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What we know and don't know about competition in New Zealand

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New Zealand Government

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This paper is part of the Ministry of Business, Innovation and Employment (MBIE) Competition and Consumer Policy team's Barriers to Competition work programme. The paper is based on an unpublished literature review by Phillip Stevens (Stevens, 2009), and draws heavily on work by MBIE (2016), Devine et al (2011), Devine et al (2010), Devine et al (2012) and Doan et al (2012).

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Access to the anonymised data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, business or organisation. The results in this paper have been confidentialised to protect individual people and businesses from identification. Careful consideration has been given to the privacy, security and confidentiality issues associated with using administrative data in the Integrated Data Infrastructure (IDI). Further detail can be found in the Privacy Impact Assessment for the IDI available from www.stats.govt.nz. The results are based in part on tax data supplied by Inland Revenue to Statistics New Zealand under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes.

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Abstract

Increasing the level of competition is often suggested as a way to raise New Zealand's productivity. However, the New Zealand-specific research on competition has not been pulled together for a number of years. There is no shared understanding of competition in New Zealand, and no systematic research agenda to improve our understanding.

This paper documents and articulates what we know about competition in New Zealand, and gaps in our collective understanding. A literature review of the relevant empirical evidence and theory on competition in New Zealand was conducted. Literature based on New Zealand data or relevant to the New Zealand context was targeted. The paper then suggests policy-relevant areas for further competition-related research.

The aim of this paper is to provide a foundation for, and direction to, future research into competition in New Zealand, with the end goal of raising the performance of the New Zealand economy. Through improved understanding of the relationship between competition and economic performance, we can develop more effective competition policy.

List of abbreviations

ANZSIC	Australian and New Zealand Standard Industrial Classification
GVA	Gross Value Added
HHI	Herfindahl-Herschman Index
IDI	Integrated Data Infrastructure
LBD	Longitudinal Business Database
MBIE	Ministry of Business, Innovation and Employment
MED	Ministry of Economic Development
NZSIOC	New Zealand Standard Industry Output Categories
OECD	Organisation for Economic Cooperation and Development
PE	Profit elasticity
R&D	Research and development

1. Introduction

Understanding the relationship between competition and economic performance is critical to developing government policy and regulation to support a dynamic and growing economy. Effective competition from domestic and international firms gives New Zealand businesses an incentive to increase their efficiency and innovate, leading to improvements in productivity and consumer welfare. Businesses competing for customers and market share leads to outcomes such as:

- Lower prices and better quality goods and services;
- Businesses that are in an even better position to compete on the international stage; and
- Higher living standards driven by higher productivity, higher incomes, and greater consumer choice.

When we see these outcomes they are indicators that competition is likely to be working effectively.

The level of competition in New Zealand markets is influenced by our small, distant economy. Consequently, it is important that New Zealand-specific research is undertaken to understand the link between competition and economic performance. In so doing, we can target policies to promote competition in New Zealand and assess their effectiveness.

2. Scope and outline of this study

This paper undertakes a stocktake of what we know and don't know about competition across the New Zealand economy. This will inform competition policy and serve as the foundation for future research. The paper is structured around our key areas of knowledge on competition, including:

- different measures of competition and their attributes;
- empirical evidence on the level of competition in various industries in New Zealand;
- the relationship between competition and productivity;
- the relationship between competition and innovation; and
- the unique circumstances of New Zealand and their effect on the relationship between competition and economic performance.

While extensive (albeit dated) data is available on the level of competition across New Zealand industries, there are knowledge gaps in the relationship between competition and economic performance which could be plugged with further research. The evidence shows that many New Zealand industries have low competition. Gaining a greater understanding of the level, determinants and effects of competition will help inform improved government policy to raise the intensity of competition in New Zealand.

What this paper does not do is provide an in-depth competition analysis of specific markets, such as the electricity or dairy markets. Also outside the scope of this paper is analysis of the competition impact of particular regulatory interventions, evaluation of the Commerce Commission's performance as a competition watchdog and evaluation of the effectiveness of New Zealand competition law.

This paper is primarily a descriptive analysis of the competition landscape. Although it does identify areas for future research, it avoids recommending specific policies.

This paper draws heavily upon an unfinished literature review by Phillip Stevens, as part of the Cross Departmental Research Project into competition in New Zealand (Stevens, 2010). This project took place between 2009-2011 and combined the resources of the former Ministry of Economic Development, the Treasury, the Commerce Commission and the Ministry of Foreign Affairs and Trade. The objective of the project was to determine the nature, extent and impact of competition in the New Zealand economy, taking into account the particular features of our small, distant economy. At its inception, this was expected to involve answering the following questions:

1. How competitive are sectors in New Zealand?
2. What is the link between the degree of competition and firm outcomes, such as innovation, productivity and management practices?
3. How do these compare with other countries?

4. What are the implications for competition policy and economic policy more generally?

The project led to new empirical evidence on the level of competition in New Zealand (Devine et al, 2010; Devine et al, 2011; Devine et al, 2012; MBIE, 2016). These studies use the profit elasticity measure of competition, which measures the responsiveness of a firm's profits to changes in their average input costs. The project was never completed but nevertheless generated a range of useful findings that are summarised in this literature review.

Owen Dillon produced a report (Dillon, 2017) which drew together data from a number of sources on competition-related factors to assess the level of competition in different industries. His report included measures relating to market structure, profitability, and self-reported values of competition by firms. The report also analysed the correlation between different measures of competition. The report makes some interesting findings but it is important to note that it has not had a technical peer review and so its findings should be taken as preliminary only.

Other key papers which provided input into this report include:

- Boone, 2000: originally devised the profit elasticity measure
- Conway, 2016: Productivity Commission report on productivity in New Zealand, includes analysis on firm dynamics and market structure
- Evans et al, 2002 (Charles River Associates): meta-analysis of international literature on competition and innovation
- Evans and Hughes, 2003: theoretical discussion of competition policy in small market economies
- Gal, 2003: the effect of market size on competition policy
- Griffith et al, 2005: built upon the work of Boone, 2000 to refine the profit elasticity measure
- Griffith, 2010: the relationship between competition and innovation
- Stevens, 2009: empirical analysis of relationship between competition and economic performance

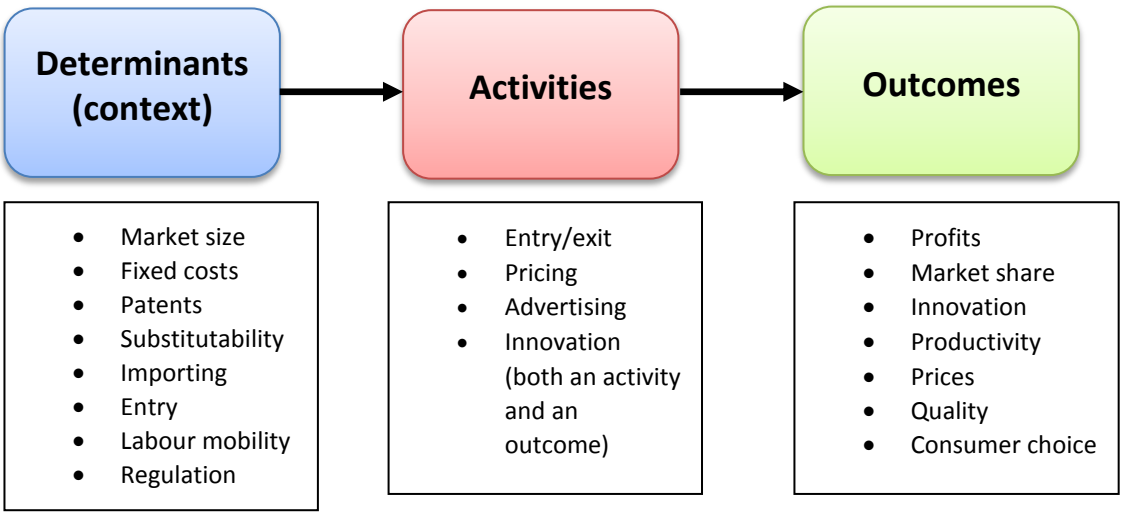
A more extensive summary of empirical and theoretical competition literature relevant to the New Zealand context is found in Appendix 2.

3. Theoretical constructs of competition

Defining competition

Competition is a process of rivalry between firms striving for dominance in a market, something that not all can obtain or possess (Stigler, 1987; Vickers, 1995). Stevens (2009) conceptualised a framework for analysing competition as a process. This framework separates competition into three aspects: the determinants or context that influences the intensity of competition, the activities that take place in the act of competing, and the outcomes of competitive behaviour.

Figure 1: Model of competition (adapted from Stevens, 2009).



Drivers or barriers to competitive behaviour include industry and product-specific factors such as the fixed costs of entry into the industry, patents and substitutability of the product. These factors influence firms' behaviours – such as whether they enter or exit a market, how they price their product, and their advertising strategy. Ultimately, this affects outcomes such as profits, market share and innovation.

As noted in MBIE (2016), a market is typically more competitive when forces prevent firms from exercising market power. A firm has market power if it has the ability to profitably raise prices above marginal costs. Forces that may constrain market power include:

- supply-side responses (the ability to compete on quality, product differentiation and prices);
- entry, or the threat of entry, by other firms; and
- demand-side responses from consumers (including consumer preferences).

An increase in competition can affect firms in a particular market differently, depending on the market structure and their level of productivity. An increase in competition (for example due to the entry of a new competitor) is expected to result in:

- incumbent firms reducing their prices to compete, and therefore reducing the average mark-up;
- the so-called reallocation effect (the reallocation of output from less efficient to more efficient firms, as the former are less able to reduce margins and remain profitable); and
- the so-called selection effect (when inefficient firms become unprofitable and are forced to exit the market (MBIE, 2016)).

Measuring competition

To assess competition across the New Zealand economy we need to obtain a robust measure of competition that allows for comparisons between industries and across time. The complexities involved in measuring competition mean that there are many alternative ways in which it can be measured. Historically, the empirical literature has used the Herfindahl-Herschman index or the price-cost margin to measure competition. More recently, the profit elasticity measure has been developed. The profit elasticity measure helps to overcome some of the weaknesses of market-share based competition measures. This section outlines the most common methods of measuring competition and a brief discussion on their advantages and disadvantages.

Measures based on market share

Market share measures the portion of a market's total sales controlled by a company. It can be a starting point for analysing competition. However, it does not reveal much about the level of competition in the market. Market share is not the same as market power. Larger players in the market often have high market power and can use this to suppress competition. However, there may still be intense competition in a duopolistic market where there are only two market players.

The **concentration ratio** measures the concentration of market share within an industry, and is defined as the ratio of the total output produced in an industry to a given number of firms in the industry. Like market share, the concentration ratio assumes that market share is a proxy for market power. It is not always a good proxy for competition.

The **Herfindahl-Herschman index (HHI)** is the sum of squares of the market shares for all firms in a market, where the market shares are expressed as percentages. Due to their similarity, the HHI and the concentration ratio are closely correlated (MBIE, 2016; Dillon, 2017).

The concentration ratio and HHI are measures of market structure. These measures indicate the degree of concentration in a market. However, as noted in MBIE (2016), high

concentration does not necessarily indicate low competition. This is particularly true in dynamic markets in which there is a high degree of firm churn.

In these markets, where the selection effect (new firms enter and unsuccessful firms exit) and the reallocation effect (more efficient firms grow at the expense of less efficient ones) are especially prominent, a highly concentrated market might be highly competitive (MBIE, 2016). Furthermore, in markets where firms engage in 'leap-frog innovation', displacing the incumbent standard with a radically improved technology, a particular firm's dominance in terms of market share is likely to be temporary (MBIE, 2016; Schilling, 2003).

Measures based on price-cost margins

The **Lerner index** is a measure of the market power of a firm, based on its price-cost margin. It ranges from 0 to 1, with higher values indicating greater market power (less competition). The Lerner index is defined as: (Price – Marginal Cost)/Marginal Cost. A firm operating in a perfectly competitive industry is unable to set prices above marginal cost. With decreasing levels of competition, firms possess greater market power and can set prices above marginal cost to make 'supernormal profits'. In most circumstances, a change in the level of competition in the market will affect the Lerner of all firms in the market.

Profit elasticity (PE) measures the sensitivity of firms' profits to changes in marginal cost. Profit elasticity is always negative, with more negative values indicating higher competition. It is a market level measure of competition developed by Griffith et al (2005) based on the work of Boone (2000). As competition rises, the profits of more efficient firms will become relatively larger than those of less efficient firms, even if profits fall for all firms, due to the reallocation effect. In other words, the profit gap between efficient and inefficient firms will widen as new entrants enter the market. PE captures this effect, because in theory, firms in markets with higher competition will have a higher (in effect, more negative) PE.

Boone (2000) and Griffith et al (2005) consider PE to be a more accurate barometer of competition in an industry than market power-based measures, such as the concentration ratio or Lerner index, as it allows for differences in the cost of production between firms. It also takes into account the reallocation effect, which leads to more efficient firms gaining market share at the expense of less efficient firms.

PE is calculated using the same data as that used for price-cost margins. The PE is not without its problems. It was originally developed for identifying changes in competition within a market across time, rather than comparing competition across markets.

Another problem with competition data more generally is that data is reported on an industry, rather than market, basis. An industry is not always a reliable proxy to a market, as industry classifications exclude the effects of geography and other factors that affect the substitutability of products. However, there is no readily available data that captures competition on a market basis.

4. The competition landscape in New Zealand

Regulatory settings are good but competition and productivity is still low

New Zealand's economic and regulatory policies compare favourably with international best practice in many areas, such as the ease of starting a business and labour and product market regulation. New Zealand has an open economy with few remaining tariffs or other protective mechanisms. Free trade agreements have been established with many key trading partners. Yet New Zealand's labour productivity is only about 80% of the OECD average (MED et al., 2011). Commentators such as Conway (2016) have identified low competition as a primary reason for low productivity. Competition puts pressure on firms to either innovate to increase efficiency, reduce costs and grow market share; or suffer loss of market share and go out of business. Lack of competition is therefore likely to contribute to low productivity in many New Zealand industries (Gal, 2003).

Despite New Zealand's favourable regulatory settings, there are still barriers to competition from international firms. New Zealand's distance from major markets insulates domestic firms somewhat from international competition. International firms seeking to expand to new markets may find the potential returns in New Zealand low when compared to the costs of entry, due to its small market size. This disincentivises the entry of new competitors (Gal, 2003). This is problematic not only because of the loss of competition, but because international connections facilitate technology diffusion into domestic firms, which raises productivity.

Another factor is New Zealand's small and geographically-dispersed population, which means relatively few firms operate in some domestic markets (Gal, 2003). New Zealand's small economy suffers from a lack of scale that larger economies benefit from (Gal, 2003). This is particularly problematic in localised service markets (e.g. hospitality or hairdressing) where spatial transaction costs are high, meaning that geography imposes limit on the size of the market.

An open trade policy can help small economies overcome the disadvantages of smallness and distance from major markets. New Zealand has vigorously pursued a path of free trade in the last three decades, forging closer trade links with Australia, China, Japan and many other nations, as well as removing tariffs and other trade barriers.

A key tradeoff in competition policy is allowing economies of scale while avoiding misuse of market power

One of the issues in competition policy is balancing efficiency considerations with market power considerations. On the one hand, traditional conceptions of competition law prescribe limits on market power; on the other hand, economies of scale are required for firms to operate efficiently. The conflict between these objectives is particularly acute in a small nation such as New Zealand (Evans and Hughes, 2003).

As noted above, small economies such as New Zealand's are unable to support large numbers of firms, or very large firms, in an industry (McLeod, n.d). This means that industries are often more concentrated than in larger economies such as the United States, and firms cannot achieve the same economies of scale and scope in the domestic market (Gal, 2003).

Resolving this tension is not easy, and it is beyond the scope of this paper to offer policy solutions to this dilemma. One implication is that traditional metrics for assessing concentrated markets, based on the U.S. market, may be inappropriate in the New Zealand context.

If there is no competition and no likelihood of market entry then there is little incentive for innovation. It is likely that for firms to face an incentive to innovate, they need to face either: domestic competition, exposure to strong international competition or economic regulation to proxy the effects of competition.

5. Empirical evidence on competition in New Zealand

Current New Zealand research on competition is sparse

This section outlines the current empirical evidence on competition in New Zealand. There is a large amount of data in Statistics New Zealand's Longitudinal Business Database (LBD) that can be used to measure and monitor competition in New Zealand. However, relatively minimal research has been undertaken to extract meaningful findings from this data, compare empirical measures of competition across the economy, and assess the relationship between competition and economic performance in New Zealand. Most studies are meta-analyses, purely theoretical, focus on specific sectors and markets, or are based on international evidence that may be inappropriate in the New Zealand context.

Current empirical literature on competition in New Zealand includes the outputs of the Cross-Departmental Research Project: Devine et al (2011), Devine et al (2010), Devine et al (2012), and Doan et al (2012); more recent MBIE papers (MBIE, 2016; Dillon, 2017); and the Productivity Commission's Services Sector Inquiry (Productivity Commission, 2014). The Productivity Commission's 2016 paper "Achieving New Zealand's productivity potential" (Conway, 2016) also covered aspects of competition.

Arguably the most robust indicator of competition, of those currently available, is profit elasticity, as it is not affected by the reallocation and selection effects. MBIE (2016) is the first comprehensive assessment of profit elasticity in New Zealand industries. Using the same data, Dillon (2017) compared profit elasticity across New Zealand industries to other competition measures, such as the concentration ratio and the Herfindahl-Herschman index. The key findings from these studies are outlined below.

The intensity of competition varies across the economy and depends on the measure used

The LBD data allows competition to be considered on a sector or industry level.[1] An industry is a statistical classification of firms undertaking similar activities. An industry is a narrower classification than a sector, which is a cluster of industries. It is important to emphasise that an industry is not the same as a market. Competition occurs in markets, which consist of substitutable goods or services. Industry classifications are based on similarities in the production of goods and services, not whether the goods or services are substitutable. Industry classifications also ignore the geographical distribution of firms, which affects the substitutability of products. For example, a competitive roofing market in Auckland is of no use if you need a roof in Christchurch. In addition, imports, which can be substituted for domestically produced goods, can also change market size, and are not considered in this data (Dillon, 2017).

Competition varies across New Zealand industries, which is to be expected given the differences in market structure. While there are large differences between the most and least

[1] In this report, 'sector' is used to refer to the 1-digit level of the 1996 ANZSIC or NZSIOC classification system, and 'industry' is used to refer to the 3 or 4-digit level of these classifications.

competitive sectors, there is also variation between industries within these sectors. There is also considerable difference between those industries that are considered concentrated depending on the measure used to assess competition. However, we can draw out some key findings on both profit elasticity and concentration ratios.

Profit elasticity

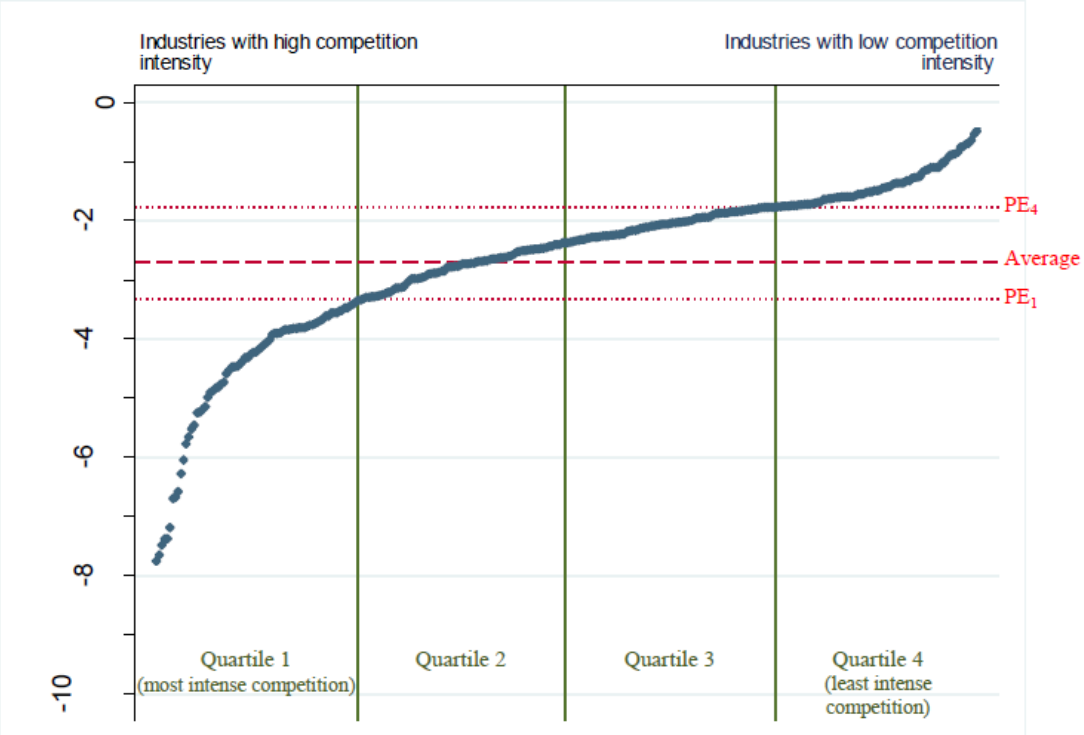
As stated in section 3, PE measures the responsiveness of a firm's profits to changes in its marginal cost. Competition acts as a barrier to firms settings prices high above marginal cost. However, efficient firms can keep their costs low. This leads to the relative profit difference between efficient and inefficient firms growing wider. Consequently, in markets where there is high competition, we would expect profits to be more responsive to changes in marginal cost (a more negative PE value).

Table 1 summarises the PEs for sectors which are ranked from most competitive to least competitive in terms of their unweighted average PE. The data shown here is for the period 2000-2010. Figure 2 shows the PE values on a graph. The estimated PE is represented on the vertical axis and the industries are ranked from most to least competitive on the horizontal axis.

Table 1: PE levels by sector (2000-2010) (MBIE, 2016).

Sector (1-digit 1996 ANZSIC)	4-digit industries (*N*)	PE (unweighted)	PE (weighted by GVA)
Manufacturing	109	-3.50	-3.20
Construction	21	-2.99	-3.44
Hospitality	3	-2.91	-2.69
Transport & Storage	22	-2.90	-2.59
Communications Services	3	-2.63	-3.87
Retail	38	-2.46	-2.39
Agriculture, Forestry & Fishing	33	-2.17	-1.42
Property & Business	30	-2.00	-1.82
Wholesale Trade	40	-1.78	-1.66
Finance & Insurance	10	-1.78	-1.54
Total	**309**	**-2.72**	**-2.36**

Figure 2: PE levels across 4-digit industries in the period 2000-10



Sectors with the highest competition intensity by PE include manufacturing, construction and hospitality, with unweighted PEs of -3.50, -2.99 and -2.91 respectively. (A more negative PE indicates higher competition intensity). Sectors with the lowest competition intensity include finance and insurance, wholesale trade, and property and business with PEs of -1.78, -1.78 and -2.00 respectively (MBIE, 2016). Weighting these sectors by their contribution to the economy reorders the results somewhat, giving us communication services, construction, and manufacturing as the most competitive sectors by Gross Value Added (GVA). This reflects the larger average size of firms in communication services and construction relative to, for example, hospitality.

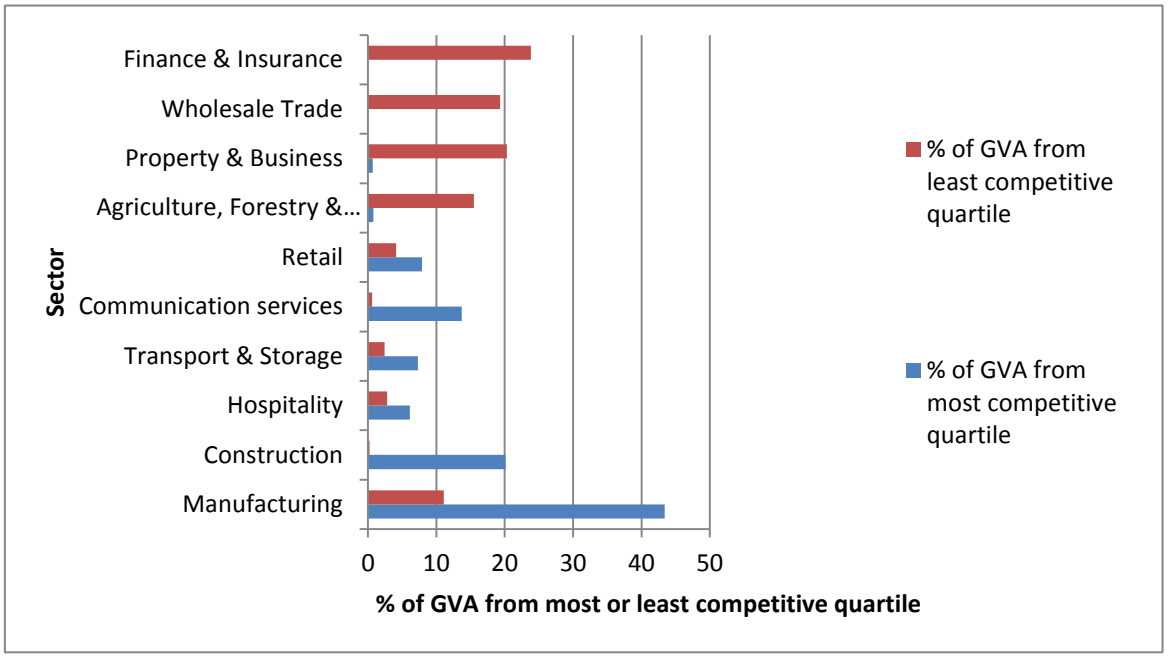
One potential limitation of this data is that it conflates markets with industries, which is not necessarily valid, for the reasons noted above. While 4-digit industries are proxies for markets, they only enable imperfect measures of competition. The more we aggregate industries, the less substitutable the products or services within those industries are and therefore the less robust the measure of competition. 1-digit industries are therefore only averages of competition rather than capturing the nuances of competition within a sector. For example, the average 4-digit industry in the manufacturing sector is relatively competitive, but the sector includes 4-digit industries that are some of the most and least competitive markets in New Zealand e.g. paint manufacturing has a PE of -6.69, while machine tool and part manufacturing has a PE of -0.33 (MBIE, 2016; Dillon, 2017; Statistics New Zealand, 2015).

To better understand these nuances, MBIE (2016) assessed the proportion of industries in the most and least competitive quartile from each sector, and the proportion of each sector found in the most and least competitive quartiles. This data gives an indication of the variance within

each sector and whether there is a concentration of very competitive or uncompetitive firms from a particular sector. By weighting each sector by its contribution to the economy, the authors provided an indication of industries we should be more concerned about. Some of their key findings are discussed below.

Figure 3 shows the proportion of GVA produced in the sector that comes from 4-digit industries that are in the most and least competitive quartiles.

Figure 3: Proportion of GVA produced in industries in each sector which are in most or least competitive quartile (based on data in MBIE, 2016)



These results align well with the data in Table 1, in that the most competitive industries, weighted by GVA, are manufacturing, construction and communication services. There are a few interesting findings in these results:

- The manufacturing sector accounts for 63% of the 4-digit industries in the most competitive quartile, but only 43% of GVA in the most competitive quartile. This suggests that there are large numbers of small manufacturing firms.
- The concentration of manufacturing among the most competitive industries has been found in other countries. For example, a study in Portugal, which has a similar-sized economy to New Zealand's, found that 88% of industries in the most competitive quartile were from Portugal's manufacturing sector (Amador and Soares, 2012, as cited in MBIE, 2016).
- The retail sector features a long tail of both highly competitive and very uncompetitive industries. This reflects the diverse nature of the retail industry and the concentration of small, localised markets in this industry.

Concentration ratios

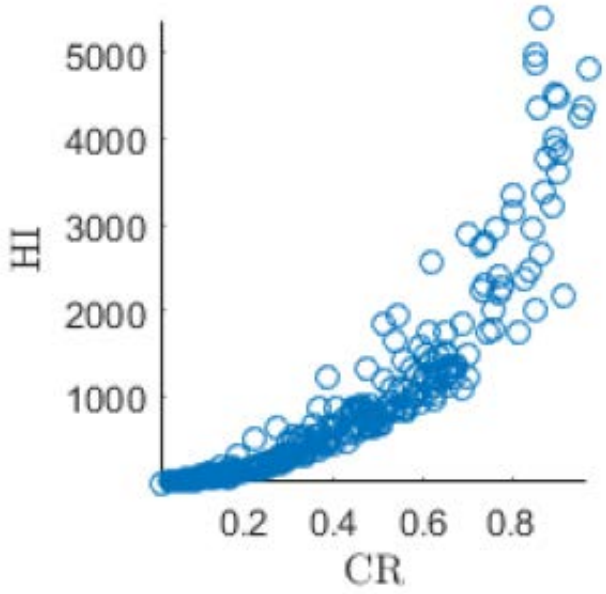
Data on concentration ratios across New Zealand industries shows considerable heterogeneity. Concentration ratios, between 2000 and 2007, vary from under 5% in agriculture to over 90% in some areas of mining (Stevens, 2009). Most of the highly concentrated industries, such as mining, are those with high fixed costs. High fixed costs are particularly challenging for small and early-stage firms. This supports the intuitive rationale that high barriers to entry impair the development of competition.

Concentration ratios in the 4-digit industry are generally higher than those in 3-digit level. Logically, the narrower the category, the greater the competition, and this is empirically true (Stevens, 2009). See Appendix 1 for a comparison of the most concentrated industries according to different competition measures.

Comparison of measures

An initial comparison of results between different empirical measures leads to different findings on which industries are highly concentrated. Further testing of these findings needs to occur to ensure these results are correct. As would be expected, there appears to be a high degree of correlation between the market share-based measures of competition such as the Herfindahl index and the concentration ratio, as shown in Figure 4 below.

Figure 4: Comparison of concentration ratio and Herfindahl index (Dillon, 2017)



However, profit elasticity does not seem to correlate well with either the concentration ratio or the Herfindahl index, as shown in Figures 5 and 6 (Dillon, 2017).

Figure 5: Comparison of concentration ratio and profit elasticity (Dillon, 2017)

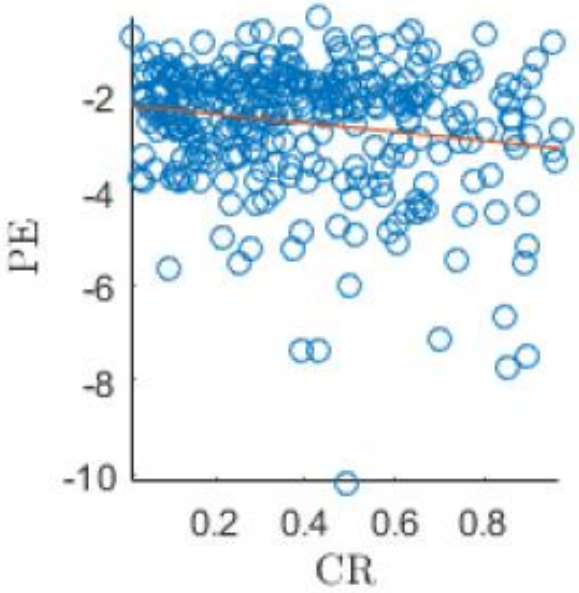
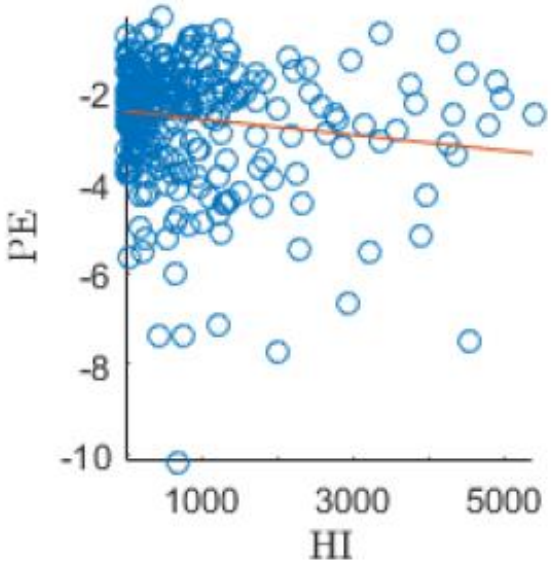


Figure 6: Comparison of Herfindahl index and profit elasticity (Dillon, 2017)



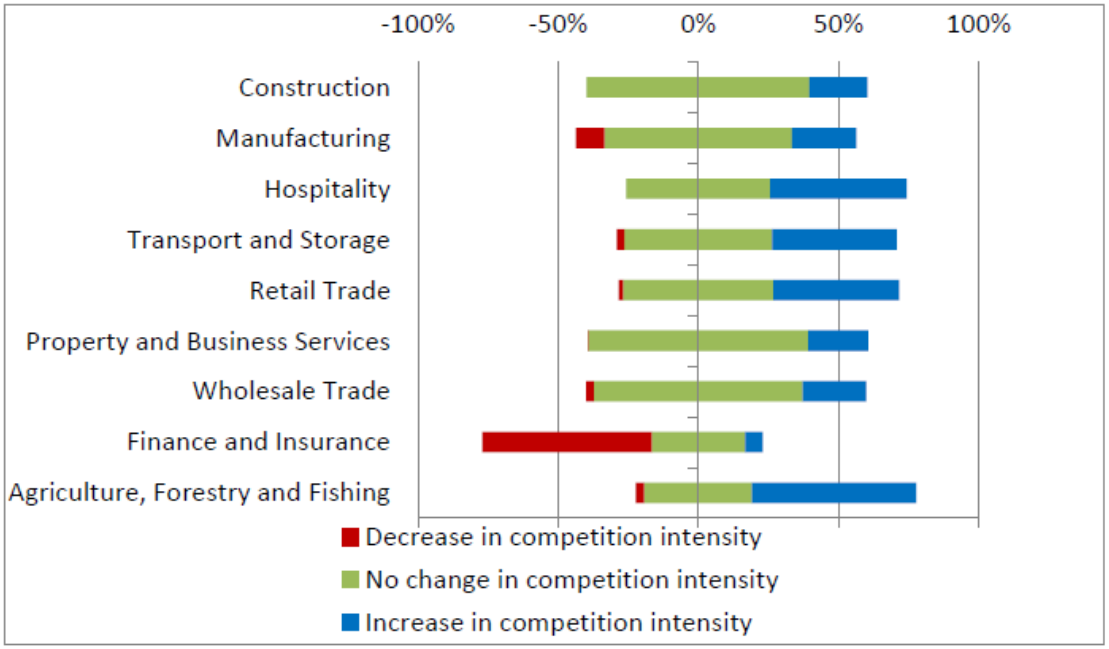
Most New Zealand industries experienced no change in competition intensity between 2000 and 2010…

We have discussed the level of competitive intensity across New Zealand industries according to various measures. But what are the trends over time? MBIE (2016) also examined this question. The authors found that the majority of industries (73.8%, constituting 63.8% of GVA) did not experience a statistically significant change in competition intensity between 2000 and 2010.

…but more industries had an increase in competition intensity than a decrease.

However, most of the 4-digit industries with a statistically significant change in profit elasticity experienced an increase in competition (MBIE, 2016). In Figure 7, the blue bars indicate the percentage of industries in the sector with an increase in competition, the red bars indicate those that had a decrease and the green indicates those industries that had no change.

Figure 7: Profit elasticity trends by sector in the period 2000 to 2010 (MBIE, 2016).



According to the profit elasticity data, the Finance and Insurance sector experienced the largest decrease in competition intensity in the period 2000-2010. This is primarily driven by the banking industry.

Since 2010 (and therefore not captured in this data), new entities have registered as banks in New Zealand, such as the Cooperative Bank (2011) and Heartland Bank (2012). These new entrants may have increased competition in the banking industry, particularly in the retail banking and mortgage markets, and may indicate that regulatory barriers to entry in the banking industry are not unduly high. This is something that may be worth testing with further research.

While the profitability of banks in the New Zealand market is high by international standards, price-cost margins and profit elasticity are only moderate compared to other jurisdictions (Clerides et al, 2013). In addition, the potential for disruptive innovation in the banking sector, with the rise of Fintech, is high. New Zealand banks tend to quickly adopt innovative products to maintain or gain market share, such as contactless payment systems and banking apps for smartphones.

There is a theory that the relationship between competition and productivity is "U-shaped"

The relationship between competition and productivity has been extensively discussed in the international literature. Several overseas studies (e.g. Aghion et al, 2005; Nickell, 1996) have posited the existence of a parabolic relationship between competition and productivity, shaped like an "inverted U". Using data on the New Zealand manufacturing sector between 2000 and 2009, Devine et al (2011) found that the "inverted U" relationship holds when measuring competition according to the Lerner index (Figure 8).

However, these findings should be treated with caution, for several reasons. This paper was not finalised, and contradictory results were reported depending on the measure of competition used. While the results may hold for the manufacturing sector in that specific time period, this would not necessarily be true for other sectors in other time periods, so we cannot generalise this relationship across the whole economy.

The "inverted U" result can be explained through two dynamics, the "competition effect" and the "Schumpeterian effect", which have opposing effects on managerial incentives. The "competition effect" describes the effect of competitive pressure increasing the probability of exit from an industry. This heightened risk of failure pushes managers to reduce costs and increase productive efficiency. This effect suggests a positive relationship between competition and productivity. The second dynamic is the "Schumpeterian effect". This is the idea that greater competition reduces the returns to innovation, leading to decreased managerial effort (Schmidt, 1997). Firms have less incentive to innovate if they know that the supernormal profits derived from innovation are going to be lost to competition (see page 23). Excessive competition may have particularly strong effects on curtailing innovation for a small market such as New Zealand, where the potential returns to innovation are lower than in big economies like the US and Europe (MBIE, 2016). Further research could shed light on the extent to which this effect applies in New Zealand.

The competition and Schumpeterian effects exist in differing magnitudes depending on the level of competition in the industry. In the first half of the curve in Figure 8, the high Lerner index implies competition is low, and the competition effect dominates the Schumpeterian effect. Until the inflection point, productivity is an increasing function of competition, i.e. the effect of competition on managerial incentives remains positive. At this end of the curve, the market has a high Lerner index, implying firms have high market power, and consequently can set prices high above marginal cost. Moving up the curve, competition increases and firms possess reduced price-setting ability.

However in the second half of the curve, beyond the optimum (productivity-maximising) level of competition, the Schumpeterian effect is greater than the competition effect, leading to diminishing returns to competition (Devine et al, 2011). Decreasing returns to innovation means that increased mark-up is associated with reduced productivity.

However, the "inverted U" result is not consistent across alternative constructs of competition. Using PE to measure competition gives the opposite result, i.e. a U, as shown in Figure 9 (Devine et al, 2011). The authors explain that this *prima facie* contradiction is due to the different facets of competition analysed by the different measures. Where firms are not intensely competing to serve the market, as in the first half of the curve in Figure 9, higher responsiveness of profits to changes in cost is associated with a reduction in productivity. In a stagnant market, there is less incentive for firms to innovate if small increases in costs result in large decreases in profits. Equivalently, if the market is stagnant and firms are not competing intensely for market share, the fact that a small reduction in R&D expenses will result in a large increase in profits will be a disincentive to innovate. However, as the competition for the market rises, the threat of market share reallocation to more efficient firms is likely to spur firms to innovate as well as to increase productive efficiency.

Figure 8: Relationship between productivity and competition according to the Lerner index (based on New Zealand empirical evidence in Devine et al, 2011)

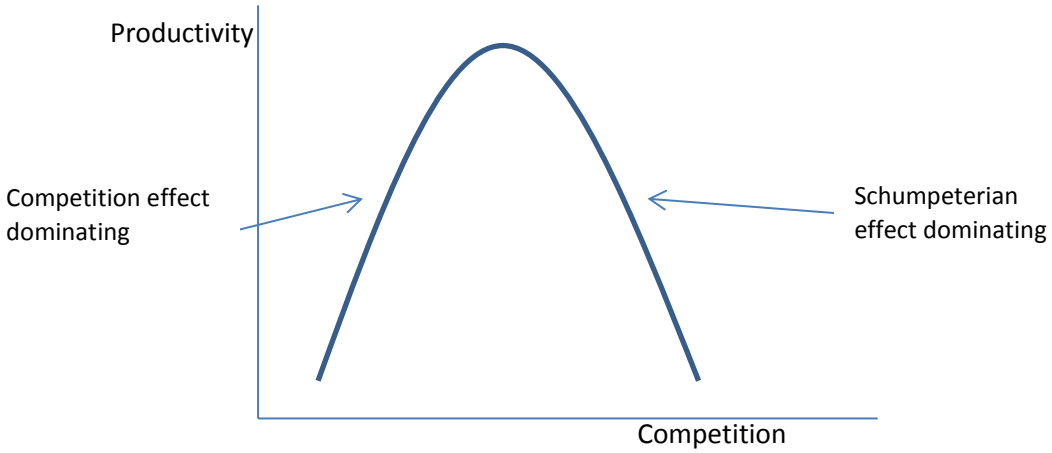
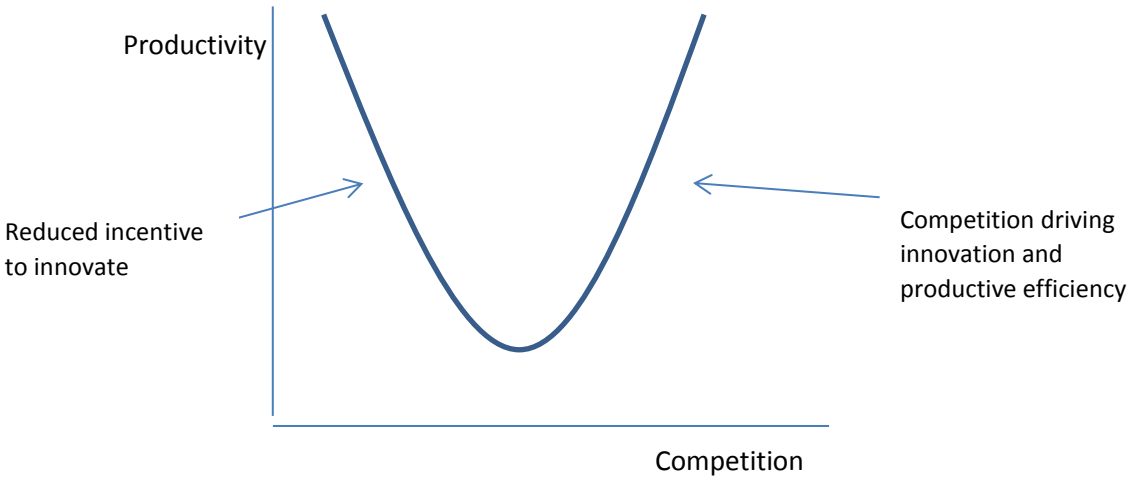


Figure 9: Relationship between productivity and competition according to profit elasticity (based on New Zealand empirical evidence in Devine et al, 2011)

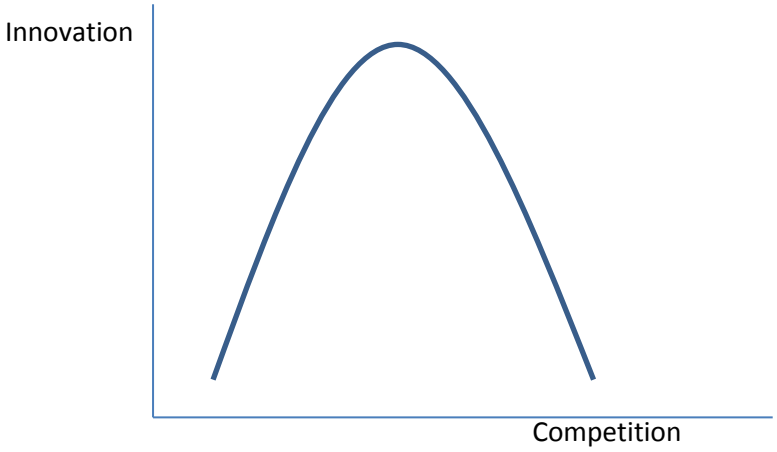


Competition can have opposing effects on innovation

Literature on the competition and innovation relationship has evolved considerably since the Schumpeterian view of more concentrated markets yielding increased innovation (Schumpeter, 1950; Aghion and Howitt, 1992). More recently, using data on publicly-listed manufacturing firms in the United Kingdom, Aghion et al (2005) found a U-shaped relationship between competition and innovation. Since then, a model devised by Hashimi (2011) using data on publicly-listed manufacturing firms in the United States, shows a positive and linear relationship between competition and innovation (Hashimi, 2011).

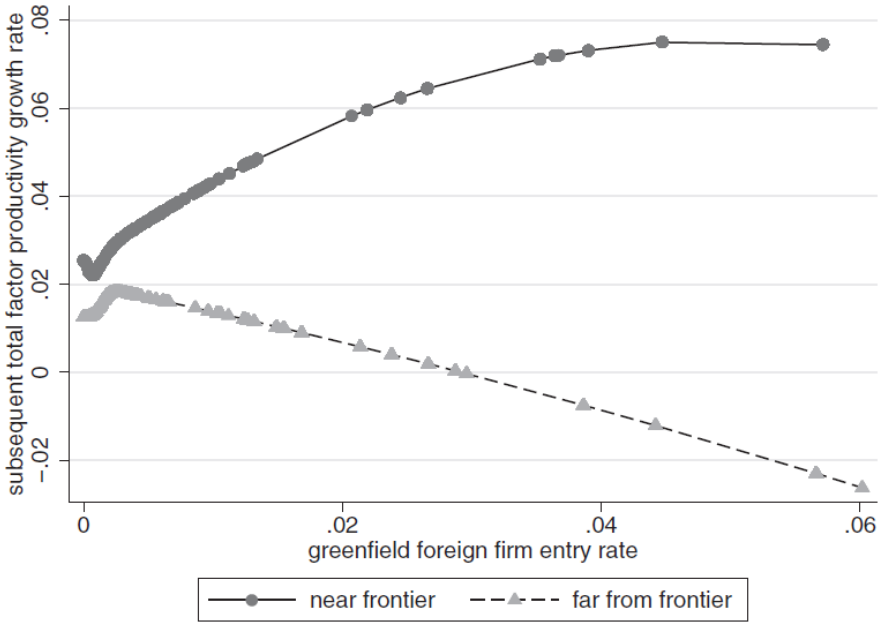
The trade-off implicit in the inverted-U theory (see Figure 10) is that permitting increased competition, for example by removing barriers to entry, increases the potential for innovation in the industry by newcomers. However, at a certain point, the prospect of greater competition in the industry may discourage established firms from undertaking research and development (Griffith, 2010). This is because the prospect of earning monopoly profit is a powerful motivator for firms to undertake innovation. Competition may reduce the scope for firms to earn monopoly profit as returns will be competed away (Griffith, 2010). This aligns with the inverted-U productivity and competition relationship in Figure 5, as innovation is a key driver of productivity (Lewis, 2008).

Figure 10: Inverted-U relationship between competition and innovation (Aghion et al, 2005)



The degree to which competition affects innovation may depend on how technologically advanced the firm is compared to its peers in the industry. Evidence from the United Kingdom indicates that for firms close to the technological frontier (i.e. more technologically advanced), competition stimulates increased productivity; firms that are further from the frontier often don't bother to attempt to compete (Griffith, 2010). This is shown in figure 11.

Figure 11: Reactions to entry in incumbents near and far from the technology frontier (Aghion et al, 2009)



The effect of competition on innovation also depends on managerial incentives. Schmidt (1997) found that for inefficient firms with 'managerial slack', a reduction in profits from increased competition may incentivise the manager to work harder to innovate and achieve cost reductions to keep their job and stay in business. However, if competition reduces the value of innovation to the owners of the business (as profits are competed away), the owner may induce the manager to work less hard.

What does this mean for New Zealand? The competition and innovation relationship has not been tested empirically in New Zealand. However, MBIE (2016) noted that cooperation between firms may be advantageous to innovation, particularly in small markets such as New Zealand's, where the potential returns to innovation are lower than in big economies like the US and Europe. Innovation is costly. Lower potential returns may "compound the effects of high levels of competition on innovation" (MBIE, 2016). Given that New Zealand generally has low levels of competition, it is unlikely that excessive competition is hindering innovation. This would suggest a positive and linear relationship between competition and innovation. Further research could reveal whether this is true.

Firms entering and exiting the market play an important role in competition

Firm entry and exit is an important part of the competition story. In most economies, around 20% of firms will be born or fail in any given year (Doan et al, 2012). New entrants, or even the threat of potential entrants, puts pressure on incumbent firms to increase efficiency and causes the least efficient incumbents to go out of business. The death of inefficient firms

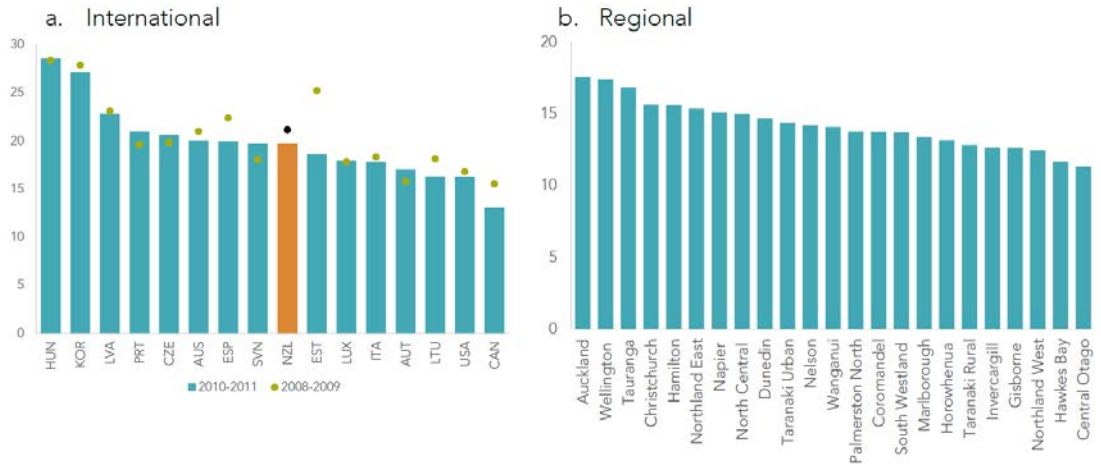
releases resources for more productive use and creates space for more productive firms. This leads to a virtuous cycle of Darwinian selection, or "creative destruction" that ensures only the fittest, most productive firms survive, and increases aggregate productivity (Doan et al, 2012).

Empirical evidence indicates a correlation between firm entry and exit rates, and the business cycle. In other words, high numbers of new entrants may indicate a growing economy and high numbers of firms exiting the market may be indicative of a recession (Doan et al, 2012). Theory suggests that a high rate of firm churn is a hallmark of a healthy business environment and a well-functioning, competitive market economy.

However, theory posits that other factors can also influence entry and exit rates, such as barriers to entry and the regulatory environment. Barriers to entry depend on the start-up costs of the particular industry; e.g. the fixed costs of aircraft manufacturing are higher than takeaway food retailing. Low regulatory barriers to entry can encourage entry into an industry – for example, New Zealand's permissive approach to new developments in financial technology (FinTech), which is New Zealand's fastest growing technology sector (Technology Investment Network, 2016).

The firm churn rate in New Zealand falls in the middle of the range of OECD countries surveyed by Conway, 2016, as shown in Figure 12.a. However, the regional data (Figure 12.b.) paints a more differentiated picture, with a difference of 5% between the most and least dynamic markets. Churn is higher in urban centres than smaller provincial towns, which reflects the more dynamic markets and higher competition in larger cities.

Figure 12: Firm churn rates – an international and regional comparison (Conway, 2016)

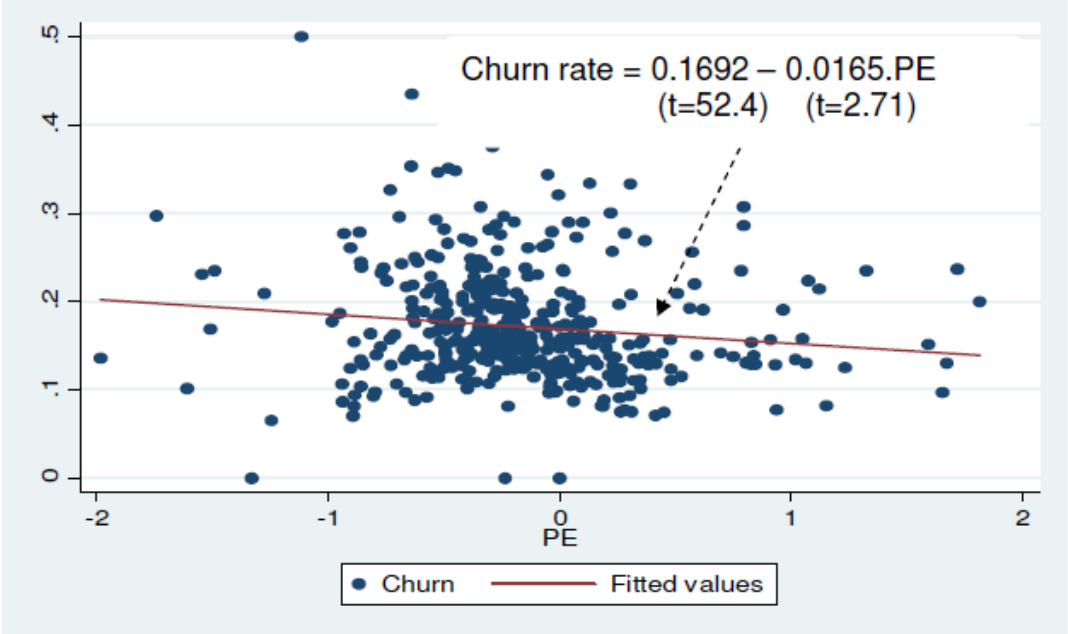


However, it should be noted that New Zealand has one of the highest rates of enterprise birth in the world and has been rated as the easiest place in the world to start a business (Doan et al, 2012; World Bank, 2017).

High firm churn is a likely indicator of competition. However, high competition in a market doesn't necessarily result in high firm churn. A monopolistically competitive or oligopolistic market may have several strong competitors competing intensely for market share, but low

churn due to high barriers to entry and exit. The intuitive relationship between firm churn and competition is supported by some empirical New Zealand-specific evidence, which indicates a weak positive correlation between the rate of firm churn in an industry and the level of competition as measured by profit elasticity, as shown in Figure 13 (Doan et al, 2012).[2] The high dispersion of results among industries is the likely reason for the relationship being weak.

Figure 13: Weak relationship between firm churn and profit elasticity in New Zealand (Doan et al, 2012)[3]



- *Note: some extreme outliers are removed.*

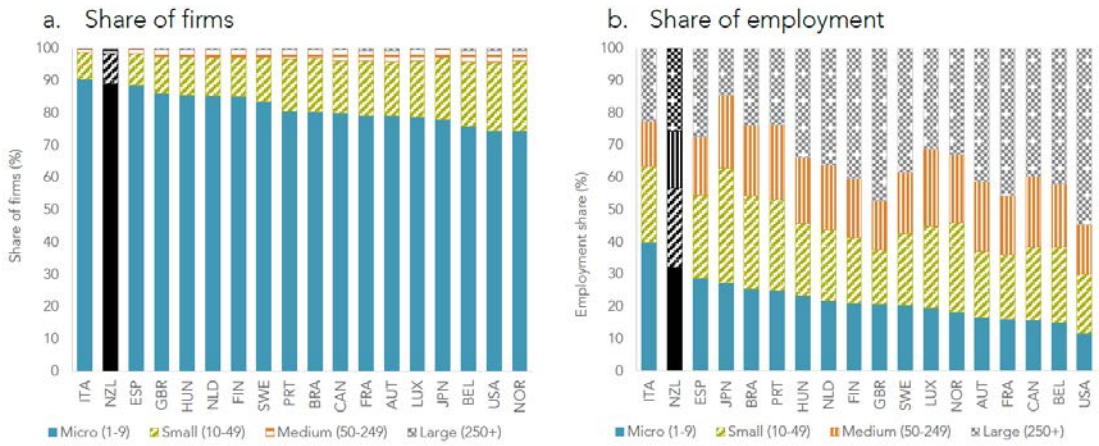
The New Zealand economy has high numbers of small firms which drag down aggregate productivity

The New Zealand economy features a high number of very small firms in comparison to other countries, as shown in Figure 14. Almost 90% of New Zealand firms have fewer than nine employees, second only to Italy in an OECD study (Criscuolo et al, 2014, as cited in Conway, 2016). These 'micro' firms constitute more than 30% of total employment in New Zealand. At the other end of the size distribution, firms employing over 250 people account for 25% of New Zealand employment compared with 55% in the United States (Criscuolo et al, 2014, as cited in Conway, 2016).

[2] Note, more negative profit elasticity indicates higher competition. Therefore, the relationship between profit elasticity and firm churn appears as a downward sloping line, although this is a positive relationship.

[3] These results should be treated with caution, as the figure includes positive profit elasticity, which is not theoretically possible.

Figure 14: Firm size in New Zealand (Conway, 2016)



Source: Criscuolo, Gal and Menon (2014)
Note: Sectors covered are manufacturing, construction and non-financial business services.

Small firms are often found in localised, low-competition markets

These small firms are especially concentrated in the services industry, for example, in hospitality, tourism or hairdressing, where, in theory, competition is often impaired due to localised markets. The low tradability and high spatial transaction costs of these types of services means that the size of the market is often constrained to the local geographic area. For example, while a processed food manufacturer can ship food nationally and even internationally, a hairdresser's clients are confined to those in the immediate vicinity. Of course, some services are highly tradable and have low spatial transaction costs, particularly knowledge-intensive industries, such as finance and ICT. Figure 15 shows the degree of domestic tradability of each industry, ranked from low to high, from left to right.

Figure 15: Domestic tradability index by industry in New Zealand (Conway, 2016)

The proliferation of small firms and low tradability leads to reduced productivity in the services sector and may drag down New Zealand's productivity overall (Conway, 2016). In some of these markets, there is no easy way to stimulate greater competition due to insufficient demand (for example roofing services in a small town). However, the Productivity Commission suggests that in some service sectors, reducing barriers to foreign investment, harmonising regulatory regimes and adopting international standards could improve competition (New Zealand Productivity Commission, 2014).

6. Conclusions and further research

This literature review has summarised the key empirical findings on competition in New Zealand, as well as theoretical explanations of the state of competition in New Zealand. As discussed in this report, there are many areas where more evidence or research would be useful in determining an appropriate policy response.

New Zealand faces unique challenges as a small economy, which impacts on the performance of firms and markets. The tension between the objectives of scale-driven efficiency and competition-driven efficiency is particularly acute for a small nation such as New Zealand. Further research could endeavour to identify industries in which more or less competition is desirable, to achieve the appropriate trade-off between these objectives. In some industries, more collaboration between firms might be desirable to achieve minimum efficient scale and drive innovation; in others high degrees of competition are paramount to improve outcomes for consumers.

While New Zealand has a middling rate of firm churn, there is high regional variation. In contrast to theory, New Zealand empirical evidence indicates a weak relationship between firm churn in an industry and competition. This suggests that factors other than competition are more important in influencing firm dynamics.

While competition across the New Zealand economy varies, the manufacturing sector appears to be the most competitive sector and the finance and insurance sector is the least competitive sector. Caution should be applied to comparing competition measures across radically different industries – for instance, industries with high fixed costs (such as mining) tend to be more concentrated. Most industries had no change in competition intensity between 2000 and 2010, but more industries had an increase than a decrease.

There are some limitations with existing data which prevent us from assessing the full picture of competition across the New Zealand economy, for example, the confidentiality requirements of Statistics New Zealand which exclude some industries from reporting. Also, data is reported on an industry basis, whereas competition occurs in markets. This means that geographic constraints on competition in regional markets are often ignored. Currently, there is very limited evidence on regional markets, which is a significant gap in our knowledge base. More evidence here would be useful in determining whether low competition in a sector is widespread or a problem confined to specific localised markets.

Some theory suggests a U-shaped relationship between competition and productivity, and also between competition and innovation. One study using New Zealand empirical evidence indicates that the U-shaped relationship between competition and productivity holds in the New Zealand manufacturing sector. However this has yet to be tested in other sectors, and further research would be desirable. This would help policy makers assess the implications of policies to increase competition on productivity and innovation.

Potential areas for future research coming out of this literature review are listed below.

Possible areas for future research

Consumer policy and labour markets

- How do labour mobility, skills, and geographic constraints affect labour market competition across different occupations?

Firm dynamics

- Is low competition the reason that New Zealand industries often show low "up-or-out" dynamics?
- Understand the reasons behind the weak relationship between firm churn in an industry and competition, as reported in Doan et al, 2012.
- In which industries would there be benefits to removing barriers to exit?

Factors affecting competition

- Some factors that affect competition are not commonly analysed. These include geography, policy change, foreign exchange, tariffs, transport or global supply and demand shocks. What is the effect of these factors on competition?
- Natural experiments may provide useful case studies e.g. the China Free Trade Agreement, regulatory change in an industry, or a large player entering or exiting a market.
- What is the effect of changes in technology on competition?

Industries/sectors

- In which industries is more or less competition desirable, to achieve the appropriate trade-off between scale-driven efficiency and competition-driven efficiency?
- What is the minimum efficient scale in different industries? How does being below or above this impact on productivity, price, quality and innovation in a market?
- What is the welfare cost to consumers of a lack of competition?
- How competitive is the finance and insurance sector? MBIE (2016) reported that the finance and insurance sector experienced the biggest reduction in competition between 2000 and 2010. What caused this, and have new entrants since 2010 (particularly in banking) increased competition in the sector?

International comparisons

- How does New Zealand's level of competition stack up in comparison to other small, distant economies?

Measuring competition

- Update PE, HHI, and concentration ratios in New Zealand with the most recent data. What is the trend in these measures across time?
- What is the empirical relationship between competition and innovation in New Zealand?

- Can we confirm and explain the counterintuitive results that were found when comparing productivity versus profit elasticity, with productivity versus the Lerner index? Is this due in part to the measure of productivity that is being used?
- Do firms within an industry agree about how competitive that industry is? If not, why not? (e.g. they may have differing opinions on market scope)

Regional markets

- How does competition vary across regions and over time? There is currently a limited evidence base on competition in regional markets (as opposed to industries on a national level).

Regulation

- How has regulatory change or government intervention impacted on competition previously in New Zealand's recent history? (e.g. Fonterra, KiwiBank)
- In which markets would regulatory reform be most valuable, and in which is it lower priority?
- Is there a point where too much competition is inefficient (would New Zealand ever reach the downward-sloping portion of the curve in Figures 8 and 10)?

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Appendix 1: Comparison of least competitive industries, according to different measures and studies[4]

MBIE (2016): Profit elasticity by 1-digit sector (unweighted)	*Dillon (2017): market share*	*Dillon (2017): concentration ratio*	*Dillon (2017): Herfindahl index*	*Dillon (2017): profit elasticity*
Manufacturing	Dairy cattle farming	Basic iron and steel manufacturing	Commercial space heat/cooling equipment manufacturing	Machine tool and part manufacturing
Construction	Commercial property operators/developers	Soft drink, cordial and syrup manufacturing	Confectionery manufacturing	Photographic equipment wholesaling
Hospitality	Dairy product manufacturing	Beer and malt manufacturing	Postal services	Sound recording studios
Transport and storage	Supermarket and grocery stores	Fertiliser manufacturing	Basic iron and steel manufacturing	Structural steel erection services
Communication services	Grocery wholesaling	Petroleum product wholesaling	Inorganic industrial chemical manufacturing	Scientific research

[4] Note: this paper has not received technical peer review so results should be treated with caution.

Appendix 2: Summary of New Zealand competition literature and key themes

Papers are colour-coded based on whether they are primarily empirical or theoretical. Empirical findings in red; theoretical in blue.

Source	Theme	Conclusions
Abramovsky, L., Griffith, R. and Miller, H. (2010). *Public Policy and Growth in New Zealand*.	Competition and intangible investment International competition	• Both too little and too much competition are negatively associated with intangible investment (consistent with Chappell and Jaffe, 2016). • International competition can drive the Darwinian selection process of firms, driving poor performers out of business and increasing aggregate efficiency; but may also reduce incentives for domestic investment in innovation (in technologically laggard industries).
Chappell and Jaffe (2016). *Intangible investment and firm performance*. Wellington: MOTU Public Policy research.	Intangible investment	• Larger and newer firms have more intangible investment. • Both too little and too much competition are detrimental to intangible investment. • Investment appears unrelated to a firm's past growth.
Conway, P. (2016). *Achieving New Zealand's productivity potential*. Wellington: New Zealand Productivity Commission.	Barriers to competition in NZ Competition policy	*Theoretical discussion of why NZ is underperforming in productivity and recommendations to improve this. Some comments on competition too.* • Importance of international connections: even more important for small economies to be internationally connected to overcome scale disadvantages and reap benefits of larger, more competitive markets. • Scale disadvantages accentuated: While the importance of distance for low value-added activities has decreased due to a reduction in transport costs, the rewards to proximity for high value-added activities has increased given the importance of face-to-face contact and tacit knowledge. As a result, these activities are increasingly taking place within large cities.

		• Policy prescriptions for improving competition in the service sector: ○ Reform Commerce Act s 36 ○ Review occupation regulation with the aim of removing anti-competitive entry barriers and conduct regulation ○ Reduce switching costs ○ Remove the shipping exemption from the Commerce Act and improve the logistics chain. • Why NZ is underperforming in productivity: ○ Low technology diffusion. Technology diffusion is important for productivity growth. NZ evidence indicates that technology diffusion/productivity spillover from high productivity foreign firms to low productivity domestic firms is low. ○ Distance from major markets reduces NZ's participation in GVCs, which are important for technology diffusion. Negative impact of distance may have increased due to the growth of knowledge based industries and the importance of face to face contact and tacit knowledge in this sector. ○ Capital-shallow economy. Weak business investment due to high long-term real interest rates and small markets. ○ High real exchange rate a disincentive to export. ○ Small markets and low competition. High number of small unproductive firms, especially in service sector. Often low competition in these small local markets (accommodation,

		restaurants); low churn rates.
		
		• Foreign direct investment trade off:
		  ○ Positives: exposes domestic industries to competition, technology diffusion/learning opportunities, market access and funding.
		  ○ Negatives: multinationals imposing monopoly power is bad for consumers. While international evidence shows that foreign-owned firms improve aggregate productivity through competition and technology spillover effects, NZ evidence indicates that the technology diffusion/productivity spillover from high productivity foreign to low productivity domestic firms is low.

Crawford, R. (2006). *Competition Policy and Innovation Issues for New Zealand.* Wellington: Ministry of Economic Development.	Competition and innovation	*Meta-analysis/literature review on recent competition literature. Theoretical and most of these papers are based on overseas evidence, even the NZ literature reviews.*
		
		• Economic literature on competition in NZ falls into 3 categories:
		  ○ Expert commentary on application of competition policy in specific cases
		  ○ Descriptive statistics on characteristics of NZ industry relative to competition policy (e.g. Stevens, 2009)
		  ○ Econometric studies.
		
		• Literature points to a positive relationship in developed countries between effective competition policy (especially low regulatory

		barriers to entrepreneurship, effective competition law, and openness to trade), innovation, productivity growth and economic growth. • Benefits of dynamic competition through innovation outweigh benefits of allocative and productive efficiency in medium/long-term. • Implications: depends on country, but may justify relaxed approach to post-innovation market power to incentivise investment.
Devine, H., Doan, T., Iyer, K., Mok, P., Iyer, K., and Stevens, P. (2010). *The Dynamics of Competition in New Zealand.* Wellington: Ministry of Economic Development.	Labour productivity	*Empirical evidence from this paper:* • High output growth is associated with high labour productivity and productivity growth. This is consistent with the reallocation effect (competitive pressure reallocates resources to more productive firms). • Both entrants and exiters have below industry average labour productivity. The latter is consistent with the selection effect (least efficient firms are driven out of market). • High PE industries have high entering and exiting rates compared to low PE industries. • Efficient firms are able to appropriate market share from the relatively inefficient ones.
Devine, H., Doan, T., Iyer, K., Mok, P., and Stevens, P. (2011). *The Productivity and Competition Nexus in New Zealand.* Wellington: Ministry of Economic Development.	Competition and productivity relationship Competition and innovation Measures of competition	• Testing the "inverted U" relationship between competition and productivity in NZ gives different results depending on the competition measure used. • Empirical evidence from NZ manufacturing industry confirms an inverted U relationship between competition and productivity based on the Lerner index (a Lerner value above 0 implies the firm has some

		market power, i.e. can set Price above marginal cost and is subject to less competition). • I.e. at very low levels of competition, higher mark-up is associated with higher productivity. (Magnitude: 1% ↑ markup -> 0.43% ↑ firm productivity) However, as competition intensifies, beyond the inflection point of 15% mark-up, higher competition will result in reduced productivity. This can be attributed to reduced managerial effort (Schmidt, 1997) and/or the Schumpeterian effect (Aghion et al, 2005). • *Also: Theoretical discussion of effect of competition on productivity and innovation.*
Devine, H., Doan, T., Iyer, K., Mok, P., and Stevens, P. (2012). *Decomposition of New Zealand firm productivity, 2001-2008.* Wellington: Ministry of Economic Development.	Competition and productivity relationship Labour productivity; effect of entrants and exiters	*Empirical evidence for NZ*: • Contribution of entering firms to aggregate productivity index is negative and contribution of exiting firms is positive, implying that entering and exiting firms are less efficient than surviving firms. However, the positive effect of exiters > negative effect of entrants. • Entrants are less efficient because they haven't had much experience i.e. they are 'learning-by-doing'. Exiters are generally less efficient by definition (their inefficiency has led to their exit from the market). • NZ evidence indicates that policies aimed at job creation should pay attention to entering and exiting firms as they are important contributors in job creation and destruction. This compares to continuing (often larger) entities, which play crucial roles in growing outputs. • International evidence indicates countries with business-friendly

		regulatory environment (e.g. NZ) have entrants with lower productivity growth than those with higher barriers to entry.
		• A greater proportion of aggregate productivity determined by entrants and exiters due to high churn rate and higher proportion of small firms relative to other OECD countries.
		• The key drivers of the aggregate productivity index in the short term and long term are different. In the short term, an increase in firm productivity (x-efficiency) is the main driver; in the long term reallocation and selection effects/firm churn is more important.
		
		Theoretical discussion on relationship between competition and productivity.
		Overseas evidence has shown that competition contributes significantly to productivity growth. This occurs through:
		
		• Within-firm effects (x-efficiency). Pressure to lower costs through:
		  ○ Managerial efficiency
		  ○ Increased assimilation of technology
		  ○ Organizational restructuring/downsizing.
		• Between-firm effects (market sorting)
		  ○ Reallocation effect (market share reallocated from inefficient to efficient firms)
		  ○ Selection effect (inefficient firms forced out of market).
		Studies on the UK manufacturing industry have shown that:
		
		• For firms remaining in the market, there is limited mobility within the productivity distribution – i.e. 45% of efficient firms stay efficient and 70% of inefficient firms had exited; the remainder staying inefficient. However, 50% of most productive firms had also exited.

		• The considerable churn is evidence of the reallocation effect in action.
Doan, T., Devine, H., Nunns, P. and Stevens, P. (2012). *Firm Entry and Exit in New Zealand Industries.* Wellington: Ministry of Economic Development.	Firm entry and exit	• Entry and exit is a function of the business cycle. Entrants increase competition and competition causes least efficient firms to fail. NZ has one of the highest rates of enterprise birth (even the threat of potential entry puts pressure on incumbent firms to increase efficiency). • International evidence shows that entrants are smaller and less productive than incumbents and less likely to survive. Surviving entrants experience improvement in labour productivity. Exiters are less productive than incumbents prior to exit; although increase in productivity in final years. This could be because they employ fewer people in their final and penultimate years (laying off as they prepare to shut). • Weak relationship between firm churn in an industry and competition.
Evans, L., Quigley, N., Mellsop, J., Burgess, M., and Curry, E. (2002). Innovation and competition policy – recent economic literature. Wellington: Charles River Associates.	Innovation and competition	*Meta-analysis based on international literature* • Competition is essential for long-run sustainable growth – it ensures firms strive to perform well relative to other firms in their industries. • Cooperation can be socially beneficial particularly where it is disciplined by competition. Most businesses engage in both competition and cooperation with other firms. • Cooperation may encourage innovation, but is often restricted by competition law. Competition provides incentives and discipline to allow firms to innovate. Cooperation is also useful for innovation, for example in sharing the fixed costs of R&D and taking advantage of knowledge externalities.

		• Other efficiencies that may arise from cooperation include standard setting, reduced transaction costs and diversification of risk.
		• The market structure most supportive of innovation is oligopoly (i.e. moderate competition). This aligns with the U-shape relationship between competition and innovation discussed elsewhere.
		• Dynamic efficiency gains (through innovation) are significantly more important for social welfare than static (allocative and productive) efficiency gains.
		• Where there is a trade-off, competition policy should favour dynamic efficiency gains.
		• A more concentrated market is not necessarily less competitive. Firms may compete heavily in concentrated markets, and anticompetitive behaviour is harder to sustain in dynamically competitive markets.
		• To promote innovation, competition policy should:
		  ○ Eliminate barriers to entry – this will increase incentives to innovate and reduce returns to anti-competitive practices.
		  ○ Relax restrictions on cooperation – must be introduced concurrently with the above as the threat of entry will discipline cooperation so that it is socially beneficial.
		• Competition is multidimensional, and may involve factors other than price such as quality, product differentiation, brand recognition etc.
		• UK evidence indicates that:
		  ○ Firms facing greater competition in the product market had significantly higher growth rates of total factor productivity.
		  ○ Less competitive industries have lower innovation, but within industries, firms with higher market share innovate most frequently.

		• Network effects make entry into a market more difficult but do not necessarily lead to market failure or reduce incentives to innovate.
Evans, L., and Hughes, P. (2003). *Competition Policy in Small Distant Open Economies: Some Lessons from the Economics Literature*. New Zealand Treasury Working Paper 3/31.	Competition policy in small distant economies	• Low barriers to trade are the most important aspect of competition law for small economies, by facilitating competition through imports. • Small countries should use case-by-case efficiency criteria to judge mergers and trade practices rather than rote application of overseas rules. • Cooperation can be efficient in small economies by helping firms achieve scale and export performance. Trade-off between allowing firms to achieve minimum efficient scale vs maximising consumer welfare.
Green, R., Agarwal, R., Brown, P., Tan, H., and Randhawa, K. (2011). *Management Matters in New Zealand: How does Manufacturing Measure Up?* Ministry of Economic Development Occasional Paper 11/03	Relationship between firm performance and management	• Firm size is an important determinant of management performance; larger New Zealand firms significantly outperform smaller firms. • Ownership is also a factor; multinational corporations adopt and spread better management practices as compared to domestic firms. • New Zealand publicly listed companies also exhibit superior management performance compared to other types of companies including privately-owned firms, family-owned firms and co-operatives. • Family run firms tend to underperform other firm types in their management practices. • Higher levels of education and skills among both managers and non-managers positively impacts management performance. • The degree of manager autonomy is a crucial factor leading to superior management performance.

		• Organisational hierarchy is also significantly related to management scores, indicating that optimally balancing organisational structure and managerial autonomy is crucial. • While the international study found increased labour market flexibility correlated with a superior people management score in a number of countries, the New Zealand findings do not support this. New Zealand has over the years developed a relatively flexible labour market, but does not score well in people management practices. • The nature and characteristics of people management, including collaborative workplace relations and an open organisational culture, are primarily determined by firms themselves rather than by the structure of the labour market. • New Zealand managers tend to over-rate their firms' management performance. Their self-assessed scores of how they see their firm performing do not align with the firm's management score as assessed through the interview scoring grid.
Griffith, R. (n.d.). *Competition in New Zealand in International Context*.	Average profitability	• Average profitability higher in NZ higher than most other OECD countries in most industries. • Small capital market impediment to R&D activity.
Griffith, R. (2010). *Competition, Innovation and Growth.*	Competition and growth; competition and productivity; Competition and innovation relationship	*Based on international literature* • Reconciling the conflicting views on the competition and growth relationship. • Competition exerts downward pressure on costs -> ↑growth; competition reduces scope to earn monopoly profits and incentive to innovate -> ↓growth.

		• Empirical evidence suggests firms are more innovative and productivity growth higher in more competitive industries, other things equal.

McLeod, R. (n.d.) *Competition Policy in Small Economies: Issues Arising for New Zealand.*	Competition policy in small distant economies	*Theoretical discussion of why competition policy for small countries should be tailored to their unique circumstances.*
		
		• Small economies have more concentrated markets.
		• Tension/trade-off between encouraging competition and reducing market power of firms, and efficiency advantages of larger firms (minimum efficient scale). In other words, conflict between the small number of firms in many industries and the fact that these firms are often of sub-optimal size (See Gal, 2001) "There may be a trade-off between achieving allocative efficiency through vigorous application of competition law, and productive efficiency through economies of scope and scale".
		• Open trade and investment policies can mitigate the disadvantages of small size, and access to export markets can boost the productive efficiency of domestic producers.
		• Characteristics of a small economy:
		  ○ Approaching the minimum size necessary to operate a full set of regulatory and competition policies and institutions.
		  ○ Can support only a small number of competing firms in many industries.
		  ○ Many firms will struggle to achieve minimum efficient scale when catering to domestic demand only.

		• Smallness of NZ exacerbated by geographic isolation and internal dispersal. • Small economies have high levels of industrial concentration, and presence of monopoly and oligopoly. For economic costs of monopoly, see Evans et al (2002).
Ministry of Business, Innovation and Employment (2016). *Competition in New Zealand Industries: Measurement and Evidence*. Occasional Paper, 16/1.	Empirical analysis of competition in NZ industries, trends and international comparison Measuring competition Competition and innovation	• [First major study on general levels of competition in NZ economy (rather than market studies)] Empirics: • Most industries in NZ did not experience a change in competition intensity between 2000-2010. • Competition levels in NZ industries range from -0.33 to -10.17. Unweighted mean is -2.72. Theory: • McCann, 2009: NZ paradox of good business environment and open economy yet low labour productivity. • Potential returns to innovation are lower in small country like NZ. Therefore, decreasing returns to innovation is not a good reason to limit competition in NZ. • More competition likely to stimulate innovation rather than curtail it, in NZ (based on theory).
Ministry of Business, Innovation and Employment (2016). *What we know (and don't know) about economic growth in New*	Factors influencing competition	• High firm churn and low growth in entrants may reflect low barriers to entry but lack of competition.

Zealand. 16/01.		• NZ has low competition compared to similar countries based on profit elasticity (Devine et al, 2013b). • Higher quality management practices positively correlated with firm performance (labour productivity, total factor productivity, return on capital, firm size and probability of survival). • NZ ranked 5th equal in OECD product market regulation (PMR) index which measures competition-friendliness of regulatory settings. • Some inconsistency in the extent to which policy settings are supportive of competition
New Zealand Productivity Commission. (2014). *Boosting Productivity in the Services Sector.*	Measuring competition Policies that affect the level of competition	• Pressure from actual or prospective competition increases productivity growth. • No single measure of the intensity of competition. • Intensity of competition varies between industries in the services sector. But generally NZ service industries experience less competition than the goods-producing and primary industries. • At the whole-of-industry level, services industries with less intense competition are finance and insurance, rental, hiring and real estate, retail, and professional, scientific and technical. • Many policies affect competition in service industries, including barriers to foreign investors. • ICT is increasing competition by expanding consumers' access to info about service providers, and opening up retail to overseas competition.
Stevens, P. (2009). *Competition in New Zealand: An analysis using micro data.*	Competition measures in NZ	Empirical evidence: • Considerable heterogeneity in degree of competition within and

		between 2-digit industries.
		• High degree of correlation between the market share based measures of competition (Herfindahl, concentration ratio).
		• Industries with most concentrated markets seem to be those with high fixed costs (e.g. mining).
		Theory:
		• Competition is a process and difficult to define, so this framework is useful:
		  ○ Determinants (fixed costs, patents) -> activities (entry, exit, pricing, advertising) -> outcomes (profits, market share, innovation).
		• Measures of competition
		  ○ Concentration ratio
		  ○ Market share
		  ○ Herfindahl index
		  ○ Price-cost margin (PCM)
		  ○ Lerner index
		  ○ (does not mention profit elasticity).