The dynamics of competition in New Zealand

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Abstract

In this paper we examine the performance and dynamics of markets in the New Zealand economy. Using the prototype Longitudinal Business Database (LBD), we measure the evolution of competition amongst NZ firms. Our analysis has two parts. First, we examine a range of indicators of the dynamics across economy. Like most other studies in this area, our definition of 'market' is the 4-digit industry (using the 1996 ANZSIC system). Second, we focus on a few industries and examine the dynamics of the market in more detail. Our lens for doing this is a transition matrix. We use these matrices to examine the dynamics of various aspects of the productivity distribution (and firm entrants).

JEL Classification: D40, D22, D24

Keywords: Competition, firm entry and exit, turnover

Table of Contents

List of Figures

List of Tables

1. Introduction

Competition is a dynamic process. Firms interact: they act, they react, they plan and they anticipate. The competitive process involves firms growing and shrinking, being created and being destroyed. In order to aid our understanding of competition in New Zealand, in this paper we examine the dynamics of its industries. This is the second of three papers that are the initial outputs of a cross-departmental project to determine the nature, extent and impact of competition in the New Zealand economy.

In Devine, Doan, Iyer, Mok and Stevens (2011a), we consider the background to this analysis and the measurement of competition. We outline two indices of competition in a market: the price-cost margin (or Lerner index) and the recently developed profit elasticity measure due to Boone (2008).

Competition limits firms' ability to mark up their prices over marginal costs, but the overall effect on the average price-cost margin is ambiguous; it depends on the balance between reducing the price-cost margin of all firms and causing the least efficient firms to exit the market. Industries that are more competitive are likely to have less of a spread of profitability or productivity than less competitive markets, *ceteris paribus* (Haskel and Martin, 2002). If the price of inefficiency in competitive markets were the death of inefficient firms, we would expect to see more firm exits in more competitive markets. We would also expect firms at the lower end of the productivity distribution to be more likely to exit than more productive ones.

In this paper we examine the performance and dynamics of markets in the New Zealand economy. Our analysis has two parts. First, we examine a range of indicators of the dynamics across economy. Like most other studies in this area, our definition of 'market' is the 4-digit industry (using the 1996 ANZSIC system). Second, we focus on a few industries and examine the dynamics of the market in more detail. Our lens for doing this is a transition matrix. We use these matrices to examine the dynamics of various aspects of the productivity distribution (and firm entrants). Through this we can answer a number of questions about the functioning of these markets. Are firms' positions in the distribution persistent over time or are market leaders overtaken by their peers? What happens to those at the bottom of the distribution? Are they forced to either improve their performance or exit? Or are they able to stumble on for the same time?

In the next section we provide some background to the paper. In section 3 we briefly describe our data sources. In section 4 we look at the performance of New Zealand industries. Section 5 takes a closer look at industry dynamics in a selection of industries using transition matrices. Section 6 concludes.

2. Background

New Zealand's policies compare favourably with international best practice in areas like ease of starting a business and the general regulatory environment. It is an open economy: tariffs and other protective mechanisms have all but been phased out and it has established free trade agreements with key trading partners, such as China. Nevertheless, New Zealand has a level of labour productivity that is about 80% of the OECD average (MED *et al.*, 2011). As the 2003 OECD economic survey of New Zealand noted: 'The mystery is why a country that seems close to best practice in most of the policies that are regarded as the key drivers of growth is nevertheless just an average performer' (OECD, 2003).

One explanation is a lack of competition. It is argued that competition tends to raise managerial effort and hence company performance (Vickers, 1992) and promote innovation (Porter, 1990). Others have argued that competition may actually *reduce* innovation. It is argued that competition lowers both the rents from which innovative activity can be funded and the post innovation rents, the hope of which stimulates such activity (e.g. Schumpeter, 1943; Aghion and Howitt, 1992; and Grossman and Helpman, 1991). Recently, Aghion and Griffith (2006), and with various other co-authors[1] brought the two alternative views together into a framework whereby the relationship between competition and outcomes is U-shaped.

How do competitive markets work? Competition is often supposed to reduce slack and promote efficiency, to weed out the less efficient and promote (or reduce) innovation. Authors such as Nickell (1995) divide the impacts of competition into improvements of performance in static (efficiency) terms (e.g. through managerial effort) and those in the dynamic context (e.g. through innovation)[2].

[1] E.g. Aghion, Bloom, Blundell, Griffith and Howitt (2002, 2005), Aghion, Griffith and Howitt (2006a and 2006b).

[2] Tirole (1988), considering the strategic interaction of firms in a game-theoretic industrial organisation framework, classifies the instruments with which firms to compete in a market according to the speed at which they can be altered. In the short run, firms compete by altering their price, advertising and sales effort. In the medium term firms can change their cost structures and product characteristics (within given cost and production sets – technology, in economics parlance). Finally, in the long run, the

What would a competitive market look like? In Devine, Doan, Iyer, Mok and Stevens (2011a), we considered the measurement of competition. In particular, we outlined two indices of competition in a market: the *price-cost margin* (or Lerner index) and the recently developed *profit elasticity* measure due to Boone (2008). We have already noted that competition attenuates firms' ability to mark up their prices over marginal costs, but that the overall effect on the average price-cost margin is ambiguous. Competition will tend to affect the profits of less-efficient firms by more than it does more-efficient firms. Therefore, the overall impact depends on the balance between reducing the price-cost margin (PCM) of all firms and causing the least efficient firms to no longer be profitable and to exit the market. This is the basis of the profit elasticity (PE) measure of Boone (2008). We shall utilise the PE measure in this paper.

3. Data and variables

The data for this study comes from the prototype Longitudinal Business Database (LBD). The LBD is built around the Longitudinal Business Frame (LBF) (Seyb, 2003). To this is attached, among other things, AES, Goods and Services Tax (GST) returns, financial accounts (IR10) and aggregated Pay-As-You-Earn (PAYE) returns all provided by the Inland Revenue Department (IRD). The full prototype LBD is described in more detail in Fabling, Grimes, Sanderson and Stevens (2008) and Fabling (2009).

The panels extracted for this paper are Annual Enterprise Survey (AES), Linked Employer-Employee Database (LEED), Business Activity Indicator (BAI) dataset and company financial accounts (IR10). The firms are linked, starting in 2000 and at present continuing through 2009, allowing the tracking of individual firm performance over time. We have corrected for the discontinuity in firm identifiers based on the employment continuity rules (see Fabling, 2011). For more information on the calculation of the variables used in this paper, see Devine *et al.*, (2001a) and the data appendix to this paper.

In order to identify entering and exiting firms, we lose one year from the data at the beginning and the end. Therefore, our analysis relates to the period from 2001 to 2008.

product characteristics and the cost structures themselves (i.e. shift the frontier of the production and cost sets) can be changed through research and development and other investments (p. 205).

3.1. Productivity

We measure labour productivity using data from the Annual Enterprise Survey, supplemented by the Business Activity Indicator (BAI) database of GST returns, Financial Accounts from Inland Revenue and the Linked Employer-Employee Database (LEED). Value added is calculated as gross output less intermediate consumption and deflated using production and materials deflators at the 2-digit ANZSIC level. Our measure of labour input is a combination of rolling mean employment (RME) and working proprietor counts from the LEED.

Our measure of employment is made up of two components: employees and working proprietors. Our measure of employees is defined as an average of twelve, monthly PAYE employee counts in the year (known as rolling mean employment, or RME). This takes into account part-year working, but not variations in hours worked (such as the difference between full-time and part-time workers). Our measure of working proprietors also comes from the LEED, but is rather more complex. It is a count of the number of self-employed persons who are paid taxable income during the tax year. This is based on a number of IRD forms and is calculated on a March year-end basis. For more information on the calculation of this figure, see the data appendix.

3.2. Firm entry and exit

Firm entry and exit in any study of this nature is complicated by two major problems. The first is misidentification of a firm birth or death because of incomplete or incorrect data. The second is the fact that firms can change industries. This second may happen because the firm has truly changed its industry – think IBM changing from computers to consulting; it may also because firms are coded to their predominant industry (by employment share) and this may change because of changing employment shares within the sub-sections of the firm (Fabling, 2011).

In this paper we define firms that enter, exit and present in an industry in a given year t as follows:

N_t = entering firms are present in year t but not in t - 1

C_t = continuing firms are present in year t and t - 1

X_t = exiting firms are present in year t - 1 but not in t

Continuing firms are classified as active firms with positive VA and employment. Although we are aware of firms changing industries they have not been taken into account in this analysis; they are classified as continuing firms.

3.3. Profit elasticity

Our estimates of the price elasticity of profits (PE) come from a set of industry-year OLS regressions described in Devine *et al.* (2011a). In particular, we take the estimated elasticity, $\hat{\beta}$, from the from the following OLS regression:

$$PE_{jt} : \ln\left(y_{ijt} - tvc_{ijt}\right) = \alpha_{jt} - \beta_{jt} \ln\left(\frac{tvc_{ijt}}{y_{ijt}}\right) + \varepsilon_{ijt} \quad (1)$$

where y_{it} is gross output of firm i at time t, total variables costs (tvc_i) are the sum of intermediate consumption and labour costs. All variables are deflated using production and materials deflators at the 2-digit ANZSIC level. Please refer to Devine *et al.* (2011a) and Table 1 in the Appendix to this paper for detailed explanation of the measures.

4. Industry performance

In this section, we present a picture of the performance of industries in New Zealand. We begin by summarising the overall results. We then consider the relationship between firm growth and labour productivity. Finally, we focus in on a subset of industries that were rated by Devine *et* al., (2011a) as having relatively high and relatively low levels of competition, as measured by their profit elasticity measure.

4.1. Overall results

In this section, we present a picture of the performance of industries in New Zealand. The full set of results is set out in Table A - 2 in the appendix to this paper and are summarised in Table 1. Note that the figures for each industry set out in Table A - 2 are the unweighted averages of firms in that industry. Therefore one must be careful interpreting these figures. The figure for labour productivity is the unweighted average of firm-level labour productivity in an industry (i.e. the sum of labour productivities divided by the number of firms in the industry), not the labour productivity of the industry (i.e. the sum of value-added divided by the sum of labour input). This is because we are interested in the performance of firms within the market. Furthermore,

Table 1 summarises the unweighted industry level figures. These figures should not be interpreted as economy-wide figures[3].

The first row of Table 1 describes labour productivity growth. This is the log difference of labour productivity (i.e. $ln(LP_t)–ln(LP_{t-1})$). We can see that, on average, industries' labour productivity grew around two and one-half percent between 2001 and 2008. However, the average firm in over a quarter of 4-digit industries experienced negative growth.

The second row describes output growth (the log difference in gross output). On average, output actually shrank for industries between 2001-2008. Again, note that this suggests that the average firm in the average industry experienced negative output growth. It is likely to be the case that most of the output in most of the industries is produced by a few large firms that experienced positive output growth.

In the third row, we summarise the results for the dispersion of labour productivity (the ratio of the 90th to the 10th percentile of labour productivity in industries). The mean labour productivity gap between the 90th and 10th percentile in industries is about 17 to 1, with the median of 12 to 1 (Column 3). This indicates that the labour productivity difference between the most productive and least productive is large.

The next two rows summarise our industry average entry and exit rates. Entry rates have tended to be higher than exit rates over this period, with 8.8% of the firms in the median industry in any year being new and 7.4% exiting. Therefore there is a net entry of firms between 2000 and 2008.

The final two rows describe the labour productivity of the entrants and exiters into industries, relative to the industry mean. In most industries, both the entering and exiting firms have lower than average labour productivity. The fact that exiting firms have lower productivity than continuing firms should be no surprise. It is consistent with the view that competition drives out less productive firms. On the other hand, the fact that the new entrants tend to be less productive than the industry average may be rather less intuitive on first consideration. This is consistent with the fact that firms have to pay a set up cost to entering the market and those firms need to undergo a period of learning-by-doing to reach their equilibrium value of labour productivity. Evidence presented in Fabling, Grimes, Sanderson and Stevens (2007) suggests that

[3] If, for example, large firms are more productive, the figure in the tables will underrepresent the LP for the industry as a whole.

when firms enter, their productivity is below average, but that after a few years they asymptote to a level slightly above the mean. These results are consistent with other studies of this nature (e.g. Foster *et al.*, 1998; Law & McLellan, 2005).

Table 1: Summary of industry performance measures and dynamics, 2001-2008

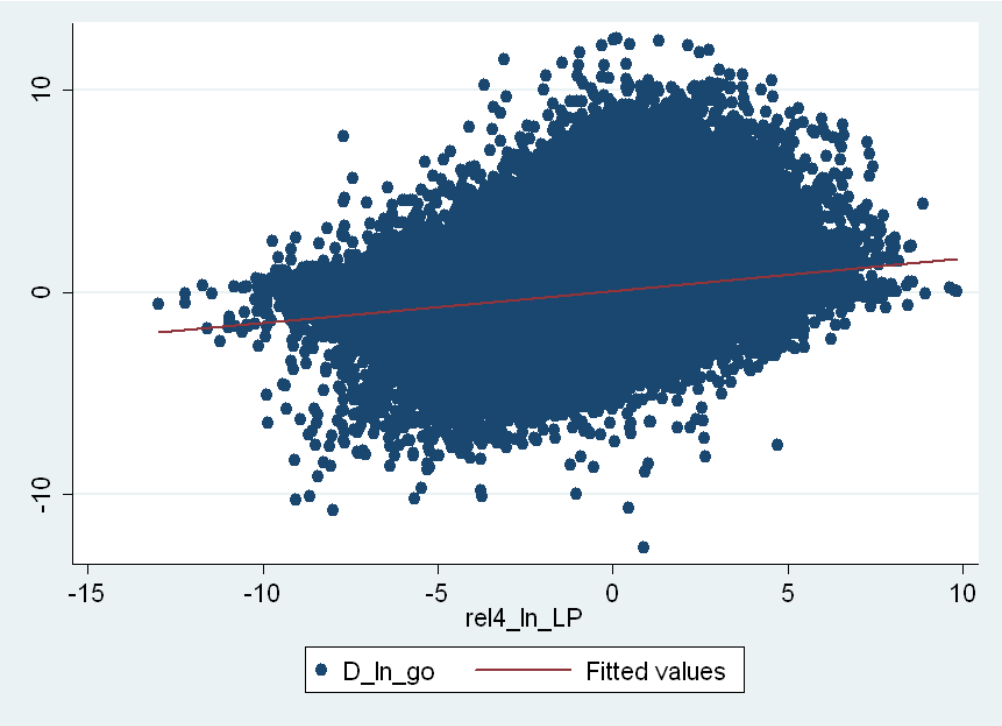
	Mean	P25	Median	P75
Output growth	-0.040	-0.073	-0.042	-0.009
Labour productivity growth	0.025	-0.001	0.022	0.046
Labour productivity 90/10 ratio	16.816	8.235	11.588	18.939
Entry rate (%)	9.9	6.9	8.9	11.5
Exit rate (%)	8.0	6.4	7.4	8.8
Relative Productivity				
Entrants	-0.388	-0.530	-0.411	-0.233
Exiters	-0.392	-0.607	-0.406	-0.214

4.2. Output growth and labour productivity

Before we narrow our focus and consider the dynamics of some specific examples of industries in more detail, it is perhaps instructive to consider one more thing, the relationship between productivity and growth. At the aggregate level, ever since Solow (1956), we have focussed on productivity as the main source of output growth in developed economies. Is this true at the micro level? Do more productive firms grow faster? Do firms that are becoming more productive also grow faster? The Boone (2008) model is based on the unproductive, inefficient firms exiting the market and having profits reallocated to their more efficient rivals as a result of competition[4].

[4] As well as seeing less efficient firms exit, we would expect more efficient firm to grow.

Figure 1: Output growth and relative labour productivity

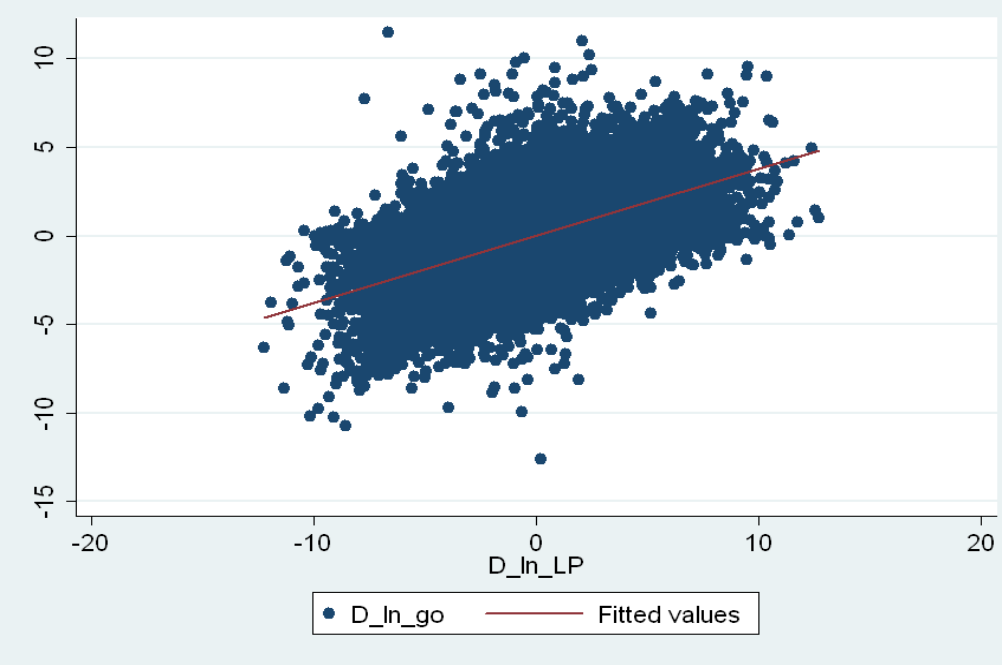


We can explore the reallocation effect of competition on productivity growth through the relationship between output growth and productivity. More productive do indeed appear to grow faster. Figure 1 shows a scatter plot of the growth in output (the first difference of log gross output, D_ln_go) and the labour productivity of the firm relative to the average in the 4-digit industry (rel4_ln_LP). We found evidence of a positive correlation between output growth and relative labour productivity, with a correlation coefficient of 0.213, which is significant at 5% level[5].

We also found a strong positive (0.584) correlation between output growth and relative labour productivity growth, suggesting that high LP growth firms are growing faster, in terms of gross output. These significant positive correlations suggest that competitive markets are reallocating resources to most productive firms in the market.

[5] Firms that are more productive than their industry peers do indeed appear to growth faster.

Figure 2: Output growth and labour productivity growth



4.3. Narrowing our focus: Competition, industry performance and firm dynamics

In order to get a better feel for our results, in this section we focus in on a selection of a dozen 4-digit industries. Because the subject of this project is competition, we use the profit elasticities (PEs) generated in Devine *et al.* (2011a) as our focusing mechanism. We shall focus further on a subset of these in Section 5.

Table 2 summarises the measures of industry performance and dynamics for six of the industries with the highest estimated PE and six with the lowest. We also provide figures for the employment share of the industry in the whole sample. The industries vary in size from "*Industrial machinery and equipment manufacturing"*, with an employment share of 0.8% in the whole economy, to "*Cafés and restaurants"*, with an employment share of 3.5%.

The high PE (i.e., more negative) industries tend also to have lower PCMs. They also appear to have higher turnover, both in terms of entry and exit. Another interesting result is that they tend to have less dispersed labour productivity, in terms of the ratio of the 90th percentile to the 10th percentile firm. Firms in the industries with a high PE tend also to experience higher labour productivity growth. However, without proper instruments, we have to be careful in interpreting this relationship as causal. We investigate the relationship between industry-level measures of competition and firm performance in more detail in Devine *et al*., (2011b).

Table 2: Summarising industry measures of performance, 2001-2008

	LP growth	***Output growth***	***Enter rate***	***Exit rate***	***LP 90/10***	$\frac{LP^{X}_{j,t-1}}{LP_{jt}}$	$\frac{LP^{N}_{jt}}{LP_{jt}}$	***PE***	***PCM***	***Employment Share***[1]
High PE industries										
Industrial machinery and equipment manufacturing	0.022	-0.012	9.0%	6.8%	7.9	-0.555	-0.577	-3.597	0.106	0.8%
Takeaway food retailing	0.081	-0.027	14.0%	12.2%	9.9	0.102	-0.447	-3.967	0.055	1.1%
Retailing	0.007	-0.081	12.5%	11.5%	19.8	-0.637	-0.123	-2.871	0.044	0.9%
Accommodation	0.066	-0.023	11.2%	7.7%	12.6	0.326	-0.214	-3.146	0.127	1.8%
Cafes and restaurants	0.064	-0.046	15.1%	11.6%	7.7	0.070	-0.409	-3.359	0.090	3.5%
Road freight transport	0.021	-0.063	9.1%	9.3%	8.3	-0.277	-0.616	-3.403	0.117	1.8%
Overall, high PE industries	*0.044*	*-0.042*	*11.8%*	*9.9%*	*11.1*	*-0.162*	*-0.398*	*-3.390*	*0.090*	*1.7%*
Low PE industries										
Dairy cattle farming	0.029	-0.053	5.7%	6.3%	16.9	-0.193	-0.409	-1.002	0.318	2.7%
Services to agriculture	0.056	-0.007	10.7%	7.7%	17.0	-0.040	-0.397	-1.146	0.121	1.4%
House construction	0.014	-0.037	11.5%	8.4%	8.9	-0.435	-0.461	-1.630	0.081	1.7%
Consultant engineering services	0.025	-0.043	10.9%	8.2%	11.9	-0.570	-0.496	-0.992	0.247	1.0%
Accounting services	0.015	-0.020	10.0%	6.9%	12.2	-0.616	-0.410	-0.945	0.375	1.2%
Business management services	0.036	-0.036	14.8%	9.2%	16.7	-0.542	-0.385	-1.316	0.286	1.7%
Overall, low PE industries	*0.029*	*-0.033*	*10.6%*	*7.8%*	*13.9*	*-0.399*	*-0.426*	*-1.172*	*0.238*	*1.6%*
Overall all industries	**0.025**	**-0.040**	**9.9%**	**8.0%**	**16.8**	**-0.392**	**-0.388**	**-1.950**	**0.135**	

Notes: These figures represent the unweighted average of firm values. Thus they do not reflect the 'industry averages' of things like output and labour productivity growth. In contrast to the figures in this table, aggregate measures of output and labour productivity growth will be dominated by relatively few, larger firms.

[1] *Employment share is the percentages of employment for the respective industry to the total employment. We have dropped the 4-digit industries where there are small numbers of firms for confidentiality reason. Thus, the figure is different from the SNZ figure.*

5. A closer look at industry dynamics

In this section, we focus on a small number of markets to investigate their dynamics in more detail. Our choice of industries on which to focus is based on a combination of the analysis in section 4, the competition measures calculated by Devine *et al*., (2011a).

We use the transition matrices to examine how readily the firms move from different parts of the distribution. Tables 3 to 6 show 7-year transition matrices for labour productivity. The first two tables display the productivity transition matrices for the industries identified as high *PE* measure while Tables 5 and 6 are for the low *PE* measure. Each diagonal cell shows the percentage of firms in the quintile remaining in the same quintile after 7 years later from 2001 to 2008. The bold figures in the top row and first column show the 1st productivity quintiles, with the 1st quintile being the bottom productivity quintile and 5th quintile being the top. We also show the quintile positions of new entrants and exitors in the tables.

5.1. Industrial machinery and equipment manufacturing (C2869)

ANZSIC industry C2869 is "Industrial Machinery and Equipment Manufacturing not elsewhere classified". This is a catch-all industry for manufacturing that excludes "Motor vehicle and part manufacturing; Photographic and Scientific equipment manufacturing; Electronic equipment manufacturing; Electrical equipment and appliance manufacturing; Agricultural machinery manufacturing; Mining and construction machinery manufacturing; Food processing machinery manufacturing; Machine tool and part manufacturing; Lifting and material handling equipment manufacturing; Pump and compressor manufacturing; Commercial space heating and cooling equipment manufacturing". In our analysis, it was found to be one of the industries with a high PE.

The transition matrix for 'Industrial Machinery and Equipment Manufacturing' is set out in Table 3. The rows relate to the five quintiles of the industry labour productivity distribution in 2001, with the final row indicating firms that entered in 2001. The columns indicate where the same firms were in 2008.

Table 3: Transition matrix for C2869

Quintile 2001	*Quintile 2008*					
	1	**2**	**3**	**4**	**5**	**Exit**
1	**35.29**	32.35	11.76	8.82	2.94	8.82
2	22.81	**24.56**	19.30	19.30	7.02	7.02
3	12.50	17.19	**29.69**	26.56	7.81	6.25
4	4.35	14.49	26.09	**28.99**	23.19	2.90
5	3.23	11.29	9.68	19.35	**48.39**	8.06
Entry	18.18	13.64	18.18	18.18	22.73	9.09
Total	**13.64**	**18.18**	**20.13**	**21.75**	**19.81**	**6.49**

Notes: Row 1 column 2 of each table shows for example the probability that a firm whose LP in t falls into the bottom quintile moves on to the 2nd quintile in t+7. The entry row shows the percentage of entrants that have entered to the various quintiles.

Productivity is clearly not random. There is a fairly high degree of persistence across years in the industry. The cells in the diagonal are the largest numbers on each row, indicating that between one-quarter and one-half of firms were in the same quintile in 2008 as they were in 2001. Around two-thirds of firms remain in either the same quintile or the one immediately above or below. Around three per cent of firms in the lowest or highest find their way to the other extreme of the distribution seven years later.

Firms that entered in 2001 are spread fairly evenly across the distribution 2008. We have seen that in their year of entry, they tend have much lower labour productivity than the average firm in the industry. However, as was seen in Fabling *et al.*, (2007), entering firms tend to grow faster than incumbent firms. If anything, they tend to end up above the average seven years later with. It should be noted, however, that they also have the highest exit rate, slightly above that of firms in the lowest quintile of the productivity distribution. It is a risky business entering a new market, but the rewards may be high.

The probability of exit does appear to be negatively correlated with productivity, with the exception of the high exit rate for firms in the top quintile in 2001. Their exit rate is very similar to that of the lowest quintile. It may be that this reflects the higher intensity of competition at the frontier. We shall investigate this issue further in future work.

5.2. Takeaway food retailing (G5125)

This industry includes the takeaway food retailing of the following kinds: "Fish and chips; Hamburger and ethnic food takeaway stores; Chicken takeaway stores; Ice-cream parlours and mobile ice-cream vendors; Pizza takeaway stores; and Other takeaway food stores which includes sandwiches and savouries". It is another industry that was found to have a high PE.

Table 4: Transition matrix for G5125

Quintile 2001	*Quintile 2008*					
	1	**2**	**3**	**4**	**5**	**Exit**
1	**32.69**	25.00	15.38	11.54	3.85	11.54
2	20.00	**25.71**	21.43	12.86	10.00	10.00
3	8.22	23.29	**24.66**	19.18	15.07	9.59
4	7.04	16.90	22.54	**23.94**	23.94	5.63
5	3.33	6.67	11.67	23.33	**48.33**	6.67
Entry	14.29	11.90	23.81	21.43	19.05	9.52
Total	**13.59**	**18.75**	**20.11**	**18.75**	**20.11**	**8.70**

Notes: Refer to Table 3

Similar pattern is displayed in Table 4 for the Takeaway food retailing market. A high percentage of less-efficient firms are forced to exit the market. Again, new entrants appear to be even more likely to be in relatively high productivity quintiles in 2008. Exit rates are higher in this industry than in Industrial machinery, in particular for lower productivity firms.

5.3. House construction (E4111)

House construction is one of the industries found to have a low PE. It includes all firms in "House construction", and excludes firms in "Residential Building construction not classified elsewhere and non-Residential Building construction".

Whilst the largest numbers in the table once again appear in the diagonal, there is much less persistence in the top quintile. New entrants to this industry in 2001 are less likely to be still there in 2008, by comparison to both the Industrial Machinery and Takeaway food industries.

Table 5: Transition matrix for E4111

Quintile 2001	*Quintile 2008*					
	1	**2**	**3**	**4**	**5**	**Exit**
1	**30.81**	21.21	14.14	11.11	9.09	13.64
2	23.27	**26.55**	16.73	13.09	11.64	8.73
3	14.89	18.12	**24.60**	20.39	13.59	8.41
4	11.18	14.29	20.81	**25.78**	20.81	7.14
5	8.33	10.00	15.33	20.00	**39.00**	7.33
Entry	11.89	15.38	13.99	23.08	22.38	13.29
Total	**16.10**	**17.39**	**18.29**	**19.20**	**19.91**	**9.11**

Notes: Refer to Table 3

5.4. Business Management Services (L7855)

Our other low PE industry is Business Management Services. This excludes firms in the "Advertising services; Commercial art and display services; Market research services and Business administrative services".

Table 6: Transition matrix for L7855

Quintile 2001	*Quintile 2008*					
	1	**2**	**3**	**4**	**5**	**Exit**
1	**39.17**	17.50	12.50	8.33	5.83	16.67
2	23.88	**24.63**	19.40	11.19	8.21	12.69
3	16.18	19.65	**23.70**	18.50	10.98	10.98
4	6.63	14.80	22.45	**29.59**	18.37	8.16
5	7.39	8.87	11.82	21.67	**43.84**	6.40
Entry	15.46	11.59	15.94	19.32	23.19	14.49
Total	**16.17**	**15.39**	**17.72**	**19.26**	**20.33**	**11.13**

Notes: Refer to Table 3

Business Management Services experienced a much higher rate of firm exit than the other three industries considered here. Approximately one-sixth of the firms in the lowest quintile of labour productivity in 2001 had exited by 2008.

6. Conclusions

In this paper we have explored the productivity growth in the high and low *PE* markets identified using the competition measures defined in Devine *et al.* (2011a). We found that firms that experienced high output growth have had both high labour productivity and high productivity growth. This is consistent with the competition theory that suggests competitive pressure would reallocate the resources to more productive firms. We also found that the average labour productivity for the exiting firms to be lower than the industry average, proving the selection effect of driving the less-productive firms out of the market.

As expected, high *PE* markets display a higher entering and exiting rates as opposed to the low *PE* markets. We also find that labour productivity is highly dispersed between firms and markets over the studied period. The average LP gap between the 90th and 10th percentile firm is about 17 to 1. However, the average dispersion is lower in the high *PE* markets, suggesting that competition lowers the productivity dispersion.

Transition matrices reveal a similar pattern between high and low *PE* markets. The diagonal elements are the highest elements in terms of labour productivity, indicating a high degree of persistence. The high degree of persistence is consistent with the findings from Law, Buckle and Hyslop (2006). Using NZ firm microdata from 1994-2003, they found that on average the proportion of firms that remain in the same quartile for labour productivity as they were nine years earlier is around 33%. Other international evidence also shows high degree of persistence in the transitions rates. For example, Haskel and Martin (2003) found that between 21% and 50% of the UK manufacturing plants remain in the same quintiles for the 3 year gap.

The majority of firms who exit are from the lowest quintile with higher percentages displayed in the low PE markets. Entering firms' LP is dispersed overtime; either exiting the market or improving markedly.

Like most datasets, our analyses are constrained by the absence of price level where the within-industry price differences are embodied in productivity measures. Thus, if prices reflect market power shifts, high productivity firms may not be particularly efficient (Foster, Haltiwanger & Syverson, 2005). New firms often charge lower prices than incumbents, therefore, we might understate the contribution of entering firms to

aggregate labour productivity growth due to the unobserved price level. In addition, the deflators used in the productivity measures do not reflect any quality improvement in output and will potentially result in a downward bias in the measure.

In a future version of this paper, we will consider measuring the competition growth and decompose competition growth into internal (such as new technology and organisational change among continuing firms) and external restructuring (exit, entry and market change). We will also quantify the importance of within-sector reallocation to productivity dynamics through decomposition of productivity dynamics in each four-digit industry.

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Data appendix

The source of our data is the prototype Longitudinal Business Database (LBD). The full LBD is described in more detail in Fabling, Grimes, Sanderson and Stevens (2008) and Fabling (2009).

Table A - 1: Variables and Data Sources

Variables	***Acronym***	***Data source and explanation***
Value added	VA	In constant 2009 NZ$000's. From Annual Enterprise Survey (AES) and IR10.
Intermediate Consumption	IC	In constant 2009 NZ$000's. From AES and IR10.
Gross output	GO	In constant 2009 NZ$000's. From AES and IR10.
Employment	RME	Employee and working proprietor count. From Linked Employer-Employee Database (LEED).
Wages	W	In constant 2009 NZ$000's. From LEED
Labour productivity	LP	Log of VA less the log of RME

Industry tables

Table A - 2: Industry growth in labour productivity and firm turnover in 2001-2008 (4-digit industry)

ANZSIC 4-digit industry	Output growth	Labour Productivity			Entry rate	Exit rate	Productivity relative to industry	
	Mean	Growth	Mean	90/10			Exiters	Entrants
0111	-0.051	0.028	9.806	21.093	5.9%	6.2%	-0.32	-0.12
0112	-0.033	0.039	9.417	35.115	5.3%	8.8%	0.29	-0.31
0113	-0.073	0.031	9.859	27.313	5.3%	7.7%	0.13	-0.28
0114	0.177	0.125	10.363	36.449	10.8%	4.5%	0.44	-0.26
0115	-0.124	0.054	9.944	26.486	2.6%	6.9%	-0.38	-0.16
0116	-0.026	0.092	9.632	37.504	4.5%	6.4%	0.23	0.12
0117	-0.095	-0.051	10.117	29.059	4.3%	5.8%	-0.35	0.06
0119	0.031	0.058	9.597	52.351	7.6%	6.4%	0.60	-0.08
0121	-0.047	0.032	10.505	40.478	3.9%	5.7%	0.13	-0.08
0122	-0.047	0.035	10.532	27.146	6.3%	4.8%	0.30	-0.31
0123	-0.032	0.042	10.405	34.763	10.2%	5.8%	0.32	0.22
0124	-0.043	0.072	10.301	34.629	2.2%	4.9%	0.24	0.09
0125	-0.022	0.073	9.722	79.300	3.4%	5.7%	0.49	-0.20
0130	-0.053	0.029	11.101	16.862	5.7%	6.3%	-0.19	-0.41
0141	-0.037	0.068	10.557	31.664	5.5%	9.7%	-0.33	-0.26
0142	-0.084	0.022	9.868	20.484	5.9%	6.1%	-0.14	-0.81
0151	-0.049	-0.010	9.930	40.539	3.9%	6.8%	-0.06	0.37
0152	0.029	0.099	9.661	97.739	7.1%	6.0%	0.43	0.06
0153	-0.015	0.106	10.024	69.599	2.9%	5.5%	0.39	0.41
0159	0.042	0.096	9.889	63.180	9.5%	7.8%	0.17	-0.21
0169	-0.006	0.081	10.012	73.317	5.1%	5.3%	0.66	-0.30
0212	-0.091	-0.009	10.238	4.983	8.6%	7.9%	-0.06	-0.23
0213	-0.084	-0.010	10.870	14.728	8.8%	6.0%	-0.70	-0.40
0219	-0.007	0.056	10.174	16.985	10.7%	7.7%	-0.04	-0.40
0220	-0.037	0.055	10.202	16.290	11.2%	9.3%	-0.21	-0.37
0301	0.013	0.106	9.564	122.495	4.1%	4.3%	0.59	0.07
0302	-0.064	0.087	10.518	13.194	8.9%	8.6%	-0.33	-0.63
0303	-0.048	0.064	10.214	11.316	9.8%	10.3%	-0.28	-0.43
0411	-0.079	0.033	10.860	15.892	4.9%	6.5%	-0.24	-0.46
0413	-0.071	0.013	10.605	21.489	7.9%	10.9%	-0.93	-0.35
0415	-0.088	-0.023	10.553	20.930	7.6%	10.9%	-0.69	-0.42
0419	0.004	0.046	10.544	22.975	12.5%	7.1%	-0.37	-0.52
0420	-0.007	0.043	10.232	24.074	6.5%	6.2%	-0.33	-0.64
1411	0.000	0.008	11.327	14.042	6.0%	4.8%	-0.45	-1.01
1419	-0.030	-0.012	11.327	8.807	7.3%	4.9%	-0.36	-0.61
2111	-0.003	0.027	10.499	11.127	7.5%	6.2%	-0.48	-0.39
2113	-0.086	0.023	10.450	8.030	6.5%	7.9%	-0.56	-0.75
2129	-0.116	-0.037	10.981	15.883	11.5%	8.4%	-0.22	-0.03
2130	-0.038	0.065	10.312	13.777	8.4%	6.8%	0.03	-0.43
2161	-0.032	0.012	9.907	13.893	11.6%	7.4%	-0.49	-0.67
2162	-0.059	0.064	10.069	6.302	8.1%	8.1%	-0.47	-0.44
2172	-0.008	0.013	10.028	12.295	10.3%	7.9%	-0.09	-0.45
2173	-0.125	0.052	10.613	14.755	6.0%	5.5%	-0.16	-0.68
2174	0.003	0.046	10.792	9.211	8.5%	6.8%	0.55	-0.53

ANZSIC 4-digit industry	Output growth	Labour Productivity			Entry rate	Exit rate	Productivity relative to industry	
	Mean	Growth	Mean	90/10			Exiters	Entrants
2179	0.036	0.030	10.307	16.776	11.4%	7.0%	-0.43	-0.67
2181	0.041	0.057	10.517	16.970	11.6%	7.5%	-0.87	0.07
2182	-0.014	0.097	11.013	37.865	8.2%	6.3%	-0.30	-0.27
2183	0.101	0.039	10.823	19.630	9.1%	3.5%	-1.54	-0.09
2213	-0.081	-0.004	10.211	8.641	8.6%	6.7%	-0.77	-0.58
2214	-0.059	0.013	10.415	12.460	4.8%	6.2%	-0.44	-0.34
2221	-0.026	0.028	9.993	7.890	7.2%	6.7%	-0.46	-0.49
2223	-0.086	0.023	10.247	13.562	5.7%	6.4%	-1.18	-0.52
2229	0.003	0.006	9.998	12.245	7.8%	7.1%	-0.44	-0.41
2239	-0.094	-0.015	10.015	9.776	3.0%	6.3%	-0.79	-0.44
2240	-0.073	0.018	9.913	11.290	7.5%	8.4%	-1.44	-0.77
2250	-0.062	0.031	10.070	7.399	6.1%	8.1%	-0.11	-0.56
2261	-0.083	0.054	10.114	18.939	4.7%	8.7%	-0.32	-0.32
2262	-0.060	0.016	9.607	14.145	5.2%	7.4%	0.85	-0.44
2311	-0.059	0.035	10.124	15.560	6.7%	7.7%	0.26	-0.32
2313	-0.014	0.059	10.619	7.355	7.1%	5.9%	-0.67	-0.44
2322	-0.026	-0.001	10.636	8.791	8.3%	3.8%	-0.59	-0.32
2323	-0.049	0.019	10.315	6.174	6.4%	6.5%	-0.81	-0.08
2329	-0.075	0.006	9.956	13.043	5.8%	6.9%	-0.60	-0.44
2339	-0.019	-0.004	10.785	11.221	9.5%	6.9%	-0.43	-0.40
2412	-0.068	0.016	10.356	9.597	6.9%	7.1%	-0.37	-0.53
2413	-0.099	-0.010	10.308	11.467	6.6%	8.2%	-0.28	-0.62
2421	-0.028	0.061	10.300	9.722	9.4%	8.8%	-0.73	-0.26
2422	-0.025	0.065	10.429	14.712	10.7%	8.3%	0.18	-0.61
2423	-0.059	0.041	10.285	25.831	10.8%	7.1%	-0.77	0.08
2531	-0.183	-0.007	11.100	11.561	8.2%	6.5%	-0.22	-1.43
2533	-0.076	-0.023	11.062	10.356	6.0%	7.4%	-1.20	-0.15
2535	-0.029	0.011	11.666	9.403	8.0%	6.0%	-0.99	0.18
2542	-0.069	-0.018	10.806	9.175	4.9%	3.5%	-0.59	-0.36
2543	-0.034	0.007	10.785	14.903	7.8%	4.7%	1.67	-0.05
2545	0.025	0.057	10.198	18.957	7.8%	6.3%	-0.40	-0.66
2546	0.078	0.035	10.516	11.809	7.8%	5.4%	-0.21	-0.42
2549	0.010	0.049	10.858	18.987	9.2%	6.3%	-0.70	-0.18
2559	-0.067	-0.006	10.488	10.709	7.1%	6.7%	-0.63	-0.16
2562	-0.036	0.007	10.795	10.300	4.6%	5.0%	-0.04	-0.49
2563	-0.027	0.013	10.928	6.903	4.4%	2.2%	-0.08	-0.41
2564	-0.050	0.011	10.421	7.811	6.5%	5.6%	-0.59	-0.40
2565	0.065	0.002	10.847	9.802	3.9%	5.3%	-0.56	-0.59
2566	-0.016	-0.009	10.600	8.049	6.6%	4.9%	-0.38	-1.21
2610	-0.016	0.005	10.274	11.374	7.4%	5.5%	-0.59	-0.74
2629	-0.099	-0.017	9.683	18.280	6.3%	8.0%	-0.71	-0.51
2633	0.006	0.057	11.109	7.264	5.8%	5.8%	-0.07	-0.53
2635	-0.019	0.062	10.485	8.863	11.1%	8.5%	-0.75	-0.16
2640	-0.023	0.038	10.518	8.421	10.3%	6.6%	-0.78	-0.59
2711	0.053	0.039	10.790	14.543	17.1%	7.1%	-0.45	-0.44
2712	-0.001	0.080	10.695	7.088	10.0%	6.9%	-0.28	-0.34
2733	-0.125	-0.048	10.895	4.947	3.8%	4.6%	-0.44	-0.38
2741	-0.057	0.013	10.844	6.079	5.7%	6.0%	-0.43	-0.44
2742	-0.061	0.008	10.727	4.847	6.8%	5.3%	-0.26	-0.41
2749	-0.076	0.018	10.690	6.111	6.0%	7.5%	-0.19	-0.41

ANZSIC 4-digit industry	Output growth	Labour Productivity			Entry rate	Exit rate	Productivity relative to industry	
	Mean	Growth	Mean	90/10			Exiters	Entrants
2751	-0.102	0.001	11.140	7.349	3.8%	5.3%	-0.94	0.32
2759	-0.009	0.012	10.860	5.198	8.6%	5.1%	-0.18	-0.35
2761	-0.070	0.012	10.429	12.531	6.9%	6.0%	-0.35	-0.68
2762	-0.063	-0.017	10.711	8.235	5.5%	6.3%	-0.44	-0.43
2764	-0.046	-0.010	10.581	6.454	6.8%	6.6%	-0.84	-0.34
2769	-0.027	0.019	10.509	9.104	9.3%	7.4%	-0.18	-0.52
2812	-0.032	-0.001	10.470	8.916	10.0%	5.5%	-1.44	-0.16
2819	-0.068	0.012	10.550	6.504	6.2%	5.7%	-1.29	-0.46
2821	-0.084	-0.021	10.518	8.790	3.7%	6.5%	-0.04	-0.47
2822	-0.047	0.028	10.411	8.986	9.4%	8.2%	-0.70	-0.82
2824	-0.010	0.048	10.666	8.190	12.9%	6.7%	-0.53	-0.23
2832	-0.004	-0.002	10.670	6.953	7.0%	4.7%	-0.69	-0.42
2839	-0.043	-0.034	10.376	13.700	5.9%	5.9%	-0.81	-0.62
2841	-0.046	0.049	10.423	12.078	7.6%	8.0%	-0.55	-0.58
2842	-0.055	-0.054	10.410	14.824	6.4%	5.8%	-0.45	-0.37
2849	-0.021	-0.008	10.465	11.258	7.9%	4.9%	-0.45	-0.52
2851	0.042	0.029	10.776	11.493	13.3%	6.9%	-0.24	-0.12
2854	-0.059	0.001	10.686	8.238	7.3%	6.8%	-0.68	-0.27
2859	-0.035	-0.020	10.721	6.629	6.2%	4.6%	-0.96	-0.30
2861	-0.059	-0.001	10.517	10.051	4.7%	4.7%	-0.58	-0.48
2864	-0.056	-0.019	10.624	6.793	5.6%	5.2%	-0.71	-0.45
2865	-0.059	0.043	10.831	6.349	9.3%	7.6%	-0.43	-0.46
2866	-0.067	-0.008	10.687	9.112	3.8%	4.5%	-0.18	-0.50
2867	-0.105	-0.043	10.738	4.887	5.0%	5.8%	-0.60	-0.57
2869	-0.012	0.022	10.541	7.932	9.1%	6.8%	-0.57	-0.58
2911	-0.068	0.044	10.541	12.677	8.7%	7.8%	-0.43	-0.45
2919	-0.026	0.050	10.566	8.535	14.1%	8.9%	-0.32	-0.45
2921	-0.070	0.006	10.140	8.019	6.4%	7.4%	-0.30	-0.61
2922	-0.099	0.011	10.552	6.168	4.2%	5.1%	-0.26	-0.53
2929	0.012	0.036	10.169	8.507	14.8%	7.9%	-0.34	-0.51
2941	-0.056	-0.014	10.217	9.662	7.5%	6.5%	-0.23	-0.51
2942	-0.054	0.004	10.001	15.001	7.6%	7.8%	-0.56	-0.52
2949	-0.071	0.000	10.213	11.839	7.6%	7.6%	-0.68	-0.59
4111	-0.037	0.014	10.394	8.920	11.5%	8.4%	-0.77	-0.73
4112	0.121	0.123	10.297	11.705	29.7%	8.8%	-0.42	-0.52
4113	-0.033	0.028	10.678	10.302	10.9%	7.9%	-0.42	-0.45
4121	-0.045	0.022	10.807	7.370	8.7%	7.0%	-0.38	-0.49
4122	-0.063	0.011	10.655	8.525	8.5%	7.3%	-0.34	-0.54
4210	0.003	0.030	10.538	10.563	10.6%	6.7%	-0.52	-0.53
4221	0.011	0.057	10.492	7.537	13.2%	8.6%	-0.39	-0.60
4222	-0.043	0.002	10.351	6.381	9.7%	8.0%	-0.43	-0.64
4223	-0.009	0.023	10.551	6.953	12.5%	10.1%	-0.29	-0.48
4224	0.044	0.066	10.567	7.159	14.3%	10.1%	-1.08	-0.66
4231	-0.033	0.011	10.491	6.585	8.4%	7.1%	-0.43	-0.40
4232	-0.040	0.013	10.481	7.460	9.0%	7.2%	-0.73	-0.74
4233	0.033	0.040	10.664	7.364	12.1%	6.7%	-0.38	-0.74
4234	-0.072	0.013	10.452	8.527	11.4%	10.6%	-0.35	-0.42
4241	-0.042	0.025	10.353	7.383	14.6%	11.1%	-0.23	-0.09
4242	-0.051	0.002	10.277	8.510	7.6%	9.7%	-0.45	-0.33
4243	-0.029	0.030	10.354	6.902	12.5%	9.1%	-0.73	0.12

ANZSIC 4-digit industry	Output growth	Labour Productivity			Entry rate	Exit rate	Productivity relative to industry	
	Mean	Growth	Mean	90/10			Exiters	Entrants
4244	-0.034	0.021	10.293	7.331	11.1%	9.1%	-0.38	-0.19
4245	-0.020	0.032	10.448	6.289	10.3%	7.5%	-0.63	-0.40
4251	0.019	0.058	10.169	9.485	16.2%	8.5%	-0.39	-0.23
4259	0.010	0.045	10.460	8.730	15.5%	8.9%	-0.59	-0.29
4511	-0.208	-0.058	11.118	25.419	4.7%	6.6%	-0.75	-0.38
4519	-0.058	-0.003	10.720	28.335	10.3%	7.6%	-0.46	-0.52
4521	-0.029	0.042	10.987	22.911	8.0%	6.7%	-0.67	-0.26
4522	0.014	0.040	10.911	15.446	8.8%	6.0%	-0.18	-0.15
4523	-0.063	0.034	11.159	32.830	7.4%	6.7%	-1.26	-0.30
4531	-0.117	0.020	10.832	10.837	6.9%	7.9%	-0.44	-0.35
4539	-0.044	0.010	10.837	10.834	9.3%	7.0%	-0.31	-0.59
4611	-0.094	-0.007	10.835	11.588	6.8%	5.8%	-1.04	-0.67
4612	0.014	0.040	11.301	19.619	8.1%	5.4%	-0.60	-0.54
4613	-0.158	-0.027	10.774	25.978	6.5%	9.9%	-0.57	-0.70
4614	-0.139	-0.009	10.728	11.161	7.4%	9.8%	-0.62	-0.42
4615	-0.056	0.012	10.981	15.289	9.5%	7.6%	-0.81	-0.49
4619	-0.070	-0.003	10.958	13.742	6.5%	6.2%	-1.19	-0.44
4621	-0.220	-0.078	11.048	31.204	14.4%	12.6%	-0.30	-0.27
4622	-0.157	-0.047	11.139	20.270	6.4%	6.4%	-0.81	-0.29
4623	-0.060	-0.014	10.628	10.391	8.3%	7.6%	-0.74	-0.78
4624	-0.092	-0.023	10.354	7.726	7.9%	6.9%	-0.97	-0.76
4711	-0.101	-0.019	11.260	40.932	7.3%	7.3%	-0.55	-0.28
4713	-0.059	0.051	10.762	8.435	9.6%	7.5%	-1.61	-0.73
4714	-0.093	0.004	11.133	45.417	7.7%	8.1%	-1.56	-0.15
4715	-0.172	-0.006	10.982	44.346	9.2%	8.0%	-1.54	-0.19
4716	-0.140	-0.012	10.089	20.448	9.0%	14.1%	-0.84	-0.15
4717	-0.082	-0.024	10.811	25.834	12.1%	9.2%	-0.84	-0.38
4719	-0.049	0.015	10.505	14.403	10.4%	9.7%	-0.13	-0.51
4721	-0.097	-0.028	10.746	13.442	7.6%	6.5%	-0.78	-0.37
4722	-0.068	-0.048	10.699	25.294	10.1%	8.4%	0.08	-0.19
4723	-0.084	-0.049	11.069	22.516	8.4%	6.6%	-0.12	-0.35
4731	-0.089	-0.019	10.977	22.800	7.9%	8.6%	-0.25	-0.20
4732	-0.134	0.020	10.712	17.314	12.6%	9.6%	0.25	0.05
4733	-0.043	0.018	10.889	12.925	10.9%	6.3%	0.31	-0.53
4739	-0.080	-0.001	10.740	14.307	10.3%	7.2%	0.10	-0.45
4791	-0.109	-0.030	11.099	11.414	6.3%	7.7%	0.14	-0.54
4792	-0.073	-0.070	10.679	17.425	9.7%	6.7%	-0.21	-0.23
4793	-0.074	-0.016	10.678	17.619	9.7%	7.9%	-0.40	-0.14
4794	-0.107	-0.030	10.332	20.642	6.2%	8.8%	-0.44	0.17
4795	-0.078	-0.020	10.619	20.691	7.2%	7.3%	-0.43	-0.19
4796	-0.065	0.000	10.915	28.208	9.6%	7.7%	-0.43	-0.11
4799	-0.079	-0.004	10.553	23.185	9.6%	9.8%	-0.64	-0.29
5110	-0.080	0.043	9.663	8.828	11.0%	9.6%	-0.33	0.05
5121	-0.088	0.037	9.970	8.186	9.5%	10.4%	-0.29	-0.24
5122	-0.134	0.033	9.688	11.424	11.5%	11.9%	-0.25	-0.09
5123	-0.067	-0.019	10.265	8.784	12.2%	8.9%	-0.36	0.02
5124	0.000	0.095	9.675	6.851	12.3%	10.0%	-0.24	0.01
5125	-0.027	0.081	9.340	9.950	14.0%	12.2%	-0.36	-0.08
5126	-0.276	0.065	9.930	9.226	4.3%	11.5%	-0.11	-0.14
5129	-0.044	0.014	9.768	10.542	14.2%	11.1%	-0.56	-0.20

ANZSIC 4-digit industry	Output growth	Labour Productivity			Entry rate	Exit rate	Productivity relative to industry	
	Mean	Growth	Mean	90/10			Exiters	Entrants
5221	-0.054	-0.017	10.052	10.471	12.4%	9.0%	-0.50	-0.35
5222	-0.068	-0.024	10.185	6.351	8.2%	7.1%	-0.41	-0.28
5223	-0.112	-0.015	9.869	10.437	7.7%	8.2%	-0.27	-0.08
5231	-0.108	-0.026	10.328	9.676	10.8%	8.4%	-0.34	-0.46
5232	-0.041	0.021	10.584	6.766	9.4%	6.0%	-0.85	-0.13
5233	-0.094	-0.024	10.262	7.008	7.3%	6.6%	-0.64	-0.12
5234	-0.093	0.020	10.258	11.132	11.9%	9.3%	-0.63	-0.55
5235	-0.155	-0.039	9.986	11.721	8.7%	10.4%	-0.90	-0.25
5241	-0.084	-0.010	10.226	7.532	9.2%	7.0%	-0.39	-0.23
5242	-0.063	-0.004	9.899	15.879	14.6%	11.2%	-1.04	-0.21
5243	-0.119	-0.014	9.922	7.903	7.3%	8.8%	-0.35	-0.32
5244	-0.148	-0.041	10.210	6.915	9.0%	7.8%	-0.44	-0.57
5245	-0.095	-0.008	10.515	10.508	11.6%	6.8%	-0.47	-0.56
5251	-0.096	0.014	10.527	4.833	5.9%	5.5%	-0.46	-0.32
5252	-0.144	-0.022	9.743	15.391	7.9%	10.4%	-0.56	-0.44
5253	-0.112	0.025	9.861	10.849	10.3%	9.5%	0.33	-0.21
5254	-0.107	0.012	9.621	9.590	11.2%	11.7%	0.23	-0.24
5255	-0.082	-0.017	10.159	7.821	8.4%	6.6%	0.07	-0.41
5259	-0.081	0.007	9.749	19.779	12.5%	11.5%	-0.28	-0.62
5261	-0.076	0.007	10.070	7.582	8.2%	8.6%	-0.41	-0.40
5269	-0.057	-0.003	10.013	8.789	7.5%	7.1%	-0.28	-0.13
5311	-0.179	-0.034	10.622	11.625	8.5%	7.4%	-0.25	-0.58
5312	0.000	0.019	10.248	9.244	10.4%	6.6%	0.38	-0.41
5321	-0.136	0.016	10.091	5.572	7.4%	8.7%	-0.40	-0.15
5322	-0.013	0.032	10.339	5.350	8.0%	6.1%	0.05	-0.25
5323	-0.034	0.020	10.185	6.479	7.2%	7.5%	-0.52	-0.44
5324	-0.034	0.018	10.419	5.056	8.3%	6.2%	-0.58	-0.54
5329	-0.033	0.023	10.246	6.126	7.9%	6.7%	0.05	-0.99
5710	-0.023	0.066	9.977	12.629	11.2%	7.7%	-0.16	-0.35
5720	-0.104	0.046	9.996	6.592	13.4%	10.5%	-0.54	-1.28
5730	-0.046	0.064	9.715	7.715	15.1%	11.6%	-0.32	-0.65
6110	-0.063	0.021	10.645	8.326	9.1%	9.3%	-0.22	-0.48
6121	-0.043	0.044	10.111	15.273	7.6%	7.0%	-0.22	-0.49
6122	-0.067	-0.034	9.727	9.918	3.3%	6.9%	-0.30	-0.80
6123	-0.003	0.001	9.466	11.486	13.2%	9.9%	-0.23	-0.57
6302	0.016	0.058	10.253	38.682	18.5%	9.0%	-0.14	-0.19
6303	0.009	0.017	10.330	16.580	16.2%	7.7%	-0.16	-0.16
6403	0.028	0.051	10.513	36.116	10.6%	8.1%	-0.70	-0.94
6509	0.126	0.071	10.551	14.362	25.2%	9.9%	-0.60	-0.26
6629	0.006	0.032	10.934	29.415	16.2%	7.7%	-0.40	-0.50
6641	-0.020	0.029	11.210	89.222	9.9%	7.9%	-0.17	-0.05
6642	0.071	0.142	10.953	21.341	13.6%	10.1%	0.17	-0.26
6643	-0.020	0.005	12.320	28.704	6.6%	7.9%	-0.99	-0.76
6644	0.080	0.031	11.956	107.965	27.8%	7.1%	-0.35	0.00
6649	-0.050	0.037	10.799	17.620	12.2%	9.8%	-0.28	-0.26
6709	0.021	0.062	10.797	13.932	10.5%	6.0%	-0.52	-0.14
7111	-0.035	0.055	9.956	6.915	8.4%	8.9%	-0.62	-0.42
7112	-0.006	0.088	10.151	7.563	15.3%	15.9%	-0.51	-0.46
7120	0.046	0.120	10.645	29.521	19.5%	9.7%	-0.61	-0.52

ANZSIC 4-digit industry	Output growth	Labour Productivity			Entry rate	Exit rate	Productivity relative to industry	
	Mean	Growth	Mean	90/10			Exiters	Entrants
7310	0.294	0.578	9.298	22.018	11.4%	5.7%	-0.77	-0.66
7329	-0.019	0.012	12.375	14.261	7.9%	2.9%	-0.57	-0.50
7330	0.014	-0.008	11.818	44.298	14.6%	8.6%	-0.63	-0.49
7340	-0.108	-0.013	10.495	76.528	14.7%	11.5%	-0.06	-0.38
7422	-0.009	0.052	11.718	52.456	17.2%	6.5%	-0.25	-0.50
7519	-0.038	-0.007	10.739	28.903	15.0%	8.5%	-0.39	-0.40
7520	-0.056	0.019	10.650	14.089	9.9%	8.0%	-0.88	-0.82
7711	0.157	0.060	10.058	56.628	25.1%	7.3%	-0.62	-0.41
7712	0.026	0.063	10.320	45.562	8.3%	7.3%	-0.62	-0.55
7720	-0.065	-0.029	10.628	19.869	10.9%	8.4%	-0.61	-0.53
7730	0.008	0.051	9.893	76.714	8.2%	9.9%	-0.79	-0.38
7741	0.022	0.043	9.667	28.569	11.6%	12.8%	-0.46	-0.51
7742	0.022	0.061	10.062	59.969	11.2%	7.3%	-0.54	-0.39
7743	0.005	0.039	10.324	24.678	9.6%	7.0%	-0.41	-0.52
7810	0.075	0.037	10.491	14.639	21.3%	7.8%	-0.17	-0.21
7821	-0.027	0.037	10.485	9.427	10.1%	7.7%	-0.52	-0.34
7822	-0.013	0.049	10.644	7.474	9.3%	5.7%	-0.15	-0.48
7823	-0.043	0.025	10.684	11.921	10.9%	8.2%	-0.48	-0.62
7829	-0.052	0.016	10.578	12.113	9.8%	7.3%	-0.18	-0.54
7831	-0.051	-0.002	10.595	19.406	10.2%	9.8%	-0.86	-0.43
7833	0.001	0.057	10.074	15.668	16.9%	10.1%	-0.46	-0.45
7834	-0.029	0.048	10.761	14.462	15.9%	10.8%	0.27	-0.14
7841	-0.010	0.028	11.109	7.976	6.8%	3.9%	-0.36	-0.37
7842	-0.020	0.015	10.521	12.165	10.0%	6.9%	-0.50	-0.47
7851	-0.046	0.018	10.699	18.105	14.2%	9.9%	-0.55	-0.47
7852	-0.026	0.023	10.267	13.741	10.9%	8.0%	-0.85	-0.61
7853	-0.008	0.077	10.461	19.551	11.7%	7.7%	-0.37	-0.55
7854	0.044	0.121	10.506	19.580	24.9%	7.2%	-0.40	-0.42
7855	-0.036	0.036	10.654	16.676	14.8%	9.2%	-0.43	-0.53
7861	-0.020	0.031	10.618	13.534	14.9%	10.8%	-0.29	-0.62
7862	0.063	0.083	10.323	9.513	22.7%	10.2%	-0.72	-0.58
7863	-0.057	0.019	10.027	14.969	8.2%	9.3%	-0.38	-0.38
7864	-0.022	0.063	10.251	9.531	13.6%	12.3%	0.13	-0.54
7865	-0.027	0.071	10.119	14.158	12.6%	8.9%	0.20	-0.07
7866	0.029	0.052	9.838	8.781	15.9%	10.8%	-0.28	0.18
7867	-0.063	0.037	10.288	13.292	7.1%	6.7%	-0.61	-0.31
7869	-0.043	0.036	10.417	17.645	13.5%	9.6%	-0.66	-0.43
8410	0.038	0.029	9.840	8.297	10.2%	6.1%	0.69	-0.03
8440	-0.001	0.049	10.075	16.101	12.9%	8.8%	0.05	-0.75
8611	-0.105	0.019	10.509	4.994	7.9%	6.3%	-0.34	-0.37
8621	-0.019	0.043	10.941	9.955	6.9%	6.5%	-0.55	-0.32
8622	0.009	0.040	11.189	15.616	10.2%	5.7%	-0.52	-0.64
8623	-0.006	0.035	11.013	6.908	9.0%	6.3%	-0.61	-0.46
8632	-0.021	0.005	10.826	4.902	8.7%	7.2%	0.00	-0.13
8635	0.017	0.072	10.474	6.799	10.9%	8.0%	-0.13	-0.38
8636	0.036	0.085	10.497	5.925	14.1%	7.9%	-0.44	-0.37
8639	0.026	0.055	10.461	12.271	13.0%	8.7%	0.08	0.17
8640	-0.015	0.019	10.640	6.541	6.7%	4.4%	0.13	-0.35
8710	0.073	0.087	10.113	5.386	12.5%	6.7%	-0.15	-0.07
8721	-0.091	0.036	9.881	5.185	6.4%	6.7%	-0.44	-0.19

ANZSIC 4-digit industry	Output growth	Labour Productivity			Entry rate	Exit rate	Productivity relative to industry	
	Mean	Growth	Mean	90/10			Exiters	Entrants
8722	-0.002	0.014	10.334	5.925	9.0%	7.3%	-0.27	-0.62
8729	0.053	0.046	10.191	9.333	16.0%	7.3%	-0.12	-0.17
9111	-0.011	0.035	10.678	17.088	15.7%	9.0%	-0.50	-0.51
9113	-0.020	0.006	9.998	6.705	7.5%	7.1%	-0.82	-0.71
9121	-0.037	0.101	10.423	10.208	11.9%	9.9%	-0.47	-0.56
9241	-0.005	0.025	9.938	23.813	22.9%	8.4%	-0.40	-0.46
9242	-0.053	-0.009	10.098	20.256	9.6%	7.6%	-0.35	-0.47
9251	-0.022	0.033	10.147	21.138	11.8%	8.2%	-0.21	-0.57
9259	-0.051	0.000	10.380	16.228	11.8%	8.5%	-0.32	-0.12
9311	0.007	0.061	9.637	20.028	7.4%	6.9%	0.29	-0.31
9312	-0.009	0.053	9.888	10.478	13.4%	9.1%	0.13	-0.28
9319	0.030	0.083	10.067	17.143	18.4%	9.0%	0.44	-0.26
9329	-0.091	0.015	10.266	4.005	6.7%	9.8%	-0.38	-0.16
9330	-0.005	0.053	9.952	19.590	10.0%	9.1%	0.23	0.12
9511	-0.116	-0.005	9.817	6.968	9.9%	9.2%	-0.35	0.06
9519	0.011	0.056	10.058	11.815	14.0%	6.5%	0.60	-0.08
9521	-0.011	0.062	9.982	7.932	10.9%	9.7%	0.13	-0.08
9522	-0.152	-0.034	10.145	9.263	5.6%	10.1%	0.30	-0.31
9523	-0.013	0.028	10.034	17.052	10.8%	6.7%	0.32	0.22
9524	-0.033	0.023	10.815	7.453	6.2%	4.7%	0.24	0.09
9525	-0.016	0.035	9.823	10.139	13.6%	10.9%	0.49	-0.20
9526	-0.018	0.027	10.004	5.967	11.6%	9.1%	-0.19	-0.41
9529	-0.019	0.033	9.846	16.609	18.3%	13.1%	-0.33	-0.26
9634	-0.030	0.041	10.491	9.463	10.1%	9.2%	-0.14	-0.81

Selected 4-digit industry classifications

Dairy Cattle Farming (A0130)

This includes all firms in the 6-digit industry Dairy Cattle Farming (A013000), excludes firms in Horticulture and fruit growing; Grain, Sheep and Beef Cattle Farming; Poultry Farming and Other Livestock Farming.

Services to Agriculture not elsewhere classified (nec) (A0219)

This excludes firms in Shearing services; Aerial Agricultural services and Hunting and Trapping.

Industrial Machinery and Equipment Manufacturing (nec) (C2869)

This excludes Motor vehicle and part manufacturing; Photographic and Scientific equipment manufacturing; Electronic equipment manufacturing; Electrical equipment and appliance manufacturing; Agricultural machinery manufacturing; Mining and construction machinery manufacturing; Food processing machinery manufacturing; Machine tool and part manufacturing; Lifting and material handling equipment manufacturing; Pump and compressor manufacturing; Commercial space heating and cooling equipment manufacturing.

House Construction (E4111)

This includes all firm in House construction, and excludes firms in Residential Building construction not classified elsewhere and non-Residential Building construction.

Takeaway Food Retailing (G5125)

This includes firms in the Fish and chips; Hamburger and ethnic food takeaway stores; Chicken takeaway stores; Ice-cream parlours and mobile ice-cream vendors; Pizza takeaway stores and Other takeaway food stores which includes sandwiches and savouries.

Retailing (nec) (G5259)

This includes firms in the retailing not classified elsewhere, which excludes Department stores; Clothing and soft good retailing; Furniture, houseware and

appliance retailing; Recreational good retailing; Pharmaceutical, cosmetic and toiletry retailing; Antique and used good retailing; Garden supplies retailing; Flower retailing and Watch and jewellery retailing.

Accommodation (H5710)

This includes Hotels; Motels and motor inns; Hosted accommodation; Backpacker and youth hostels; Caravan parks and camping grounds; and other accommodations not classified elsewhere.

Cafes and Restaurants (H5730)

This includes all cafes and restaurants, excluding Clubs; Pubs, taverns and bars.

Road Freight Transport (I6110)

This includes all firms in Road freight transport, excludes firms in Road passenger transport (e.g. bus and taxis).

Consultant Engineering Services (L7823)

This excludes firms in Scientific research; Architectural services; Surveying services; Technical services not classified elsewhere; and Computer services.

Accounting Services (L7842)

This includes firms in the Accounting services.

Business Management Services (L7855)

This excludes firms in the Advertising services; Commercial art and display services; Market research services and Business administrative services.