

# 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

	International	NZ
<b>Productivity dispersion</b>	Large & persistent differences (Syverson, 2011)	Large differences (Fabling and Sanderson, 2014)
<b>Relationship with competition</b>	Firms in more competitive industries are more productive (Backus, 2020)	Evidence limited to highly concentrated industries, where Maré and Fabling (2019) observe: <ol style="list-style-type: none"><li>1. Fewer entries and exits</li><li>2. More productive exiting firms</li><li>3. Narrower productivity distribution</li></ol>

# 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

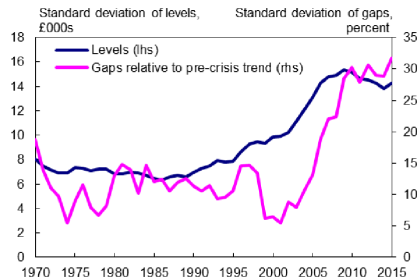
$$VA/F_{i,j,t} = \frac{\text{Sales}_{i,j,t} - (\text{Wages}_{i,j,t} + \text{Materials}_{i,j,t})}{FTE_{i,j,t}}$$

Three reasons to use VA/F as stepping stone:

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

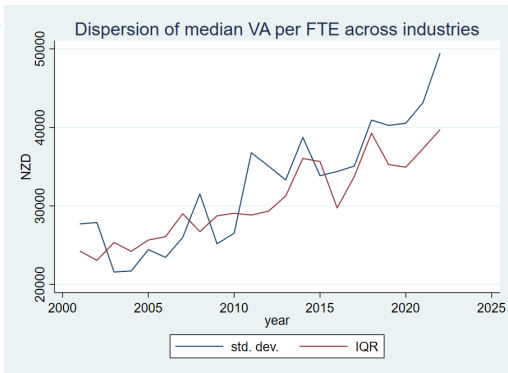
# NZ's inter-industry productivity dispersion has increased like the UK's, but with a more steady trend

**Chart 14: The standard deviation of productivity across industries**

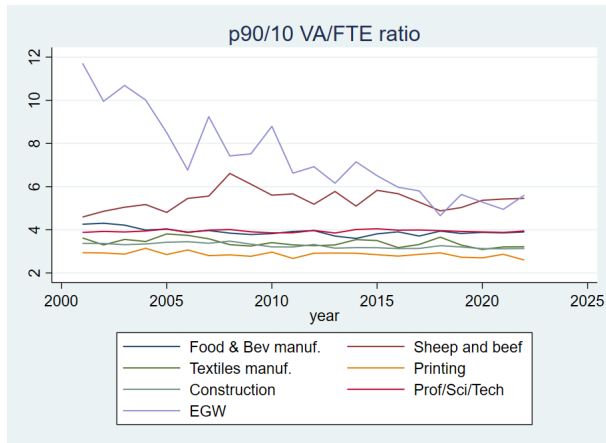


Source: EUKlems productivity database, ONS and Bank calculations.

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 & productivity; mixed changes 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:

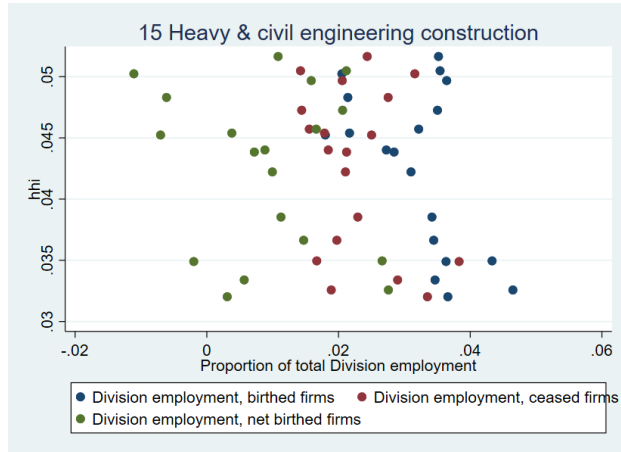
- ▶ Increased from 2001 to 2019
- ▶ Strongly positively associated with average VA/F

## Market power:

- ▶ PE and weighted (aggregate) PCM have flatlined
- ▶ Unweighted mean PCM has declined
- ▶  $\Rightarrow$  Large firms are maintaining/improving margins while smaller firms seeing margins compress



# 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	<b>HHI</b>	Weighted measure of market concentration <i>Larger <math>\Rightarrow</math> weaker competition</i>
Power	<b>PCM</b>	Percentage markup over costs <i>Higher <math>\Rightarrow</math> weaker competition</i>
Power	<b>PE</b>	How strongly cost increases reduce profits (negative values) <i>Larger negative <math>\Rightarrow</math> stronger competition</i> (profits more sensitive)

\*Following Maré and Fabling (2019)

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## 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
- ▶  $\text{HHI}_{X,jt} \in (0, 1]$

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## 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
- ▶  $\text{PCM}_{A,jt} \in (-\infty, 1)$

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## Profit Elasticity (PE)

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

- ▶ 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
- ▶  $PE \in (-\infty, 0]$

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