How do productivity, competition and business dynamics move over time? Deepening the productivity conversation in New Zealand with an updated dataset

Tim Ng* Benjamin Stubbing*

May 2025

Abstract

This paper introduces a panel dataset covering 39 New Zealand industries from 2001 to 2022, integrating firm- and industry-level data on market structure, productivity, firm dynamics and competitive conditions. The dataset, based on an earlier dataset developed by Maré and Fabling (2019), is intended to support research and policy analysis to improve economic performance in New Zealand. The dataset is an entry point for researchers to investigate a wide range of micro-economic policy questions across multiple industries. Such questions often hinge on industry idiosyncrasies such as within-industry knowledge diffusion mechanisms, intra-market competition, external trade exposure, position in value chains, and regulation - which can be explored by linking the relevant variables at the firm level as a further development of the dataset. The dataset is intended to inform current debates about increased concentration, declining business dynamism, and the secular productivity slowdown seen across advanced economies, including New Zealand. We present illustrative industry-level stylised facts from the dataset and discuss some research and policy questions that it could be used to unpack.

Keywords: competition, productivity, business dynamics
JEL Codes: L11, L16, D24

*NZ Treasury. This paper is not policy advice. The views, opinions, findings, recommendations, and conclusions expressed in this paper are those of the authors, and do not necessarily reflect the views of the New Zealand Treasury or the New Zealand Government. The New Zealand Treasury and the New Zealand Government take no responsibility for any errors or omissions in, or for the correctness of, the information contained in this paper. We thank Hilary Devine, Margaret Galt and Bettina Schaer for helpful comments on earlier versions of this paper, and Richard Fabling, Dave Maré and Lynda Sanderson for making their code and earlier datasets available to us. Any remaining errors or omissions are solely our responsibility.

Contents

List of Tables

List of Figures

1 Introduction and previous work

Understanding the drivers of productivity and firm performance remains a central challenge for economic policy, in New Zealand (D. Cook et al., 2024; Nolan, 2014; Nolan et al., 2018) and across the developed world (OECD, 2015). The topic is especially salient currently, with aggregate productivity growth having stalled across many advanced economies since the early 2000s, with far-reaching social and economic consequences (Dieppe, 2021; Syverson, 2017). Responding to this challenge, and armed with increasingly rich longitudinal microdata sources, researchers and practitioners are now able to go beyond aggregate or sectoral approaches and probe the underlying firm-level dynamics shaping these trends (Syverson, 2011). Research is now shedding light on a range of questions concerning the complex and heterogeneous relationships between productivity, competition and business dynamics at a highly granular firm level (E. Bartelsman et al., 2013; E. J. Bartelsman and Doms, 2000; Decker et al., 2020; Fabling, 2021; Lane, 2011). This includes literature on the heterogeneity of productivity performance across the distribution of firms, with evidence that firm behaviour in each tail of performance - "frontier" firms vs. "laggards" - can be quite different and driven by different forces (Andrews et al., 2015; Fabling, 2021; New Zealand Productivity Commission, 2021).

To support these efforts, this paper describes and makes available an updated dataset on competition, productivity, and firm dynamics in New Zealand. The dataset is based on the firm-level dataset constructed by Maré and Fabling (2019) for their study of the relationship between competition and productivity. Our intent is to build on and extend their firm-level approach by including additional variables and distributional summary statistics by industry, which can act as an entry point for deeper analysis within particular sectors of interest.

In this paper, we describe and illustrate some features of the publicly available updated industry-level dataset, so that researchers and practitioners can investigate sectoral patterns and trends without needing to access Stats NZ's secure Datalab environment. Those wanting to do deeper and more rigorous firm-level analysis (including by conditioning on firm characteristics such as size, frontier/laggard status, foreign exposure, age, etc.) can also access and build on our update to the consistent firm-level dataset from which the industry aggregates are derived, within the secure environment (subject to the usual Datalab authorisation procedures).

The industry-level dataset features competition and productivity-related variables for 39 measured-sector industries ("production function" industries in Maré and Fabling, 2019) corresponding to, or aggregating, New Zealand Standard Industrial Output Classification (NZSIOC) Level 3 industries, observed annually from 2001 to 2022.

The rest of this note proceeds as follows. Section 2 describes the data sources. Section 3 illustrates the intended uses of the dataset by presenting some stylised facts and descriptive statistics from the dataset in the context of current productivity concerns and their possible relation to competition and business dynamics issues. Section 4 discusses limitations and potential future work to develop the dataset.

2 Dataset preparation and access

We source raw firm-level data for the industry-level dataset from the labour and productivity tables constructed by Fabling and Maré (2015) and Fabling and Maré (2019) and

available in the Longitudinal Business Database (LBD; Fabling and Sanderson, 2016). We source the 1-digit industry-level firm dynamics ("churn") data from Stats NZ's publicly available business demographics data (though intend to produce more disaggregated data as an early next step in the development of the dataset).

The data dictionary worksheet in the industry-level dataset contains further detail on all source and derived variables.

Version 1.0 of the industry-level dataset is available in spreadsheet form on the Treasury website.[1]

3 Potential policy and research questions

This section illustrates how the industry-level dataset can be used to support policy analysis and research into substantive questions about trends in productivity and their nexus with competitive conditions and business dynamics. We present and briefly discuss some cross-industry patterns and summary statistics about within-industry distributions of these measures and their evolution, which can act as starting points or suggestive evidence from which to delve deeper into the firm-level detail within industries.

3.1 The NZ productivity experience in light of the UK's

That productivity and productivity-growth questions are highly salient in the current conjuncture is evident from a range of policy analyses and speeches by policymakers (Bache, 2025; L. D. Cook, 2022; Lowe, 2022; Makhlouf, 2024). The UK is a striking case, with the Bank of England's Andy Haldane expressing the view that "the UK's productivity slowdown [since 2008] appears to have been larger than in almost any other country" (Haldane, 2018, p.1). Haldane has presented a range of granular data in recent speeches (Haldane, 2017, 2018) that help define the contours of the productivity slowdown in the UK and the global economy more generally.

Below, we present similar data from the industry-level dataset to compare, at an impressionistic level, the UK and New Zealand cases (noting that the underlying samples, industry definitions, etc. may not be strictly comparable). In the version of the dataset discussed in this paper, we proxy firm- and industry-level productivity by per-FTE *nominal* sales less variable costs (defined as wages plus materials costs), which is close to nominal value-added per FTE (for brevity, VA/F). While productivity analysis would conventionally either use real value added (output) per FTE or per hour worked (as labour productivity), or multi-factor productivity (MFP) (as in Maré and Fabling (2019), for example), both of these measures are more data-intensive in that real output requires a measure of prices for deflation, and MFP requires in addition a measure of the capital stock or capital services. Using VA/F has less demanding data requirements, and hence allows generally larger samples, as well as having the advantage of capturing relative price changes, which may be relevant especially in a context where competitive conditions are salient, or if deflator measurement issues mean that real output measures are unable to capture quality improvements (thus understating productivity growth). We intend to include labour productivity and MFP measures alongside sales less variable cost

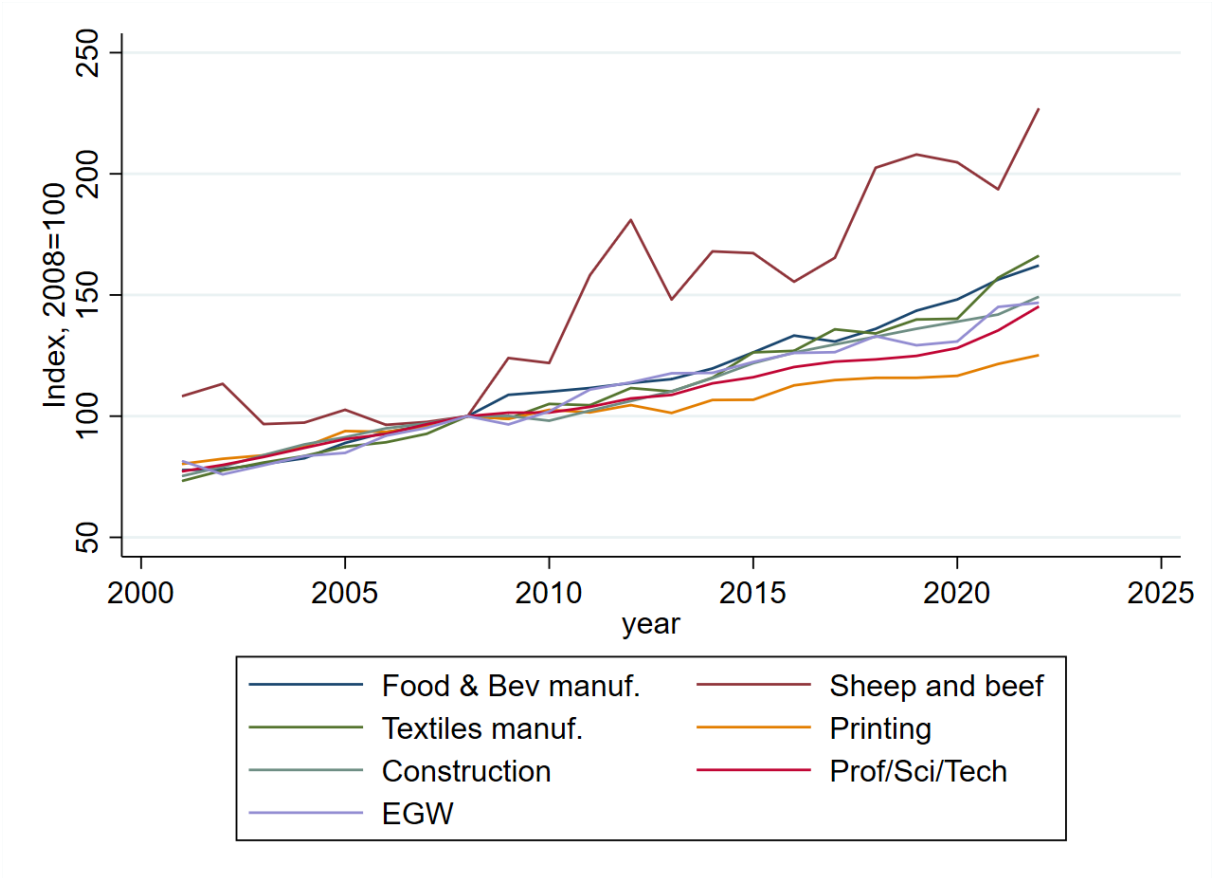
[1] `https://www.treasury.govt.nz/publications/research-and-commentary/modelling-and-data-tools`

in future versions of the dataset, so that these different perspectives on firm-level productivity/profitability performance can be investigated using consistently defined samples.

3.1.1 Productivity dispersion across industries

Mason and Osborne (2007) and Kidd (2008) have documented differences in sectoral productivity in New Zealand, including with some comparisons with the UK. In both cases, there is a wide disparity in the level of productivity across industries, which in the UK case has grown since 2008, as shown in Haldane (2017)'s Chart 13. We illustrate the New Zealand case (Figure 1) using the VA/F measure for selected industries. VA/F is a nominal measure and so the time trends since 2008 include generalised inflation, but allowing for 2 - 3% annual inflation over the 15 or so years since 2008 suggests growth in real value-added per FTE in most of the industries shown. The dispersion of VA/F among the industries shown has not increased since 2008 to the same degree as in the UK; further investigation using better (deflated) measures of productivity will enable more direct comparisons.

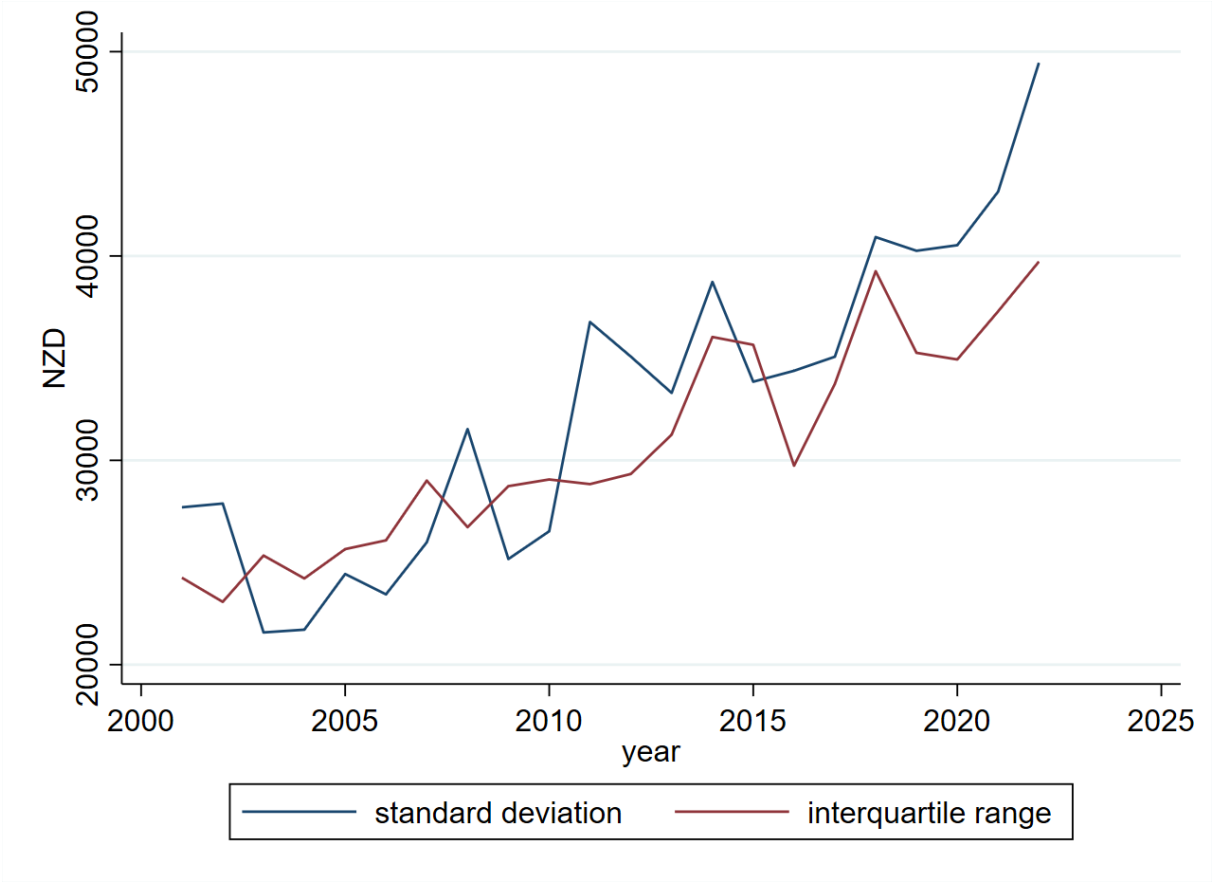
Figure 1: Median sales less variable cost per FTE



A striking feature of the recent UK experience is that the dispersion in the UK sharply increased following the Global Financial Crisis (GFC), and appears to have settled at a markedly higher level (with the standard deviation of the level of productivity doubling since the GFC; Haldane, 2017, Chart 14). New Zealand has shown an increase in the dispersion of VA/F over the past 20 years or so (Figure 2), but there is no obvious break

in the trend, and the change since the GFC is rather smaller (a 50-60% increase in the standard deviation). Figure 2 also reconfirms the well-known fact that the productivity dispersion within industries is not trivial, with the interquartile range of nominal VA/F reaching NZ$40,000 by 2022.

Figure 2: Dispersion of sales less variable cost per FTE across industries

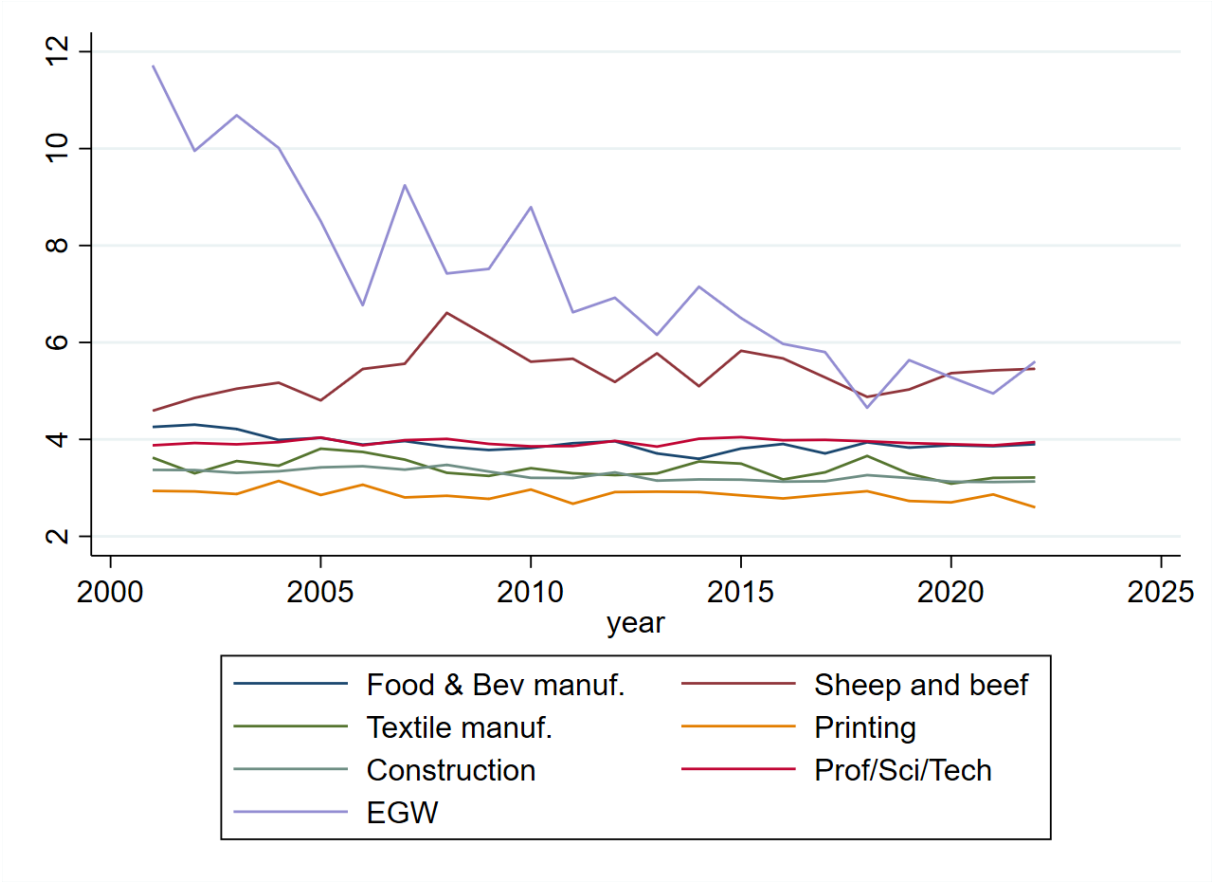


3.1.2 Productivity dispersion within industries

Haldane (2017)'s Chart 20 shows that the UK has been an outlier among OECD countries in having noticeably high within-industry productivity dispersion, using broad definitions of the services and manufacturing industries. The shift up in cross-industry productivity dispersion since the GFC also seems to be unique to the UK, among the countries shown in Haldane's chart, which include New Zealand. Figure 3, which plots the ratio of 90th and 10th percentiles of VA/F for firms within selected industries in New Zealand, unpacks at a sectoral level the New Zealand aggregate data in Haldane's chart and shows that the within-industry measures shown either generally flatlined or fell (for the electricity-gas-water industry), with the only industry showing a mild increase being sheep and beef.[2] Hilary Devine's and Finn Smith's forthcoming analytical note being presented at the 2025 NZAE conference discusses the 1-digit sectoral dispersion and whether the productivity growth in New Zealand has come from within industry or across industry allocaton, extending previous work by Meehan (2014).

[2]While Haldane shows the log(90/10 ratio), we show the non-log 90/10 ratio for ease of interpretation of the unit.

Figure 3: Within-industry dispersion of value added less variable cost per FTE

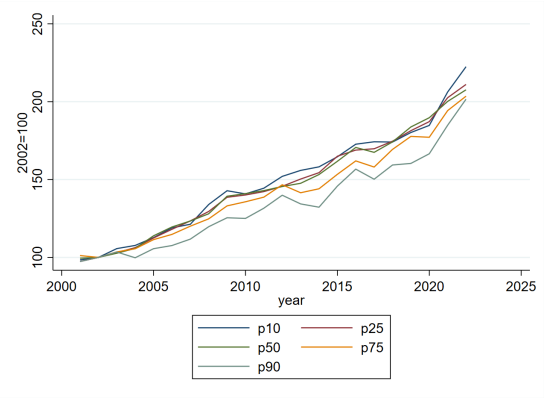


3.1.3 Linking industry- and firm-level productivity analyses

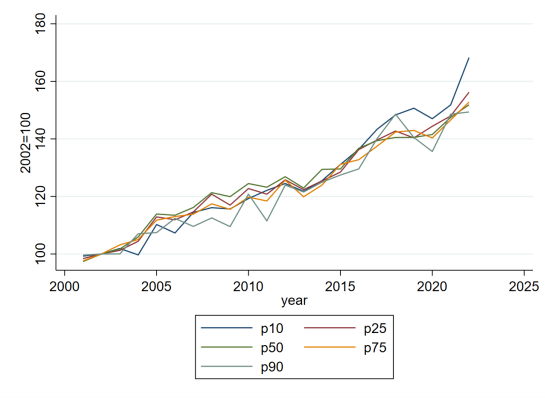
Versions of Figures 1, 2 and 3 for New Zealand using older data from a variety of sources have already been drawn and discussed in the literature. The contribution of our dataset project is that the industry-level dataset is aggregated from a corresponding firm-level dataset with common sample definitions and filters, which can also readily be made accessible to researchers within the Datalab environment. With our datasets, industry- and firm-level studies can thus be conducted using consistent firm-level sampling and firm subgroup definitions across firm-level characteristics (age, size, industry, trade exposure, ownership structure, etc.).

Figure 4 provides an illustration of how firm- and industry-level performance analysis can be integrated, by showing selected percentiles from the firm-level distributions by industry. The Figure illustrates how, for selected industries, the dispersion of productivity across firms has increased over time, which among other things sheds light on the relative contributions of different parts of the distribution to the aggregate trends, and what is happening to the shapes of the distributions themselves. For the industries shown, the within-industry dispersion has changed very little over the sample, unlike in the UK case shown in Haldane (2017)'s Chart 17, in which the frontier group shows steady increases in productivity well ahead of those in the middle group, while the laggard group shows a substantial decline in productivity followed by a recovery to barely above its position at the beginning of the sample.

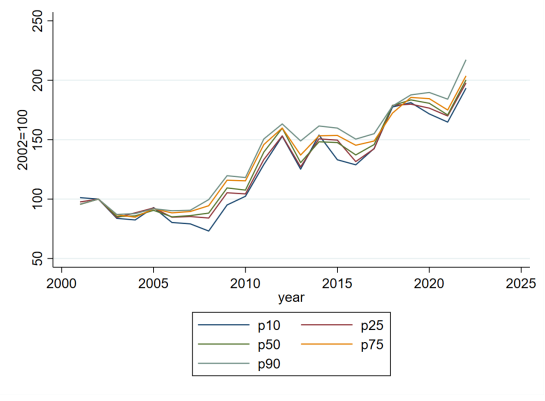
Figure 4: Distributions of sales less variable cost per FTE



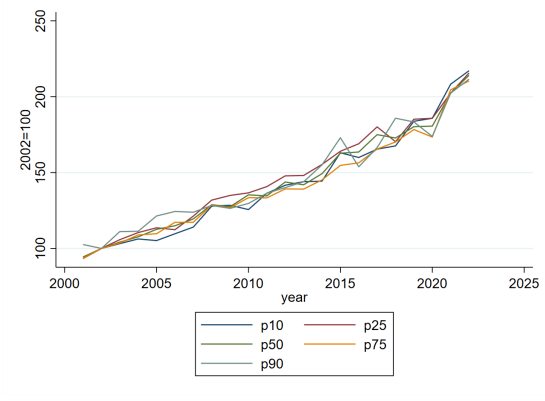
(a) Food/beverage manufacturing



(b) Printing



(c) Sheep, beef and grain farming



(d) Textile and footwear manufacturing

3.2 Productivity and competition

Previously, Maré and Fabling (2019) examined the association between productivity and competitive conditions. This dataset extends that work and fascilitates the exploration of new research questions. It includes and updates not only variables measuring competitive conditions calculated in the same way as those authors, but also introduces the VA/F indicator and incorporates measures of industry dynamism at the broad 1-digit level based on publicly available data (discussed in Section 3.3).

In Sections 3.2.3 to 3.2.6 we look at the association between competition and both the median and dispersion of VA/F using Pearson correlation coefficients, where dispersion is estimated by the difference between the 90th and 10th percentiles of VA/F. We limit our discussion to correlations for two reasons. First, the main goal of this section is to explore the dataset and demonstrate its potential for future research. Second, there are measurement considerations that should be addressed before confidently positing and interpreting formal empirical models such as regression models. While we performed linear regressions for robustness checking and the results broadly corroborated the correlational findings, focusing on correlations at this stage provides a simple initial exploration of the relationships within our dataset, without over-interpreting results that might be influenced by underlying measurement complexities. Although correlations do not indicate economic magnitudes, they effectively reveal the directional strength of the relationship between variables.

3.2.1 Measuring competition

We follow Maré and Fabling (2019) in estimating three competition indicators: the Herfindahl-Hirschman Index, price-cost margins (measured both as an unweighted average across firms and as an industry-wide aggregate weighted by firm output) and profit elasticity (measured by estimating the responsiveness of firm profits to changes in costs at the firm level, and expressed as a negative coefficient where more negative values indicate stronger competition).

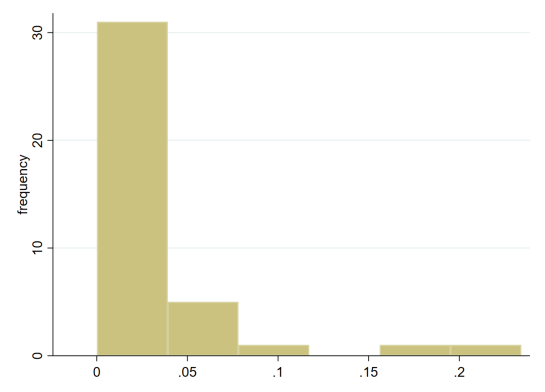
The Herfindahl-Hirschman Index (HHI) captures market concentration by measuring how market shares are distributed. Calculated as the sum of squared market shares, the HHI ranges from values approaching zero in markets with many firms of similar size to one in the case of monopoly.

Price-cost margins (PCM) shift focus from market structure to market power, measuring the percentage markup firms can maintain over their costs. These are calculated in two ways: as an unweighted average across all firms in an industry (giving equal weight to each firm regardless of size) and as an industry-wide aggregate (weighted by firm output). Higher PCM values indicate firms' ability to price above marginal cost, suggesting weaker competition. We calculate price-cost magins using output shares rather than labour.

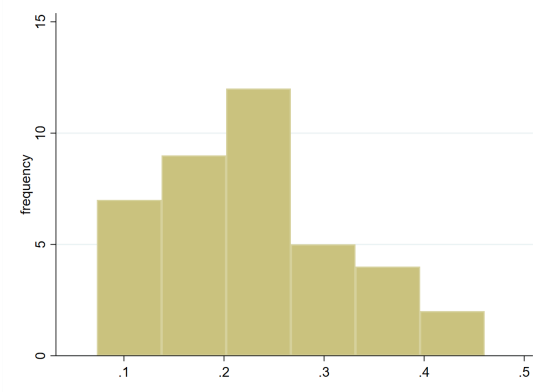
Profit elasticity (PE) measures how sensitive firm profits are to changes in costs, estimated through regressing log profits on the ratio of costs to output (in Maré and Fabling, 2019, estimated in a regression model with firm fixed effects or alternatively, without). In highly competitive markets, small cost increases dramatically reduce profits (producing a large negative coefficient), while in less competitive markets, firms can maintain profits despite cost increases (resulting in a smaller negative coefficient).

Figure 5 shows the cross-industry distribution of the sample-period-average competitive conditions indicators in the dataset.

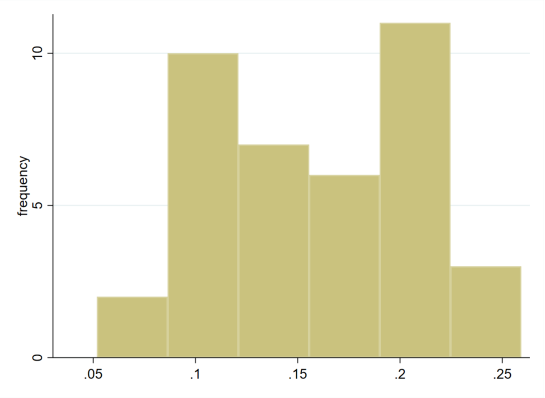
Figure 5: Cross-industry distribution of competition indicators (sample period average)



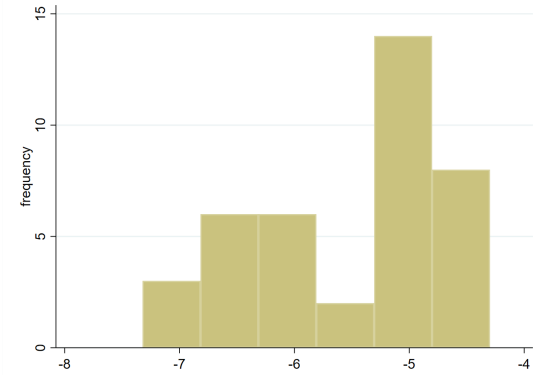
(a) Herfindahl-Hirschman Index



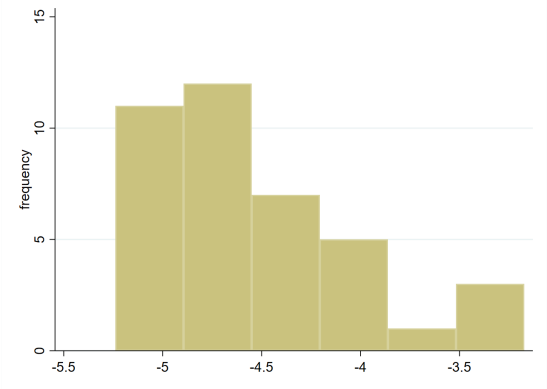
(b) price/cost margin, output-weighted



(c) price/cost margin, unweighted



(d) profit elasticity (estimate with firm fixed effects)



(e) profit elasticity (estimate without firm fixed effects)

3.2.2 Competition and productivity dynamics in interrelated markets

To illustrate how the dataset can be used to investigate the relationship between competition and productivity at the industry level, we examine four construction-related industries: non-metallic mineral product manufacturing, building construction, heavy and civil engineering construction, and construction services. This sectoral focus serves multiple purposes. First, non-metallic mineral product manufacturing includes ready-mix concrete, a sub-industry frequently analysed in the longitudinal micro-data productivity literature (see e.g. Backus, 2020; Syverson, 2004). Second, construction holds significant policy relevance as a substantial contributor to New Zealand's GDP and business cycle, though growth has decelerated since mid-2022 due to cost pressures and economic uncertainty. Third, these four industries represent economically interrelated markets within the broader construction value chain, allowing us to observe variation in competitive conditions across related sectors.

Figure 6 places the four construction-associated industries within the distribution of all industries over the sample period. Relative to all industries, non-metallic mineral product manufacturing and heavy and civil engineering construction exhibit relatively high market concentration (top quartile of mean HHI values), while construction services and building construction show relatively low concentration (bottom quartile).[3] Market power measures tell a more complex story. Under the simple OLS (no firm fixed effects) estimates of profit elasticity, heavy and civil engineering construction and building construction rank in the top quartile, with the other two industries in the second quartile. When we include firm fixed-effects to produce the estimates, however, three industries move to the bottom quartile while heavy and civil engineering construction falls only to the second quartile. Price-cost margins reveal further heterogeneity: aggregate measures place three industries in the bottom quartile, with non-metallic mineral product manufacturing in the third quartile. Mean price-cost margins show greater dispersion. They range from building construction (bottom quartile) through construction services and non-metallic mineral product manufacturing (second quartile) to heavy and civil engineering construction (third quartile).

3.2.3 Non-metallic Mineral Product Manufacturing (CC61)

Market concentration, as measured by the HHI, oscillates between approximately 0.04 and 0.06 throughout the sample period with no clear secular trend. There is limited evidence of a trend in profit elasticities: starting around -6, the no-fixed-effects estimates trend toward zero, suggesting increasing market power over time. When the estimates are based on a model with firm fixed effects, however, the trend mostly disappears. The price-cost margin indicators present contrasting narratives. The aggregate measure (weighted by firm output) declines from peaks around 0.3 to troughs near 0.19, representing a decline of more than 30%. Conversely, the unweighted mean price-cost margin shows modest upward drift. This divergence suggests that while the average firm maintains or slightly increases its markup capacity, larger firms operate with compressed margins.

The median VA/F is weakly to moderately correlated with four of the five competition measures, but correlation with the mean measure of the price-cost margin is strongly

[3]When discussing the cross-industry distribution of competition indicators (sample period average), each observation represents an industry-year pair. For profit elasticity and price-cost margin measures we have 858 observations; for HHI we have 741 observations as this series does not extend to 2022.

Figure 6: Cross-industry distribution of competition indicators (sample period average): contextualising the construction-associated industries

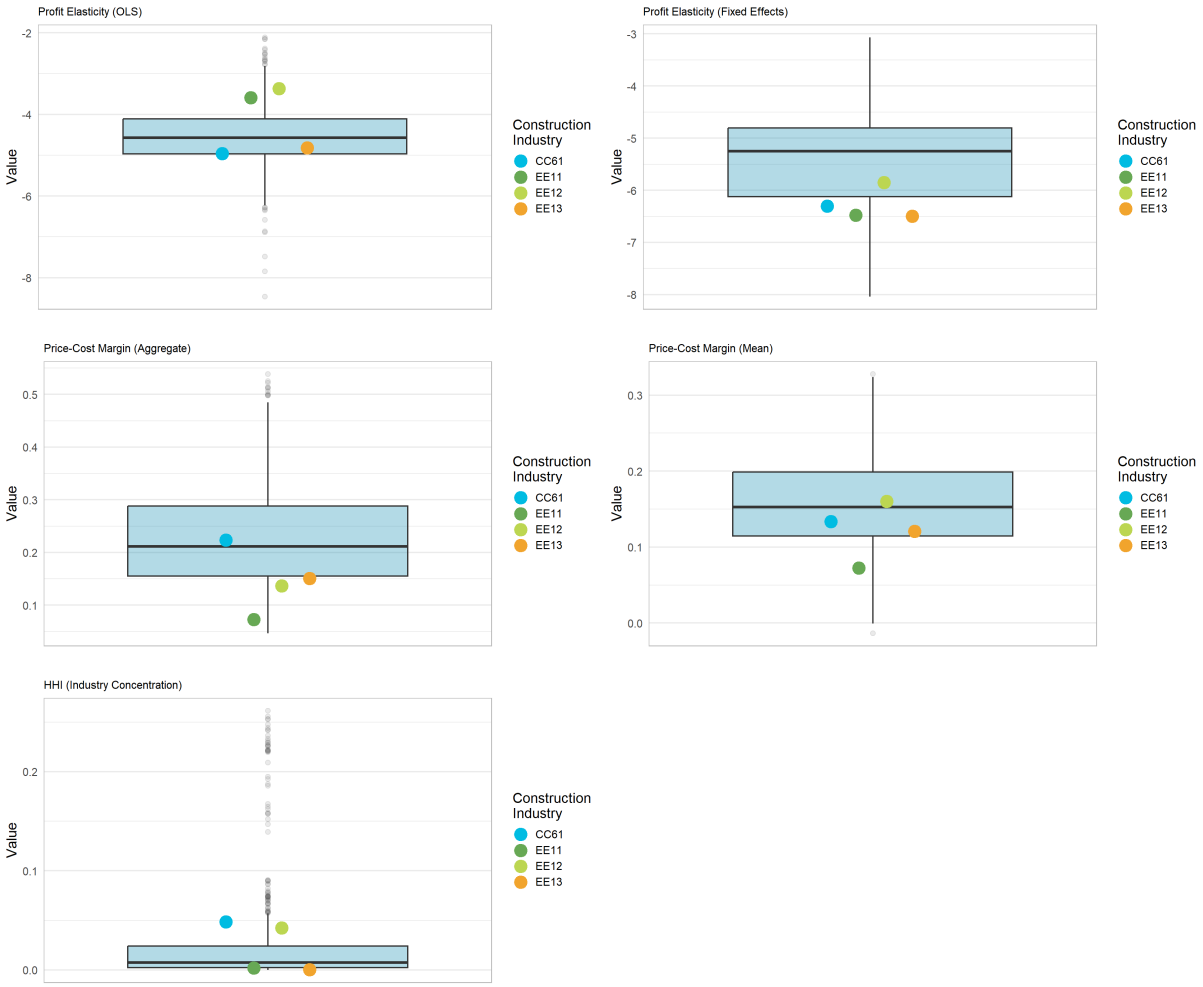
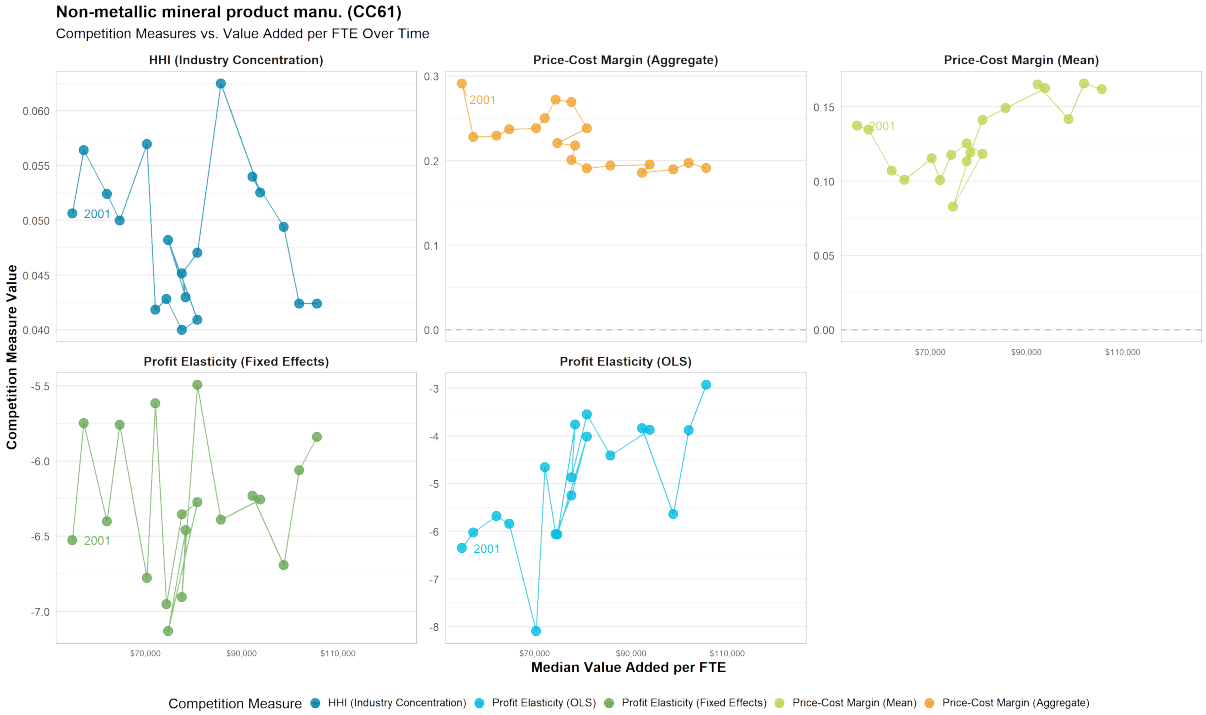


Figure 7: Competition and productivity: Non-metallic mineral product manufacturing



positive (0.73 at the 0.1% threshold).

3.2.4 Building Construction (EE11)

Although there is a visible increase in building construction's HHI after 2008, the range remains narrow and the trend is only weakly upward. Both profit elasticity measures remain relatively stable over the sample period, with slight downward slopes. The no-fixed-effects estimates range from -2.5 to -4.3, while the fixed effects estimates range is narrower (between -5.6 and -7.3) with an even weaker downward slope. Both measures of price-cost margins trend upward despite dipping around 2010. Increasing price-cost margins imply that firms' market power has increased over the sample period.

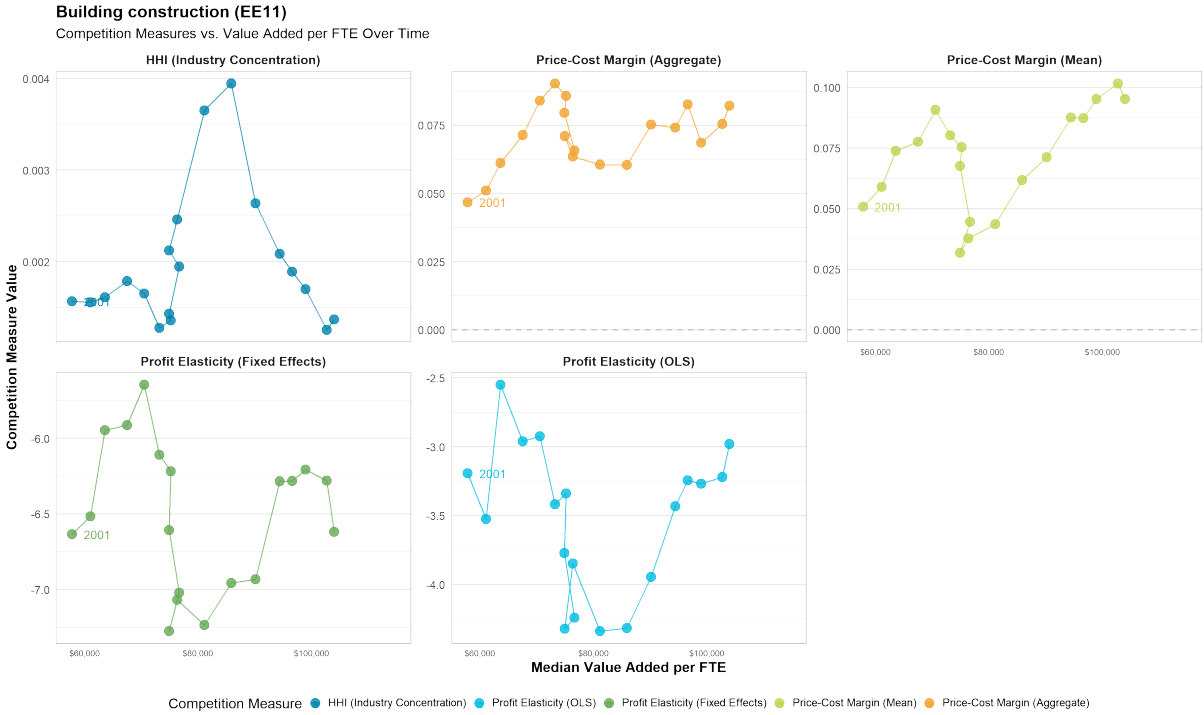
Median VA/F is moderately positively correlated with both the weighted ("aggregate") and unweighted ("mean") measures of price-cost margins. Interestingly, the dispersion of VA/F is strongly (0.71) positively associated with the aggregate price-cost margins and moderately (0.66) positively correlated with the mean price-cost margin.

3.2.5 Heavy and Civil Engineering Construction (EE12)

Of the four sectors we examine, Heavy and Civil Engineering Construction exhibits the most pronounced increase in market concentration from 2001 to 2019 with $R^2 = 0.76$. Market concentration is also strongly positively correlated with median VA/F (0.82 at the 0.1% threshold). HHI is also moderately (0.64 at the 1% threshold) positively correlated with the dispersion of VA/F. This means that as the market has become more concentrated, the variance in VA/F has increased.

Although market concentration has increased, there appears to have been no change or even a reduction in market power. Profit elasticity is essentially flat under either

Figure 8: Competition and productivity: Construction



specification, as is the trend in aggregate price-cost margins. Mean measures of price-cost margins, however, show a weak decline over the sample.

3.2.6 Construction Services (EE13)

Although we should be wary of comparing levels across industries, it is important to note that construction services exhibits markedly different competitive characteristics, with HHI levels an order of magnitude smaller than those in the other three industries. We observe a strong negative correlation between HHI and median VA/F (-0.75 at the 0.1% threshold) and VA/F dispersion (-0.76 at the 0.1% threshold).

Turning to market power, both measures of profit elasticity remain flat, while measures of price-cost margins follow a weak upward trajectory, suggesting small increases in market power despite stable concentration levels.

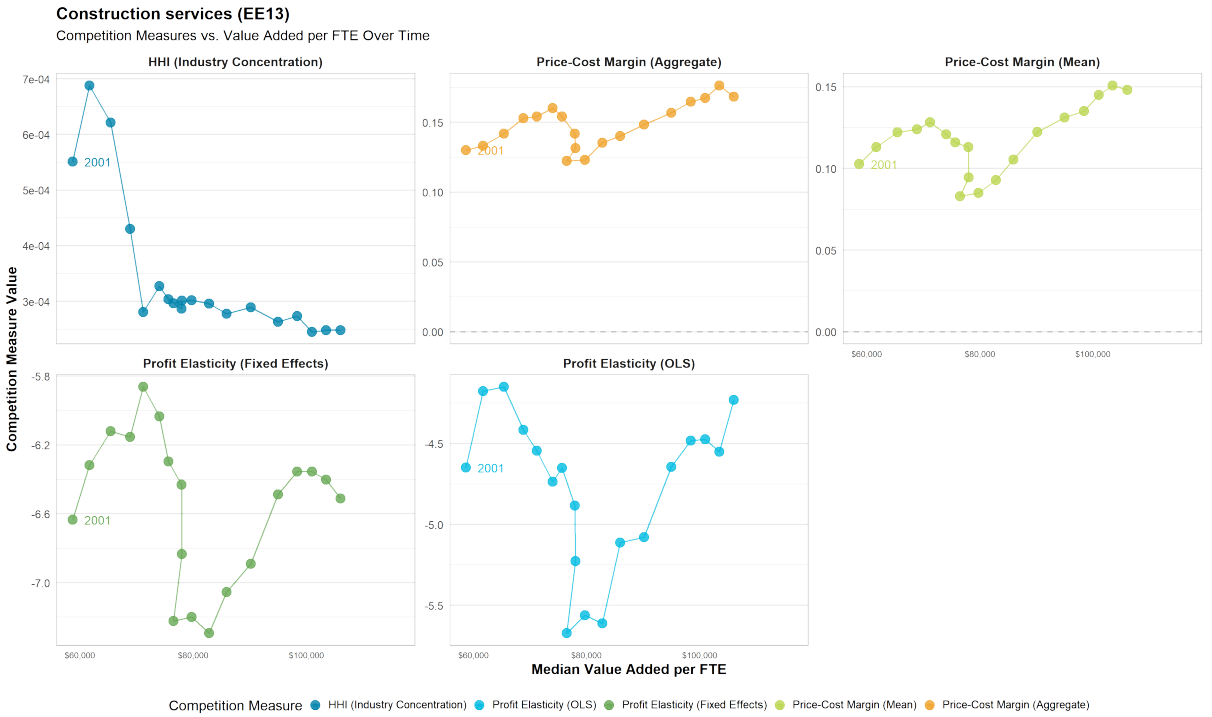
3.2.7 Cross-Industry Patterns

Cross-industry comparisons face two key limitations. First, we cannot meaningfully compare levels across competition measures because industries may inherently differ in competitive conditions due to factors such as scale economies, market size, and capital intensity changing industry dynamics. Second, industry-level aggregation obscures firm heterogeneity, capturing only average effects. While our construction focus reflects an *a priori* plausible conjecture about these industries' value chain relationships, its validity is limited. For instance, our conjecture is limited insofar as non-metallic mineral product manufacturing includes many sub-industries—let alone firms—unrelated to construction.

With these limitations in mind, we turn now to some stylised cross-industry observations. Profit elasticities declined weakly across all industries except non-metallic mineral

Figure 9: Competition and productivity: Heavy & civil engineering construction

Figure 10: Competition and productivity: Construction services



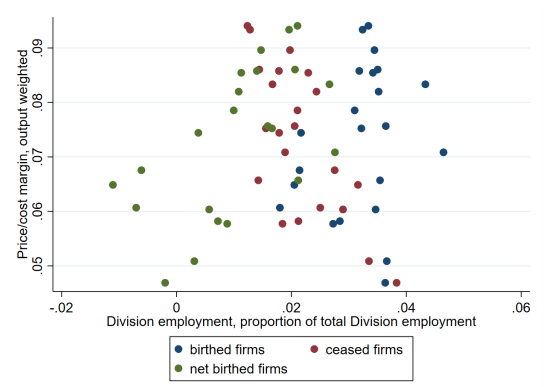
product manufacturing. Price-cost margins generally increased, though aggregate measures fell moderately in both non-metallic mineral products and heavy civil engineering. Market concentration remained stable or declined slightly in three industries, with heavy civil engineering showing strong HHI increases. The relative magnitudes of these trends—with profit elasticity slopes exceeding price-cost margin slopes, which in turn exceed HHI slopes—reflect both the distinct nature of these competition measures and their varying responsiveness to market changes.

These sectoral variations underscore the importance of industry-level analysis in competition-productivity research and the value of using multiple competition metrics, which can move in opposite directions to one another. The construction value chain demonstrates how competitive dynamics vary meaningfully across related markets, with implications for both market structure evolution and productivity outcomes. Understanding these heterogeneous patterns is essential for policy interventions targeting competition and productivity.

3.3 Competition and business dynamics

High rates of business dynamism – rates of entry and exit, and other churn measures such as labour movements between firms and industries – should be associated with high competitive pressure, since they indicate firms and workers actively seeking (or being forced to seek) new and better opportunities. To illustrate, Figures 13 from the dataset shows simple measures of business dynamism at the ANZSIC Construction Division level plotted against the measures of competitive conditions for the three subdivisions available within this Division.

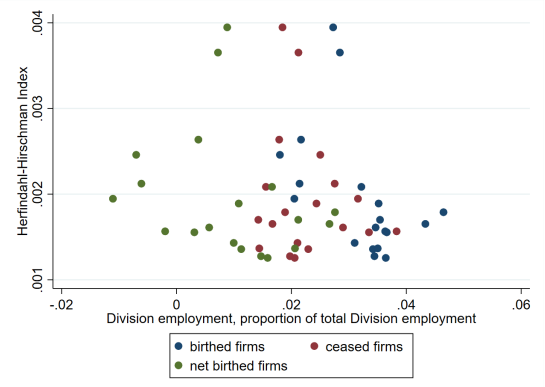
The expected statistical relationship is negative, all else equal, since higher levels of each competition indicator indicate lower levels of competition. The dynamism indicator that appears to show the most consistent negative relationship with the competition indicators is employment in ceased geographic units at the 1-digit level. Although these charts use publicly available business dynamism data at a relatively highly aggregated industry level, future work on the dataset could straightforwardly include analogous measures calculated for the 2-digit industries featured in the dataset, built up from our firm-level dataset, allowing more granular analysis. As well, more sophisticated measures of firm demographics such as longevity, which would enable studies of the relationships between risks of firm failure, competition and productivity could be added.


Price/cost margin, output weighted
.05
.06
.07
.08
.09
-.02
0
.02
.04
.06
Division employment, proportion of total Division employment
birthed firms
ceased firms
net birthed firms

(a)


Price/cost margin, unweighted
.04
.06
.08
.1
-.02
0
.02
.04
.06
Division employment, proportion of total Division employment
birthed firms
ceased firms
net birthed firms

(b)


Herfindahl-Hirschman Index
.001
.002
.003
.004
-.02
0
.02
.04
.06
Division employment, proportion of total Division employment
birthed firms
ceased firms
net birthed firms

(c)

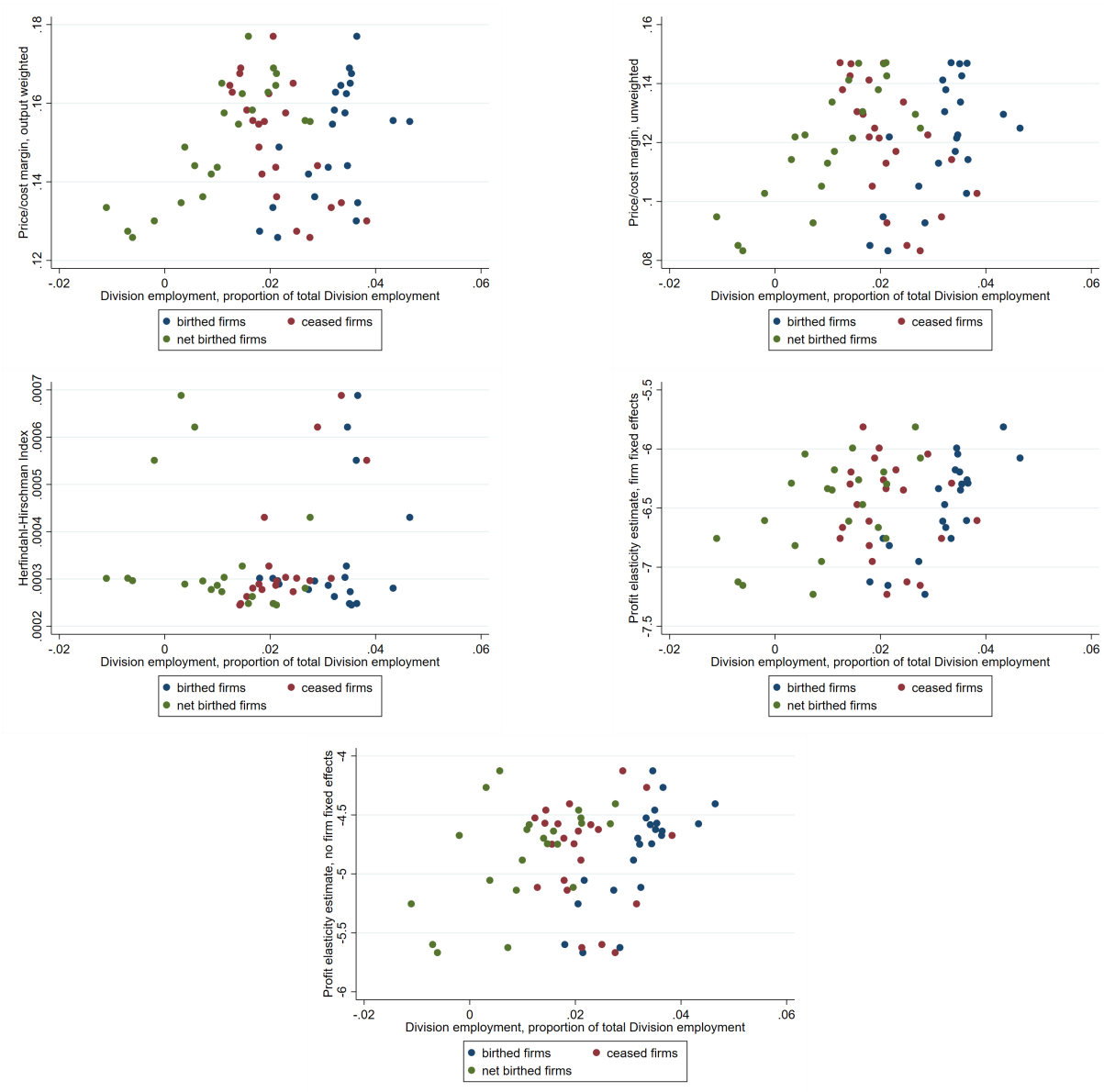

Profit elasticity estimate, firm fixed effects
-7.5
-7
-6.5
-6
-5.5
-.02
0
.02
.04
.06
Division employment, proportion of total Division employment
birthed firms
ceased firms
net birthed firms

(d)


Profit elasticity estimate, no firm fixed effects
-4.5
-4
-3.5
-3
-2.5
-.02
0
.02
.04
.06
Division employment, proportion of total Division employment
birthed firms
ceased firms
net birthed firms

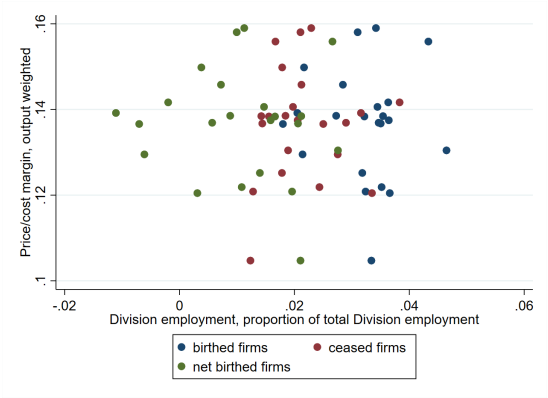
(e)

Figure 12: Business dynamism and competition indicators: Construction services



(a)

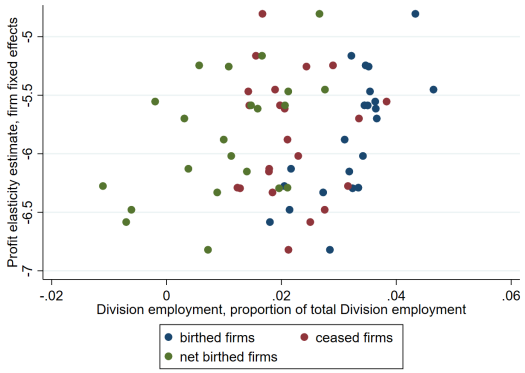
Figure 13: Business dynamism and competition indicators: Heavy and civil engineering construction



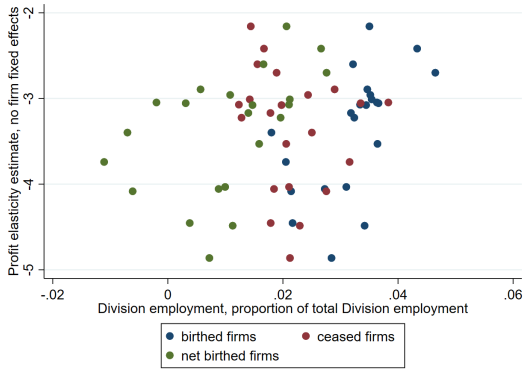
(a)

(b)

(c)

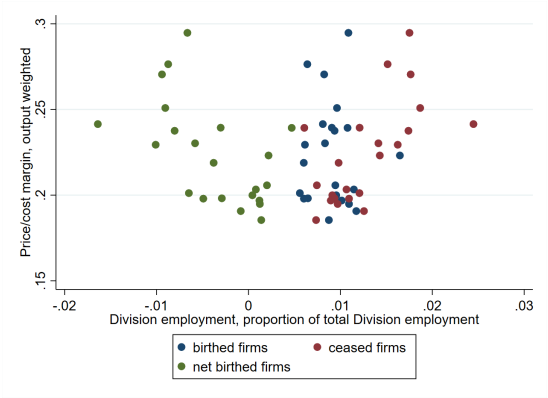


(d)



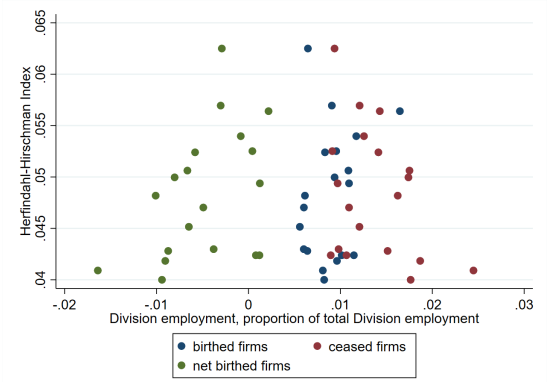
(e)

Figure 14: Business dynamism and competition indicators: Non-metallic mineral product manufacturing



(a)

(b)



(c)

(d)

(e)

4 Discussion and potential future work

We have intended and designed the dataset presented in this paper as a platform for addressing long-running, yet conjuncturally salient, policy and research questions in New Zealand, such as: How do competitive pressures influence firm-level productivity? What role do firm entry and exit play in aggregate productivity dynamics? How can policy better support the reallocation of resources toward more productive firms? By making this dataset available for further analysis, we aim to support further empirical research and evidence-based policy analysis on these important questions, either at the whole-economy ("horizontal") level allowing for industry variation, or in deeper and more finely-grained ("vertical") analysis within a particular industry. In both cases, the very wide range of rich firm-level data in the LBD, of which we have only scratched the surface here, can be further exploited.

4.1 Limitations

Limitations encountered in developing the industry-level dataset for public release include the need to suppress data for some industry-years because of high concentration in those industries limiting the number of observations that can be released. This is of course an unavoidable issue for confidentiality and privacy reasons, but some choices are available in future versions of the dataset that may reduce the impact on the information content in publicly releaseable industry data. We welcome further engagement from users on the specific industries and research questions of most interest to which the dataset could be applied, to inform some of these choices.

4.2 Future work

The dataset and its code have been designed to be easy to update and extend in terms of firm-level variables. They have also been designed to conform with data quality and formatting requirements needed for New Zealand data to be included in multi-country productivity and firm dynamics analysis initiatives such as the OECD's MultiProd and DynEmp projects, which will support more reliable cross-country comparisons including New Zealand, due to more consistent and transparent methods and measurement. Of the two, DynEmp is the simpler structure, and one of our relatively near-term priorities is to complete the firm-level dataset to the standard needed for New Zealand to be included in the DynEmp sample. Further work on the dataset should include working towards conformance for inclusion of New Zealand in the MultiProd sample also.

References

Andrews, D., Criscuolo, C., & Gal, P. N. (2015). *Frontier firms, technology diffusion and public policy: Micro evidence from OECD countries* (tech. rep.). OECD.

Bache, I. W. (2025). *Cooperation and independence – Norges Bank in a turbulent world.* Speech, Norges Bank, 8 April.

Backus, M. (2020). Why is productivity correlated with competition? *Econometrica*, *88*(6), 2415–2444.

Bartelsman, E., Haltiwanger, J., & Scarpetta, S. (2013). Cross-country differences in productivity: The role of allocation and selection. *American Economic Review*, *103*(1), 305–334.

Bartelsman, E. J., & Doms, M. (2000). Understanding productivity: Lessons from longitudinal microdata. *Journal of Economic Literature*, *38*(3), 569–594.

Cook, D., Devine, H., & Janssen, J. (2024). *The productivity slowdown: Implications for the Treasury's forecasts and projections* (tech. rep.). New Zealand Treasury.

Cook, L. D. (2022). Speech by Governor Cook on the economic outlook and U.S. productivity.

Decker, R. A., Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2020). Changing business dynamism and productivity: Shocks vs. responsiveness. *American Economic Review*, *110*(12), 3952–3990.

Dieppe, A. (Ed.). (2021). *Global productivity: Trends, drivers, and policies*. World Bank.

Fabling, R. (2021). *Living on the edge: An anatomy of New Zealand's most productive firms* (tech. rep.). Working Paper 2021-01, Motu Economic; Public Policy Research.

Fabling, R., & Maré, D. (2015). *Production function estimation using New Zealand's Longitudinal Business Database* (tech. rep.). Working Paper 15-15, Motu Economic and Public Policy Research.

Fabling, R., & Maré, D. C. (2019). *Improved productivity measurement in New Zealand's Longitudinal Business Database* (tech. rep.). Working Paper 19-03, Motu Economic and Public Policy Research.

Fabling, R., & Sanderson, L. (2016). *A rough guide to New Zealand's Longitudinal Business Database*. Working Paper 16-3, Motu Economic and Public Policy Research.

Haldane, A. G. (2017). *Productivity Puzzles*. Speech, Bank of England, 20 March.

Haldane, A. G. (2018). *The UK's productivity problem: Hub no spokes*. Speech, Bank of England, 28 June.

Kidd, N. (2008). *Enterprise and productivity: Harnessing competitive forces*. Productivity Paper 08/04, New Zealand Treasury.

Lane, J. (2011). Administrative data: Problems and benefits. *Annals of the American Academy of Political and Social Science*, *633*(1), 230–245.

Lowe, P. (2022). *Inflation, productivity and the future of money*. Speech, Reserve Bank of Australia, 20 July.

Makhlouf, G. (2024). The tangle of ageing populations and productivity growth.

Maré, D., & Fabling, R. (2019). *Competition and productivity: Do commonly used metrics suggest a relationship?* (Tech. rep.). Working Paper 19-16, Motu Economic and Public Policy Research.

Mason, G., & Osborne, M. (2007). *Productivity, capital-intensity and labour quality at sector level in New Zealand and the UK* (tech. rep.). WP 07/01, New Zealand Treasury.

Meehan, L. (2014, June). *Structural change and New Zealand's productivity performance* (tech. rep.). Working Paper 2014/4, New Zealand Productivity Commission.

New Zealand Productivity Commission. (2021). *New Zealand firms: Reaching for the frontier*. Final Inquiry Report, NZ Productivity Commission.

Nolan, P. (2014). Lifting New Zealand's productivity: A research agenda. *Policy Quarterly*, *10*(2), 22–29.

Nolan, P., Fraser, H., & Conway, P. (2018). Moving on from New Zealand's productivity paradox. *Policy Quarterly*, *14*(3), 3–9.

OECD. (2015). *The future of productivity*.

Syverson, C. (2004). Market structure and productivity: A concrete example. *Journal of political Economy*, *112*(6), 1181–1222.

Syverson, C. (2011). What determines productivity? *Journal of Economic Literature*, *49*(2), 326–65.

Syverson, C. (2017). Challenges to mismeasurement explanations for the US productivity slowdown. *Journal of Economic Perspectives*, *31*(2), 165–186.