP per capita in New Zealand was around 125 per cent of the OECD average (Conway and Orr, 2000). At this time, colonial ties to the United Kingdom provided easy access to capital, expertise, and a secure market for New Zealand's agricultural exports at guaranteed prices. This facilitated specialization and scale in an area of strong comparative advantage. The economy was highly concentrated in the production and processing of primary products and much of the policy and

institutional focus was on distributing wealth generated from these activities across the population.

From the 1960s, New Zealand's relative standard of living began to slip as export revenues became insufficient for a growing population and volatile commodity markets highlighted the vulnerabilities of a narrow economic base. Britain's entry into Europe in 1972 and widespread increases in protectionism for agricultural products restricted the ability of primary producers to reap the benefits of their comparative advantage. In response, the government

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of the day implemented an increasingly protectionist and dirigist micro agenda along with expansionary fiscal and monetary policies. This contributed to a general worsening in New Zealand's economic situation and by 1980 GDP per capita had fallen to around 90 per cent of the OECD average.

From the mid-1980s, widespread dissatisfaction with the systematic underperformance of the New Zealand economy prompted a period of comprehensive economic reform aimed at improving both microeconomic efficiency and macroeconomic stability. These reforms transformed the economy from one of the most interventionist in the OECD to one of the most open and market-based. Over the latter part of the 1980s and into the early 1990s, the rigours of microeconomic adjustment coincided with a deep global recession and a shock market collapse. In 1992, GDP per capita fell to a low of around 80 per cent of the OECD average.

In the post-reform period, New Zealand's economic performance has improved and GDP per capita is currently around 90 per cent of the OECD average. Since the mid-1990s, growth in hours worked per capita has been strong while multi-factor productivity (MFP) increased markedly over the 1990s. However, this surge in MFP faded by 2000, consistent with the idea that economic reform delivered a level shift in productivity but did not significantly increase its long-run growth rate.

Notwithstanding strong growth over the 1990s, and despite a low level of productivity vis-à-vis high-income OECD economies, New Zealand's long-run productivity performance has been poor by international standards. This is unusual within the OECD, given that lagging economies have, in principle, greater scope for improving productivity more quickly than

leading economies. New Zealand's lack of productivity catch-up is even more perplexing given that its economic policies are often regarded as fit for purpose.

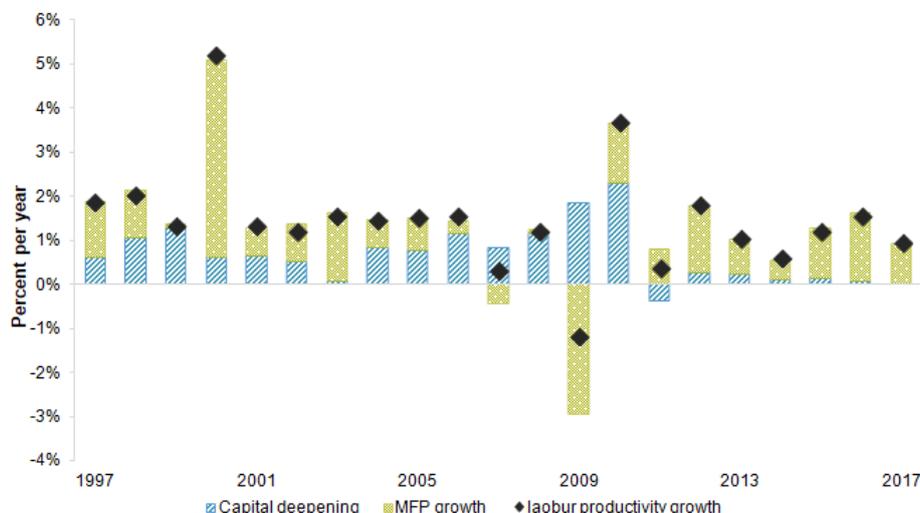
To shed some light, this article outlines recent evidence on the underlying reasons for New Zealand's comparatively poor long-run productivity performance. This review is undertaken against the background of a growing literature on potential reasons for sustained productivity differences across firms and economies, despite the expectation that technology diffusion and market selection effects should tend to equalize productivity over time.

From the outset, it is important to acknowledge that New Zealand with low population scale and density and extreme geographic isolation is not a typical OECD economy. Consequently, New Zealand's development path may be different from that of larger or better-connected economies. For example, New Zealand's unique economic geography might imply a development path based around tasks and activities that tend not to agglomerate in large global cities.

New Zealand's distinct mix of characteristics also adds to the challenge of understanding the economy and setting policy appropriately. Despite these challenges, important aspects of New Zealand's productivity story are yet to be researched in detail and parts of the diagnosis and policy prescription outlined in this article are exploratory. By highlighting areas of uncertainty, the article also serves as the basis of an ongoing research agenda aimed at lifting New Zealand's productivity.

The article proceeds as follows. Section 1 outlines New Zealand's productivity performance at the aggregate and firm levels. Section 2 discusses the underlying reasons for slow productivity growth in the market sector of the New Zealand economy. Section 3 focuses on the role of policy in responding

Chart 1: Contributions to Labour Productivity Growth in New Zealand, 1997-2017



Source: Statistics New Zealand

to New Zealand’s productivity challenges. Concluding remarks are offered in Section 4.

New Zealand’s Productivity Performance

Aggregate Drivers of Growth

Productivity growth in New Zealand has been reasonable in some years and in some industries but has generally been weak in international comparison over the long run. Consistent with this relatively poor long-run productivity growth performance, the level of labour productivity in New Zealand has been well below the average of high-income OECD economies for some time.

Since the mid-2000s, New Zealand has not suffered the same decline in MFP growth seen in many OECD economies apart from a strong negative outturn in 2009, MFP growth strengthened a little post the Global Financial Crisis (GFC) (Chart 1). However, as in a number of OECD economies, capital deepening declined from the mid-2000s, leading to a softening in labour productivity growth. However, this labour productivity slowdown has been comparatively minor and New Zealand’s decline in labour productivity relative to high-income OECD economies came to an end in the mid-2000s (Chart 2).

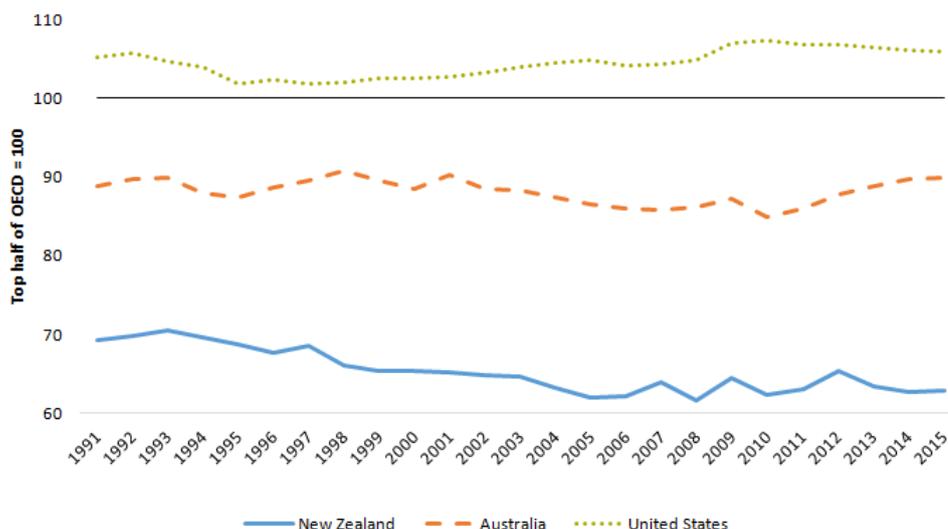
Although New Zealand’s labour productivity has been “keeping up” in the context of a generalized productivity slowdown across the OECD, there is still no evidence of any “catching up” and a sizable productivity gap remains.

In contrast to a relatively poor long-run productivity performance, growth in labour input has been a key driver of GDP growth. This reliance on the labour market as a driver of economic growth has intensified in recent years. For example, since 2000, growth in the New Zealand labour force has been more than twice the OECD average, driven by much faster growth in the working-age population and a greater increase in labour force participation (Culling and Skilling, 2018). In turn, rapid growth in the working-age population has largely been driven by strong immigration inflows, while participation rates have increased for older workers and, more modestly, for females. In addition, hours worked per worker has fallen by less in New Zealand than in the rest of the OECD, adding to the overall increase in labour supply.

Productivity of New Zealand Firms

From a firm perspective, New Zealand’s poor long-run productivity performance

Chart 2: New Zealand's Labour Productivity Level Relative to High-income OECD Countries, 1991-2015



Source: OECD

Note: Population-weighted average for the top 17 OECD countries for labour productivity, calculated using 2010 purchasing power parity exchange rates.

could reflect a failure of productivity-enhancing technologies to diffuse from firms operating at the global productivity frontier to firms operating at the domestic frontier and then on to domestic laggards (OECD, 2015a). Weak market selection effects that impede the allocation of productive resources may also contribute to poor aggregate productivity. This includes the scope for relatively productive firms to grow, and the incentives faced by relatively unproductive firms to shrink and exit.

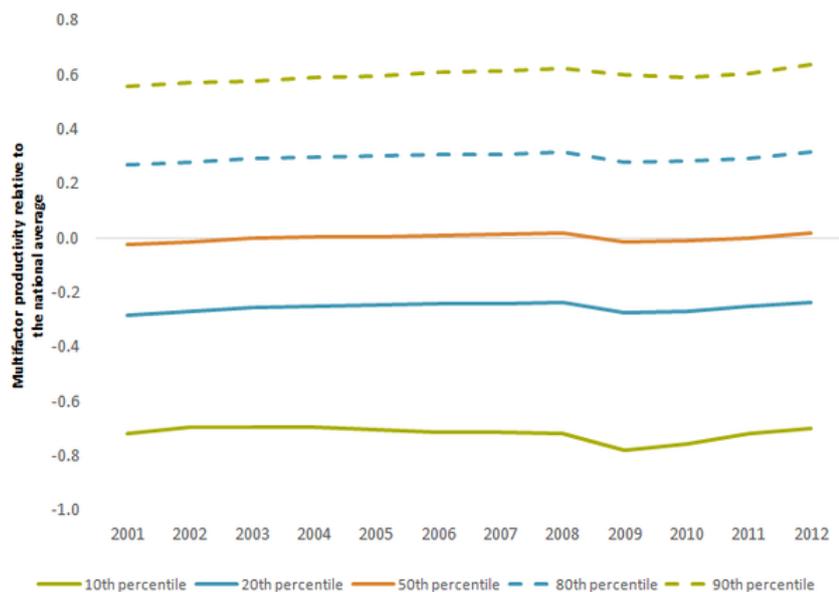
As a rough indicator of poor technology diffusion, MFP growth has generally been much weaker in firms operating at the New Zealand productivity frontier than in firms operating at the international frontier in the same industry (Conway, 2016).² This is consistent with the idea that New Zealand's most productive firms struggle to learn from global frontier firms in the same industry.

This lack of a cohort of leading firms with fast productivity growth is also apparent in the distribution of MFP across New Zealand firms, which has been remarkably stable (Chart 3). This contrasts with the recent experience in a number of other OECD economies in which leading high-productivity firms have pulled further ahead of lagging firms. Although stable, New Zealand's productivity distribution is extremely wide in international comparison, with top-decile firms producing around seven times more output per unit of input than firms in the lowest decile.

This coexistence of high and low-productivity firms may point to weak technology diffusion within the domestic economy. Conway, Meehan and Zheng (2015) find evidence of productivity convergence across manufacturing firms, but very slow or no convergence in parts of

² Given the difficulties in measuring technology, the globally most productive firms are assumed to operate with the globally most advanced technologies (OECD, 2015a). The most productive domestic and international firms are defined as firms in the top 5 per cent of the respective industry-level productive distribution.

Chart 3: Firm-level Multifactor Productivity Distribution in New Zealand, 2001-2012



Source: New Zealand Productivity Commission calculations.

the services sector and in the construction industry, which dominate in aggregate.

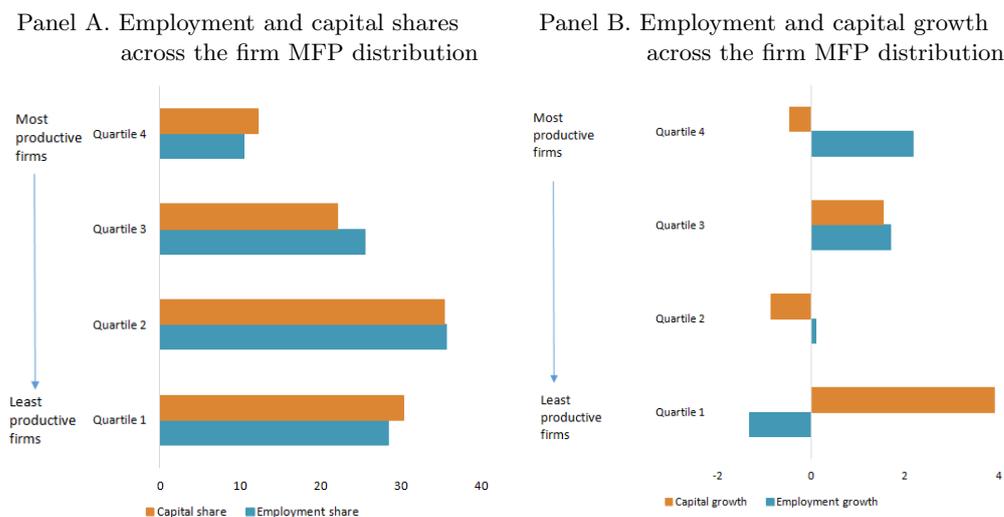
New Zealand’s wide and stable productivity distribution may also reflect weak market selection effects that allow low-productivity firms to survive in parts of the economy. Indeed, firms in the lower two quartiles of the productivity distribution in their industry account for a larger share of employment and capital compared to firms in the upper two quartiles (Panel A in Chart 4). This contrasts with the pattern in a number of other OECD economies in which firm productivity and size distributions are positively correlated. As well as weak competition that allows low-productivity firms to survive, this result may also reflect size constraints for relatively productive firms operating in New Zealand’s small domestic markets. More encouragingly, employment growth over the 2000s was weighted towards relatively productive firms, although capital tends to flow to relatively unproductive firms (Panel B in Chart 4) (Meehan, 2018).

Why New Zealand Firms Have Low Productivity

The previous section paints a picture of an economy that has generally struggled to “catch up” with the productivity performance of high-income OECD economies, despite the emergence of a considerable productivity gap. Consistent with the aggregate results, firm-level analysis highlights issues with technology diffusion and resource allocation across firms, with a large share of labour and capital employed in low-productivity firms.

A growing literature has identified a range of possible reasons for weak technology diffusion and productivity-detracting resource reallocation, despite theoretical predictions and empirical evidence of productivity convergence within the OECD. This includes a host of structural factors, such as weak international connection and the geographic segmentation of domestic markets. Firm-level differences in productivity-enhancing investment, including in knowledge-based assets such as R&D and managerial capability, have

Chart 4: (Re)allocation by Multifactor productivity quartile, 2000-2012



Note: The left-hand chart shows the share of employment and capital across the (lagged) distribution of MFP across firms. The right-hand chart shows growth in employment and capital stock across the (lagged) distribution across firms. Both charts show the deviation from the 2000-2012 average.

Source: Meehan (2018).

also been found to play a role (Harris and Le, 2018). Against the background of this literature, this section investigates some of the deeper causes of the productivity dynamics reported in the previous section.

Small Markets and Firms

The size of the market in which firms operate influences their productivity. Large markets reduce search costs and facilitate specialization by allowing a finer division of labour. They can also encourage better knowledge flows and spillovers across firms and facilitate increased competition that improves reallocation. The funding necessary to invest in capital and to innovate may also be more forthcoming for firms operating in large markets.

In small economies, international connection is the only way of securing the benefits that come with large markets. While international connection is important in general – for example, more open economies converge more quickly (Melitz

and Ottaviano, 2008) – it is especially important for small economies. As such, there is a clear negative cross-country relationship between economic size and trade intensity (Chart 5).

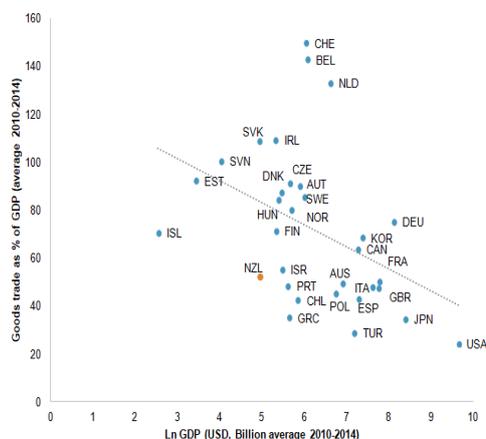
For a small economy, New Zealand is not well connected internationally. The intensity of international trade in both goods and services has declined over recent years and is one of the lowest among economies of a similar or smaller size (Figures 5 and 6). New Zealand firms also participate to a minimal extent in global value chains (de Backer and Miroudot, 2014).

The stock of FDI in New Zealand peaked at around 50 per cent of GDP in the late 1990s and has fallen slightly since. In contrast, global cross-border investment flows increased markedly over the late-1990s and 2000s as globalization deepened. The stock of FDI in New Zealand as a share of GDP is now around the OECD median, while outward direct investment is

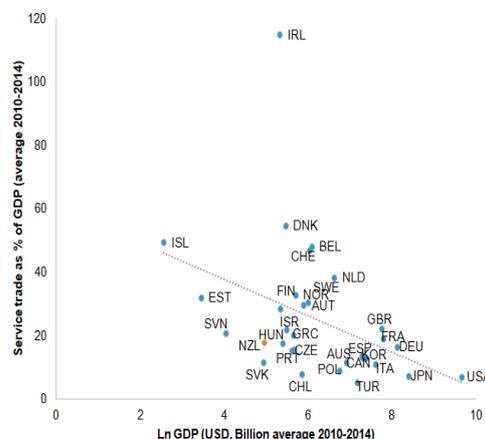
³ Based on this performance, Wilkinson and Acharya (2013) argue that since the mid-1990s, New Zealand has been left behind in the international growth of cross-border investment flows.

Chart 5: Trade Shares of GDP in OECD Countries, 2005-2015

Pannel A. Goods Trade



Pannel B. Services Trade



Source: OECD

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

among the lowest in the OECD.³ Firm-level analysis also finds no evidence of technology spillovers from relatively productive foreign-owned firms operating in New Zealand to lower-productivity domestic firms (Doan, Maré and Iyer, 2015; Conway *et al.*, 2015).

More optimistically, although digital connection to the rest of the world measured as international bandwidth per capita use is relatively low, it has grown at a reasonable pace since 2006. International connection via people flows is also relatively high, with a large share of workers born overseas. However, as discussed below, given capacity constraints in the New Zealand economy, currently very high inward migration may work against capital deepening.

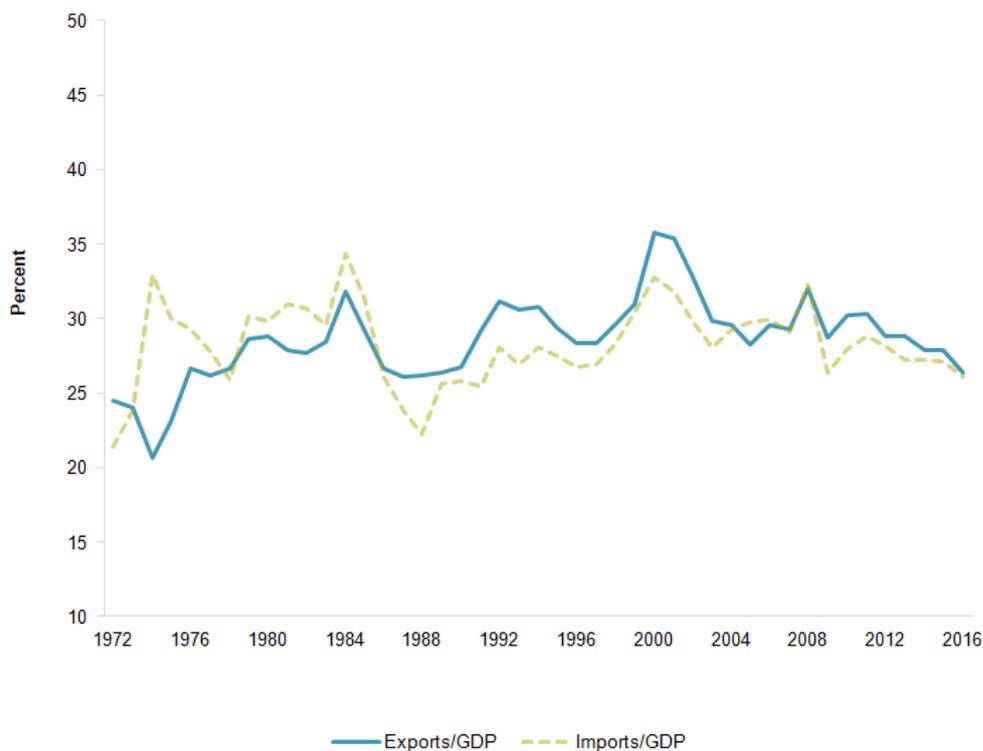
On balance, weak international connection is the key explanation for the “technology disconnect” between leading New Zealand firms and leading international firms outlined above. Compared to firms focused on domestic markets, exporting and foreign-owned firms operating in New Zealand are typically more productive and larger, suggesting that international connection facilitates technology diffusion and allows productive firms to grow and benefit from scale effects. However, despite

these productivity and size advantages, there are relatively few outward-looking firms operating in New Zealand.

This challenge of weak international connection is compounded by small and geographically segmented domestic markets. The associated negative impact on productivity may be considerable in New Zealand – a long, thin, mountainous and sparsely populated country in which infrastructure provision to link regional economies is challenging. This is likely to be an important reason for weak market selection effects and limited productivity “catch up” across firms within the domestic economy. For example, Zheng (2016) finds that firms in some services industries and in the construction industry tend to focus on the local market in which they are geographically situated and these firms are also the least likely to catch up to the national productivity frontier in their industry.

Overall, because the size of the market affects the size of constituent firms, weak international connection and small, insular domestic markets mean that New Zealand firms are relatively small in international

Chart 6: Trade Shares of GDP in OECD in New Zealand, 1972-2016



Source: Statistics New Zealand

comparison.⁴ They also grow relatively slowly on average – within-firm employment growth is driven by a small cohort of high-growth firms whereas a large number of firms do not grow at all (Meehan and Zheng, 2015).

A Capital-shallow Economy

Investment lifts labour productivity directly by adding to the capital workers have at their disposal and indirectly through MFP, as new technologies are often embedded in new capital. Capital intensity can also influence an economy’s areas of comparative advantage and specialisation. For example, Johansson and Olaberria (2014) show that across OECD economies, higher capital intensity is associated with

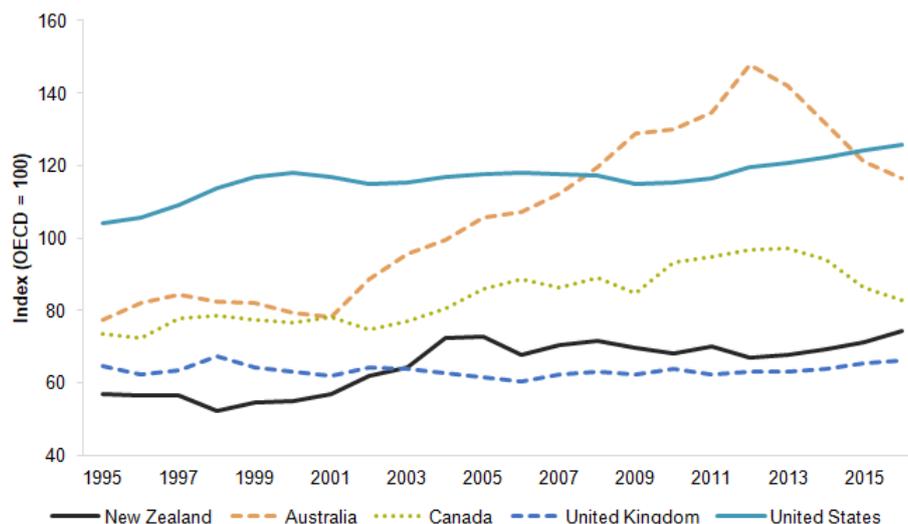
higher exports.

Over recent decades, non-residential business investment as a share of GDP in New Zealand has averaged slightly below the OECD median (Conway, 2016). However, with low GDP per capita and rapid employment growth, this is spread across relatively more workers compared to other OECD countries. Put differently, rapid population growth necessitates a higher investment share of GDP if New Zealand is to maintain capital per worker relative to countries with lower employment growth. In any case, investment per New Zealand worker is relatively low in international comparison (Chart 7).

These rough indications of capital

⁴ For example, firms employing fewer than 50 people account for around 98 per cent of New Zealand firms and well over half of employment. In comparison, only 30 per cent 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 per cent of New Zealand employment compared with 55 per cent in the United States (Crisuolo, Gal and Menon, 2014).

Chart 7: Gross Fixed Non-residential Capital Formation per Person in the Labour Force, OECD = 100, 1995-2016



Source: OECD

Note: Data for gross non-residential capital formation are in current prices and were converted into a common currency using 2010 purchasing power parity exchange rates. The labour force includes only people aged 15-64. Data for the OECD exclude Chile, the Czech Republic, Estonia, Greece, Hungary, Iceland, Israel, Latvia, Luxembourg, Mexico, Norway, the Slovak Republic, Slovenia and Turkey. Data for New Zealand excludes investment related to the Canterbury earthquake rebuild.

shallowness are borne out by more detailed cross-country analysis. Mason (2013) finds that capital per hour worked in the market sector of the New Zealand economy was almost 40 per cent lower than in Australia in 2010, with New Zealand firms investing considerably less per hour worked in 19 of the 24 industries included in the study.⁵ This is found to account for 39 per cent of the trans-Tasman gap in labour productivity.

While investment per New Zealand worker has increased slightly relative to the OECD average (Chart 7), New Zealand's capital-to-labour ratio has essentially been flat since 2010 as net investment has only just matched rapid growth in labour input (Chart 8). This is particularly concerning in an environment of historically low interest rates and highlights the labour-intensive nature of New Zealand's recent economic

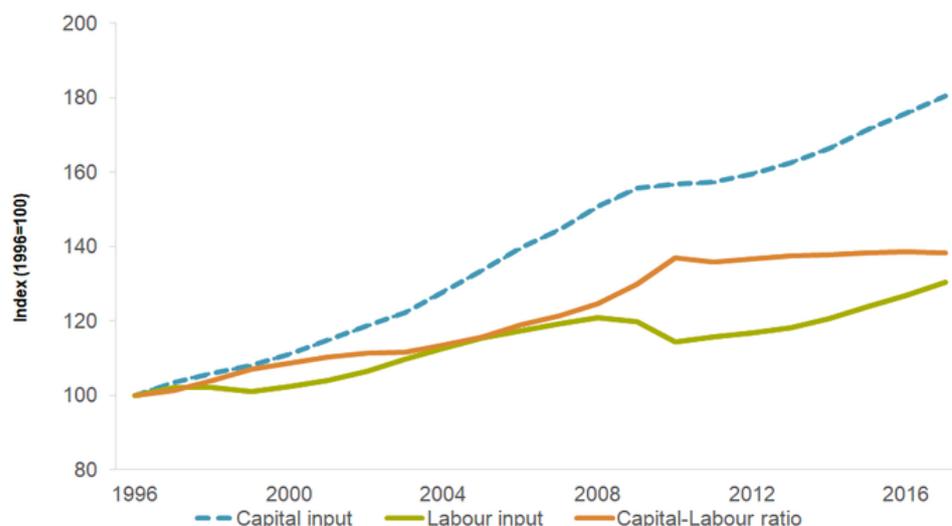
growth.

More encouragingly, New Zealand firms have invested strongly in ICT over recent years and the share of ICT investment in total investment and in GDP is now among the highest in the OECD (OECD, 2017). As with investment in general, this will be diluted to some extent by rapid employment growth. However, this might still hint at the potential for future productivity improvements, particularly in parts of the services sector where ICT has been a key input for innovation and productivity growth in some OECD economies.

There are a number of possible explanations for generally weak investment and the associated capital shallowness of the New Zealand economy. Although low historical interest rates since the GFC have been insufficient to lift capital intensity,

⁵ 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.

Chart 8: Capital-Labour Ratio in the New Zealand Market Sector, 1994-2016



Source: Statistics New Zealand

unusually high long-term interest rates relative to other countries have most likely worked against capital deepening in the New Zealand economy over recent decades (Chart 9).

There is some debate as to the underlying reasons why long-term real interest rates are relatively high in New Zealand. The “risk premium” explanation contends that New Zealand’s net international (private) debt position and/or volatile exchange rate obliges international lenders to charge a premium for holding New Zealand-based assets. In contrast to private debt, public debt is very low in New Zealand and therefore an unlikely source of any interest rate risk premium.

An alternative explanation is that higher interest rates are principally the result of persistent demand pressure in the economy. With modest savings and low productivity, high real interest rates effectively reconcile elevated demand pressures with the economy’s more limited supply capacity. In this “macro imbalance”

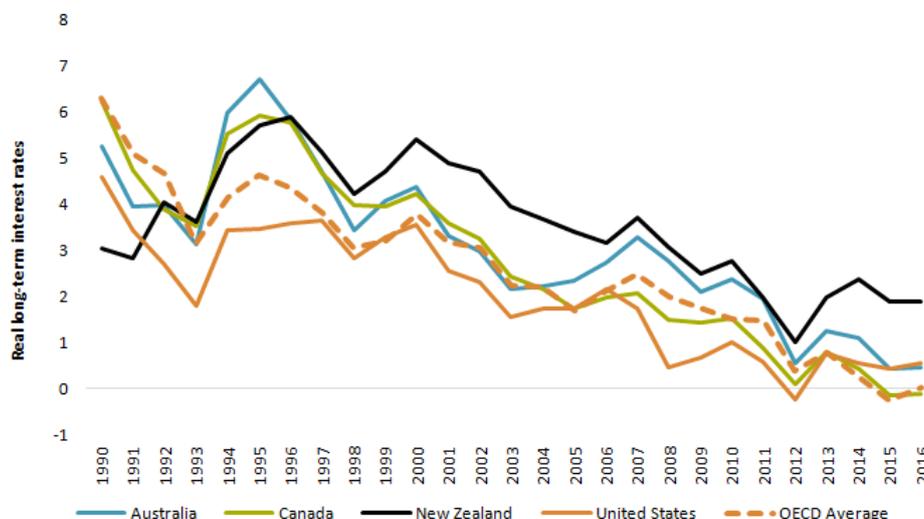
view, high real interest rates are associated with an overvalued exchange rate that is expected to depreciate but does not do so given the persistent nature of the demand shock.

Reddell (2013) argues that rapid migration-fuelled population growth is the underlying cause of these persistent demand pressures. This hypothesis potentially explains a range of puzzles about New Zealand’s macro-economy – including no evidence of Balassa-Samuelson effects (Steenkamp, 2013) – but has not been investigated empirically.⁶

Capital shallowness may also arise because the very small firms that make up the bulk of the New Zealand economy simply do not have the scale and sales volumes necessary to justify significant capital outlays. This is consistent with work showing that by increasing the return on investment, access to international markets can convince potential investors that a project has a better chance of exploiting returns to scale (de Serres, Yashiro and

⁶ The Balassa-Samuelson hypothesis suggests there should be a relationship between a country’s relative productivity performance and its real exchange rate (Steenkamp, 2013).

Chart 9: Long-term Real Interest Rates in Selected OECD Countries, 1990-2016



Source: OECD

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

Boulhol, 2014). Although this “small-firms” explanation should also apply to ICT, it is possible that “software as a service” and cloud computing have increased the feasibility of ICT investment for small New Zealand firms.

At the other end of the size distribution, weak investment by New Zealand’s largest firms may reflect governance issues. Among firms with \$1 billion plus turnover is a prevalence of farmer-owned cooperatives and partly-privatized state-owned enterprises. A common factor across these firms is a reluctance to provide capital for growth and a strong aversion to risk, especially associated with expansion into overseas markets. More generally, government involvement in the business sector is

relatively high in New Zealand, which may run the risk of crowding out private investment.⁷

Finally, for reasons that are not well understood, the off-the-shelf cost of investment goods is also high in New Zealand compared with other OECD countries.⁸ This mix of a real interest rate premium, small firms operating in small markets, relatively widespread government influence and an abundant supply of labour encourages New Zealand firms to grow by investing relatively little in capital and taking on additional workers.

Low Investment in Knowledge and Skills Mismatch

Investing in knowledge-based assets is important not only for firms operating at the

7 For example, in the OECD’s indicators of product market regulation, New Zealand ranks 25th out of 35 countries on the extent of “public ownership” in the economy. This indicator is made up of sub-indicators covering “scope of SOEs”, “Government involvement in network sectors”, “Direct control over enterprises” and “governance of SOEs”.

8 Using the International Prices Comparison data, Gemmill (2014) finds that the price of investment goods in New Zealand is around 19 per cent higher than the OECD average and 15 per cent higher than in Australia. The price of machinery and equipment is 12 per cent and 5 per cent higher than the OECD average and Australia respectively while the cost of non-residential construction is estimated to be 22 per cent above the OECD average.

global frontier but also for lagging firms to facilitate the adoption of new technology and its adaptation to local conditions. Because aspects of new technology are not easily codified, lagging firms need to undertake some R&D to successfully incorporate new technologies into their production processes. Synergistic investment in skills, organizational know-how and managerial capability are also important in improving firms' ability to absorb and benefit from new technologies (Bloom, Sadun and Van Reenen, 2016).

While data on knowledge-based capital is relatively poor in New Zealand, there are indications that low investment in these types of assets may be an important part of the reason for weak long-run productivity growth. In particular, de Serres *et al.* (2014) estimate that as much as 40 per cent of New Zealand's productivity gap compared with the OECD average reflects weak investment in knowledge-based assets.

Most obviously, public and private investment in R&D as a share of GDP is among the lowest in the OECD, with New Zealand's large firms performing particularly poorly (OECD, 2017). In part, this reflects the structure of the New Zealand economy and composition of exports, which are skewed towards low-R&D industries and products respectively. However, compared to other countries, business spending on R&D is also low within industries, indicating that structural factors offer only a partial explanation.

As with investment in general, a relatively high cost of borrowing and the impact of small markets may dampen the incentives

firms face to undertake R&D. Sparse networks of researchers and innovative firms may also restrict R&D and other types of innovation. This fits with the fact that internationally-connected New Zealand firms are much more likely to innovate compared to firms focused solely on domestic markets (Wakeman and Le, 2015). Internationally-engaged firms are also more likely to improve their productivity as a result of innovation, whereas a domestic market focus on domestic markets can stifle these gains (Wakeman and Conway, 2018).

Across all firms, "working on the business" is just as important as developing new and improved products in lifting productivity. This highlights the importance of management capability, which has been assessed as relatively poor in New Zealand on average (Green *et al.*, 2011).

More broadly, the human capital available to firms is a key determinant of their ability to absorb and benefit from new ideas and technology – skilled workers adopt innovations earlier and are associated with greater firm investment in knowledge-based assets. While New Zealand's education system has accommodated strong growth in student numbers, results from the Programme for international Student Assessment (PISA) show a deterioration in the performance of 15 year olds relative to other countries up to 2012 and then a slight absolute deterioration to 2015.⁹ Results also show that the difference between high and low achievers in New Zealand and the influence of socio-economic factors on student performance are among the highest in the OECD.

⁹ While raw PISA scores increased between 2009 and 2012, New Zealand's relative position in the OECD slipped from 7th in reading, 7th in science and 13th in maths to 13th, 18th and 23rd respectively. In 2015, the scores for New Zealand students declined slightly but rankings improved a little. The Programme for the International Assessment of Adult Competencies (PIACC) shows that the skills of older cohorts in New Zealand rank more highly in international comparison compared to younger cohorts, consistent with a relative deterioration in performance through time.

There is also evidence of a high incidence of skills mismatch in the New Zealand labour market, which may also restrict the ability of firms to successfully adopt new ideas and technology. Indeed, results from the Programme for the International Assessment of Adult Competencies (PIACC) show that skills mismatch in New Zealand is among the highest in the OECD. Consistent with this, the returns to education in New Zealand are among the lowest in the OECD and have declined over recent years.¹⁰ Although some level of skills mismatch is inevitable especially in the context of a small New Zealand economy largely comprised of many small firms extensive mismatch and falling wage premiums for education indicate a disconnect between the education system and the skill requirements of firms.

The Challenge for Policymakers

New Zealand's broad policy settings are often assessed as comparing well with other countries. Yet they have been unable to move the economy onto a high-productivity growth path. In part, this apparent disconnect between policy and performance reflects the uniqueness of New Zealand's economic situation. The reality of being a small country distant from major global markets resonates through the economy in complex ways that are not always well understood, adding to the challenge of setting policy appropriately.

Although policy settings might look highly supportive of productivity growth when viewed through the long-range telescopes of the OECD and the World Bank, economic reform clearly lost momentum in New Zealand after the initial burst from the mid-1980s to the early-1990s. For example, Conway (2011) argued as early as 2011 that New Zealand was no longer

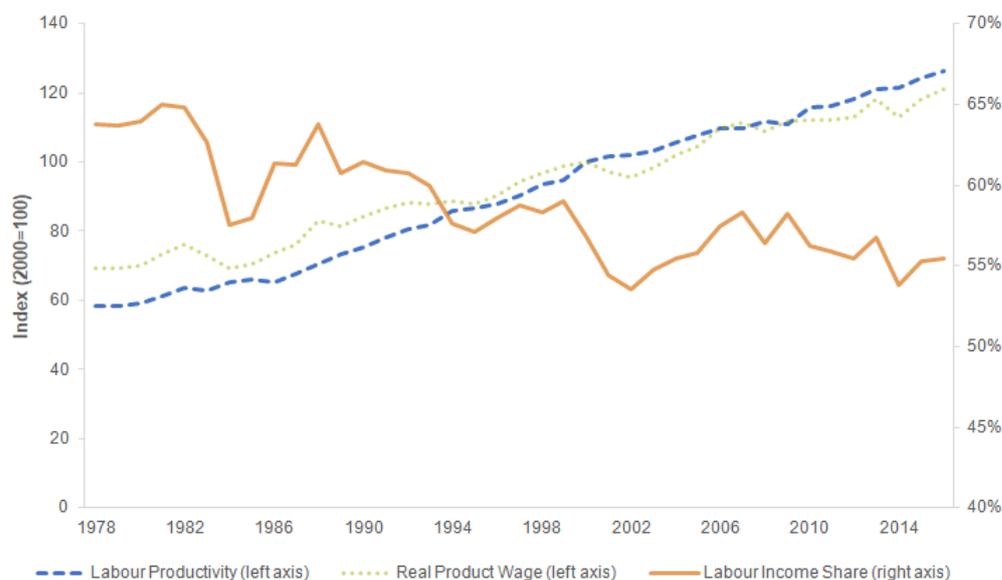
at the forefront in many areas of product market regulation. Since then, successive inquiries by the New Zealand Productivity Commission have identified serious weakness in policymaking and regulatory governance. As such, successfully responding to the challenge of improving New Zealand's long-run productivity performance will require significant capability improvements within the public sector.

Another obvious way in which government can contribute to higher aggregate productivity is by lifting its own performance. In its inquiry into state sector productivity, the Productivity Commission identifies examples of extremely poor productivity growth within the public sector. For example, government funding per school student increased by 66 per cent from 2003 to 2016, which includes the period in which New Zealand's PISA scores declined in relative and absolute terms. However, despite much room for improvement, measuring and lifting state sector productivity is currently not a priority for officials (NZPC, 2017a).

Helpfully, changes in technology have the potential to counter some of the economic forces that have constrained the productivity of New Zealand firms. Most obviously, dramatic falls in spatial transaction costs and the rise of global value chains are fundamentally changing global trade. In aggregate, these developments may increase the negative impact of distance on international connection. For example, McCann (2009) argues that this has made it more difficult for New Zealand firms to connect internationally. However, a multitude of stories are playing out within the aggregate picture and in some areas of activity, the forces that have restricted

¹⁰ For example, the wage premium for degree-qualified workers relative to workers without degrees fell from 73 per cent in 2000 to 52 per cent in 2017 (Maré, 2018).

Chart 10: The Labour Income Share in New Zealand, 1978-2016



Source: Fraser (2018).

international connection by New Zealand firms may be loosening their grip.¹¹

As well as bringing great potential for higher productivity and living standards, new technology also carries a risk of increased inequality if the benefits are skewed towards the owners of capital, a relatively small group of people in society. This dynamic is apparent in recent falls in the share of national income accruing to workers in some OECD economies. While the labour-income share has fallen overall in New Zealand, it has been relatively stable since the late-1990s, consistent with limited technology adoption and international connection (Chart 10).

In this environment, the challenge for New Zealand policymakers is to work against the economic forces outlined above that have kept productivity growth low for decades. A key aspect of this is to build on the opportunities that new technology brings while mitigating downside risks. The fact of

a broadly stable labour income share implies a grace period in which to make the economy more flexible and resilient to new technology while ensuring that the benefits are widely spread.

In what follows, the elements of such a policy response are outlined. While this does not constitute a full economic strategy, it highlights some of the economics that needs to sit at the heart of such an agenda. As indicated, the Productivity Commission has written inquiry reports outlining detailed policy recommendations in some of these areas. In other areas, the economics and public policy is more speculative and in need of further work.

Help Small and Remote Firms into Global Markets

To make the most of a growing window of opportunity for international connection by New Zealand firms, trade in services and digital products need to be key elements in New Zealand’s trade strategy. To a

¹¹ For example, while the production of ICT equipment has become increasingly agglomerated, the provision of ICT services has become increasingly dispersed across the globe (OECD, 2017).

large extent, trade facilitation in these areas involves international regulatory cooperation and coherence to reduce “behind the border” trade barriers. Given the complexities, this can be a long slow process. However, this will only become more important as the global economy becomes more interdependent and multipolar. As such, New Zealand should leverage its good reputation in multi-country fora and international organizations with the aim of using best-practice regulatory governance to improve cross-country coordination issues.

At home, looking outwards to assess the potential impact of domestic regulation on international connection needs to be a cornerstone of regulatory stewardship. For example, where appropriate, the adoption of reputable international standards is an increasingly important part of international regulatory coherence that can reduce costs for firms wanting to operate across borders. However, given variable quality, international standards and regulatory regimes should only be adopted within New Zealand if in the national interest (which includes the need to strengthen international connection).

On goods trade, although most imports enter New Zealand duty-free, tariffs still generate costs, including higher-priced intermediate inputs for some New Zealand firms. As such, New Zealand’s remaining tariffs should be reviewed with a view to removal.

Improve the Matching of Skills to Jobs

The strong performance of the New Zealand labour market in creating jobs and soaking up labour – including low-skilled workers – may have detracted from human capital and productivity growth. For example, Maré, Hyslop and Fabling (2015) estimate that the average quality of New Zealand workers fell slightly from the early

2000s as the impact of lower-skilled new entrants more than offset improvements in the qualifications and experience of existing workers. This is estimated to have reduced MFP growth from 0.24 per cent to 0.14 per cent per year over the sample period of the study.

Although the labour market dynamics behind this result are not well understood and in need of deeper analysis, these interdependences between the labour market and economic growth raise important questions about the performance of New Zealand’s education system. If the creation and adoption of new technologies is to play a part in improving New Zealand’s long-run productivity performance, then a large share of the working population will need to be equipped with the skills and experience necessary to operate with these technologies. Accordingly, the education system potentially plays a key role in “winning the race between skills and technology” and spreading the benefits of new technologies across the population.

Fortunately, there are some encouraging signs. For example, consistent with strong ICT investment, PIACC results show that New Zealand workers have very high proficiency for problem-solving in technology-rich environments. More broadly, however, the evidence outlined above suggests that New Zealand’s education system may not be keeping up with leading OECD countries and could be doing more to alleviate skills mismatch and improve social mobility. As such, a major challenge for the skills system is to become more effective at equipping all New Zealanders with relevant skills and the ability to update their skills as labour market demand changes into the future.

In an inquiry into new models of tertiary education, the New Zealand Productivity Commission found that a high degree of

central control restricts the incentives for tertiary institutions to innovate. This report put forward a number of specific recommendations aimed at making the system more adaptive and responsive to changing labour market demands (NZPC, 2017b).

Use Immigration to Lift Human Capital

Immigration policy could also do more to improve human capital and skills matching within the New Zealand economy. PIACC results show that the overseas-born population in New Zealand are highly skilled relative to immigrants in other OECD countries but still less skilled than the New Zealand-born population on average. It also shows a relatively high incidence of qualification mismatch among immigrants in New Zealand.

As with labour market dynamics in general, the broader impacts of immigration on the New Zealand economy are not well understood and in need of deeper study. However, available evidence implies a risk that strong migration inflows might restrict wage growth and encourage a reliance on low-cost labour by some firms and industries. While strong employment growth has kept pace with strong immigration inflows, many immigrants are poorly paid and working in unskilled occupations in lower-productivity industries (McLeod, Fabling & Maré, 2014). This may suppress investment and productivity improvements and work against efforts to increase the employment of lower-skilled New Zealanders.

The limited available evidence suggests that the government's objectives around immigration for labour market purposes should be more firmly focused on lifting the skill composition of the workforce, with the

aim of improving international connection and the flow of new technology into the economy. New Zealand is currently an attractive destination internationally and policy needs to use that advantage to more clearly target high-skilled migrants.

Make Investment Easier and More Effective

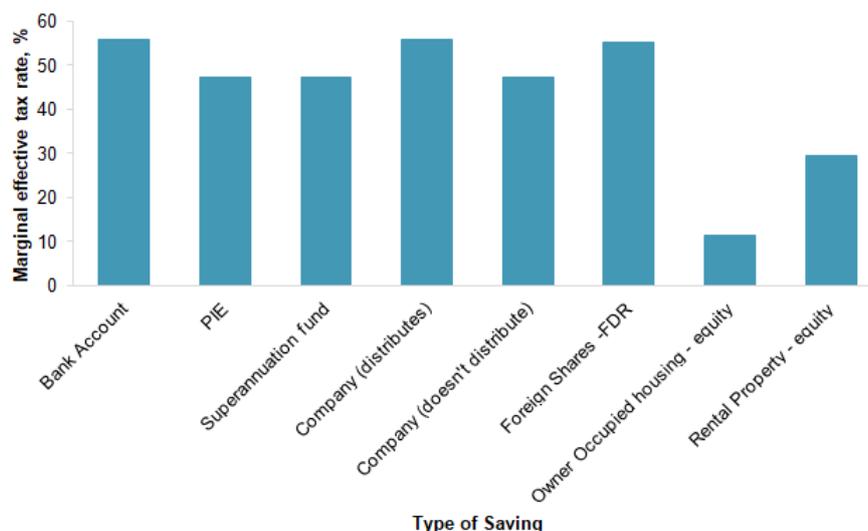
Although the capital-to-labour ratio has been flat recently in the face of low interest rates, it is highly likely that the cost of capital features in firm investment decisions. As such, low capital intensity over the long run most likely reflects, in part, higher borrowing cost for New Zealand firms relative to firms in some other OECD economies.

Of course, New Zealand is an open economy and firms are free to borrow in international capital markets. However, imperfect capital mobility, home-biased investors and relatively unsophisticated New Zealand firms may result in a link between domestic savings and investment. Alternatively, if a risk premium is the cause of relatively high interest rates, then higher national savings would alleviate this by improving New Zealand's net international debt position. Even if higher savings have no impact on interest rates or investment, lower consumption may enable structural adjustment into the tradable sector, with a positive impact on MFP.

So conditional on a deeper analysis of the underlying economics, policies aimed at increasing savings may need to be considered in raising capital intensity (Brook, 2014). The impact of tax settings would need to be part of this consideration. Currently, savings in New Zealand are taxed on a "Taxed-Taxed-Exempt" basis, whereas most other OECD countries provide more favourable

12 "Taxed-Taxed-Exempt" means that contributions to savings schemes are made out of after-tax income and that the returns on savings are taxed while withdrawals are exempt from tax. Australia and Turkey

Chart 11: Marginal Effective Tax Rates on Savings in New Zealand



Source: Tax Working Group (2018)

Notes: Marginal effective tax rates measure the tax rate on real, pre-tax income from investments that earn the same rate of return. The figures in the graph are based on the assumption that the risk-free return is 3 per cent, inflation is 2 per cent, the real capital gain on rental property is 1 per cent per year, and the statutory marginal tax rate is 33 per cent. “PIE” stands for “portfolio investment entity”, which have a maximum tax rate of 28 per cent.

tax treatments to encourage savings (OECD, 2015b).¹² In contrast to savings and business assets, housing is taxed relatively lightly in New Zealand (Chart 11).

There is a risk that this differential tax treatment may skew investment into housing over financial assets. For example, in the ten years to 2017, the housing-share of household wealth increased by 20 percentage points and accounted for around 85 per cent of the total increase in New Zealanders’ wealth. It follows that conditional on corroborating research, a more consistent tax treatment across different asset classes could potentially lift private savings, improve the composition of investment and spread the ownership of capital across the population.

Outside of the tax system, improving the performance of the housing market could redirect investment flows into the

tradables sector and reduce skills mismatch by allowing people to live where their talents are most valued. The New Zealand Productivity Commission has made numerous recommendations aimed at improving the institutional, legislative and regulatory frameworks used in the design and implementation of the urban planning system (e.g., NZPC, 2015 and 2017c). Improving productivity in the construction sector – which has been at the centre of a number of construction disasters over recent decades – would also help.

Relatively high central and local government control in the market sector of the New Zealand economy runs the risk of crowding out private investment, including in infrastructure. While privatization should always be an option, improving the ways in which government funds and regulates its involvement in markets is also important.

are the only other two OECD countries that use this approach (OECD, 2015b).

For example, a well-understood pipeline of public infrastructure projects and clear frameworks for the use of third-party capital could alleviate tax and borrowing constraints and improve the performance of government-owned assets.

Increased inward foreign investment is another way of lifting capital intensity. New Zealand's FDI regime is subject to considerable discretion, adding uncertainty and cost to an already complex system. As such, the FDI regime could be simplified, with any restrictions on foreign ownership of specific asset types clearly specified.

Strong investment flows to firms with low productivity levels (Panel B of Chart 4) might reflect a New Zealand banking system that struggles to provide credit to high-productivity firms with no credit history or a lack of tangible assets to use as collateral. This highlights the importance of reviewing financial regulations to remove inhibitions to the development of deep capital markets. As well as developing New Zealand's small venture capital and share markets, new funding sources such as crowd funding also need to be encouraged. Issues with private-sector funding for intangible-intensive firms also highlights the importance of government support for business innovation, which is discussed below.

Moderate Population Growth to Encourage Capital Deepening

Immigration has had a strong impact on the New Zealand labour market – around a quarter of New Zealand's current population were born elsewhere compared with a worldwide average of about three per cent (Fry, 2014). Recently, with lower departures and increased arrivals, immigration has surged to a net inflow

of about 60-70 thousand people per year, contributing up to 1.5 percentage points to New Zealand's population growth (Chart 12), which is consequently one of the fastest in the OECD.

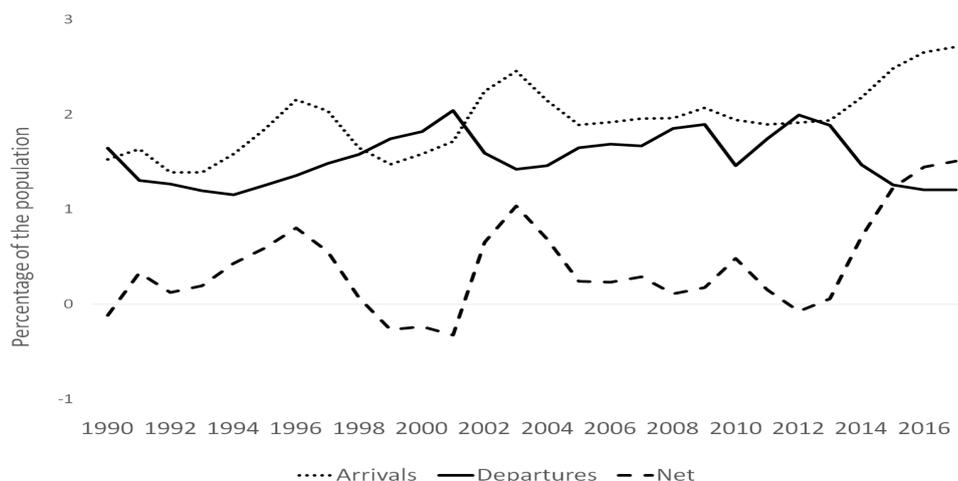
If low investment constrains the ability of the New Zealand economy to produce housing, infrastructure and business capital, then reducing high labour force growth would be an important key in lifting capital intensity. Reducing inward immigration from currently very high levels is the only practical way of doing this. Importantly, as future productivity improvements lift the capacity of the New Zealand economy to respond to higher demand, then net migration can be increased again, according to the preferences of New Zealanders.

Although the lags involved probably preclude migration policy being used as a macroeconomic stabilisation tool, better management of the volatility in net migration could potentially improve long-range construction and investment planning in the public and private sectors.

Although the devil is in the detail, the sharper focus on genuine skills proposed above could be used as a basis for reducing migration inflows. This would most likely have a negative short-run impact on GDP growth.¹³ This cost could be mitigated by efforts to encourage more low-skilled New Zealanders into the workplace, including more attractive career options for low-skilled workers and changes in the interface between the tax and welfare systems. For example, Nolan (2018) shows that effective marginal tax rates are over 100 per cent for some categories of workers moving off benefits and into part-time work.

13 For example, Coleman and Karagedikli (2018) find that net inward migration is “hyper-expansionary”, in that the immediate demand for housing from immigrants exceeds their productive potential, thereby creating pressure for additional inward migration. Conversely, a reduction in migration would reduce economic activity.

Chart 12: Migration Flows into New Zealand, 1990-2017, (% of the Population)



Source: Statistics New Zealand

Improve Competition to Lift the Contribution of Services

Parts of the services sector are the epicentre of New Zealand’s poor productivity performance.¹⁴ Enhancing competition in this part of the economy would improve technology diffusion and energize market selection effects, making it less likely that productive resources – including skills and intellectual property – become trapped in lagging incumbents and, instead, flow to more innovative new entrants.

As well as a significant direct effect, higher productivity in services would also contribute indirectly to aggregate productivity growth, given that almost half of services-sector output is used as intermediate inputs by firms in other parts of the economy. With services deeply embedded in virtually all products made in New Zealand, performance improvements would lift comparative advantage across the

board, including in prospective new areas of international connection.¹⁵

A New Zealand Productivity Commission inquiry into the services sector made a number of recommendations to lift competition by reducing the costs for consumers and businesses of searching and switching between service providers (NZPC, 2014). Comparison websites, information disclosure and reasonable contract termination arrangements all have a role to play. As in most other OECD countries, reforming occupational regulation also has the potential to improve competition and lift performance in a key part of the services sector.

New Zealand’s competition policy framework could also do more to enhance competition. The government’s recent decision to give the competition regulator the power to conduct market studies is a step in the right direction. Shifting to an effects-based test in the abuse of market

14 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 and Meehan, 2013; NZPC, 2014). In broad terms, service industries that invest in and use ICT intensively have relatively high productivity, skills intensity and wages. The distributive and person-centred service industries are generally the converse.

15 While the direct contribution of services to gross exports is around 30 per cent, the total services content embodied in New Zealand’s gross exports is almost double that at 60 per cent of total exports (Rajanayagam, 2017).

power provisions is the obvious next step.¹⁶ As well as being competition enhancing, this would also improve cross-country regulatory coherence, including with Australia, given the aspiration of a single trans-Tasman economic market.

Infrastructure provision is another way in which government can influence competitive intensity by better linking small markets across New Zealand's towns and cities, thereby improving proximity between customers and providers. By facilitating firm-to-firm connections, this also has the potential to improve technology diffusion. As such, infrastructure provision could be more responsive, including pricing and funding that reflects actual costs, use and impacts.

Pro-competition regulation was once world-leading in New Zealand (Conway and Nicoletti, 2006). A key current challenge for policymakers is to rediscover that commitment, with a strong focus on parts of the services sector. This should include potential new opportunities to lift competition. For example, bank account number portability has the potential to lower the costs of switching between banks, increasing customer churn and the impact of competition on bank performance.

Strength the Economic Return from Science and Innovation

The ongoing policy challenge in this space is to develop a science and innovation system that is open and responsive to new opportunities and focused on creating rich, dense innovation ecosystems in areas appropriate for New Zealand's economic geography. This may entail a greater focus on thematic research platforms in areas conducive to small, remote firms engaging

internationally.

Although it has increased recently, government support for business R&D in New Zealand is still among the lowest in the OECD. On the face of it, this suggests that greater support could yield increased innovation and productivity benefits. However, if weak innovation reflects poorly-managed firms operating in small, fragmented and uncompetitive markets, then further R&D subsidies risk being ineffective. Accordingly, a much better understanding of the impact of innovation support on firm performance and the contribution of the science system to New Zealand's economic performance would be extremely valuable. Ideally, these evaluations should reflect back into the policy design process.

As well as a tighter focus on thematic research platforms and improvements in policy evaluation, innovation prizes could also be considered for solutions to well-defined issues. Relatively small prizes seem to be effective in motivating research and innovation to solve practical problems. This would complement the existing framework of R&D grants and a soon-to-be-introduced tax credit and recognize that there is more to innovation than R&D, especially in the services sector.

Given that innovation and international connection go hand-in-hand in New Zealand, there may also be scope for greater coordination or merger between the government agencies that administer government support for innovation and international connection.

More could also be done to encourage knowledge diffusion across firms and to leverage the intellectual property in the

¹⁶ Currently, 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 is 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.

national science system. For example, in the context of transitioning to a low-emissions economy, the New Zealand Productivity Commission has suggested a government program aimed at scanning international developments in low-emissions technologies and feeding relevant information to New Zealand firms and industry associations. Efforts to increase collaboration between research organizations and firms and to encourage firms to improve management practices could also encourage diffusion.

Experimentation is a critical part of catching up to the productivity frontier and firms need the flexibility to discover and learn about emerging technological possibilities and business models. As such, because failure is an inherent part of innovation, tax and regulatory settings should be consistent with risk taking and not overly penalize failure.

Conclusion

Since the beginning of the GFC, growth in per capita income in New Zealand has been above the OECD average. In large part, this reflects terms of trade improvements and a labour market that has continued to be very successful at providing employment and absorbing strong growth in the labour force. New Zealand's productivity performance relative to high-income OECD countries has also improved and the economy is managing to "keep up" in the context of a generalized productivity slowdown. However, there is still no evidence of "catching up" despite a substantial productivity gap.

Of course, getting workers into jobs is important in improving well-being and testament to the benefits of New Zealand's flexible labour market. However, New Zealand cannot continue to rely on strong labour market growth as a predominant driver of economic growth. First, with constraints on investment, ongoing strong employment growth works

against capital deepening and labour productivity improvements. Second, because productivity growth is the key driver of higher wages, a strong reliance on employment growth runs the risk of creating many low-productivity jobs that are not well remunerated. As such, New Zealand's key economic challenge is to move from a growth strategy based on labour absorption to one in which productivity improvements play a much bigger role.

This article argues that New Zealand's poor long-run productivity performance reflects a number of economic features. Firms are generally not well integrated into international markets, leading to a "technology disconnect" and limited scope for productive firms to grow. In the domestic economy, firms focused on small insular local markets are less likely to be exposed to new technologies and competitive pressures that facilitate productivity-enhancing reallocation. Low investment, including in knowledge-based assets such as innovation and management capability, also contributes to weak technology diffusion across New Zealand firms.

This diagnosis is undertaken against the backdrop of rapid changes in technology and in the global trading environment. Although face-to-face connection is still paramount, these changes are opening areas of economic activity in international markets that are less constrained by distance, firm size and the legacy of past investment choices. These trends are likely to continue as a growing part of production is digitized and delivered remotely through fibre-optic cables and the scope for using technology to communicate, learn and interact from a distance keeps improving. In much the same way that colonial ties to the United Kingdom once offset the impact of distance, new technology is opening a window of opportunity for New Zealand firms to engage internationally

in areas of activity that are no longer disadvantaged by remoteness.

To make the most of these opportunities, this article outlines a number of policy considerations aimed at countering the economic forces that have constrained New Zealand's long-run productivity performance. These include opening the economy to new opportunities for international connection and improving comparative advantage through capital deepening and MFP growth. In turn, higher MFP could come about through the more effective use of domestic and international human capital, greater service sector competition and a more effective science and innovation system.

Because many aspects of New Zealand's productivity story are under-researched, important parts of the analysis and policy conclusions offered in the article are in need of further work. For example, a deeper understanding of the impact of the tax system on capital intensity and productivity is highly desirable. Other prospective research areas include understanding the cause of New Zealand's interest rate premium and the impact of immigration on the economy, in addition to developing a much deeper understanding of labour market dynamics more generally. The apparently very poor allocation of productive resources across firms is also in

need of deeper investigation.

New Zealand is well placed to make the transition from employment-led growth to productivity-led growth. The economy has weathered the GFC in good shape and aspects of New Zealand's macro imbalances are showing signs of improvement. Increasing export diversity and a growing high-tech sector, including strong growth in the market capitalization of various ICT firms, suggest improved international connection in some areas. By building on these developments, policymakers have a good shot at finally breaking free of the economic constraints that have kept productivity low for so long.¹⁷

References

- de Backer, K. and S. Miroudot (2014) "Mapping Global Value Chains," European Central Bank Working Paper No. 1677.
- Bloom, N., R. Sadun and J. Van Reenen (2016) "Management as a technology," NBER Working Paper no. 22327. Cambridge, MA, United States: National Bureau of Economic Research.
- Brook, A. (2014) "Options to Narrow New Zealand's Savings-investment Imbalance," NZ Treasury Working Paper 14/17. Wellington: NZ Treasury.
- Coleman, A., and O. Karagedikli (2018) "Residential Construction and Population Growth in New Zealand: 1996-2016," Reserve Bank of New Zealand Discussion Paper. Wellington: Reserve Bank of New Zealand.
- Conway, P. (2011) "How to Move Product Market Regulation in New Zealand Back Towards the Frontier," OECD Working Paper No 880, Paris. OECD.

17 Some of 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. Access to the anonymized data used in this study was provided by Statistics New Zealand under the security and confidentiality provisions of the Statistics Act 1975. Only people authorized by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organization, 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 New Zealand 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.

- Conway, P. (2016) "Achieving New Zealand's Productivity Potential," New Zealand Productivity Commission Research Paper, 2016/1, Wellington: NZPC.
- Conway, P. and G. Nicoletti (2006) "Product Market Regulation in the Non-manufacturing Sectors of OECD Countries: Measurement and Highlights," OECD Economics Department Working Paper No. 530. Paris. OECD.
- Conway, P. and L. Meehan (2013) "Productivity by the Numbers: The New Zealand Experience," Wellington: NZPC.
- Conway, P., L. Meehan and G. Zheng (2015) "Do New Zealand Firms Catch Up to the Domestic Productivity Frontier," NZPC Working Paper, 2015/3. Wellington: NZPC.
- Conway, P. and Orr, A. (2000) "The Process of Economic Growth in New Zealand," *Reserve Bank of New Zealand Bulletin*, Vol. 63. No. 1.
- Criscuolo, C., P. Gal and C. Menon (2014) "The Dynamics of Employment Growth: New Evidence from 18 Countries," *OECD Science, Technology and Industry Policy Papers*, no. 14. Paris, France: OECD.
- Culling, J. and H. Skilling (2018) "How Does New Zealand Stack Up? A Comparison of Labour Supply Across the OECD," *Reserve Bank of New Zealand Bulletin*, Vol. 81, No. 2.
- Doan, T., D. Maré, and K. Iyer (2015) "Productivity Spillovers from Foreign Direct Investment in New Zealand," *New Zealand Economic Papers*, Vol. 49, No. 3, pp. 249-275.
- Fraser, H. (2018) "The Labour Income Share in New Zealand: An Update," New Zealand Productivity Commission. Wellington.
- Fry, J. (2014) "Migration and Macroeconomic Performance in New Zealand: Theory and Evidence," NZ Treasury Working Paper 14/10. Wellington: NZ Treasury.
- Gemmell, N. (2014) "The Prices of Goods and Services in New Zealand: An International Comparison," New Zealand Productivity Commission Working Paper, 2014/2. Wellington: NZPC.
- Green, R., R. Agarwal, P. Brown, H. Tan and K. Randhawa (2011) "Management Matters in New Zealand: How Does Manufacturing Measure Up?," *Ministry of Economic Development Occasional Paper* 11/03.
- Harris, R. and T. Le (2018) "Absorptive Capacity in New Zealand Firms: Measurement and Importance," New Zealand Productivity Commission Working Paper, 18-01.
- Johansson, Å and E. Olaberria (2014) "Long-term Patterns of Trade and Specialisation," Paris, France: OECD.
- Maré, D. C., D. Hyslop and Fabling, R. (2015) "Firm Productivity Growth and Skills," Motu Working Paper 15-18. Wellington: Motu Economic and Public Policy Research.
- Maré, D. (2018) "The Labour Market in New Zealand, 2000-2017," *IZA World of Labor* 2018: 427.
- Mason, G. (2013) "Investigating New Zealand-Australia Productivity Differences: New Comparisons at Industry Level," NZPC Working Paper, 2013/02. Wellington: NZPC.
- McCann, P. (2009) "Economic Geography, Globalisation and New Zealand's Productivity Paradox," *New Zealand Economic Papers*, Vol. 43, No. 3, pp. 279-314.
- McLeod, K., R. Fabling and D.C. Maré (2014) "Hiring New Ideas: International Migration and Firm Innovation in New Zealand," Ministry of Business, Innovation and Employment, New Zealand.
- Meehan, L. and G. Zheng (2015) "Firm Dynamics and Job Creation in New Zealand: A Perpetual Motion Machine," NZPC Research Note, 2015/2. Wellington: NZPC.
- Meehan, L. (2018) "Misallocation and Productivity in New Zealand," NZPC Working Paper. Wellington: NZPC.
- Melitz, M. and G. Ottaviano (2008) "Market Size, Trade and Paroductivity," *Review of Economic Studies*, Vol. 75, No. 1, pp. 295-316.
- New Zealand Productivity Commission (2014) "Boosting Productivity in the Services Sector," Wellington: NZPC.
- New Zealand Productivity Commission (2015) "Using Land for Housing," Wellington: NZPC.
- New Zealand Productivity Commission (2017a) "Measuring and Improving State Sector Productivity: Draft Report," Wellington: NZPC.
- New Zealand Productivity Commission (2017b) "New Models of Tertiary Education," Wellington: NZPC.
- New Zealand Productivity Commission (2017c) "Urban Planning," Wellington: NZPC.
- Nolan, P. (2018) "Effective Marginal Tax Rates: The New Zealand Case," Tax and Transfer Policy Institute Working Paper 7/2018 (Canberra: Tax and Transfer Policy Institute).
- OECD (2015a) "The Future of Productivity," Paris, France: OECD.
- OECD (2015b) "Stocktaking of the Treatment of Funded Private Pension Plans in OECD and EU Countries," Paris. OECD.
- OECD (2017) *OECD Science, Technology and Industry Scoreboard, 2017*. Paris, France: OECD.

- Rajanagayam, S. (2016) "The 'Servicification' of Trade," NZPC Research Note. Wellington: NZPC.
- Reddell, M. (2013). "The Long-term Level Misalignment of the Exchange Rate: Some Perspectives on Causes and Consequences," Paper prepared for the Reserve Bank/Treasury exchange rate forum. Wellington: Reserve Bank of New Zealand.
- de Serres, A, N. Yashiro, and H. Boulhol (2014) "An International Perspective on New Zealand's Productivity Paradox," NZPC Working Paper, 2014/1. Wellington: NZPC.
- Steenkamp, D. (2013) "Productivity and the New Zealand Dollar: Balassa-Samuelson Tests on Sectoral Data," Reserve Bank of New Zealand Analytical Note (Wellington: Reserve Bank of New Zealand).
- Tax Working Group (2018) "Taxation of Capital Income and Wealth," Background paper, Wellington.
- Wakeman, S. and P. Conway (2017) "Innovation and the Performance of New Zealand Firms," NZPC Working Paper, Wellington.
- Wakeman, S. and T. Le (2015) "Measuring the Innovative Activity of New Zealand Firms," New Zealand Productivity Commission Working Paper 2015/2. Wellington: NZPC.
- Wilkinson, B. and K. Acharya (2013) "Open for Business: Removing the Barriers to Foreign Investment," Wellington: The New Zealand Initiative.
- Zheng, G. (2016) "Geographic Proximity and Productivity Convergence Across New Zealand Firms," NZPC Working Paper. Wellington: NZPC.