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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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

- **Productivity:** Large gaps between leading and lagging firms (Fabling and Sanderson, 2014)
- **Competition:** Limited variation makes relationship hard to see; in more competitive industries, Maré and Fabling (2019) observe:
  1. **Fewer entries and exits:** Higher productivity thresholds
  2. **More productive exiting firms:** Stronger selection pressure
  3. **Narrower productivity distribution:** Truncating tail of unproductive firms

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

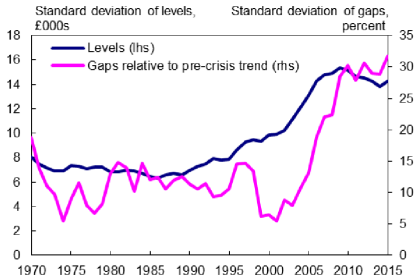
$$\text{VA/F}_{i,j,t} = \frac{\text{Sales}_{i,j,t} - (\text{Wages}_{i,j,t} + \text{Materials}_{i,j,t})}{\text{FTE}_{i,j,t}}$$

Three reasons to use VA/F as stepping stone:

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

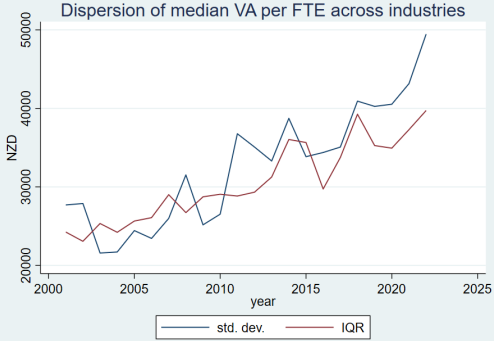
NZ's inter-industry productivity dispersion has increased like the UK's, but with a more steady trend

Chart 14: The standard deviation of productivity across industries

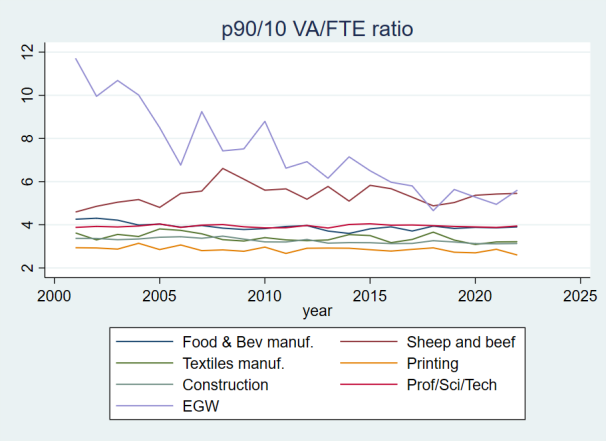


Source: EUKlems productivity database, ONS and Bank calculations.

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

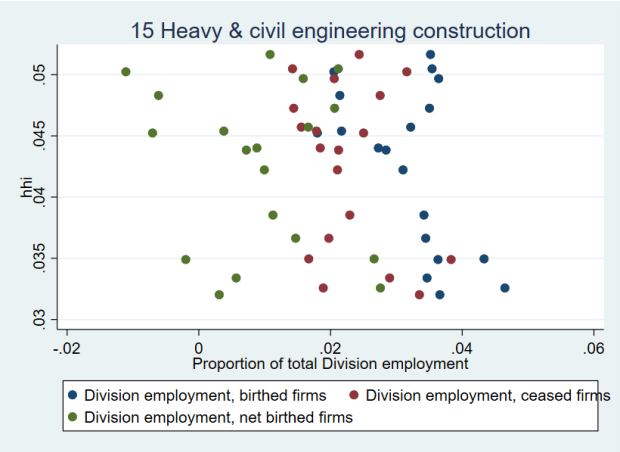
Relative to all 39 industries::

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