MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Business investment in New Zealand

A literature review

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HĪKINA WHAKATUTUKI

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Abstract

This report presents the findings of a literature review that examines a range of questions about business investment in New Zealand, including: why is our business investment weak? We define business investment as "the purchase of new tangible and intangible assets by businesses for production purposes". Weak business investment in New Zealand appears to reflect that, compared with their counterparts overseas, New Zealand businesses face comparatively high costs, and may receive limited benefits, from their investment. In particular, while higher business investment is associated with firm growth and some other outcomes, New Zealand firms do not appear to receive the productivity gains from business investment experienced by firms in many other countries, based on the findings of a small number of studies. This implies that, if the firm-level relationship between business investment and productivity is indeed weak, lifting business investment may do little to increase productivity across the economy as a whole.

JEL classification

D22, D24, O16

Keywords

Business Investment, Saving and Capital Investment, Firm Behaviour

Key points

- **In this report, we define business investment as "the purchase of new tangible and intangible assets by businesses for production purposes".** Tangible assets are things like buildings, machinery and inventories. Intangible, or knowledge-based, assets are computerised information, innovative property and economic competencies. The stock of assets (capital stock) increases as long as there is enough new annual investment to cover depreciation. Therefore, *net* investment – gross investment less depreciation – is the most relevant measure of business investment.
- **Business investment matters because it contributes to economic growth and other outcomes.** Business investment increases current output, expands future productive capacity, and can lift productivity, thus contributing to economic growth and improved material living standards. Depending on its nature, business investment can also contribute to environmental and other outcomes.
- **Businesses invest in anticipation of a future return.** When they are spending on assets, firms are essentially foregoing consumption today to increase their future consumption. The main determinant of business investment is therefore firms' expectations about the anticipated returns (benefits versus costs) from that investment. In addition, uncertainty affects both the level and timing of investment. Increased uncertainty is expected to lower investment and delay investment decisions; by holding off investment, firms gain more information about the uncertain future. Most international evidence – and some New Zealand evidence – supports these theories about the determinants of business investment.
- **Weak business investment has been assessed as playing a key role in New Zealand's poor productivity performance.** Of the four main factors identified by the Productivity Commission in its productivity diagnosis, two are directly related to business investment: firstly, New Zealand is relatively capital shallow; secondly, our investment in knowledge-based capital is weak. International comparisons are fraught with difficulty. Some factors may under-state New Zealand's comparative business investment performance. These factors include the fact that international comparisons are often based on gross rather than net investment, and the treatment of State Owned Enterprises differs across countries. Overall, we assessed that, while New Zealand's business investment as a share of GDP is not far off the OECD average, business investment per worker is much lower, as is business investment in research and development.
- **One *potential* problem with business investment relates to finance constraints.** Finance constraints are when financiers are reluctant to finance objectively sound projects. Finance constraints mainly arise due to information asymmetries – firms know more about their investment projects than financiers do. Small, young and innovative firms are expected to be most prone to finance constraints. Finance constraints are inherently difficult to measure, as firms that struggle to access finance may just be poor performers, in which case the financial system is acting as

expected in denying them access. Survey evidence suggests that few New Zealand firms suffer from finance constraints. The small number of New Zealand studies on this topic also find little evidence of finance constraints, with the possible exception of small, young and innovative firms, as expected.

- **The main problem we identified is that New Zealand firms face comparatively high costs of business investment…** On the cost side of the benefit-cost ratio, historically New Zealand has had comparatively high interest rates, although in recent years interest rates have fallen and the gap between interest rates here and overseas has narrowed. In addition, New Zealand has comparatively high corporate tax rates (and potential tax distortions including the favourable treatment of housing), and expensive capital goods.
- **…while the (productivity) benefits may be limited.** There are a number of reasons to think that the benefits to New Zealand firms from business investment might be restricted. These reasons include New Zealand's small domestic markets, and preponderance of small firms, which mean that firms may lack the scale and sales volumes necessary to justify significant capital outlays. Only a few studies have examined the relationship between business investment and firm performance in New Zealand, and these studies have mainly focused on intangible investment. These studies found that, while higher business investment is associated with firm growth and some other outcomes, New Zealand firms do not appear to receive the productivity gains experienced by firms in many other countries.
- **Policy prescriptions are predicated on business investment lifting productivity.** Policies suggested by the OECD and others to address weak business investment in New Zealand aim to tilt firms' investment benefit-cost ratios, for example by lowering corporate tax rates, boosting saving, developing financial markets, and providing direct fiscal support. The ultimate aim is to lift productivity.
- **However, if firms do not receive the expected productivity gains, lifting business investment may do little to increase aggregate productivity.** If the findings from the small number of New Zealand studies about limited productivity benefits to firms from business investment are correct, while the policies above may lift business investment, it is less clear that this in turn will boost productivity across the economy as a whole.
- **Where feasible, it may be beneficial to address the underlying causes of weak productivity gains.** Some of these underlying reasons likely relate to New Zealand's distinctive economic geography and may be hard to address. Others may be more amenable to policy, such as the fact that New Zealand firms seem to combine capital and labour less efficiently than firms in other countries, implying a role for skills policy and policies that encourage an entrepreneurial environment. Yet other reasons may require further investigation – a priority for future research.

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1 Introduction

1.1 Motivation

Business investment is a key ingredient of economic growth. For example, by adding to the stock of capital, business investment allows workers to produce more from their time at work, thus lifting labour productivity. Depending on its nature, business investment can also contribute to environmental and other outcomes.

Productivity growth has slowed in New Zealand and elsewhere over the last couple of decades. Part of New Zealand's productivity diagnosis is our weak business investment.

There are some outstanding questions about business investment in New Zealand, in particular what might be holding business investment back. Examining existing evidence on these questions should contribute to a shared understanding of the 'problems' where these have been investigated, and inform future research where not.

This study was undertaken during the COVID-19 pandemic, an unprecedented shock to the New Zealand and global economy. Business investment tends to be disproportionately affected during recessions compared with other parts of the economy. This study does not specifically consider the implications of COVID-19 on business investment. Instead, it considers enduring questions about business investment that should be relevant to the post-COVID economic recovery.

1.2 Objectives

This report uses evidence from existing studies to examine the following questions:

- What is business investment and why does it matter?
- What is special about New Zealand and why is our business investment weak?
- How do firms make decisions about business investment?
- How do firms finance their investment?
- What are the implications for policy and research?

The overall aims are to inform the evidence base that underpins policy in this area, and identify major knowledge gaps that could inform future research.

1.3 Approach

We reviewed studies focused on the questions above. The questions reflect some of the main strands of literature on the topic of business investment, and span quite a wide terrain. Therefore, this literature review should not be considered comprehensive. In our search we placed emphasis on New Zealand studies, studies that use micro (firm-level) data, and overview studies. We conducted the literature search in early 2020.

2 Why business investment matters

Business investment expands future productive capacity and lifts productivity growth, thus contributing to higher incomes and material living standards. Business investment also provides a key economic link between the present and the future. As well as economic outcomes, business investment can affect non-economic outcomes. For example, certain types of investment can lead to environmental degradation while others can improve environmental outcomes. The rise in intangible investment may have increased inequality by allowing a small number of leading firms to dominate some markets, thereby increasing the pay gap between people working in those and other firms.

2.1 What is (business) investment?

- **Investment is the purchase of goods that are not consumed today but are used to create future wealth** (Parker 2010). This economist's definition differs from what most people think of as investment, which is financial assets like stocks and shares. The financial asset of one person is offset by a financial liability of another, and so when assets and liabilities are aggregated, they cancel each other out. In contrast, investment to an economist represents real net wealth for the economy.
- **Investment is a *flow* variable that adds to the *stock* of capital.** The capital stock is the total amount of tangible assets (such as buildings, machinery and inventories) and intangible, or knowledge-based, assets (computerised information, innovative property and economic competencies) currently available to the economy with which to produce goods and services. This capital stock is sometimes referred to as 'produced capital' to distinguish it from human capital, natural capital and social capital etc (Janssen 2018). The capital stock increases as long as there is enough new annual investment to replace the worn out capital and still contribute some extra. Therefore, net investment – gross investment less depreciation – is most relevant to the path of the capital stock.
- **Investment can be categorised in several ways** (see for example Janssen 2018), including by who undertakes the investment spending:
    - household investment, for example spending on housing
    - government investment, for example spending on infrastructure
    - business investment (the focus of this report), which we define as "the purchase of new tangible and intangible assets by businesses for production purposes"; businesses in this context broadly means profit-motivated private firms.

2.2 How is business investment measured in practice?

- **Stats NZ produces capital stock statistics in New Zealand using a modified perpetual inventory method (PIM).** Briefly, this method generates an estimate of the capital stock by accumulating past purchases of assets over their estimated service lives (Statistics New Zealand 2014). The approach uses the PIM to:
    - estimate the gross capital stock
    - apply a depreciation function to calculate consumption of fixed capital
    - obtain the net capital stock by subtracting accumulated consumption of fixed capital from the gross capital stock.
- **Gross fixed capital formation is a commonly used macro-economic measure of business investment.** Gross fixed capital formation (GFCF) is defined as "the total value of a producer's acquisitions, less disposals, of fixed assets during the accounting period, plus certain additions to the value of non-produced assets as a result of productive activity of institutional units (such as land improvements)" (Statistics New Zealand 2014). Fixed assets are those that are used repeatedly, or continuously, in processes of production for more than one year. They include: tangible fixed assets, consisting of dwellings, other buildings and structures, machinery, and equipment and cultivated assets; intangible fixed assets, consisting of exploration, computer software, and artistic originals which are intended to be used for more than one year (Statistics New Zealand 2014). Business investment is broadly private GFCF excluding residential buildings. Note, however, that GFCF:
    - is gross of depreciation rather than net, whereas conceptually net investment is more relevant for business investment
    - only covers land improvements rather than the land per se, whereas conceptually spending on land constitutes an investment by businesses
    - has limited coverage of intangible assets, discussed further below
    - generally excludes State-Owned Enterprises (SOEs) which are included in government investment, even though some New Zealand SOEs are required to aim to generate profits for the Crown.
- **At the micro level, business investment measures are developed using data from Stats NZ's longitudinal business database (LBD).** The Annual Enterprise Survey (AES) includes data on additions, disposals, revaluations and depreciation of assets and is used to measure investment (Fabling and Sanderson 2016). The assets covered include land, buildings, motor vehicles and other transport equipment, computer software, computer hardware, lifting and handling equipment, furniture and fittings and other plant and machinery equipment (Statistics New Zealand 2014). In addition to the AES, it is possible to construct business investment measures from the LBD using IR10 data. The IR10 is an abbreviated set of financial accounts composed of a profit and loss statement and a balance sheet, collected from firms by Inland Revenue (Fabling and Sanderson 2016).

- **Some measurement issues make international comparisons challenging.** Examples include the following.
    - Most international comparisons of investment are based on figures that are gross of depreciation. Countries with high capital intensities (and hence high depreciation) will be treated favourably since they will tend to have a high ratio of gross to net investment. This could make New Zealand's business investment look low in international comparisons.
    - SOEs are generally included in the government sector in New Zealand's international reporting,[1] whereas some other countries include SOEs in the business sector. Given that SOEs account for a significant proportion of economic activity in New Zealand, this could make New Zealand's business investment look comparatively low.
    - The treatment of land can make a difference in international comparisons (Janssen 2018). For example, the depreciation rate of land is very low, which can have implications for comparing net versus gross investment if land forms a different proportion of the capital stock across countries.

2.3 How does business investment relate to growth?

- **Business investment increases current output and expands future productive capacity.** By spending on other firms' capital goods, business investment directly contributes to the current level of economic activity (current output) (Aldridge 2009). By increasing the capital stock, business investment also contributes to the future level of what the economy can sustainably produce (potential output).
- **Business investment can lift productivity.** From a macro-economic growth accounting perspective, the level of labour productivity (measured as output per worker) reflects both the level of capital stock per worker and the level of multifactor productivity (MFP, which measures the efficiency with which labour and capital are combined to produce output) (Dupuy and Beard 2008). Adding to the stock of capital that workers have at their disposal allows them to produce more from their time at work, thus lifting labour productivity (Conway 2016). Business investment can also have an indirect impact on labour productivity through spillover impacts on MFP, for example through: new equipment making changes in work practices possible and also assisting labour to gain new skills; the creation of 'knowledge spillovers' as skilled workers seek to understand and improve on technologies embodied in new capital equipment; embodied technical change not captured in the market price of new equipment (Dupuy and Beard 2008). By lifting productivity growth, business investment contributes to income growth and growth in material living standards.

[1] https://croakingcassandra.com/2020/01/17/business-investment-and-snz/.

- **Business investment reflects expectations about the future.** By foregoing consumption today, firms expect to increase their future consumption through their increased capital stock. Investment is therefore the key economic link between the present and the future (Jones 2009).
- **Business investment is more volatile than other components of GDP and affects inflation.** Investment fluctuates much more than consumption and falls disproportionately during recessions (Jones 2009). Changes in business investment can also have significant effects on inflationary pressure (Aldridge 2009). In the short term, high levels of investment may heighten inflationary pressure due to the increased demand for resources necessary to produce capital goods. In the long run, investment increases potential output and so reduces inflationary pressure.

2.4 How does business investment contribute to non-economic outcomes?

- **The type of investment can affect environmental outcomes.** Business investment might flow into sectors and processes that cause environmental degradation (OECD 2015a). Alternatively, business investment can improve environmental outcomes through investment in 'green growth' and areas such as the 'circular economy'. The circular economy involves long-lasting product design, repair and reuse, remanufacturing or recycling, and aims to minimise inputs, waste and emissions (Blick and Comendant 2018). Environmental outcomes are among those sought by Māori from their asset base, in addition to the direct contribution of these assets to output (Nana, Khan and Schulze 2015).
- **The type of investment can affect distributional outcomes.** Some argue that the rise of intangible investment is associated with a widening gap between high- and low-productivity firms and increasing income inequality (see for example Haskel and Westlake 2017). The argument is that the characteristics of intangible investment (highly scalable, spillovers from others' investments etc – see next sub-section) enable a small number of market leading firms to dominate. This in turn increases the pay gap between people working in those firms and other firms, and also leads to large differences in compensation between people who have the required skills for managing intangibles and those who do not.
- **The way in which investment is financed can also affect a range of outcomes.**
    - Ethical or socially responsible investing is defined as the integration of personal values, social considerations and economic factors into the investment decisions of fund managers etc (Michelson, et al. 2004). It can potentially change corporate behaviour towards desired environmental and social outcomes as it provides an external influence on these behaviours. However, the extent to which ethical investment actually affects firm practices and performance is not entirely clear (Michelson, et al. 2004).

- Social impact investment (SII) is the provision of finance to organisations with the explicit expectation of a measurable social, as well as financial, return (OECD 2015b). SII involves private investment for the public benefit. For example, SII finances social enterprises which may have a social or environmental goal, and which need capital to grow but often face greater obstacles than mainstream firms (Noya 2009, cited in OECD 2015b).
- Targeted groups. When access to financial services is extended to the poor, or to groups such as women whose access may be more limited, it can help reduce poverty and inequality and improve gender equity (OECD 2015a).

The remainder of this report mainly focuses on economic rather than non-economic outcomes, reflecting the main developments in the literature on business investment.

2.5 What is special about intangible investment?

Intangible investment is investment in intangible, or knowledge-based, assets – computerised information, innovative property and economic competencies (Corrado, Hulten and Sichel 2005). Intangible investment has some distinctive properties that affect its outcomes, as outlined in Table 1 below.

- **The returns to intangible investment can be high.** For example, international studies have found that the private returns to research and development (R&D) – one type of intangible investment – are strongly positive and often higher than for investment in physical capital (Hall, et al. 2009, cited in Wakeman and Conway 2017). The social returns may be even higher, but they are variable and often imprecisely measured.
- **Intangibles account for a growing share of total investment.** The high potential returns to intangible investment are reflected in its growing share in total business investment. It is estimated that investment in intangible overtook that in tangibles in the mid-1990s in the US, and in the following ten years in some other developed countries (Haskel and Westlake 2017). New Zealand has seen growth in intangibles too; intangibles increased as a share of business investment from 10.2% in March 1990 to 22.6% in March 2020, based on a narrower definition of intangibles than that used by Haskel and Westlake (2017).[2] This growth is despite standard investment measures failing to capture the importance of intangibles – see below.
- **Intangible investment has some properties that may warrant government intervention.** Properties such as non-rivalry mean that innovating firms do not capture all the benefits of their innovations and so may under-invest from society's perspective. Table 1 also implies potential failures in the finance market.

[2] Data downloaded on 1/7/20 from Stats NZ - see http://archive.stats.govt.nz/infoshare/SelectVariables.aspx?pxID=adfb3011-7ce0-4342-96aa-f7b5ddd37ed2. This is based on real intangible fixed assets as a proportion of real non-residential fixed assets. It is

- **Intangibles are hard to measure.** There is no standard accounting method to value intangibles (OECD 2019b), and so valuations tend to differ dramatically. Accounting measures tend to cover software, some aspects of R&D, and (when a firm is sold) 'goodwill',[3] but little of firm's investment in marketing and branding that intangibles also target conceptually. Standard investment measures therefore fail to capture the growing importance of intangible assets, resulting in a downward bias in the recorded book values of these assets (Ewens, Peters and Wang 2020). This bias has grown over time, as evidenced by the dramatic increase in market-to-book ratios. Further challenges include that the boundary between tangible and intangible investment is blurred (eg computer software), and it is difficult to measures volume changes as price and quality changes do not always move together (Pells 2018).

Table 1: Properties of intangible investment

Property	Description	Implications
Lack of visibility	Intangible assets do not have physical embodiment	Difficult to measure Difficult to use as collateral
Non-rivalry	Many intangible assets such as software or new product designs can be used simultaneously by multiple users without engendering scarcity or diminishing their basic usefulness	Increasing returns to scale Knowledge spillovers Firms may under-invest from society's perspective
Non-tradability	While some intangible assets – eg software and patents – can eventually be traded on organised markets, many remain inherently non-tradable	Higher returns to investing firms Difficult to measure Difficult to use as collateral
Incomplete excludability	In part because of their virtual nature, the property rights of many intangible assets cannot be as clearly defined and as well enforced as tangibles	Knowledge spillovers Firms may under-invest from society's perspective Difficult to measure Difficult to use as collateral
Non-separability	Conversely, intangible assets may have a full value that is firm-specific. This means such assets cannot be separated from the original unit of creation without some loss of value	Higher returns to investing firms Difficult to measure Difficult to use as collateral
Knowledge transferability	To be transferable, knowledge has to be codified, or (for tacit knowledge) embodied, such as in human capital	Human capital spillovers

Source: Based on Andrews and de Serres (2012), cited in Conway (2016)

[3] https://www.xrb.govt.nz/dmsdocument/2820.

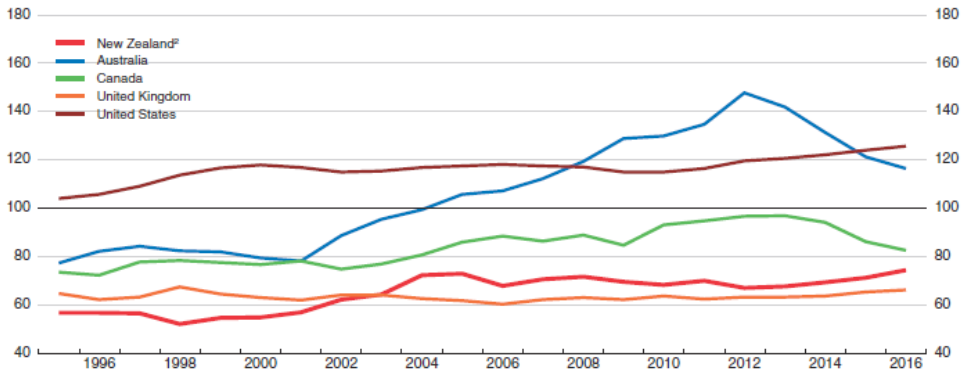
3 What's special about New Zealand?

While New Zealand's business investment as a share of GDP is not far off the OECD average, business investment *per worker* is much lower, as is business investment in R&D. Factors that may affect our capital shallowness include New Zealand's comparatively high interest rates, corporate tax rates and cost of capital goods. However, the underlying reasons for some of these factors are less well understood. A small number of studies have found that the productivity benefits to firms from their investment are low. Overall, the evidence we have assembled suggests that the benefits from business investment to New Zealand firms are likely to be restricted, while the costs are comparatively high.

3.1 How does our business investment performance compare?

- **New Zealand is comparatively capital shallow.** Total investment as a share of GDP in New Zealand broadly tracked around the OECD median over the period 1990-2014, but this was mainly due to strong residential investment and government investment; non-residential business investment has been slightly below the OECD median (Conway 2016). And while investment as a share of GDP is around the OECD average, New Zealand investment *per worker* is much lower than the OECD average (Janssen 2018) – New Zealand is comparatively capital shallow. Low investment per worker partly reflects New Zealand's comparatively high levels of labour force participation, discussed further below. Figure 1 illustrates New Zealand's persistent capital shallowness.

Figure 1: Investment per person in the labour force
Gross fixed non-residential capital formation per person in the labour force, OECD =100

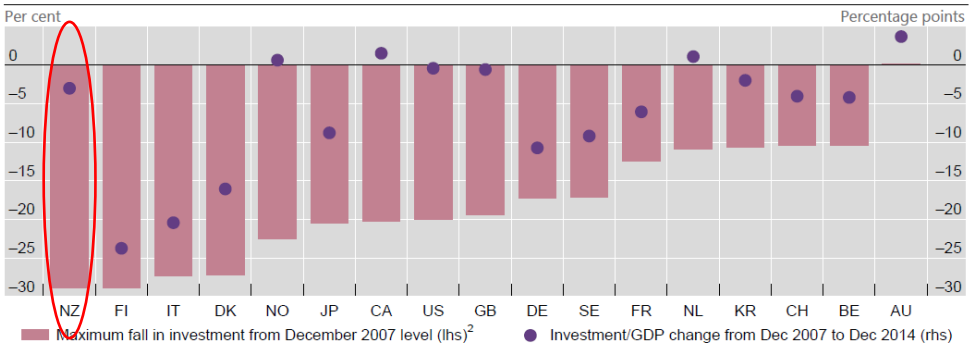


1. Data for gross non-residential capital formation are in current prices and were converted into a common currency using 2010 purchasing power parity exchange rates. The labour force includes only people aged 15-64. Data for the OECD exclude Chile, the Czech Republic, Estonia, Greece, Hungary, Iceland,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

Source: OECD (2017)

- **Business investment in New Zealand was comparatively hard hit in the global financial crisis (GFC).** Business investment collapsed across developed countries following the GFC, and in many countries has not fully recovered since (Banerjee, Kearns and Lombard 2015). Figure 2 shows the maximum fall in real private non-residential gross fixed capital formation (broadly business investment) since 2007, and the change in this measure from 2007-14.[4] New Zealand saw the largest fall in business investment among the countries covered, although by 2014 business investment had largely recovered.

Figure 2: Business investment since the GFC
Real private non-residential gross fixed capital formation



AU = Australia; BE = Belgium; CA = Canada; CH = Switzerland; DE = Germany; DK = Denmark; FI = Finland; FR = France; GB = United Kingdom; IT = Italy; JP = Japan; KR = Korea; NL = Netherlands; NO = Norway; NZ = New Zealand; SE = Sweden; US = United States.

[1] For Italy and Switzerland, government real non-residential capital formation is included. [2] Data up to December 2014.

Source: Banerjee, Kearns and Lombard (2015)

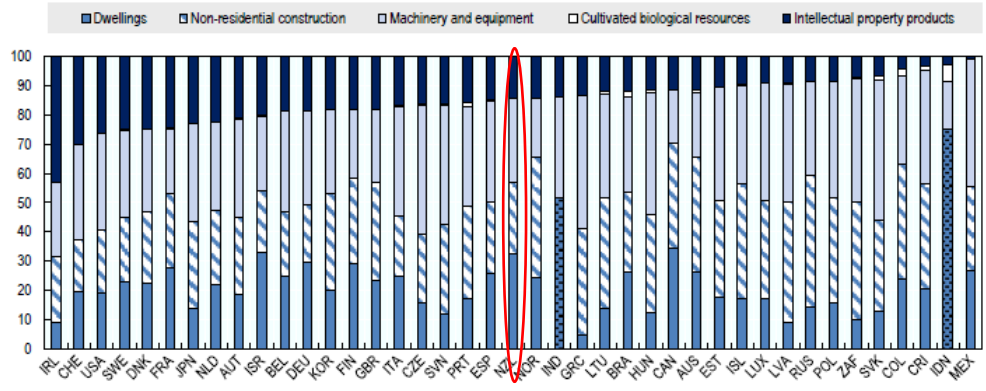
- **New Zealand has a comparatively large share of total investment in housing.** Figure 3 provides a breakdown of OECD countries' gross fixed capital formation (broadly total investment) by asset group in 2017. Compared with other OECD countries, New Zealand had a relatively large proportion of total investment in dwellings,[5] and a relatively small proportion in machinery and equipment (part of business investment).

[4] This comparison is affected by the stage in the cycle different countries were at in 2007. For example, if New Zealand was at a cyclical peak while other countries were not, then the graph would over-state the fall in business investment in New Zealand compared with other countries over the period.

[5] Housing investment is likely to reflect the population growth rate in each country; housing investment is likely to be higher in countries with higher population growth rates.

Figure 3: Gross fixed capital formation by asset type

Total economy, as a percentage of total gross fixed capital formation, 2017 or latest available



Source: OECD (2019a)

- **New Zealand has especially low levels of investment in business R&D.** In 2017, New Zealand's business expenditure on R&D (BERD, part of businesses' intangible investment) as a percentage of GDP (0.75%) was less than half that of the total across OECD countries (1.66%), placing New Zealand in the bottom quartile of OECD countries on this measure.[6] This is despite fairly strong growth in BERD in New Zealand in recent years – from 0.49% of GDP in 2007 to 0.75% in 2017, compared with 1.52% and 1.66% respectively for the total across OECD countries. Note that one of the reasons for New Zealand's low BERD, and for the recent catch-up, relates to 'reclassification'. R&D tax incentives encourage firms to reclassify other expenditure as R&D in order to receive the incentive. New Zealand introduced a R&D tax incentive in 2019; up until then New Zealand was unusual in not having a R&D tax incentive as over three quarters of OECD countries do so (OECD 2018, cited in Bloom et.al, 2019).
- **New Zealand is unique in terms of the Māori asset base**. Estimates suggest that the Māori asset base accounts for a fairly significant and growing share of the New Zealand total asset base. Berl estimated that in 2013, the Māori asset base was $42.6 billion and represented 6.1% of the total New Zealand asset base (see Nana, Khan and Schulze 2015). The authors estimated that from 2010 to 2013, the asset base increased 7.2% in real terms. The 2013 asset base estimate comprised: about $12.5 billion in Māori trusts, incorporations, and other entities; $23.4 billion in assets of Māori employers; $6.6 billion in assets of self-employed Māori. The authors also found that while the asset base is growing in value, the productivity (as broadly measured by GDP) of these assets was below average.[7] They commented that this likely reflects the nature of many of the land-based assets –

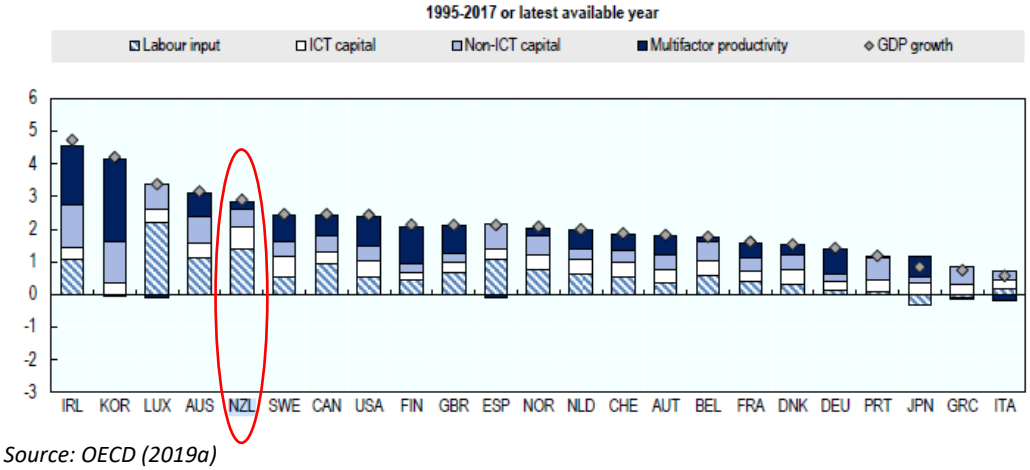
[6] Data downloaded on 5/6/20 from the OECD's Main Science and technology Indicators database – see https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB#.

[7] The relative productivity of the Māori asset was simply based on the lower contribution of Māori production to total GDP (5.6%) compared with the contribution to the asset base (6.1%).

restricted access, limited potential, and/or difficult management/ ownership structures. They also suggested that Māori seek not only economic returns from their asset base, but also broader outcomes. A more recent report also suggests strong growth in the Māori asset base. KPMG estimated that in 2017 the asset base was $50 billion, representing around 6% of the total New Zealand asset base, and that the asset base had been growing rapidly (see MBIE 2017).

- **Much of New Zealand's growth has come from labour input.** Figure 4 provides a breakdown of OECD countries' annual GDP growth over recent decades by labour input, capital input (split between ICT and non-ICT capital) and MFP. This shows that New Zealand has had fairly solid economic growth of around 3% per annum over the period. Much of this growth has come from growth in labour input, with growth in ICT capital also making a strong contribution in New Zealand – the largest among the countries covered over the period. Growth in non-ICT capital, and in particular in MFP, have made relatively small contributions to overall GDP growth in New Zealand. These breakdowns imply that New Zealand's labour productivity performance has been poor – a point made by Conway (2016) and many others.

Figure 4: Contributions to GDP growth
Total economy, annual percentage point contribution



Source: OECD (2019a)

- **New Zealand's low levels of business investment have contributed to our productivity gap with Australia**. Mason (2013) examined labour productivity performance at the industry level for New Zealand and Australia over the period 1999-2009. This included decomposing the labour productivity gap between the two countries – in 2009 New Zealand's labour productivity level was around 62% of that in Australia. The author found that in 2009, roughly 30% of the New Zealand-Australia gap in labour productivity was attributable to differences in industry structure, but 70% was attributable to within-industry productivity differences. He also found that in 2009, relative capital intensity (measured as capital per hour worked) accounted for 39% of the gap, MFP (measured as a residual) accounted for 57%, and skills (which was based on workforce qualifications and relative pay levels) accounted for 4%. Looking over a longer period, the capital contribution to the gap rose from 26% in 1999 to 39% in 2009. The difference in capital intensity

between Australia and New Zealand was not just due to differences in industry structure such as Australia's larger share of the economy in mining; in 2009, capital intensity was higher in Australia for 19 of the 24 industries analysed. These findings imply that New Zealand's weak business investment made a significant, and growing, contribution to our productivity gap with Australia over the period 1999-2009, although not as large a contributions as our low levels of MFP. Note, however, that as the author pointed out, deeper analysis is needed to understand the underlying causes of the productivity performance differences between the two countries.

- **MFP is an important part of our productivity story.** The analysis in the preceding paragraphs highlights that New Zealand's poor MFP performance may be as important – if not more important – an explanation for our productivity performance as weak business investment. The implications of this are picked up in section 6.

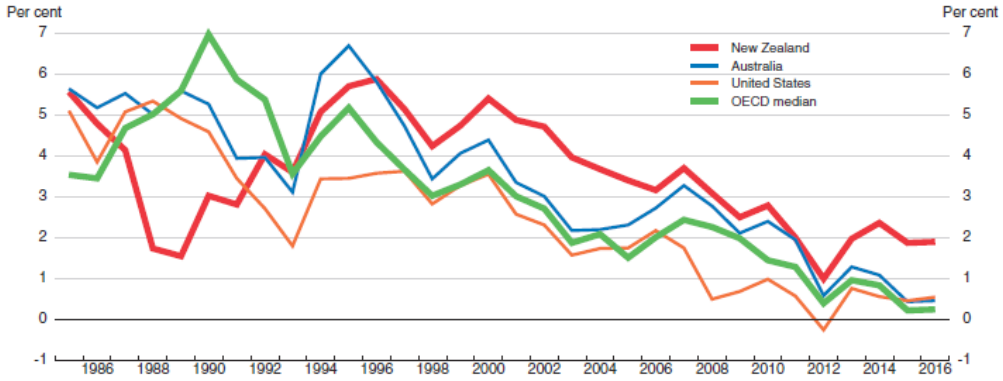
3.2 What are some of the reasons for this performance?

Here we consider some of the potential reasons for New Zealand's capital shallowness and relatively weak business investment. Note that most of these explanations have been put forward by commentators based on descriptive rather than causal analyses.

- **Historically, real interest rates have been comparatively high in New Zealand.** As noted in section 4, interest rate increases raise the user cost of capital (UCC) and so are expected in theory to result in lower levels of investment. Despite interest rates falling across the board in OECD countries in recent decades, New Zealand's interest rate premium – high long-term interest rates relative to other countries – has persisted (see Figure 5). Note, however, that since the chart in Figure 5 was developed, interest rates have fallen further and the gap between the rate in New Zealand and other countries has narrowed. In 2017, New Zealand was the only high-income OECD economy with small business interest rates close to 10%, well above the median of 3.8% (OECD 2019b). New Zealand also had among the highest interest rate spread between loans to large and small firms – between four and five percentage points difference compared with around one percentage point across OECD countries. There is no consensus about the underlying causes of New Zealand's persistently high interest rate differential compared with other countries (Conway 2018), and explanations include:
    - the 'risk premium' explanation, which 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 (Conway 2018; Dupuy and Beard 2008)
    - the 'macro imbalance' explanation, which contends that with modest savings and low productivity, high real interest rates effectively reconcile elevated demand pressures with limited supply capacity (Conway 2018)

- the interaction of global 'home bias' and low domestic saving (Dupuy and Beard 2008), where home bias is the idea that savers tend to prefer largely to invest at home and demand a premium for financing projects at great distance, which elevates interest rates if domestic saving is weak, as is the case in New Zealand (OECD 2017).

Figure 5: Long-term real interest rates
Nominal 10-year government bond yields less five-year average inflation rates



Source: OECD (2017)

- **Taxation of capital may be comparatively high.** Coleman (2019) argued that New Zealand has a tax system that differs in many ways from the tax systems of other OECD countries, and that the tax system is characterised by relatively high taxes on business and capital income and low taxes on labour incomes. In 2016, New Zealand's corporate tax rate was 28% compared with the OECD median of 25%, and the effective marginal corporate tax rate (which is more relevant for investment decisions) was considerably less competitive (OECD 2017). The OECD suggested that New Zealand's comparatively high effective corporate tax rate increases the UCC and thus might be expected to reduce aggregate investment. As noted in section 4, recent evidence has found that that the long-run investment response to tax-induced UCC changes is reasonably large (an elasticity of -1.4) (Nolan and Nolan forthcoming), which implies that lowering tax rates should stimulate investment. Note, however, that comparing corporate tax rates across countries is complicated. The Tax Working Group (2018) found that, while New Zealand's corporate tax rate is higher than average when compared with other OECD countries, after accounting for imputation the total tax to a domestic shareholder is much lower than average.[8] On this basis, the corporate rate is high for foreign investors relative to domestic ones. A number of countries have shifted away from full imputation in recent years (Inland Revenue Department and the Treasury 2018). The compelling consideration for EU countries in moving away from imputation was a judgement by the European Court of Justice that imputation systems providing tax credits only to

[8] Imputation aims to prevent the double taxation of company income that is distributed as dividends. It reduces the bias of debt over equity that arises from taxation (see section 5.2).

domestic investors are discriminatory. Differences in tax treatment between domestic and foreign investors works against the investment policy principle of non-discrimination (see section 6.1), and is likely to affect foreign direct investment (discussed in section 5.3).

- **Taxation of capital may lead to investment bias.** The lack of a systematic tax on capital gains means there are different effective tax rates on investments generating cash incomes at different time horizons, with short-horizon investments taxed at higher effective rates than long-horizon investments (Coleman 2019).
- **Taxation may encourage saving towards housing.** The taxation of saving can also affect business investment through the development of the financial system. International evidence suggests that while tax is likely to only have a modest impact on *how much* people save, tax can have a very significant impact on *how* people save (OECD 2007, cited in Treasury 2010). In New Zealand, housing has generous tax treatment compared with other types of saving (Treasury 2010; OECD 2017).[9] Conway (2018) noted that currently, saving in New Zealand are taxed on a 'Taxed-Taxed-Exempt' basis, whereas most other OECD countries provide more favourable tax treatments to encourage saving. In contrast to saving and business assets, housing is taxed relatively lightly in New Zealand.
- **Capital good are comparatively expensive.** Gemmell (2015) analysed data from the World Bank's International Comparison Program to assess the extent to which the prices of goods and services in New Zealand differ from those in other OECD countries. He found that in 2005 (the latest year for which data were available), the price of investment goods in New Zealand was around 19% higher than the OECD average and 15% higher than in Australia, the price of machinery and equipment was 12% and 5% higher than the OECD average and Australia respectively, and the cost of non-residential construction was estimated to be 22% above the OECD average. These goods were the ones for which the price differential was the largest.
- **Labour is comparatively cheap.** The cost of labour in New Zealand is relatively moderate. Expensive capital and moderately-priced labour may encourage New Zealand firms to invest relatively little in capital and instead take on additional workers (Conway 2016). Migration may play a role in this by increasing the supply of labour and thus lowering wages, as well as contributing to demand pressures related to New Zealand's interest premium discsused above (Conway 2018).
- **Small, isolated markets discourage investment.** Small domestic markets mean weak competitive pressures on firms (Conway 2018) which provides them with little incentive to invest in new equipment and technologies. New Zealand's small size also means that New Zealand has thin venture capital, stock and bond markets (OECD 2017) which limits firms' abilities to fund their investments.
- **New Zealand's firms size structure may not be conducive to investment.** Related to the point above about small domestic markets, the very small firms that make

[9] More specifically, New Zealand does not tax imputed rent or (most) capital gains. This leads to a distortion that likely favour equity investment in housing, especially owner-occupied housing.

up the bulk of the New Zealand economy do not have the scale and sales volumes necessary to justify significant capital outlays (Conway 2018). Instead, these firms may choose to operate with lower capital intensities compared with firms serving larger more open markets.

- **New Zealand's industry structure may not be conducive to investment.** New Zealand's weak R&D investment partly reflects the factors in the preceding paragraph and other factors including our industry structure. The share of traditional R&D-intensive industries in the economy is low (Crawford, et al. 2007, cited in Conway 2016). However, the OECD (2016, cited in OECD 2017) estimated that only around 20% of the shortfall in R&D expenditure from the OECD average can be ascribed to differences in industry composition, implying that the shortfall is mainly due to within-industry factors. Mason (2013) also found that differences in capital intensity between Australia and New Zealand was mainly due to within-industry differences rather than differences in industry structure (see above).

3.3 What does this imply about the returns to firms?

- **Descriptive analyses suggest that the returns to New Zealand firms may be comparatively low.** The evidence in the preceding sub-section implies that, on average and compared with other countries, the benefits from business investment to New Zealand firms are likely to be restricted, while the costs are comparatively high. These ideas are depicted in Figure 6 below.

Figure 6: Low return on investment

Source: Author, based on studies covered in this report

- **Firm-level studies find a weak relationship between intangible investment and productivity.**
    - Chappell and Jaffe (2018) found that over the period 2005-13, higher intangible investment in New Zealand firms was associated with higher labour and capital input, higher revenue, and higher reported employee and customer satisfaction, but not with higher productivity or profitability. The measure of intangible investment used in the study was an index based on firms' intangible activity reported in Stats NZ's Business Operations

Survey (BOS),[10] and the authors used a lag of two to four years to assess the effect of intangibles on the outcome variables. The authors posited a number of alternative possible explanations for the unexpected finding about the weak relationship between investment and productivity or profitability. These explanations include that: the BOS survey responses do not meaningfully reflect 'true' intangible investment; firms invest in intangibles in pursuit of firm growth, even if such growth occurs at the expense of productivity and/or profitability; firms may invest in intangibles for benefits that are themselves intangible, such as customer and employee satisfaction; firms may investment in intangibles expecting that it will allow them to grow and become more profitable/productive, but the latter outcomes are mostly unrealized. The authors concluded that from a policy perspective, if productivity improvement is the goal, encouraging intangible investment is unlikely to be a powerful tool.

- A qualitative study of business innovation (see Pells and Howard 2019) supports Chappell and Jaffe's finding that productivity gains are not the only benefits sought by firms from their innovation and R&D activities (which are part of intangible investment). Firms cited wide-ranging anticipated benefits sought from these activities including some 'soft' ones, such as increased customer and employee satisfaction, but also some 'hard' ones such as increased efficiency and thus productivity, with the ultimate aim of lifting their bottom lines and ensuring their survival. However, firms also commented that innovation and R&D is risky and expensive, and they do not always realise the benefits from these activities.
- Wakeman and Conway (2017) found that over the period 2000-12, innovating New Zealand firms grew at a faster rate than non-innovating ones but did not experience improved productivity outcomes. The study used a differences-in-differences approach to isolate the impact of innovation from other drivers of firm performance. Performance measures included growth in employment, output, and firm productivity, and the probability of survival over a three year period. The main measure of innovation was firms' innovation and R&D activity reported in the BOS. On average across all firms included in the study, innovating firms grew at a faster rate relative to firms that did not innovate but did not experience improved productivity outcomes. However, digging into the relationship between innovation and firm performance across various types of firms revealed that firms in the manufacturing sector improved their productivity performance as a result of innovation. Firms that were younger or had access to larger markets also tended to experience higher productivity growth following product and organisational innovation. The relationship

[10] The main BOS question used asked whether, in the last two years, firms had done/acquired any of the following: computer hardware and software; new business strategies or management techniques; organisational restructuring; design (e.g. industrial, graphic or fashion design); market research; marketing strategies; employee training; research and development.

between innovation and firm productivity also varied across time, with innovating firms more likely lift their productivity from 2009 (compared to the pre-GFC period). The authors commented that the results suggest that the returns to innovation in New Zealand may be lower than for comparable countries, but methodological differences make it hard to be conclusive. The authors concluded that weak returns provide a potential explanation for why New Zealand firms invest relatively little in R&D.

- Nakatani (2019) used firm-level data from the Orbis database to examine the relationship between investment (both tangible and intangible) and firm performance (profitability and return on assets (ROA)) among New Zealand firms. She found that intangible assets were negatively correlated with profit margin, but the relationship was not statistically significant for ROA. This is consistent with Chappell and Jaffe (2018) who found that intangible investment does not increase profitability in New Zealand. In contrast, there was a significant correlation between capital investment and both performance indicators, indicating that growth of tangible investments are associated with higher profitability.
- As discussed earlier in this section, Berl estimated that the productivity (as broadly measured by GDP) of Māori assets was below the average of New Zealand as a whole (see Nana, Khan and Schulze 2015).
- Steenkamp produced aggregate and industry estimates of MFP for New Zealand over the period 1996-2012 using an approach that provides estimates of the contribution of capital and labour to productivity in New Zealand. The results suggested that decreasing capital productivity in many industries has contributed to New Zealand's poor productivity performance over the period. While the study's results can be interpreted in a number of ways (see for example Janssen 2018), at face value, low capital productivity suggests low returns to firms from their investment.

4 How firms make investment decisions

Firms make investment decisions primarily based on their expectations about the likely returns from that investment. In addition, uncertainty plays a key role in both the level and timing of investment. International studies have found that business investment increases in response to firms' increased demand, lower cost of capital, increased cash holdings, lower debt levels, and lower levels of uncertainty. Many of these factors have been found to be relevant in New Zealand too.

4.1 What determines the level of investment?

4.1.1 Theories

The main determinant of business investment is firms' expectations about the anticipated returns (benefits versus costs) from that investment. In theory, firms should invest until the marginal revenue product of capital (the benefit) falls to equal the user cost of capital (UCC, the cost) (Jones 2009).

The marginal revenue product of capital is the additional value of output from an extra unit of capital. Capital runs into diminishing returns, so that when the firm has very little capital, the marginal product of capital is high.

The user cost of capital (UCC) is the total cost to the firm of using one more unit of capital. The cost includes the interest rate, the depreciation rate, any capital gain or loss associated with a change in the price of capital, and taxes (Jorgensen 1963, cited in Parker 2010). For example, if interest rates decrease, this lowers the UCC which should make investment more attractive.

A key theory about firms' level of investment is Tobin's q. Tobin's q is the ratio of market value of a company's assets to the replacement value of those assets. Tobin (1969, cited in Parker 2010) argued that a firm's investment level should depend on the ratio of the present value of installed capital to the replacement cost of capital. If $q > 1$, firms increase profits by investing in more capital, so investment is expected to be high. If $q < 1$, then the present value of the profits earned by installing new capital are less than the cost of the capital, so more investment lowers profit. Investment is expected to be near zero if $q < 1$. When $q < 1$, someone seeking to enter a particular industry can acquire the necessary capital assets more cheaply by buying an existing firm than by building a new one with new capital. Note that there is a distinction between marginal q and average q; for additional investment marginal q is relevant, while for decisions about purchasing an existing company average q is relevant.

4.1.2 International evidence

- **Firms invest to increase capacity to meet current and anticipated demand.** Aggregate demand is generally found to be the most important driver of the short-term dynamics of business investment (Fay, et al. 2017). In the long run, however, both aggregate demand and investment are driven by structural factors, such as demographics related to population aging and technology change.
- **Macro evidence suggests a weak correlation between the UCC and business investment.** Theories predict that investment should be sensitive to the cost of capital. Sometimes this sensitivity is modelled through q, sometimes through the UCC, but either way, interest rates and tax rates should affect investment. However, macro-level evidence has generally found the correlation between aggregate investment and real interest rates is extremely low and sometimes positive rather than negative (Parker 2010). This may be due to measurement error and other factors that make it difficult to make correct attributions using macroeconomic data (Hassett and Hubbard, 2002, cited in Sebastian 2009), or may be due to these studies not accounting for uncertainty.
- **However, micro evidence suggests the UCC does have an effect.** The most careful studies looking across a large number of firms find that changes in tax policy, which are somewhat exogenous (ie have an external cause), change investment by affecting q and the UCC (Jones 2009). Hassett and Hubbard (2002, cited in Sebastian 2009) provided a review of the literature on the effectiveness of tax policy and tax incentives in promoting investment. They found that tax policy affects investment, with an elasticity of –0.5 to –1.0.
- **Firms with more cash and less debt invest more.** In theory a firm's investment should depend only on the profitability of its investment opportunities. One of the clearest empirical findings is that this theoretical proposition is false – firms invest more when they are earning lots of money, almost regardless of the opportunity cost (Parker 2010; Stein 2003). In fact, controlling for investment opportunities, firms with more cash on hand invest more, as do firms with lower debt burdens. The empirical link between investment and corporate cash-flow measures applies at the macro level as well as the micro level (Parker 2010).
- **Uncertainty affects investment** – discussed in sub-section 4.3.2 below.

4.1.3 New Zealand evidence

- **Firms invest to increase capacity to meet current and anticipated demand.** In line with international evidence, business investment in New Zealand is found to be strongly related to aggregate demand. The business investment cycle is reasonably well correlated with the aggregate economic cycle (Aldridge 2009). More specifically, when demand is strong, business investment tends to be above trend. As elsewhere, in New Zealand business investment is much more volatile than aggregate demand, increasing by more than GDP during an upturn, and declining by a greater amount during a recession.

- **The UCC varies markedly across firms.** Fabling, et al. (2013) estimated firm-specific effective marginal tax rates (EMTRs) and related forward-looking UCC measures in New Zealand over the period 2000-10. They found:
    - substantial firm-level heterogeneity in EMTRs and the UCC, with differences in asset composition across firms playing a key role in this variation
    - systematic changes in EMTRs and the UCC as a result of tax reforms over the period
    - systematic differences between foreign owned and domestically-owned firms, reflecting both differences in debt-equity financing choices by foreign-owned and domestic firms, and the fact that foreign firms are generally free from domestic resident shareholder-level taxation
    - the particular measure chosen can make a substantial difference to the size of estimated UCCs and their distribution among firms and industries, which suggests that identifying the relevant measure that enters into firms' investment decisions could be important for assessing the impact of capital costs on those decisions.
- **Recent evidence suggests a negative relationship between the UCC and investment,** and that the long-run response of investment to UCC changes is much larger than previously found in New Zealand. The recent evidence is in line with international evidence.
    - Estimates from the New Zealand Treasury Model (NZTM) found an elasticity of -0.8 between changes in the UCC and the capital stock (Labuschagne and Vowles 2010, cited in Nolan and Nolan (forthcoming)). The model is based on aggregate New Zealand data.
    - Fabling, et al. (2015) examined investment responses from large New Zealand firms to changes in the forward-looking UCC associated with tax reforms over the period 1999-2012. While some groups of firms reacted strongly to tax-induced UCC changes, the expected negative relationship between UCCs and investment was significant only among firms in low capital-intensity industries. As these industries account for only a small proportion of aggregate investment, even substantial changes at the firm level do not translate into material changes in aggregate investment rates. The authors noted that their analysis considered only the short-run impacts of tax-induced UCC changes.
    - Nolan and Nolan (forthcoming) extended Fabling, et al's (2015) study in a number of ways. In particular, Nolan and Nolan (forthcoming) examined both the short- and long-run effects of tax-induced changes in the UCC. The short-run effects were found to be broadly similar to those in the earlier study. However, the long-run response of investment to UCC changes (an elasticity of -1.4) was much larger than that previously found. This is more in line with international studies compared with the earlier study.

- **One study found that investment and cash-flow are not related.** As well as the UCC as discussed above, Fabling, et al. (2015) also examined the relationship between cash-flow and investment among New Zealand firms. They found that cash-flow was not significantly related to investment, implying that firms were not financially constrained (see section 5.4.3). However, as the sample was restricted to larger firms, they could not exclude the possibility that finance constraints are significant for smaller or less established firms. The lack of a relationship between investment and cash-flow is in contrast with the finding from many international studies discussed above: that firms with more cash tend to invest more.
- **Uncertainty affects investment** – discussed in sub-section 4.3.2 below.

4.2 How do firms move towards their desired capital stock?

4.2.1 Theories

As noted above, in theory firms invest until the marginal product of capital falls to equal the user cost. This pins down the desired capital stock. If the desired capital stock exceeds the current level, then the firm is expected to undertake new investment.

Some theories assume that a firm operates in an environment where it can adjust its capital stock up or down very quickly and easily in order to stay on its optimal path. In practice this is unlikely (Jones 2009). It may take several years for a firm to reach its desired capital stock, and the path of investment will need to take into account installation costs and the costs of adjusting the capital stock. For example, replacing a broken-down machine in a factory may require stopping the assembly line.

4.2.2 International evidence

- **Adjustment costs can be large.** Discrete and 'lumpy' movements in investment in disaggregated plant-level data suggests that adjustment costs are significant in practice (Doms and Dunne 1998, cited in Bloom, et. al 2006).
- **Adjustment costs may lead to firms being 'locked in' to existing business models.** Pastor-Augustin, et. al (2009) examined the interconnectedness among existing and new tangible and intangible assets. They found that complementarities between a firm's existing and new assets generate lower adjustment costs, which increases investments. The loss of such complementarities implies greater disinvestment adjustment costs. The findings support the idea that accumulated assets enable firms to develop a series of capabilities that help generate sustainable competitive advantages, but that may also limit firms' strategic choices.

4.2.3 New Zealand evidence

- **There is limited New Zealand evidence available on adjustment costs.** We were unable to identify any New Zealand studies that directly consider adjustment costs. However, Nolan and Nolan's (forthcoming) paper on the UCC infers that the speed of adjustment of the capital stock is slow, with a half-life of five years.

4.3 What is the role of uncertainty?

4.3.1 Theories

There are two theoretical implications of uncertainty on investment (Fuss and Vermeulen 2004). Firstly, uncertainty may affect the level of investment. Second, uncertainty may affect the timing of investment.

In terms of the *level* of investment, increased uncertainty tends to lower investment. The role of uncertainty in firms' investment decisions features strongly in recent theoretical work about investment. These breakthroughs extend the standard neoclassical and q models to relax assumptions and allow for (Parker 2010):

- irreversibility – once a factory is built it cannot by 'unbuilt'
- fixed costs or other non-convex aspects of adjustment costs
- the effects of uncertainty on investment, which are important in their own right, but especially in combination with irreversibility and nonconvex adjustment costs; for example, irreversibility makes it more likely that increased uncertainty reduces investment (Fuss and Vermeulen 2004).

The effect of uncertainty on the *timing* of investment is investigated in real-options theory. In addition to irreversibility and non-convex adjustment costs identified above, uncertainty affects timing when there is a choice about the timing of an investment and there is learning through time about factors relevant to the investment decision.

Dixit and Pindyck (1994, cited in Fuss and Vermeulen 2004) show that, when investment is irreversible and there is some flexibility in the timing of investment, there is a positive value option to wait. While the firm incurs a loss of current profits from waiting, it acquires more information about the uncertain future. Uncertainty increases the value of the waiting option thereby making it optimal to postpone investment. One way to estimate the effects of uncertainty on investment is to attempt to measure firms' 'hurdle rates' – the expected rate of return required to induce them to undertake new investment (Parker 2010). For a given level of the traditional cost of capital, irreversibility implies that increases in uncertainty should raise this hurdle rate by increasing the option-cost component.

There is a theoretical distinction between uncertainty at the macro and micro level. For example, it would be conceptually possible for there to be no aggregate uncertainty, but considerable uncertainty at the micro level relating to relative price shifts.

4.3.2 International evidence

- **Increased uncertainly lowers aggregate investment.** There is a large literature on the macroeconomic effects of uncertainty on investment. For example, Caselli, et al. (2003, cited in Fuss and Vermeulen 2004) found that increased uncertainty, measured by the standard deviation of monthly and sector industrial production indexes, reduced the sensitivity of investment to sales growth and contributed to the slowdown of capital accumulation in the early 1990s in Europe.

- **Uncertainty makes waiting an attractive option.** Bloom (2009) used US firm-level data to develop the parameters of a model that simulates a large macro uncertainty shock. He found that at high levels of uncertainty the real-option value of inaction is very large, which makes firms extremely cautious. Firms only hire and invest when business conditions are sufficiently good, and only fire and disinvest when they are sufficiently bad. When uncertainty is higher, this region of inaction expands—firms become more cautious in responding to business conditions.
- **Uncertainty appears to have had a greater effect on investment since the GFC.** Banerjee, Kearns and Lombard (2015) developed a simple model of investment for the G7 economies, where uncertainty was measured as the standard deviation of GDP forecasts. They found that, historically, uncertainty about the future state of the economy played a stronger role in driving investment than financing conditions. Their results suggest that uncertainty has had a greater effect on investment since the GFC. Similarly, Fay et. Al (2017) found that heightened uncertainty since the GFC has played a key role in weak business investment in many countries.

4.3.3 New Zealand evidence

- **Increased uncertainly lowers aggregate investment,** in line with international evidence. Rice et. al (2018) examined the effect of uncertainty on the New Zealand economy including investment over the period 1997-2016, and considered both the uncertainty originating from overseas and that which is specific to New Zealand. They constructed two New Zealand-specific uncertainty proxies – one based on forecast disagreements from the Consensus Forecasts survey, and one based on the divergence between expected and experienced business conditions reported in NZIER's Quarterly Survey of Business Opinion. For overseas measures of uncertainty, the authors used a range of existing US/global uncertainty proxies. They found:
    - increases in uncertainty are followed by statistically significant falls in output, consumption, and investment
    - the impact on investment is significantly larger than the impact on consumption
    - global uncertainty has been relatively more important than domestic uncertainty in driving the New Zealand business cycle.
- **Uncertainty makes waiting an attractive option.** In a study of exporting and the performance of New Zealand firms, Fabling and Sanderson (2013) found that the timing of investment differs depending on whether firms are experienced exporters or not. While new exporters gear up for exporting through increasing their labour inputs with capital deepening occurring after entry, experienced exporters make capital investments prior to market expansion. This is consistent with the option value of waiting in the face of at least partially irreversible capital and the uncertainty of demand associated with small domestic markets.

5 How firms finance their investments

Firms finance their investments mainly through internal financing (the most common source), debt financing (the next most common) and equity financing. Finance constraints mainly arise due to information asymmetries – firms know more about their investment projects than financiers do, which may lead to financiers being reluctant to finance objectively sound projects. Finance constraints are difficult to measure. Theory suggests that small, young and innovative firms are most prone to suffering from them, and there is some limited New Zealand evidence to back this theory up. However, there is also some evidence that, rather than finance constraints leading to worse firm performance in New Zealand, it is the other way around – poorly performing firms find it difficult to access finance.

5.1 What is the role of the financial system?

5.1.1 Theories

The financial system provides the means to transfer savings from those with surplus capital to those in need of capital for their investments. Part of the financial system is the capital market, which is concerned with raising capital by dealing in shares, bonds, and other long-term securities.

The role of the financial system is to (Demirguc-Kunt and Levine 2008):

- produce information ex ante about possible investments and allocate capital – for example, financial intermediaries may reduce the costs of acquiring and processing information and so improve resource allocation
- monitor investments and exert corporate governance after providing finance – to the extent that shareholders and creditors effectively monitor firms and induce managers to maximise firm value, this will improve the efficiency with which firms allocate resources
- facilitate the trading, diversification, and management of risk, as banks, mutual funds, and securities markets all provide vehicles for trading, pooling, and diversifying risk
- mobilise and pool savings – to overcome the costly process of bringing together capital from disparate savers for investment
- ease the exchange of goods and services – as financial arrangements that lower transaction costs can promote specialization, technological innovation, and growth.

5.1.2 International evidence

- **The financial system matters for economic growth.** Countries with a better-developed financial system tend to grow faster (Demirguc-Kunt and Levine 2008) . Specifically, both financial intermediaries and markets matter for growth. The size of the banking system and the liquidity of stock markets are each positively linked with economic growth.
- **There is growing evidence that this relationship may be bi-directional** – it is not just that financial development reflects changes in long-run growth opportunities driven from other sources (Demirguc-Kunt and Levine 2008). The literature has addressed issues of reverse causality through a number of different methods.
- **Better-functioning financial systems ease the external financing constraints that impede firm expansion.** One channel through which financial development matters for growth is by easing the ability of constrained industries and firms to access external capital and expand (Demirguc-Kunt and Levine 2008). Finance constraints are discussed later in this section.
- **The financial system plays a key screening and monitoring role.** A number of studies show that venture capital (VC) investors impact start-up innovation by overcoming agency issues through staged financing, monitoring, board representation, and replacing founders with professional CEOs in the case of underperforming ventures (Kerr and Nanda 2015). Similarly, Hernández-Trillo et al. (2005, cited in Bakhtiari, et al. 2020) provided evidence of the screening and monitoring function that the finance system plays for micro-enterprise. These authors used data on Mexican firms and found that formal financial sources appear to invest in more efficient businesses than informal ones.

5.1.3 New Zealand evidence

- **Historically, New Zealand's financial system has been relatively under-developed…** Several reports have suggested that, while New Zealand's banking sector is relatively well-developed, many other parts of the financial system are under-developed ie are small and lacking in depth and liquidity (see for example Cameron, et al. 2007). The Capital Market Development Taskforce (2008) found, among other things, that New Zealand's capital markets lack scale and capability at the commercialisation stage, despite the angel market working relatively well and the model for developing the venture capital market being best practice.
- **…but has matured somewhat in recent years.** In particular, the VC market has grown rapidly. From 2010-17, VC investments more than doubled in New Zealand, one of the largest increases among OECD countries, resulting in New Zealand ranking sixth among OECD countries in 2017 for VC as a share of GDP (OECD 2018). The introduction and growth of KiwiSaver aimed to stimulate the New Zealand financial sector, although one study found that the impact on capital markets remains small (Law and Scobie 2014, cited in Inland Revenue 2015).

5.2 How do firms structure their finances?

5.2.1 Theories

There are four main options for firms in terms of investment financing (Parker 2010):

- early stage finance – raising early-stage finance from their owners' personal savings or other informal sources like friends and family, or from private investors like angel investors and VC firms (a form of private equity)
- internal finance – using accumulated profits
- debt finance – borrowing either from banks or through the issue of financial assets such as bonds
- equity finance – issuing new shares of stock either privately or publicly on the stock exchange.

The decision about how much of the firm's capital stock should be financed by borrowing versus equity or cash is usually called the leverage or gearing decision. A firm is said to be 'highly levered' or 'highly geared' if it has a lot of debt relative to equity.

The Modigliani-Miller theorem (1958, cited in Parker 2010) shows that under conditions of perfect capital markets – where everyone has full information and where everyone borrows and lends at the same interest rate – the cost of financing to firms is the same regardless of which method of finance they choose. The basic theorem assumes no taxes. If taxes are introduced, then there are advantages for firms to be levered ie use debt rather than equity finance, since firms can deduct interest payments for tax purposes whereas dividend payments are non-deductible.

In practice, and as discussed further below, the world is full of information asymmetries and other financial market imperfections that lead to some important exceptions to the Modigliani-Miller result. Later theories about firms' capital structures reflect these market imperfections and include the following (Fauzi, Basyith and Idris 2013).

- Pecking-order theory: Management is assumed to know more about the firm's value than potential financers who interpret firms' actions irrationally. Firms tend to rely on internal sources of funds and look elsewhere only once those resources are exhausted, and to prefer debt to equity if external financing is required (Myers 1984, cited in Fauzi, Basyith and Idris 2013).
- Trade-off theory: A firm chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. For example, the benefits to financing with debt include the retention of control by the owner and the tax benefits of debt, and the costs include potential financial distress and bankruptcy. The benefits of equity financing include that if the business fails there is no obligation to repay the money, and the costs include dividends to shareholders and loss of control by the owner.
- Agency theory: For example, conflicts of interest between shareholders and managers may influence the capital structure.

5.2.2 International evidence

- **Internal finance is the most common, followed by debt finance and then equity finance** (Hogan and Hutson 2005)**.** This pattern is especially true of small firms which tend to make little use of equity finance and account for a tiny fraction (often less than 1%) of market capitalisation on stock exchanges (OECD 2019b). A recent survey among listed small firms, investors and market participants in OECD countries showed that many small firms are not aware of the relative costs and benefits needed to make an informed decision about becoming listed. In addition, compliance with listing requirements, although often less onerous than for large firms, is considered to be time-consuming and expensive (OECD 2019b).
- **Many factors affect firms' capital structures.** The results from empirical studies that have investigated the trade-off theory, pecking order theory etc in various contexts are mixed and inconclusive (Fauzi, Basyith and Idris 2013). Capital structure decisions appear to be not only the product of a firm's own characteristics (such as age, size and proportion of tangible assets), but also the result of the corporate governance, legal framework and institutional environment of the countries in which the firm operates.
- **Informal sources and self-financing are important sources for young firms.** For example, studies in Slovenia and Mexico found that informal sources are much more common sources of financing than formal external finance for start-up firms (Bakhtiari, et al. 2020).
- **Innovating firms look to a number of financing options.** Early studies pointed strongly against the role of banks (and debt) in financing innovation, as discussed extensively in Hall & Lerner (2010, cited in Kerr and Nanda 2015). This is because innovation has some special features (see sub-section 5.4) such as high levels of risk which arguably make its financing more suited to venture capitalists and specialist intermediaries than banks. However, subsequent work has been more nuanced (Kerr and Nanda 2015).
    - Brown, Fazzari & Petersen (2009, cited in Kerr and Nanda 2015), provided evidence that young, high-tech, publicly traded firms finance their R&D investment almost entirely through internal cash-flow and external equity markets. They argued that their estimates can explain 75% of the aggregate R&D boom and subsequent decline in the US from 1994 to 2004.
    - However, other studies have shown that bank finance is important for innovation, but it is likely to be better suited to financing larger and mature companies, where investment is less risky for banks as a result of the firm's sufficient cash-flow from operations and collateral options from fixed assets and patents.
    - Although equity investors may be more willing to finance risky innovation, public equity markets impose an important set of agency costs on managers that can impact the rate and nature of innovation.

5.2.3 New Zealand evidence

- **Internal finance is the most common, followed by debt finance and then equity finance.** Stats NZ's BOS includes a module every few years on firm finance. Fabling (2010) analysed finance data from the BOS and found a clear ranking: internal finance was presumed by the author to be the most common based on the majority of firms not requesting finance, debt was the next most common source, then equity. More recent BOS data supports this conclusion; in the BOS 2018 the vast majority of firms (67%) reported that they had not sought new or additional finance during the last financial year. Those that had were over twice as likely to have sought new or additional debt finance (24%) compared with equity finance (9%).[11] Interestingly, there were no clear patterns by firm size in terms of the proportion of firms seeking debt finance or equity finance.
- **Many factors affect firms' capital structures**. In line with international evidence, the results from studies about what factors affect New Zealand firms' capital structures are mixed. Relevant studies include the following.
    - Kanatani and Yaghoubi (2017) examined the capital structure of 31 NZX 50 companies. They found a positive relationship between leverage and company size. At the same time, there is a negative relationship between leverage and profitability, which is consistent with pecking order theory. Overall, they concluded that NZX50 companies tend to fit with both trade-off and pecking order theories.
    - Fauzi, Basyith and Idris (2013) found that tangibility, growth, signalling, managerial ownership and firm size exhibit a significant positive impact on total debt of New Zealand's listed firms. They found some evidence in support of the pecking order theory, but overall considered that the trade-off theory is more appropriate in explaining New Zealand listed firms' capital structure.
    - Wellalage and Locke (2012, cited in Fauzi, Basyith and Idris 2013) investigated the capital structure of New Zealand's large listed companies. They found that firm-specific characteristics play a significant role in determining a firm's leverage levels rather than corporate governance variables. In addition, they found that New Zealand firms fit into the pecking-order theory.

[11] Data downloaded on 25/5/20 from: https://catalogue.data.govt.nz/dataset/business-operations/resource/2ea665fd-63e5-4a2e-baa1-b33f467588b9

5.3 What is the role of FDI?

5.3.1 Theories

The OECD (2008) defines foreign direct investment (FDI) as "a category of cross-border investment made by a resident in one economy (the direct investor) with the objective of establishing a lasting interest (when the direct investor owns at least 10% of the voting power of the direct investment enterprise) in an enterprise (the direct investment enterprise) that is resident in an economy other than that of the direct investor".

A foreign investor may add to the assets of a firm, make the assets more productive, or run them down. In this way FDI has a direct impact on the national capital stock.

The motivations of foreign investors can be many and varied. The theory of managerial discipline suggests that mergers and acquisitions (M&A) are a form of natural selection, in which inefficient plants are bought out by new owners and undergo some form of managerial change or restructuring to improve their efficiency (Fabling and Sanderson 2014). In contrast, the operating efficiency theory suggests that M&As occur when the acquiring firm sees a complementarity between their existing operations and those of the target plant. In this case, the acquiring firm will be more likely to target high-performing plants. Dunning and Lundan (2008, cited in Fabling and Sanderson 2014) provided a comprehensive review of wide-ranging motivations for FDI using the Ownership-Location-Internalisation (OLI) or ''eclectic'' framework.

In theory, increased FDI could raise or lower the productivity of domestic firms through a number of channels, including the movement of labour between firms, the provision of technical assistance or training, the effects of increased competition on firm performance or survival, and changes in domestic firms' access to markets (Doan, Maré and Iyer 2015). Some of these channels relate to the target firm itself, and some are spillover effects. There are three main types of potential productivity spillovers from FDI: horizontal (to domestic firms in the same industry); backward vertical (to domestic suppliers of foreign downstream firms); forward vertical (to domestic firms from suppliers in upstream foreign firms) (Doan, Maré and Iyer 2015).

5.3.2 International evidence

- **Empirical findings about the effects of FDI are mixed.** In keeping with the ambiguity around motivations for FDI, empirical results have been mixed (Fabling and Sanderson 2014). The literature examines a range of different outcome metrics, but studies of post-acquisition effects show little consensus. Similarly, empirical studies do not show consistent evidence of positive spillovers from FDI to domestic firms (Doan, Maré and Iyer 2915).
- **Targeted firms tend to be higher-performing before FDI.** Despite the mixed results noted above, broadly speaking, the empirical literature suggests that most FDI is positively selected – that is, that target firms tend to be larger, more productive, and to pay higher wages than firms which remain under domestic ownership (Fabling and Sanderson 2014). This finding is not unanimous, however.

- **FDI is sensitive to taxation in host countries.** This is a consistent finding from extensive research (Sebastian 2009). A meta study by De Mooij and Ederven (2003, cited in Sebastian 2009) concluded that, on average, a 1 percentage point increase in the tax rate reduced FDI by 3.3%. Though there is a wide range of elasticities, most –mainly OECD – studies find that higher tax rates have a significant negative impact on FDI flows (Sebastian 2009). Note that there are challenges in measuring the sensitivity of FDI to host country taxation due to tax avoidance strategies by multi-national enterprises.

5.3.3 New Zealand evidence

- **Targeted firms tend to be higher-performing before FDI.** Fabling and Sanderson (2014) used data from Stats NZ's Longitudinal Business Database (LBD) to examine the firm-level determinants of foreign acquisitions of New Zealand companies. A key finding, in line with international studies, is positive target selection – foreign acquisition targets tend to be firms which were already larger, more productive, and more likely to be exporting than their competitors. The authors also found:
    - that recently acquired firms exhibited stronger growth in average wages, output, and employment than might otherwise be expected
    - no evidence of increased closures in acquired firms
    - that these positive effects did not extend to productivity growth, one area that might be expected
    - tentative evidence of post-acquisition capital deepening, which was limited to target firms that were initially relatively capital-shallow.
- **Productivity spillovers appear to be limited.** Doan, Maré and Iyer (2015) used data from the LBD to examine whether FDI has spillover effects on the productivity of domestic firms. Overall, the study found limited evidence of productivity spillovers flowing from foreign to domestic firms. Limited substantial productivity spillovers from FDI to New Zealand firms was also found in another study by Conway, Meehan & Zheng (2015, cited in Conway 2016). Specifically, Doan, Maré and Iyer (2015) found:
    - no evidence of positive spillovers from increased foreign penetration within the same industry (horizontal spillovers) or within supplying industries (forward vertical spillovers)
    - evidence of a significant and positive productivity impact from increased foreign penetration in downstream customer industries (backward vertical spillovers)
    - that the positive backward spillovers occurred primarily within smaller firms (those with fewer than 10 employees) and within the primary sector; the authors hypothesised that the positive backward spillovers may reflect the role of larger foreign firms in providing stable demand for the output of small domestic firms.

5.4 What are finance constraints, which types of firms are most likely to experience them, and what are the effects?

5.4.1 Theories

Finance constraints mainly arise due to information being distributed asymmetrically between financiers and firms. In particular, firms generally know more about the prospects for and risks faced by their businesses than do financiers. This can lead to adverse selection, where high-risk firms are more likely to apply for credit, and moral hazard, where those firms that do borrow have an increased incentive to take the sort of risks that lead to default (Stein 2003).

If financiers respond to a lack of information by raising the cost of finance, then they may exacerbate the problem by encouraging only risky firms to request finance. Instead, financiers are likely to ration credit, so that firms are simply unable to obtain all the debt financing they would like at the prevailing market interest rate (Robertson 2006).

The upshot of these information asymmetries is the possibility that objectively sound firms may be denied access to finance owing to an inability to demonstrate their soundness to a financier (Fabling and Grimes 2004). One definition of finance constraints is where firms effectively face an inelastic supply of external capital: raising external capital quickly becomes ever more expensive (reflecting a steep supply curve) and in the limit the firm is shut out of the capital markets (a vertical supply curve) (Farre-Mensa and Ljungqvist 2016). These supply frictions drive a wedge between the internal and the external cost of capital.

Small, young, and innovative firms are more likely to be financially constrained.

- Small firms: While information about the prospective profit outcomes and creditworthiness of large firms is likely to be widely known, outsiders may know little about smaller firms (Parker 2010). Financiers may therefore be reluctant to provide credit to small firms, or may charge more for doing so to reflect the transactions costs involved. In addition, the fixed costs of screening and monitoring small firms are proportionally larger in relation to the amount of profit that a financier may expect to generate from an investment (Robertson 2006).
- Young firms: It is young firms, rather than small firms per se, that are most subject to finance constraints (Bloom, Van Reenen and Williams 2019). Young firms lack a credit history and track record, and so financiers may be reluctant to provide credit to them, or may charge a risk premium. Young firms also often lack sizeable assets that can act as collateral (Bakhtiari, et al. 2020).
- Innovating firms: Kerr and Nanda (2015) identified a number of factors that affect the financing of innovative firms, many of which are discussed in Table 1 above.
    - Uncertainty – not only are the probabilities associated with innovation outcomes unknown, but even the forms of the potential outcomes are not always clear. From a financier's perspective, this makes it significantly

harder to evaluate potential innovation projects, and often the only way to learn about the potential of a particular project is to invest in it.

- Skewed returns – a few innovation projects may have extremely large pay-offs, whereas the vast majority may have small pay-offs. Specialised intermediaries are often required to take on such projects, particularly those in relation to young, start-up firms.
- Intangible assets – firms engaged in innovation have a high percentage of intangible assets which tend to be harder to use as collateral compared with tangible ones as they tend to be more firm/product specific.
- Non-rivalry – since knowledge production is non-rival, the act of revealing privileged information by the firm comes with the risk of appropriation by the financier, leading to failures in the market for ideas.

Finance constraints might be expected to restrict the investment activity of constrained firms. For example, finance constraints may mean that innovative firms: invest less in intangible assets, which are more difficult to pledge as collateral; cut their investment in R&D to reduce liquidity risks; undertake less radical innovation (Demmou, Franco and Stefanescu 2020).

Finance constraints are a somewhat contentious topic. In fact, some commentators question whether they exist at all (Robertson 2006). If firms struggle to access finance, it may just be that they are poorly performing and that a good financial system is acting as expected in denying them access (Cameron, et al. 2007). To show that a gap exists, it must be demonstrated that firms unable to obtain financing actually merit financing (OECD 2004, cited in Robertson 2006).

5.4.2 International evidence

- **Finance constraints are inherently difficult to measure.** Firm-level financing constraints are not directly observable using balance sheet information (Demmou, Franco and Stefanescu 2020). Empirical studies have used a number of proxies, all of which have strengths and weaknesses.
    - In a seminal study, Fazzari, Hubbard, and Petersen (1988) grouped firms by the share of their profits paid out in dividends. The ideas was that firms that have ready access to capital would not need to retain earnings in order to invest and therefore could issue dividends more liberally. Therefore, the authors considered low-dividend firms to be potentially liquidity constrained and high-dividend firms to be unconstrained.
    - Common measures of finance constraints are the wedge between the costs of using external and internal funds, the cash-flow sensitivity of investments or a firm's cash-flow. The basic idea is that a positive relationship between current cash-flow and investment behaviour may be indicative of finance constraints as firms are more dependent on internal financing to support their investment. However, cash-flow sensitivity of investments may not be a good proxy for finance constraints as a number

of studies have found evidence that constrained firms' investment are less sensitive to cash-flow (Bakhtiari, et al. 2020).

  - Sometimes indices based on firm characteristics are used such as firm self-evaluation (ie firms reporting finance constraints in surveys), cash stocks, degree of leverage, age, size, institutional affiliation, credit ratings. All of these characteristics have been shown in previous empirical studies to be strongly correlated with the presence of finance constraints (Bakhtiari, et al. 2020).

- **Findings from early studies about the effects of finance constraints on investment and other aspects of firm performance are somewhat mixed.** For example, Fazzari et al. (1988) found that investment is more sensitive to cash-flow for firms that are facing external finance constraints, which is consistent with finance constraints adversely affecting investment. In contrast, Kaplan and Zingales (1997) found that firms that faced more extreme financial constraints (for example, firms that were in arrears in payments on existing debt) had a weaker rather than stronger effect of cash-flow on investment. Based on this evidence, the authors questioned the importance of financing constraints for investment.
- **More recent studies tend to find a negative relationship, although the direction of the relationship is not always clear.** Demmou, Franco and Stefanescu (2020) cited a number of studies about this negative relationship including the following, but it is not clear to what extent some of the studies test for causation.
  - Levine and Warusawitharana (2016, cited in Demmou, Franco and Stefanescu 2020) showed that firms in some European countries facing more severe financing frictions exhibit a higher sensitivity of future productivity growth to debt growth, confirming their prediction that an increase in financial constraints leads to reduced productivity growth.
  - Duval et al. (2018, cited in Demmou, Franco and Stefanescu 2020) showed that in 11 advanced economies, firms that entered the global financial crisis with weaker balance sheets experienced a sharper decline in total factor productivity growth relative to their less vulnerable counterparts after the crisis.
  - Ferrando and Ruggiery (2018, cited in Bakhtiari, et al. 2020) found an elasticity of total factor productivity with respect to financial constraints of -0.18 per cent. The estimate is statistically significant and quite large. The elasticity is larger for small, young, and private companies.
  - Some studies have found that increases in the value of home equity due to house price appreciation lead to entrepreneurship (see Jensen, Leth-Petersen and Nanda 2014). However, these studies are unable to isolate the effect of credit constraints on entrepreneurship. Large increases in wealth, while alleviating credit constraints, can also change an individual's risk aversion or preferences, and therefore change the propensity to engage in entrepreneurship independent of credit constraints.

- **As expected, finance constraints matter more for certain types of firms.** For example, Demmou, Franco and Stefanescu (2020) used several measures of finance constraints and found that financial frictions are more binding for the productivity growth of firms in intangible-intensive sectors. Ferrando and Ruggiery (2018, cited in Bakhtiari, et al. 2020) found financial constraints had a greater effect on productivity for small, young, and private companies.

5.4.3 New Zealand evidence

- **Evidence from official surveys suggests that firms do not generally struggle to access finance.** Surveys of small businesses in New Zealand show that access to finance is rated well below other challenges to business growth, such as skills shortages and regulation (Robertson 2006). Stats NZ's BOS includes a question each year about whether firms can access finance on acceptable terms. In the 2019 survey, over 90% of firms that had requested debt finance reported that they were able to obtain it on acceptable terms, and over 85% of firms that had requested equity finance reported that they were able to obtain it on acceptable terms.[12] While these data suggest that few New Zealand firms consider that they suffer from finance constraints, there are some caveats to this interpretation:
    - Question wording: The BOS question only relates to firms that actually requested finance. Therefore the question does not cover firms that considered the cost of finance too expensive and so did not bother to request finance.
    - Sample selection bias: The BOS covers firms with six or more employees, and so excludes very small firms that are more likely than others to experience finance constraints. Small firms also tend to be young firms (Haltiwanger, Jarmin and Miranda 2013), so the BOS is likely to exclude young firms that are also prone to finance constraints.
    - Survival bias. Surveys are not in themselves direct tests of finance constraints and are subject to survival bias (Cameron, et al. 2007). For example, firms that struggle to access finance and go out of business as a result are likely to be under-represented in surveys like the BOS.
    - Business cycle: Even though less firms seek finance during recessions, they are more likely to report finance constraints (Fabling 2010). The BOS 2019 was not undertaken during a recession and at the time of the survey credit was available on relatively easy terms, so finance constraints were unlikely to be particularly pronounced in that year.

[12] Data downloaded from Stats NZ's Infoshare on 25/5/20: http://archive.stats.govt.nz/infoshare/ViewTable.aspx?pxID=d5d0c37c-adf1-437d-af74-dfc21fa6193c

- **Studies find little evidence of finance constraints among New Zealand firms, with the possible exception of small, young and innovative firms.**
    - Fabling, et al. (2015) failed to find any evidence of finance constraints. As well as examining the effects of changes in the UCC on firms' investment behaviour (see section 4.1.3), the authors also examined the relationship between cash-flow and investment. They found that cash-flow was not significantly related to investment, implying that firms were not financially constrained. However, the authors did note that, as the sample was restricted to larger firms, it is possible that finance constraints are significant for smaller or less established firms.
    - Fabling and Grimes (2004) used data from Stats NZ's Business Practices Survey (a predecessor of the BOS) to examine the impact of firms' self-reported finance constraints on firm performance. Manufacturers, young firms and small firms were more likely than others to report finance constraints. In line with the findings from international studies, the authors found a strong association between the existence of finance constraints and firm performance. However, they found little or no evidence that the relationship was causal and perceived finance constraints lead to worse firm performance. Instead, the results suggest that poorly performing (relatively unprofitable) firms find access to capital difficult.
    - The Ministry of Economic Development (2007) commented that it had previously commissioned various studies that explore New Zealand's market for finance. The overall conclusion from this work is that access to finance is not a barrier to growth for most New Zealand firms, although it can be for start-up firms and innovative firms.
    - Buckle, et. al (2000, cited in Cameron, et al. 2007) found that firms' investment intentions are influenced in part by the strength of their balance sheets and small firms are more affected by changes in their financial position. This result suggests that financing constraints may affect firm expansion, although the study has some limitations due to weaknesses in the data.

6 Implications for policy and research

Many policies are relevant to business investment. General aims of these policies are to reduce uncertainty for firms and incentivise appropriate investment. The OECD has made a number of specific suggestions in relation to New Zealand's weak business investment. These suggestions cover taxation, saving, financing for small firms, R&D and capital markets. The suggestions are based on the assumption that increased business investment will lift productivity in New Zealand. However, some (limited) evidence suggests this may not the case. Therefore it would be valuable to develop a better understanding of the underlying reasons why business investment does not appear to achieve the anticipated productivity returns.

6.1 What are general policy prescriptions for investment?

- **The OECD has developed some principles for investment policy.** The OECD (2015a) developed a comprehensive framework for investment policy. The framework sets out some general considerations or principles for investment policy.
    - Transparency and predictability: which in particular reflects the role that uncertainty plays in investment (see section 4).
    - Non-discrimination: which provides that all investors in like circumstances are treated equally, irrespective of their ownership.
    - Protection of property rights: which includes intellectual property (IP) rights protection and well-defined land rights.
    - Contract enforcement and dispute settlement: which enhances predictability for firms.
    - International co-operation: which, for example, aims to avoid a 'race to the bottom' in terms of tax policy to attract overseas investment.
- **A wide range of polices are relevant to business investment.** In its investment policy framework, the OECD (2015a) identified a number of policies that are important for investment. The key take-outs are that many policies affect business investment, and that these policies broadly aim to reducing uncertainty for firms while incentivising appropriate investment. Relevant polices include the following.
    - Public governance: from an investor's perspective, regulatory policy should clearly set out what is expected from government regarding regulation.
    - Corporate governance: which includes the disclosure regime and which can be important for attracting long-term 'patient' capital from overseas.

- Competition policy: to encourage risk-taking and thus investment.
- Trade policy: which influences the size of markets for the output of firms and hence can shape both foreign and domestic investment.
- Tax policy: as noted in section 3, tax affects the UCC and thus investment.
- Macroeconomic policy: which is a necessary condition for savings mobilisation and credit expansion and for overall financial deepening.
- Skills and labour policy: the quality and adaptability of the labour force affects firms' abilities to benefit from new investment.
- Green growth: policies conducive to investment in general will not automatically result in a substantial increase in green investment etc.
- Finance policies: well-functioning financial systems provide funding for capital accumulation and help allocate resources to their best uses.

- **In particular, government aims to address market failures especially in the finance market.** Information asymmetries and other frictions in the finance market can lead to some potentially viable businesses being refused finance, which may be sub-optimal for economic growth. These information asymmetries relate in particular to small, young and innovative firms (see section 5), and make the finance market incomplete. Similarly, market failures provide much of the rationale for government intervention in relation to specific types of investment like innovation and green growth. For example, knowledge spillovers mean that firms tend to under-invest in innovation from society's perspective (Bloom, Van Reenen and Williams 2019). Environmental spillovers mean that firms tend to over-invest in polluting activities and under-invest in clean ones.

6.2 What is the effectiveness of access-to-finance policies?

As noted above, finance constraints arising from market failures are one of the reasons government intervene in business investment. Here we consider evidence about the effectiveness of policies that aim to improve firms' access to finance.

- **Evidence about the effectiveness of access-to-finance schemes is mixed.** The UK What Works Centre for Local Economic Growth (2016) undertook a systematic review of robust evaluations undertaken in the UK and elsewhere of policies designed to improve access to finance for firms – mainly loans and loan guarantee schemes. The Centre found that:
    - most access to finance programmes do appear to improve access
    - there is much weaker evidence that this leads to improved firm performance - the impact of policies on investment and assets was mixed, and loan guarantees may increase default risk
    - there is no evidence that programmes targeted at small businesses are more or less effective than non-targeted programmes.

- **Access-to-finance policies could help weaker firms survive.** This was a point made by the What Works Centre for Local Economic Growth (2016) in its meta evaluation, and by Bakhtiari, et al. (2020) – that support programmes to small firms may prevent unproductive firms from exiting. In support of this argument, the OECD found that the persistence of crisis-induced support policies for small businesses post-GFC contributed to the survival of old, financially-constrained, unproductive firms (see McGowan, Andrews and Millot 2017). The authors assessed that this crowded out growth opportunities for more productive firms. These findings are potentially relevant post-COVID-19, as many governments, including New Zealand,[13] have introduced loan guarantee schemes in response to the pandemic.
- **Developing the financial system has been found to improve access to finance.** Developing the finance system can improve firms' access to finance. There is a substantial literature that suggests that a developed financial system can relax the financial constraints on small businesses (Bakhtiari, et al. 2020). In particular, international evidence finds that the financial system – including VC – plays a key screening and monitoring role (see section 5). Deepening the financial sector in this way adheres to the non-discrimination policy principle described above by allowing the market to select firms and investment projects with the highest returns.
- **In New Zealand, evaluations suggest that patience in VC policy may have paid off.** Two evaluations conducted in 2009 found that, at the time, the growth in New Zealand's VC market was encouraging but modest (see Lerner and Shepherd, 2009 and Ministry of Economic Development 2009). Lerner and Shepherd recommended that policymakers should be patient and persistent, as building a VC industry takes many years. This patience appears to have paid off; as noted in section 5, in recent years New Zealand has seen one of the largest increases in its VC market among OECD countries (OECD 2018). In addition, Mason and Owen (2019) provided an assessment of New Zealand's VC policies that was highly favourable. Note, however, that these evaluations are essentially based on qualitative assessments. We were unable to find any robust impact evaluations of policy and regulatory changes in New Zealand in relation to access to finance.
- **However, the Treasury and MBIE assessed that a gap in the venture series A-B space remains.** The Treasury and MBIE (2019) argued that a significant gap still exists in the venture series A-B space (ie capital raised between NZ$2-20 million for the purposes of early stage growth), and estimated that the gap is in excess of $150m per year. Key issues are a weak pipeline of start-ups from seed through to VC, linked to a lack of demonstrated investment capability. In addition, the focus has tended to be on quantity rather than the quantity of investments which affects future exits and therefore investment attractiveness. The Venture Capital Fund has recently been established to address this gap (see MBIE and the Treasury 2019).

[13] https://www.beehive.govt.nz/release/business-finance-guarantee-%E2%80%93-applications-open

6.3 What specifically has been recommended to lift business investment in New Zealand?

Here we consider some policies that have been put forward as ways of addressing New Zealand's capital shallowness and some of the 'problems' identified in section 3. These suggestions are mainly from the OECD's 2017 economic survey of New Zealand (see OECD 2017) which specifically considered policies to lift investment as part of efforts to improve productivity in New Zealand.

- **Reform the tax system to remove barriers to investment.** Evidence from OECD countries indicates that high corporate taxes and weak financial development are associated with lower capital stocks (OECD 2017). The OECD suggested that a lower effective corporate tax rate could increase the attractiveness of investing in New Zealand. Coleman (2019) argued in support of OECD recommendations about reducing taxes on business income. Recent evidence has found that that tax changes do affect investment (Nolan and Nolan forthcoming), which implies that lowering tax rates should stimulate investment.
- **Encourage saving.** The OECD (2017) made a number of suggestions to encourage and refocus national saving. These suggestions included removing regulatory and infrastructure barriers to the expansion of housing supply to reduce capital gains on property, obliging households to save more out of current income for retirement. They also included extending automatic enrolment in KiwiSaver to all employees and considering an increase in the default contribution rate, as well as decreasing taxation of returns on non-housing saving vehicles.
- **Improve financing for small firms.** The OECD found that while New Zealand's VC has grown, it remains below the OECD median.[14] It suggested New Zealand should:
    - closely monitor outcomes under the Venture Capital and Seed Funds; further funding may be required, but care is needed to ensure funding generates additional activity and is justified by a market-failure rationale
    - conduct an impact assessment of the extent to which NZVIF investments have provided direct and spillover benefits
    - help overcome market failures in small business entrepreneurship financing – in particular, by addressing any skills gaps among small businesses in finance and providing information for credit-risk assessment of SME financing in order to encourage investors' participation.
- **Increase fiscal support for business R&D.** The OECD found that government support for business R&D is comparatively low in New Zealand, with an average rate of support of 11% compared with the OECD average of 13% in 2016. The OECD also argued that, while there is some evidence that higher investment in R&D and innovation does not generate significant productivity or profitability for firms

[14] Note that other OECD work has found very strong growth in New Zealand's VC market and a higher ranking among OECD countries in terms of VC as a share of GDP (see section 5).

(Chappell and Jaffe 2018; Wakeman and Conway 2017), the rate of government support is well below the socially efficient level indicated by international empirical studies. Specifically, the OECD argued that New Zealand should introduce a broad-based R&D tax incentive; this has in fact happened in 2019.

- **Address capital market impediments that give rise to New Zealand's interest rate premium.** In particular, the OECD suggested that increased domestic saving should reduce New Zealand's reliance on foreign savings. Measures taken to boost national saving are also likely to contribute to enlarging and deepening financial markets, as has been experienced in other countries.

6.4 What are the policy implications for New Zealand's productivity performance?

Here we consider some potential policy implications from the findings throughout this report in terms of the role of business investment in lifting productivity.

- **Weak business investment has been assessed as playing a key role in New Zealand's poor productivity performance.** New Zealand's long-run productivity performance has been comparatively weak (Conway 2016). In his diagnosis of this productivity performance, Conway (2016) identified four main contributing factors, the latter two of which are directly related to business investment:
    - small and insular markets
    - weak international connections
    - capital shallowness
    - weak investment in knowledge-based capital.
- **However, findings from a few firm-level studies suggest that lifting business investment may have a limited effect on total productivity.** As noted in section 3, Chappell and Jaffe (2018) and Wakeman and Conway (2017) found that the productivity benefits to New Zealand firms from their (intangible) business investment are small. As Chappell and Jaffe pointed out, there are a number of alternative explanations for these findings including measurement issues. However, if the findings are correct, they imply that lifting business investment may do little to boost aggregate productivity. It could be argued that, despite little productivity gains to investing firms, spillover benefits from business investment could potentially increase aggregate productivity. However, if investing firms themselves gain little from their investment, it seems unlikely that other firms will either.
- **It would be valuable to further explore the relationship between business investment and productivity, and better understand the reasons for weak productivity returns.** The unexpectedly weak relationship between business investment and productivity in New Zealand seems important, but the finding is only based on a couple of studies. Therefore, conducting more research on this relationship would be valuable. If true, the finding suggests that focusing on the

underlying reasons for low returns appears to be important. For example, Jaffe commented in relation to R&D that there may be broader reasons (eg small firms, fragmented industries, limited management capability) for low returns to R&D and innovation in New Zealand, and these need to be understood before deciding which policies would be most effective (see Productivity Hub 2015).

- **Lifting MFP appears to be a priority area for policy.** As shown in Figure 4 and Mason (2013), New Zealand's MFP growth over the past few decades has been weak compared with other countries. MFP reflects how efficiently a combination of inputs is used to produce output and is often considered a proxy for technological advances (Conway 2016; Pells 2018). Weak investment can be thought of, at least partly, as a by-product of New Zealand's low MFP – New Zealand seems to use labour and capital less efficiently than other countries, and thus presents fewer comparable opportunities for investment (Dupuy and Beard 2008). This implies that lifting MFP may have a beneficial impact on labour productivity both directly and via investment. It also implies that focusing on the factors that raise MFP will be an important part of the response to raising investment; these factors include innovation, skills and building an environment that supports enterprise development (Dupuy and Beard 2008).

6.5 What might be done to address knowledge gaps?

Building on the body of research covered in this report might involve the following.

- **Further explore the relationship between business investment and productivity, and investigate the underlying reasons for low (productivity) returns.** The unexpected finding about a weak relationship between business investment and productivity is important for two reasons: firstly, it implies that lifting business investment may do little to lift aggregate productivity; secondly, if investing firms themselves do not benefit much from their investment, then it is unlikely that other firms will either – an area of keen interest to policymakers. There is a lack of understanding about the underlying reasons for this weak relationship, and New Zealand's interest rate premium, so investigating these would be useful too.
- **Strengthen basic information on business investment.** In some cases there seems to be a lack of data available. In others, even where data are available, little descriptive analyses have been undertaken to answer basic questions.
    - Intangibles. As noted in section 2, standard accounting measures capture a very limited portion of what intangible investment conceptually targets. While the BOS includes some questions on intangibles, many of these questions – with the exception of some on R&D and innovation – are binary ('yes'/'no') in nature, and so provide little information on the value of investment. Given the growing role that intangible investment is thought to play in firm performance, this seems a priority area for improving measurement.

- Composition and quality of capital. In the National Accounts, Stats NZ provides a breakdown of gross fixed capital formation by asset and industry.[15] However, as Steenkamp (2018) pointed out, there is limited information on the composition and quality of capital. As discussed in section 2, the composition and quality of capital is important for a range of economic, environmental and other outcomes.
- Utilisation of capital. There are no official data currently available on the utilisation of capital by firms. This seems an important gap given that New Zealand's small domestic markets and preponderance of small firms suggests that large capital assets may be under-utilised. Additional research into the efficiency with which capital is employed is warranted (Steenkamp 2018).

- **Undertake qualitative research to complement quantitative studies.** For example, Pells and Howard's (2019) qualitative study of business innovation was partly motivated by the unexpected findings of a weak firm-level relationship between innovation and productivity. Similar qualitative studies could be undertaken in relation to business investment. For example, Fabling, Gemmell, et al. (2013) suggested that identifying the relevant measure that enters into firms' investment decisions could be important for assessing the impact of capital costs on those decisions; qualitative research could shed light on this and other aspects of firms' investment decision-making processes.
- **Update some previous studies.** There was a flurry of New Zealand papers on investment, saving and capital markets in the mid-late 2000s, mainly from the Treasury as part of its productivity series. Since then less work has been done. Some of the firm-level studies referenced in this report are also somewhat dated and would be worth updating. In particular, an empirical study on access to finance might be useful, as the only study we found on this topic was undertaken in 2004 (see Fabling and Grimes 2004) and the financial system has changed considerably since then. MBIE is in fact doing some work on this topic, as well as updating and extending Fabling, Kneller and Sanderson's (2015) UCC paper (see Nolan and Nolan forthcoming).
- **Investigate some of the non-economic outcomes from business investment.** We found little New Zealand evidence on the environmental or distributional impacts of business investment. Similarly, there is little evaluation evidence available on the effectiveness of green growth policies (OECD 2013).

[15] The asset groups are residential buildings, non-residential buildings, other construction, land improvement, transport equipment, weapons systems, plant, machinery and equipment, and intangible assets (mainly R&D).

7 Conclusions

One of the aims of this study was to identify any 'problems' with business investment in New Zealand. We found that while New Zealand's business investment as a share of GDP is not far off the OECD average, business investment per worker is much lower, reflecting New Zealand's comparatively high levels of labour input. Business investment in R&D is particularly low in New Zealand – around half that of the OECD average when measured as a share of GDP.

The main problem we identified relates to the high costs, and low benefits in terms of productivity gains, of business investment for New Zealand firms relative to their counterparts overseas. On the cost side, historically, New Zealand has had comparatively high interest rates. We also have comparatively high corporate tax rates and expensive capital goods. On the benefit side, evidence from a small number of studies suggests that New Zealand firms receive limited productivity gains from their investment. In addition, New Zealand's small markets and industry structure are not conducive to business investment. Given high costs and low benefits, it is perhaps not surprising that firms are reluctant to invest.

A further *potential* problem relates to finance constraints. While survey evidence indicates that few New Zealand firms struggle to access finance on acceptable terms, theories (and some limited evidence from studies) suggest that small, young and innovative firms may suffer from finance constraints.

Some have argued that weak business investment is a major reason for New Zealand's poor productivity performance, and so efforts should be made to lift business investment. Proposed policies aim to tilt firms' investment benefit-cost ratios, for example by lowering corporate tax rates, addressing New Zealand's interest rate premium by boosting saving etc, improving access to finance via financial market development, as well as providing direct fiscal support such as via R&D tax incentives.

However, while these policies may help lift business investment, it is less clear that this in turn will lift aggregate productivity. If, as indicated from a small number of studies, firms gain little of the expected productivity benefits from their investment, then lifting business investment may not provide the expected productivity boost for the economy as a whole. It may more beneficial instead to address the underlying causes of weak returns from business investment where these are known, or to further investigate them where not. In particular, policies that lift MFP appear to be a priority, given New Zealand's poor MFP performance and the relationship between MFP and business investment.

Potential areas for further research include further investigating the productivity-business investment relationship and any underlying reasons for this weak relationship, updating some previous empirical studies that are now somewhat dated, and investigating some of the non-economic outcomes from business investment as little has been done on this so far. There are also some more basic data and information gaps, with a key priority being improving the measurement of intangible investment.

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