



RESERVE BANK OF AUSTRALIA

# Holding Productivity Accountable

Business Dynamism and Productivity

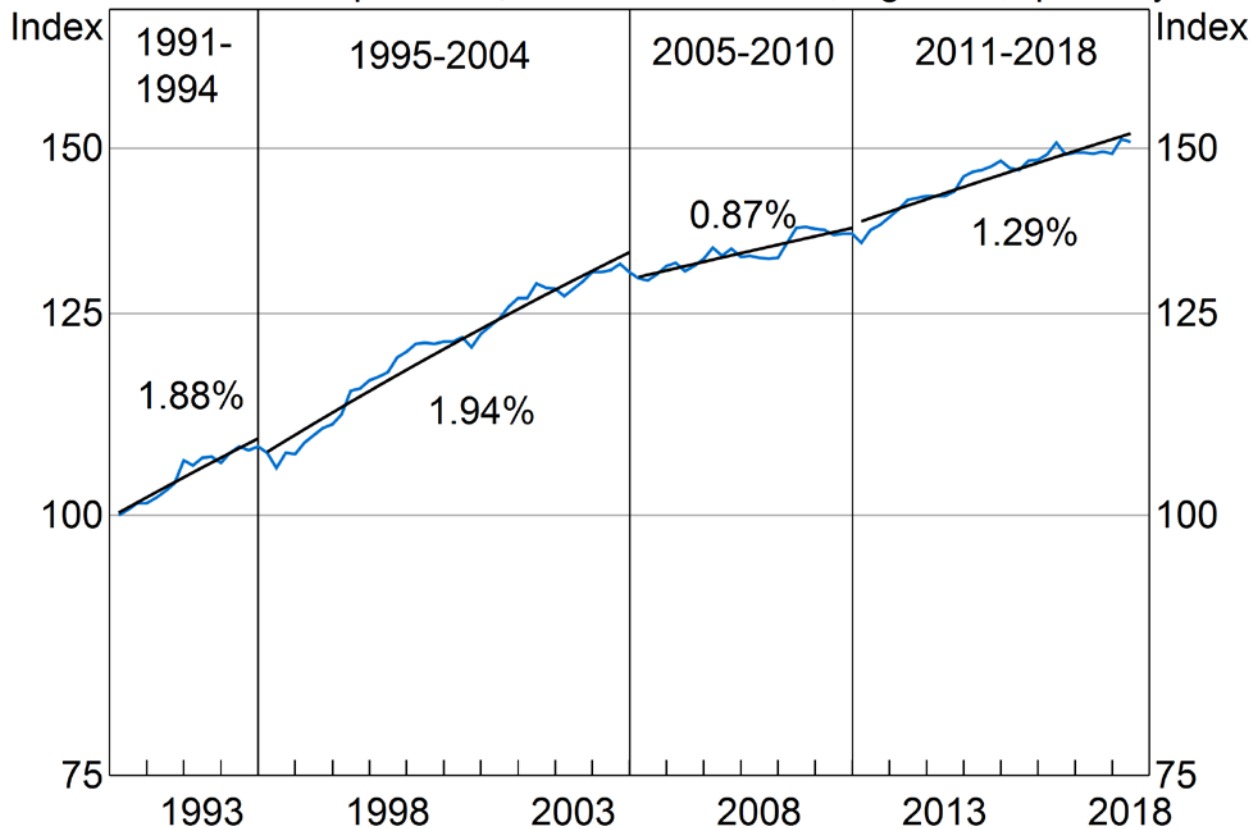
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*Disclaimer: Views expressed in this presentation are those of the author and not necessarily those of the Reserve Bank of Australia. Use of any results from this presentation should clearly attribute the work to the author/s and not to the Reserve Bank of Australia.*

# Labour Productivity\*

Non-farm GDP per hour, March 1991 = 100, log scale, quarterly



\* Black line represents a fitted line; numbers represent the annual geometric mean.

Sources: ABS; RBA

# Role of business dynamism

- Literature on the importance of business dynamism has grown.
- Zombie firms – McGowan, Andrews and Millot (2017)
- Declining allocative efficiency – Riley, Rosazza-Bondibene and Young (2015)
- Decline of start-ups and entrepreneurship - Decker, Haltiwanger, Jarmin and Miranda (2016)

# Business Entry and Exit Rates



Sources: ABS; RBA

# Question

- What is the role of business dynamism in Australian productivity growth?

# Business dynamism

- I consider two forms of business dynamism:
  - 1) External – Exits and entries
  - 2) Internal – Reallocation of resources from less productive to more productive firms

# Data & Methodology

- Business Activity Statements (BAS) from BLADE.
- Coverage: Any business registered for GST
- Sample: FY 2001/02 - 2014/15
- Diewert and Fox 2010 decomposition

# Decomposition – Diewert and Fox 2010

- Let labour productivity for firm  $i$  in period  $t$  be:

$$\Phi_{i,t} = \frac{y_{i,t}}{l_{i,t}}$$

- For each time period ( $t$ ), let there be three groups:

- 1) Entrants ( $e$ )
- 2) Exits ( $x$ )
- 3) Survivors ( $s$ )

- Productivity for a given group ( $g$ ) in period  $t$  can be expressed as:

$$\Phi_{g,t} = \sum_{i \in g} \frac{l_{i,t}}{\sum_{d \in g} l_{d,t}} \Phi_{i,t} = \sum_{i \in g} \omega_{i,g,t} \Phi_{i,t}$$



# Decomposition – Diewert and Fox 2010

- Using some algebra we can decompose the change in productivity as:

$$\Delta\Phi_t = \underbrace{\Delta\Phi_{s,t}}_{\text{contribution of survivors}} + \underbrace{\Omega_{e,t} \sum_{i \in e} \omega_{i,e,t} (\Phi_{i,t} - \Phi_{s,t})}_{\text{contribution of entrants}} + \underbrace{\Omega_{x,t-1} \sum_{j \in x} \omega_{j,x,t-1} (\Phi_{s,t-1} - \Phi_{j,t-1})}_{\text{contribution of exits}}$$

Where:

- $\Omega_{g,t}$  is the employment share of the group  $g$  relative to aggregate employment

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Where:

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# Decomposition – Diewert and Fox 2010

- Contribution of survivors can be decomposed further

$$\Delta \Phi_{s,t} = \underbrace{0.5 \sum_{k \in S} (\omega_{k,s,t} + \omega_{k,s,t-1}) (\Phi_{k,t} - \Phi_{k,t-1})}_{\text{within-change in productivity level}} + \underbrace{0.5 \sum_{k \in S} (\omega_{k,s,t} - \omega_{k,s,t-1}) (\Phi_{k,t} + \Phi_{k,t-1})}_{\text{between-change in labour shares}}$$

# Decomposition – Diewert and Fox 2010

$$\begin{aligned}\Delta\Phi_t &= \text{survivor contribution} + \text{entrant contribution} + \text{exit contribution} \\ &= \text{common productivity} + \text{internal dynamism} + \\ &\quad \text{external dynamism (entrants + exits)}\end{aligned}$$

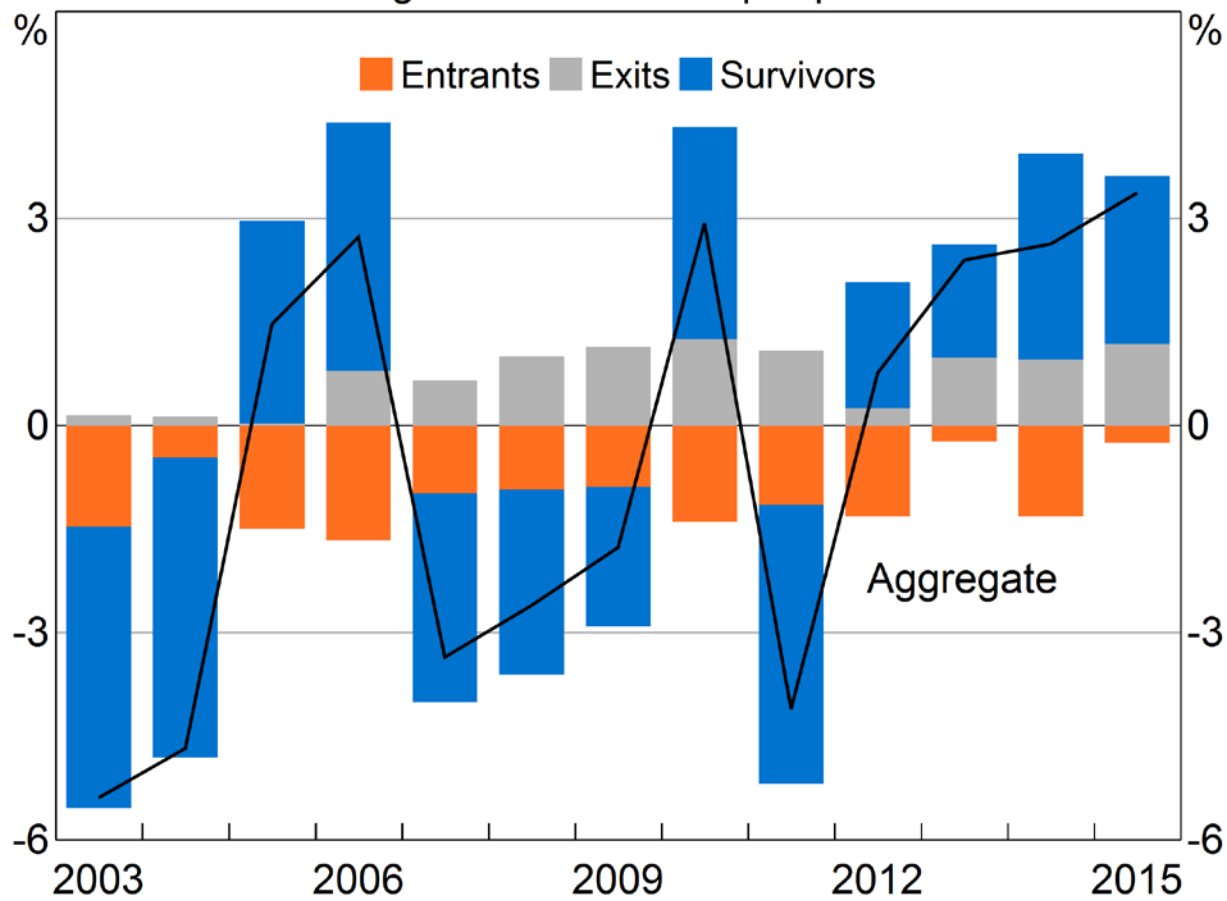
# A few caveats

- Financial, agriculture and public sector are excluded
- Negative GVA firms are zeroed
- Outliers have been trimmed
- Entrants are not necessarily new firms
- Exits haven't necessarily exited.

Aggregate

# Aggregate Productivity Growth

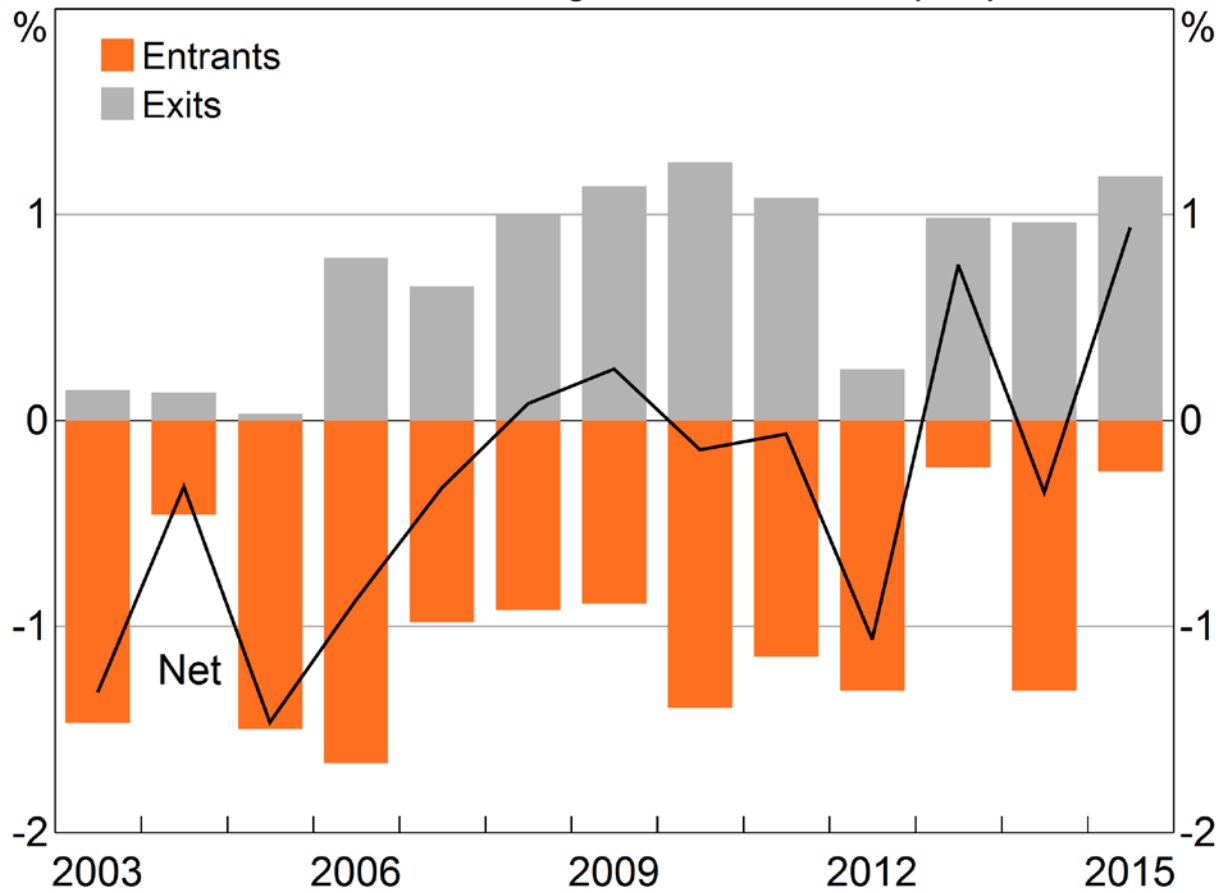
Real gross value added per person



Sources: ABS; RBA

# Aggregate External Dynamism

Entrants and exits; Real gross value added per person

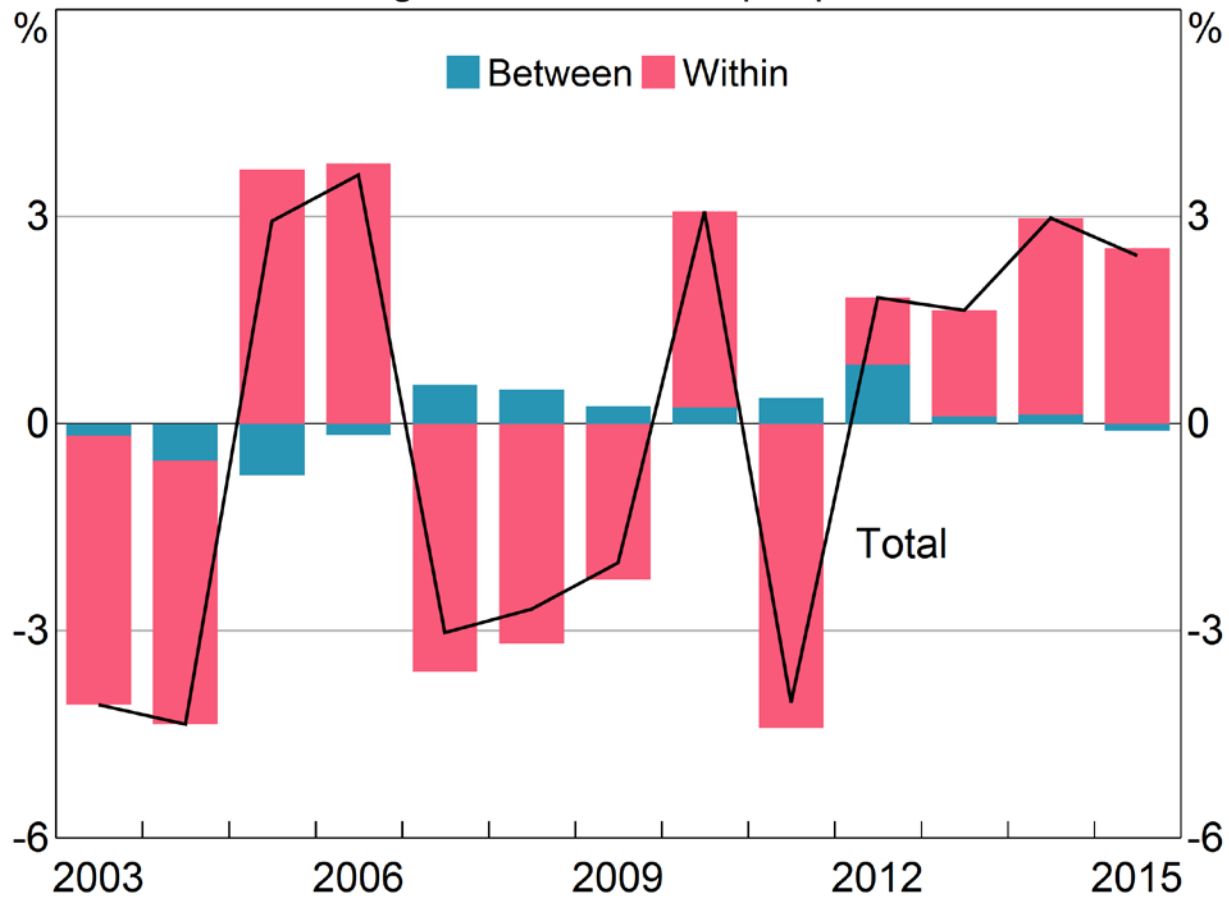


Sources: ABS; RBA



# Aggregate Survivor Productivity Growth

Real gross value added per person

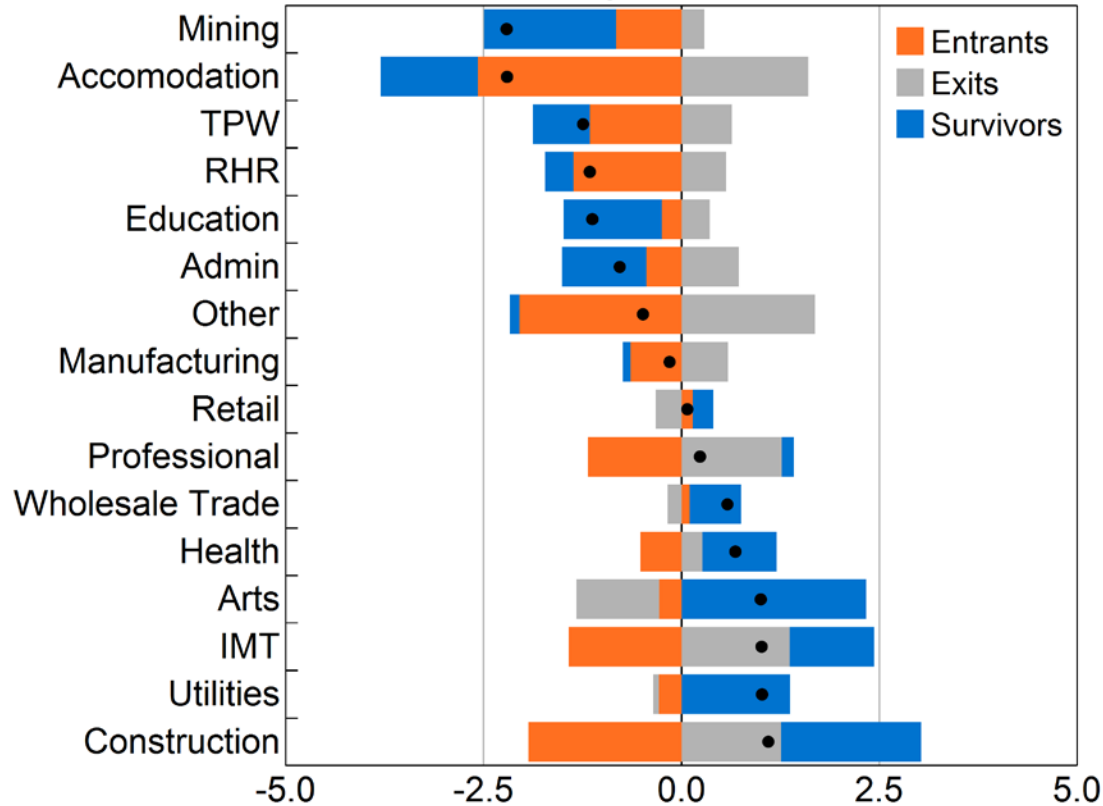


Sources: ABS; RBA

All sectors

# Productivity Growth by Industry

Average 2002 to 2015



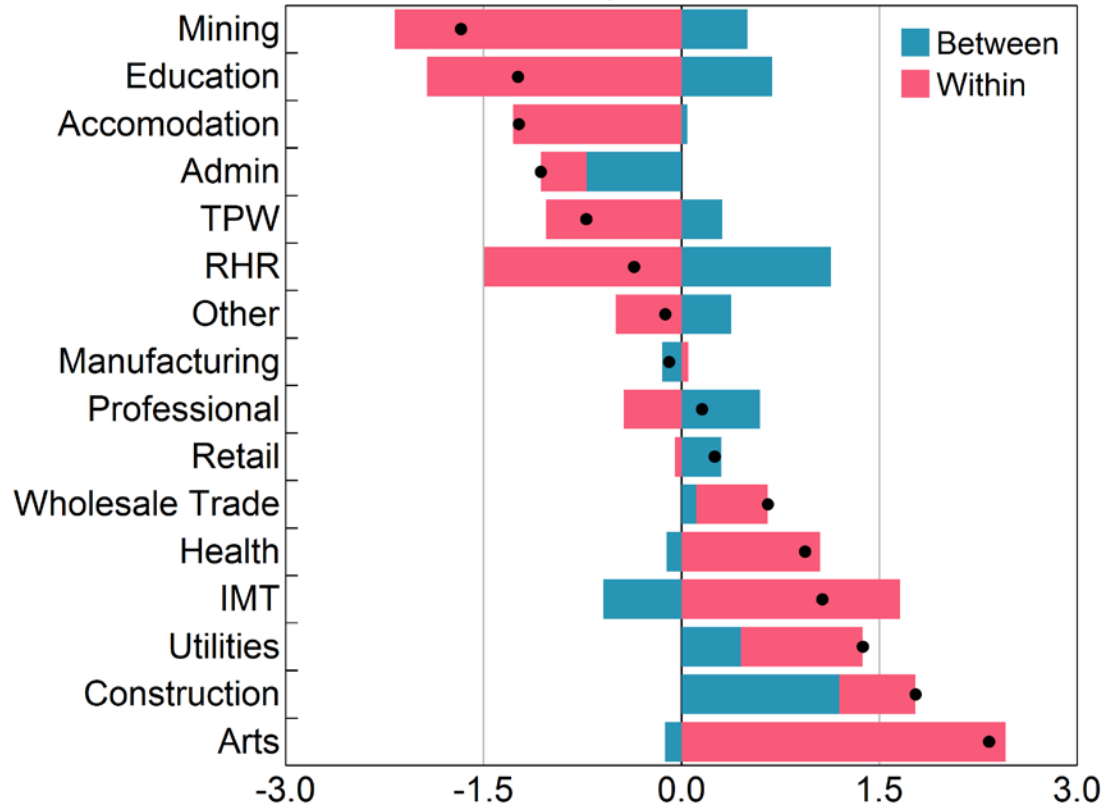
\* Dots represent average productivity growth.

\*\* RHR is Rental, Hiring and Real Estate; TPW is Transport, Postal and Warehousing; IMT is Information Media and Telecommunications.

Sources: ABS; RBA

# Survivor Productivity Growth by Industry

Average 2002 to 2015



\* Dots represent average survivor productivity growth.

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# Discussion

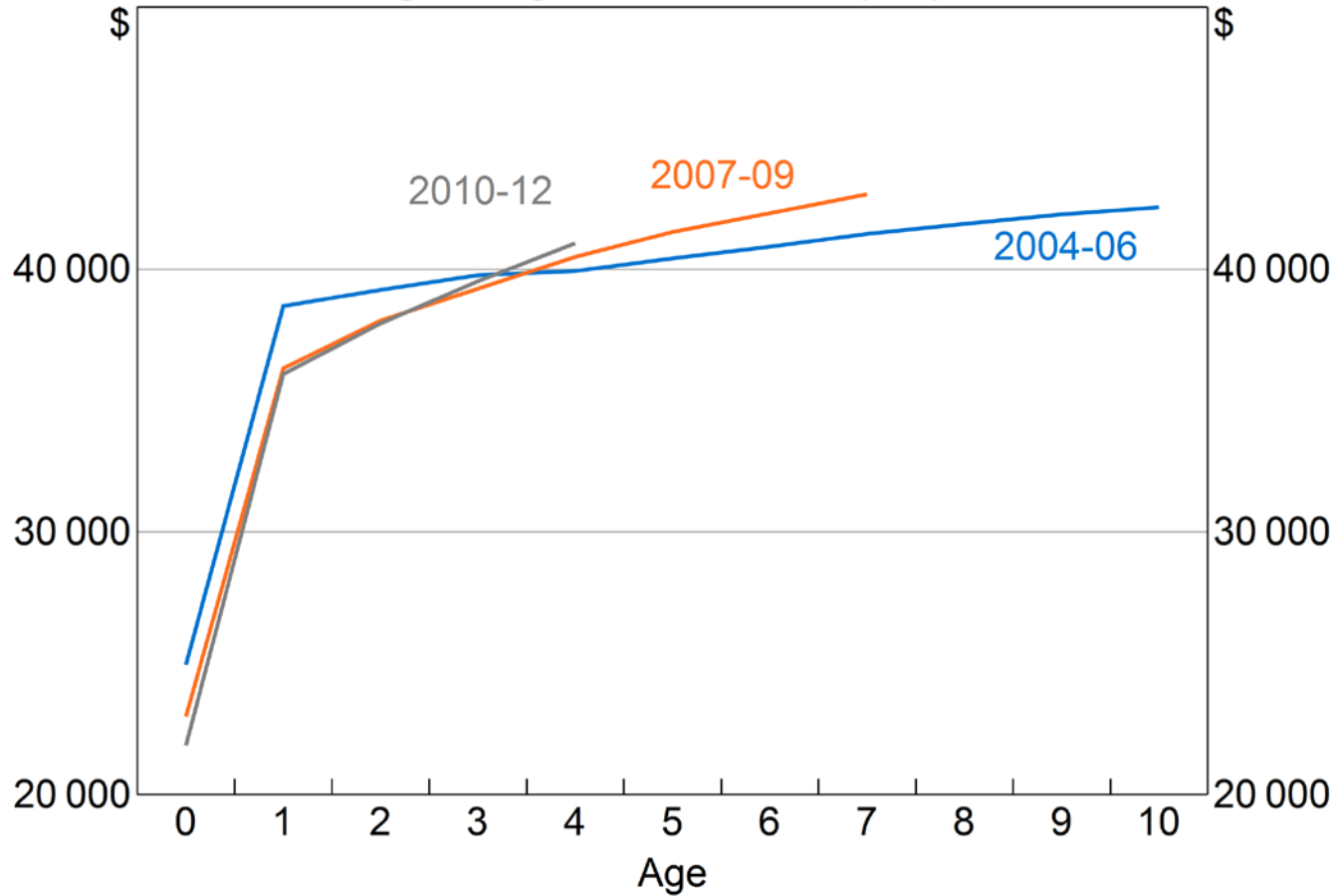
- Over time survivors have driven productivity growth
  - Common factor dominates
  - Internal dynamism is consistently positive but small
  - Exits added to productivity growth by exiting
  - Entrants subtract from productivity growth
- Industry level analysis reveals the importance of internal business dynamism

# Do entrants subtract from productivity?

- The decomposition can only classify a business as an entrant in its first year
- Ignores subsequent contribution of entrants

# Productivity by Cohort

Average real gross value added per person



Sources: ABS; RBA

# Future research

- Age, cohort, time analysis
- Survivor modelling
- Drivers in the volatility of survivors productivity



# References

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Comments or Questions?