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

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April 30th 2025

Introducing a dataset to inform productivity-related policy

- Productivity is the biggest determinant of living standards in the long-run
- NZ's productivity growth has been low for 50 years
- MoF is "Going for Growth"
- **Firm-level data provide:** large, representative samples
  + heterogeneity
  + aggregation
  + linking survey data
  → **Detailed picture of productivity-drivers across firm distribution**

Previous NZ work shows large productivity differences & limited relationship with competition

	International	NZ
Productivity dispersion	Large & persistent differences (Syverson, 2011)	Large differences (Fabling and Sanderson, 2014)
Relationship with competition	Firms in more competitive industries are more productive (Backus, 2020)	Evidence limited to highly concentrated industries, where Maré and Fabling (2019) observe: 1. Fewer entries and exits 2. More productive exiting firms 3. Narrower productivity distribution

We're building LBD capability & equipping policymakers to answer productivity questions

- **Replicating previous work**
- **Adding:**
  1. New measure of labour productivity
  2. New data (extending series to include most recent observations)
- **Two illustrations of how policymakers could use dataset**
  1. Inter- and intra- industry productivity distributions (*Cf.* UK)
  2. Relationship between productivity & competition (construction, *e.g.*)

We measure labour productivity using nominal value add per FTE

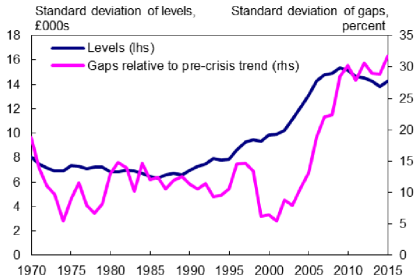
$$\text{VA/F}_{i,j,t} = \frac{\text{Sales}_{i,j,t} - (\text{Wages}_{i,j,t} + \text{Materials}_{i,j,t})}{\text{FTE}_{i,j,t}}$$

Three reasons to use VA/F as stepping stone:

1. **Less data-intensive**
2. **Does not require capital**
3. **Larger samples**

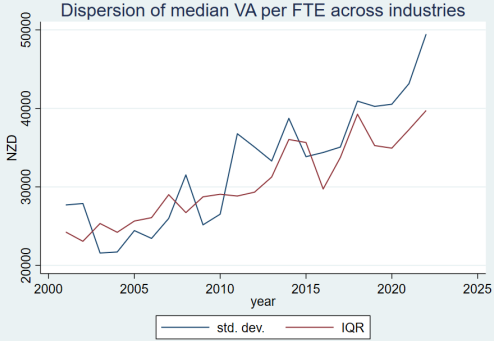
NZ's inter-industry productivity dispersion has increased like the UK's, but with a more steady trend

Chart 14: The standard deviation of productivity across industries

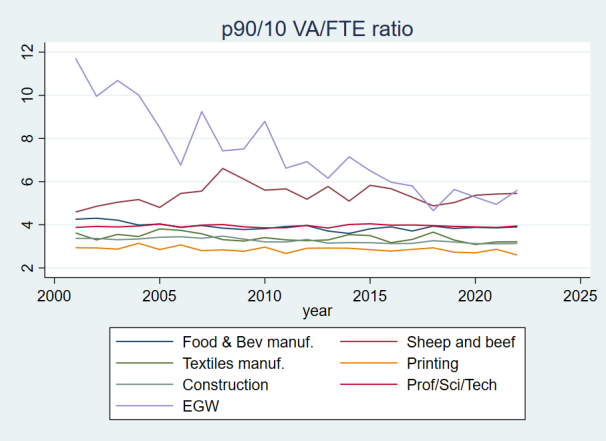


Source: EUKlems productivity database, ONS and Bank calculations.

Notes: The chart excludes the mining & extraction, energy and real estate industries.



NZ's intra-industry productivity dispersion has not increased as much as UK's



Heavy & civil engineering construction: increasing concentration & increased productivity, but no obvious change in market power

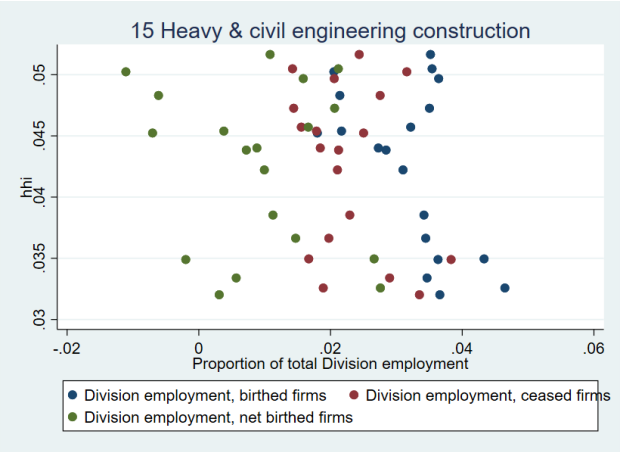
Relative to all 39 industries:

1. Top quartile mean HHI
2. Second quartile PE
3. Third quartile mean PCM
4. Bottom quartile aggregate PCM

Competition metrics details

- **Market concentration:**
  - ⋆ Increased from 2001 to 2019
  - ⋆ Strongly positively associated with average VA/F
- **Market power:**
  - ⋆ PE and aggregate PCM have flatlined
  - ⋆ Unweighted aggregate PCM has declined

Dataset can illustrate relationship between dynamism and productivity



Conclusion & next steps

Key contributions:

- Extended firm-level dataset covering 39 NZ industries (2001-2022)
- New labour productivity measures and updated competition metrics
- Policy-relevant insights on productivity dispersion and market dynamics

Next steps:

1. Deflating productivity measure
2. Adding:
   - ⋆ Capital stock measures
   - ⋆ Multifactor productivity (MFP)
   - ⋆ Additional firm characteristics
3. Contributing to OECD's DynEmp project
4. Exploring policy applications across sectors

We estimate three competition metrics*

Type	Measure	Description
Structure	**HHI**	Weighted measure of market concentration *Larger* ⇒ *weaker competition*
Power	**PCM**	Percentage markup over costs *Higher* ⇒ *weaker competition*
Power	**PE**	How strongly cost increases reduce profits (negative values) *Larger negative* ⇒ *stronger competition* (profits more sensitive)

*Following Maré and Fabling (2019)

Back to heavy & civil engineering construction

Herfindahl-Hirschman Index (HHI)

$$\text{HHI}_{X,jt} = \frac{\sum_{i=1}^{N_{jt}} X_{ijt}^2}{(\sum_{i=1}^{N_{jt}} X_{ijt})^2}, \quad X \in \{Y, L\}$$

- Captures how unequally market shares are distributed
- Higher = greater concentration; Lower = more evenly distributed
- Can be calculated using labour or output
- $\text{HHI}_{X,jt} \in (0, 1]$

Back to competition metrics

Price-Cost Margin (PCM)

Average PCM

$$= \frac{1}{N_{jt}} \sum_{i=1}^{N_{jt}} \max \left\{ \frac{Y_{ijt} - C_{ijt}}{Y_{ijt}}, -1 \right\}$$

- Average profit margin across industry, giving equal weight to each firm regardless of size
- $\text{PCM}_{jt} \in [-1, 1)$

Aggregate PCM

$$= \frac{\sum_{i=1}^{N_{jt}} (Y_{ijt} - C_{ijt})}{\sum_{i=1}^{N_{jt}} Y_{ijt}}$$

- Industry-wide profit margin, weighting each firm by its output
- $\text{PCM}_{A,jt} \in (-\infty, 1)$

Back to competition metrics

Profit Elasticity (PE)

$$\ln(Y_{ijt} - C_{ijt}) = \alpha_{j't} + \text{PE}_{jt} \times \frac{C_{ijt}}{Y_{ijt}} + \epsilon_{ijt}$$

- Captures how responsive profits are to changes in costs
- In highly competitive markets, small cost increases dramatically reduce profits
- In less competitive markets, firms have more pricing power and can maintain profits despite cost increases
- $PE \in (-\infty, 0]$

Back to competition metrics