

# MOVING ON FROM New Zealand's Productivity Paradox

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## Abstract

For many years New Zealand's productivity performance has been disappointing. This article outlines recent progress in understanding what could be driving this performance. It starts by drawing on Statistics New Zealand industry-level data, before summarising insights from firm-level research using linked data sets (the Longitudinal Business Database (LBD)). It then concludes with a high-level summary of directions of reform that could help improve New Zealand's productivity performance.

**Keywords** productivity, technological diffusion, reallocation, firm-level research

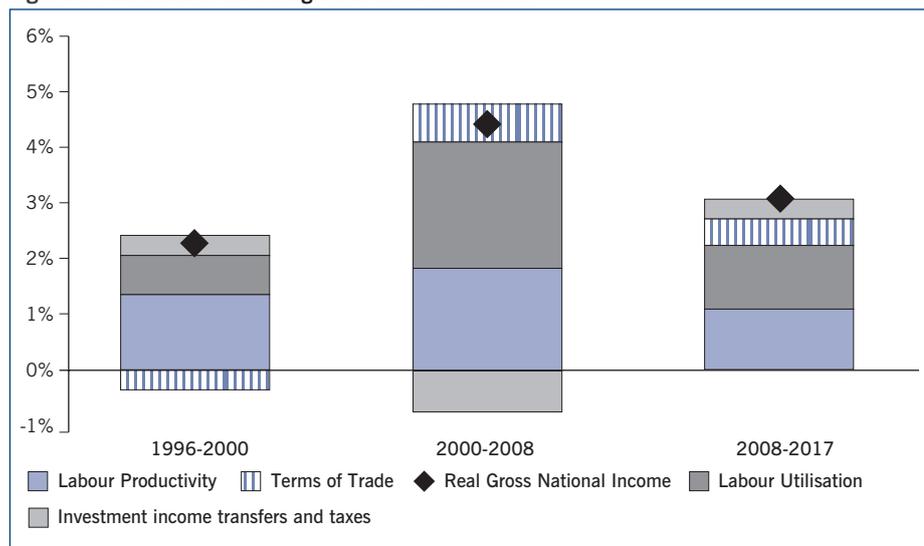
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For many OECD countries the decade following the global financial crisis was tough going. Yet New Zealand avoided the worst of the downturn. GDP growth was healthy, the public finances remained in generally good shape,<sup>1</sup> and the central bank was able to rely on conventional macro-policy tools. Participation in the labour market continued to be high and there was little or no real decline in the share of national income going to labour (the 'labour income share') (Fraser, 2018). Yet, as a previous article in this journal argued (Nolan, 2014), one area where New Zealand has needed to lift its performance for a long time is productivity, with the country being below the OECD average for output per capita and labour productivity.

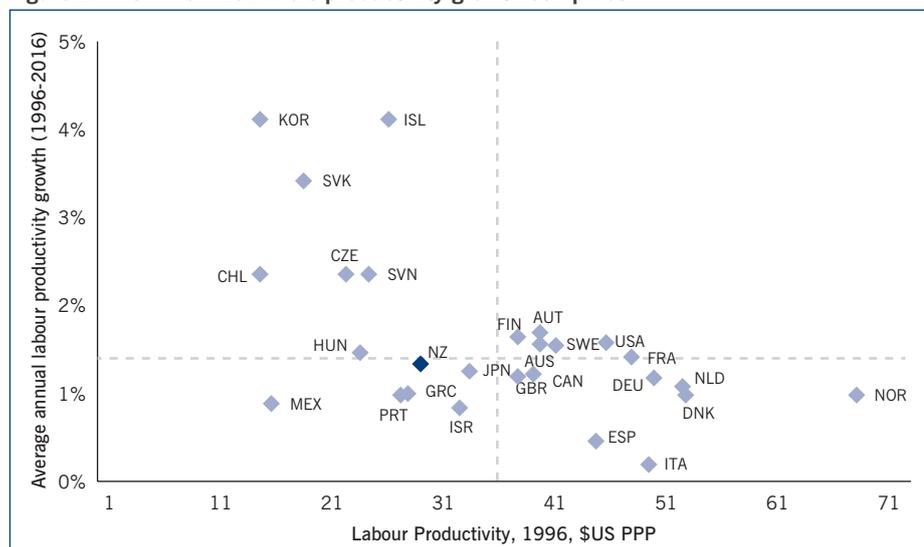
This productivity performance has been described as a paradox, as this occurred despite policy settings in many important areas appearing at or close to

Figure 1: Sources of income growth in New Zealand



Source: Authors' calculations based on Statistics New Zealand

Figure 2: How New Zealand's productivity growth compares



Source: Authors' calculations based on OECD and Statistics New Zealand

best practice; at least when 'viewed through the long-range telescopes of the OECD and World Bank' (Conway, 2018, p.52). Indeed, OECD research estimated that while New Zealand's broad policy settings should have generated GDP per capita 20% above the average for advanced OECD countries, the country was in fact 20% below (de Serres, Yashrio and Boulhol, 2014). This article revisits these concerns and considers recent progress made in understanding New Zealand's productivity performance.

**Why care about productivity?**

Higher productivity expands choices. It is a major driver of income growth. Indeed, as shown in Figure 1, increases in labour productivity have made a major contribution to lifting gross national income. New Zealand evidence also shows

that wages increase more rapidly when labour productivity growth is strongest (Conway, Meehan and Parham, 2015; Fraser, 2018). Further, productivity is not good just for incomes. A more productive use of natural resources can allow the same level of output to be achieved at lower environmental cost (Bailey and Lewis, 2018). By delivering more for less, higher productivity can also increase the time available for leisure and support the delivery of valuable state services in an increasingly tight fiscal environment (Nolan, 2018).

**New Zealand's aggregate productivity performance**

For many years New Zealand's productivity performance has, however, been disappointing. Statistics New Zealand

industry-level data shows that since 1996 the average growth in labour productivity across the whole economy has been 1.3%. Productivity in private sector industries (the so-called measured sector) has averaged 1.5% while in public sector industries, like education and health, it has averaged 0.2%. (For a fuller discussion of the performance of the public sector see articles by Gemmell, Nolan and Scobie and Nolan in this issue of *Policy Quarterly*.) Since the global financial crisis there has been a slow-down in productivity growth, with average annual productivity in the measured sector being 1.1% between 2008 and 2017.

To give a sense of how these results compare, Figure 2 shows labour productivity growth among OECD countries along with their labour productivity levels in US dollars in 1996. Making cross-country comparisons can be difficult given changes in relative prices in countries (measured in purchasing power parities (PPPs)) and the composition of the OECD (particularly the addition of lower-income countries). Nonetheless, New Zealand's growth in labour productivity since 1996 has been close to the OECD average, and has been stronger than that of countries like Australia, Canada and the United Kingdom. New Zealand's relative performance is, however, flattered by the decline in performance in these countries following the global financial crisis. For example, compared to the fall in New Zealand, the labour productivity growth rate in the UK (output per hour worked) had a larger fall from 2.1% (for 1996–2007) to 0.3% (for 2008–17). Further, New Zealand's performance since 1996 has been from a base of a relatively low productivity level and so, even with average growth, New Zealand has been trading water not catching up.

The significance of this aggregate productivity performance can be seen in Figure 3. This shows GDP per capita as a share of the OECD average. The gap between the average income in the OECD and in New Zealand has been closing since the global financial crisis. This improvement is largely due to relatively strong labour utilisation. In contrast, labour productivity (or GDP per hour worked) has remained at about 80% of the OECD average. The

result is that New Zealanders work, on average, about 10% more hours than the OECD average to produce about 20% less.

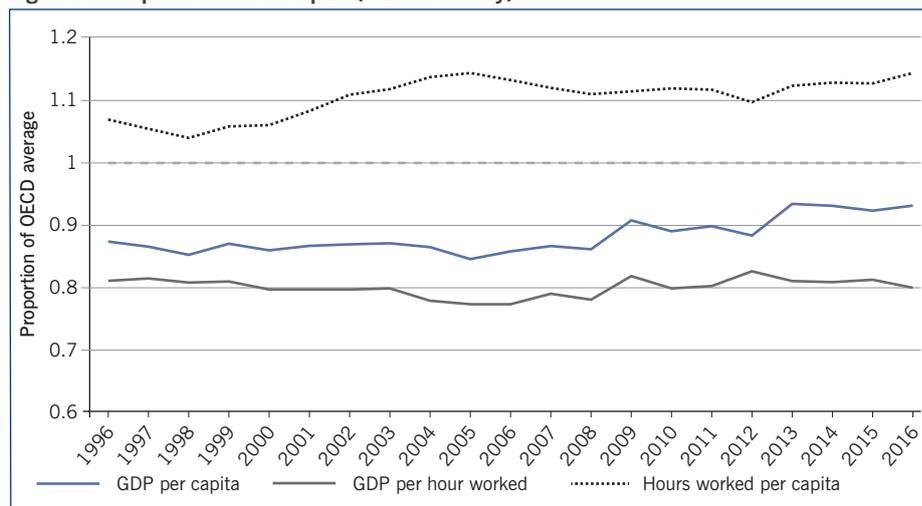
This labour productivity performance can be broken into two parts: multifactor productivity (the effectiveness with which inputs (such as labour and capital) are combined in the production process) and capital deepening (the capital available per unit of work). Since 2008 New Zealand's multifactor productivity performance has been relatively strong. Thus, as Figure 4 shows, the main reason for low labour productivity has been flat capital deepening. The figure shows an index of capital for the measured sector (excluding investment in owner-occupied housing and the government's spending on capital). While this capital index has been growing, the fast growth in labour inputs has meant that there has been little growth in capital per unit of labour. This failure of capital to grow in line with labour (in an environment of historically low interest rates) appears to have played a major role in holding back New Zealand's labour productivity since the global financial crisis.

#### Capital shallowness

This problem of capital shallowness in the New Zealand economy has been well canvassed before. For example, in 2009 it was estimated that capital per hour worked in the measured sector in New Zealand was about 40% below that in Australia and that this accounted over a third of the trans-Tasman gap in labour productivity (Mason, 2013). Similar work showed that capital per worker in New Zealand was also below that of the United Kingdom (Mason and Osborne, 2007). Capital shallowness has, in turn, been attributed to factors such as:

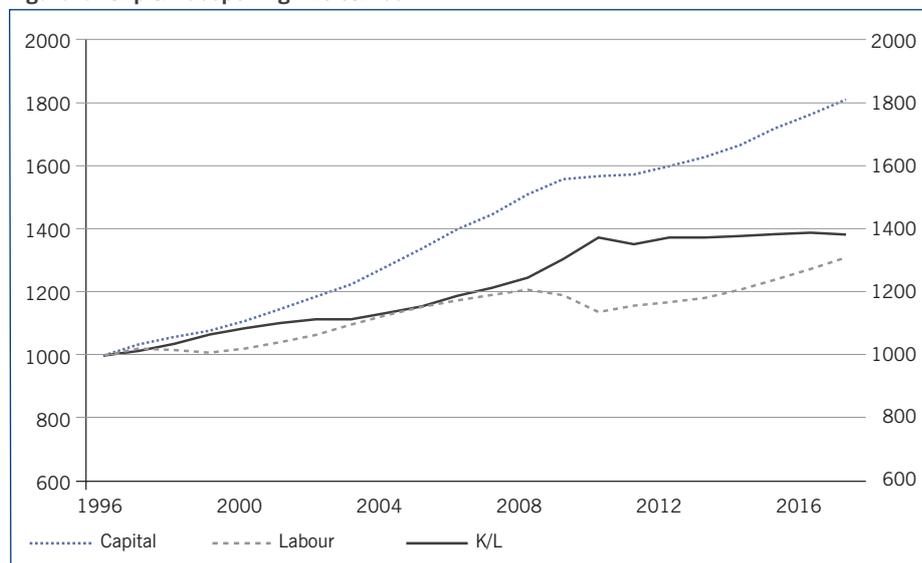
- relatively high long-term real interest rates, which contribute upward pressure on the cost of capital faced by firms and the real exchange rate. This suppresses investment and exacerbates the difficulties New Zealand firms face in accessing international markets, encouraging resources into the low-productivity non-tradable part of the economy (Conway, 2016, 2018);
- a high 'off-the-shelf' cost of investment goods. As Gemmell (2014) noted, the price of investment goods – such as infrastructure and construction – was

**Figure 3: Gap in GDP Per Capita (total economy)**



Source: Authors' calculations based on OECD and Statistics New Zealand data  
Note: Calculations are based on the full set of OECD countries and constant PPPs.

**Figure 4: Capital deepening has stalled**



Source: Authors' calculations based on Statistics New Zealand

around 19% higher in New Zealand than the OECD average and 15% higher than in Australia; and

- fast population growth. As Culling and Skilling (2018) noted, since 2000 growth in the New Zealand labour force has been more than twice the OECD average. Growth in the working-age population has been largely driven by strong migration inflows, while participation rates have increased for older workers and also women (Reddell, 2013, 2017; Conway, 2018).

Yet, while these explanations are important, they are only part of understanding New Zealand's productivity performance. A fuller explanation requires understanding, for example, the degree to which small insular markets suppress investment, how capital deepening is

related to firms' business strategies (such as exporters' entry into new markets), and the relationship between investment in capital and the diffusion of new technology (as new technologies are often embedded in capital equipment).

#### Getting under the hood

Access to linked administrative and survey data for individual firms (microdata) is improving our understanding of New Zealand's productivity performance. Aggregate data (industry-level) and microdata (firm-level) illustrate productivity performance in different ways and often employ different methodological approaches (Mai and Warmke, 2012). Aggregate data shows the performance of the average firm, which can mask how different firms

have different levels of performance (the distribution of performance). Conversely, while microdata can provide a deeper picture of performance, aggregate data can be especially useful for illustrating wider trends (providing a broader picture).

New Zealand is fortunate to have a relatively rich source of microdata on New Zealand firms: the Longitudinal Business Database (LBD). The LBD provides a detailed view of firms' behaviour and performance across a broad range of topics (Fabling and Sanderson, 2016). Over recent years there has been a focus on how microdata can transform thinking on social policy in New Zealand. The data on the firm side is proving to be just as

of the firms that survive do not grow as they age (Meehan and Zheng, 2015). The result is that, rather than flowing to higher-productivity firms, resources are getting stuck in low-productivity ones (Meehan, 2018).

### *Small firms and markets*

This raises the question of why surviving firms do not grow. One candidate is small markets. Not only is New Zealand a relatively small economy, but, when looking at employment shares, many firms only operate in (trade their output in) markets that are domestically close by (Conway and Zheng, 2014). The problem is that small markets are associated with

trade to GDP), firms' connections into global value chains (de Serres, Yashiro and Boulhol, 2014), and inward and outward foreign direct investment (Wilkinson and Acharya, 2013). This is significant, as foreign-owned firms operating in New Zealand outperform domestic firms on almost all measures of performance, with higher capital intensity, higher average wages and higher labour productivity (see, for example, Maré, Sanderson and Fabling, 2014). However, these results appear to reflect in large part foreign owners acquiring already high-performing firms (Fabling and Sanderson, 2014). Likewise, while New Zealand's internationally connected firms have relatively high productivity levels and are larger than domestically focused firms (Fabling et al., 2008), larger, more capital-intensive and more productive firms tend to opt into exporting, and this explains most of the productivity difference between exporters and non-exporters (Fabling and Sanderson, 2013).

The LBD has also been used to investigate barriers to earning international income and how these relate to the probability of future export success. Sanderson (2016) found that regulations and tariffs play a limited role in determining which firms generate international income (pp.18, 24), and noted that, while 'it is impossible to draw any strong conclusions regarding the barriers and strategies that may be holding firms back, these results point towards firms which are already succeeding in innovative or niche markets and which have definite plans for expansion having a higher chance of expanding further' (p.10). Country-specific knowledge can also be an important determinant of export success, with firms that have a higher share of workers from a specific country being more likely to export to that country (Sin et al., 2014). And there is some evidence that exchange rates make a difference (Fabling and Sanderson, 2015).

### *Investing in knowledge*

As well as market size, recent LBD research has highlighted the importance of New Zealand firms' ability to learn (absorptive capacity) as a factor in shaping their ability to innovate and improve their productivity. Harris and Le (2018) found that the ability

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powerful. Indeed, there have been several important studies completed using the LBD over the last few years. The Ministry of Business, Innovation and Employment has prepared a valuable stocktake of these studies (Allan, 2018) and key findings are summarised below.

### **Insights from recent firm-level research**

A healthy rate of firm births and deaths can ensure resources do not get trapped in underperforming firms and can, in turn, support aggregate productivity growth (Maré, Hyslop and Fabling, 2016). From the perspective of the economy as a whole the impact of a change in an individual firm's productivity will be magnified when productive firms gain market share and resources at the expense of less productive ones. Early research using the LBD found that firm entry and exit in New Zealand is not unusual when compared with other economies (Mills and Timmins, 2004; Law and McLellan, 2005; Meehan and Zheng, 2015). However, as more recent research has shown, a relatively high proportion

weak competitive intensity (Ministry of Business, Innovation and Employment, 2016), which can, in turn, hold back resource reallocation and slow technology diffusion. For example, in relation to technology diffusion, Wakeman and Conway (2017) found that small markets could be one explanation for low business enterprise expenditure on research and development and innovation in New Zealand. Their argument was that firms will be less likely to engage in risky and costly innovation when the final prize is a small domestic market. Consistent with this, they found that New Zealand firms that operate in international markets innovated more than firms focused solely on domestic markets.

One way to increase market size is to look to international markets – through trade, investment, people and the flow of ideas (Conway, 2016). Yet despite being relatively open on paper, the New Zealand economy is not well connected internationally, with there being concerns over trade intensity (ratio of international

of New Zealand firms to make use of external knowledge was positively related to their propensity to undertake research and development, innovate and export, even after controlling for other firm characteristics (e.g., foreign ownership and employee skill levels). This reinforces the importance of management practices (Bloom, Sadun and Van Reenen, 2016). Indeed, Fabling and Grimes (2014) found that firms that adopted a suite of human resource management practices boosted their productivity and raised the average wages they paid. Yet New Zealand has a relatively large number of firms with poor management practices (Bloom, Sadun and Van Reenen, 2016). Understanding the reasons behind this is an important area of ongoing research (Sanderson, 2018).

Likewise, LBD research has helped explain firms' investments in knowledge-based capital. Knowledge-based capital includes a range of intangible assets, such as software, research and development, product design, inter-firm networks and organisational know-how (Wakeman and Le, 2015). Intangible assets are difficult to measure, but international data suggests that investment in them is rising and may exceed investment in machinery and equipment in some countries. However, in New Zealand, Chappell and Jaffe (2016) found little link between investment in intangible assets and average firm productivity, although firms that invested in intangibles did expand employment and output.

This is an area where the LBD has been used to evaluate policy interventions. Wakeman (2017) found that the overall impact on firm performance of receiving a research and development grant was mixed. Likewise, while research and development subsidies were found to have a positive impact on patenting and introducing new goods and services to the world, their impact on process innovation and introducing products new to New Zealand or the firm was smaller (Jaffe and Le, 2015). Further, Fabling and Grimes (2016) found that, when considered in isolation, the adoption of ultra-fast broadband (UFB) had no effect on overall employment, labour productivity and multifactor productivity. However, firms that adopted UFB also tended to introduce

other organisational changes and there was a positive relationship between introducing complementary organisational changes and productivity among firms that adopted UFB.

Further, while New Zealand experienced strong employment growth in the lead-up to the global financial crisis, LBD research has shown that this has lowered the average quality of labour (Maré et al., 2017). Maré et al. (2017) also looked at the career and earnings trajectories of recent graduates, comparing outcomes for those who studied STEM and non-STEM subjects at both degree and sub-degree levels, and found that those who studied at degree level had

Commission, 2016) discussed how recent research has allowed us to improve on three traditional explanations for New Zealand's productivity performance – industry structure, geography and business culture. Take business culture. Low firm productivity is sometimes attributed to a supposed preference for the 'three Bs' (business owners and operators stop expanding their firms once they get a bach, boat and BMW). But more powerful insights come from research that allows researchers to understand what leads to business owners and operators deciding to limit their ambition in this way. With firm-level research on topics like barriers

A key theme of the firm-level research cited in this article is that the processes of diffusion and reallocation generally do not work as well as they could in New Zealand.

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a significantly higher contribution to productivity. However, the contribution of female workers tended to be systematically undervalued by employers (Sin, Stillman and Fabling, 2017). Chappell and Sin (2016) also showed that the 90-day trial period had no effect on firm hiring behaviour on average, but firms in the construction and wholesale trade industries (heavy users of trial periods) increased their hiring by around 10%.

#### Death of a paradox

It used to be said that New Zealand's productivity performance was a paradox, but, as the studies cited in this article show, researchers have well and truly moved on from this view. Of course, a large number of unanswered questions remain. Our understanding of the economy will always be incomplete, particularly given some of the internationally unusual features of the New Zealand economy, but progress has been made in better understanding our productivity performance over recent years. As an example, the New Zealand Productivity Commission (Productivity

to export success, it is increasingly possible to understand these underlying drivers.

A key theme of the firm-level research cited in this article is that the processes of diffusion and reallocation generally do not work as well as they could in New Zealand. Many domestic frontier firms are disconnected from the international frontier, laggard firms tend not to catch up to the domestic frontier, and resources are stuck in a tail of small and unproductive firms (Conway, 2016, 2018). While there are some successful New Zealand firms, there is evidence that too few New Zealand firms are benefiting from new productivity-enhancing technologies and ideas developed at the global frontier. A large share of employment and capital is concentrated in firms with low productivity. There are too many small, old and relatively unproductive firms that neither grow rapidly nor exit the market.

#### Conclusion

The explanations for New Zealand's productivity performance contained in this article (summarised in Table 1) lead

**Table 1 Explanations for New Zealand's productivity problems**

Explanations based on aggregate data	Explanations based on microdata
Capital shallowness reflecting: <ul style="list-style-type: none"> <li>· High long-term real interest rates</li> <li>· High off-the-shelf cost of capital goods</li> <li>· Fast population growth</li> </ul>	Impaired reallocation and diffusion (firms that are disconnected and stuck) reflecting: <ul style="list-style-type: none"> <li>· Weak international connections</li> <li>· Small size of domestic markets</li> <li>· Low investment in knowledge-based capital</li> <li>· Firms' limited ability to learn</li> <li>· Weaknesses in the allocation of labour</li> </ul>

to the question of how policy reform could support a successful New Zealand economy steadily closing the income and productivity gaps with the rest of the world. In many respects the future policy challenge is different to what has been faced previously. With dramatic falls in the price of transmitting data over distance an opportunity is now opening for firms to engage in new ways internationally (Conway, 2017). This trend is likely to continue given the 'servitisation of manufacturing' and strong growth in digital products that can be marketed and delivered worldwide through fibre-optic cables. This is consistent with some promising signs in the New Zealand economy, such as increasing export

diversity and a growing high-tech sector.

Making the most of these new opportunities implies a reform agenda focused on skills, flexibility, openness and receptiveness to new technology. These issues are canvassed in Conway (2016, 2018) and in work by the OECD and the Australian Productivity Commission (see articles by Pilat and Criscuolo and Lattimore in this issue of *Policy Quarterly*). Key directions of reform that have been proposed (Conway, 2018) include: prioritising trade in services and digital products in New Zealand's trade strategy; improving the matching of skills to jobs, including through encouraging the education system to be more adaptive and responsive to labour market demands;

focusing immigration policy on lifting the skill composition of the workforce; making investment easier and more effective, including addressing differences in the taxation of different forms of savings (e.g., business assets and housing); and enhancing New Zealand's competition policy framework. This also presents a major challenge for the New Zealand public sector and will require improvements in policymaking capability (including the use of monitoring and evaluation) and the delivery of services (Gemmell, Nolan and Scobie, 2018; Nolan, 2018).

<sup>1</sup> As the 2017 OECD economic survey of New Zealand noted, 'considerable progress [was] made in lowering the general government budget deficit from a post-recession high of 7.1% of GDP in 2010 to near balance since 2014' (OECD, 2017, p.31). A factor in this was the rise and then fall of spending related to the Canterbury earthquakes (net of reinsurance receipts), which went from 4.4% of GDP in 2010–11 to 0.3% in 2015–16.

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