The Real Effects of Debt Covenants: Evidence from Australia

Kim Nguyen (RBA)*

* The views in this paper do not represent those of the Reserve Bank of Australia.

Motivation

- *How do the use and structure of debt covenants affect real business activity and pass-through of monetary policy?*

- Debt covenants: designed to mitigate information frictions in debt financing
  - Make credit available
  - Set the conditions (financial statistics) a borrower is obligated to satisfy + consequences of violations.

  => Impose financial restrictions on borrowers => affect business behaviour + amplify shocks

- Commonly used and violations occur more frequently than insolvencies.

- COVID-19 raise concerns about the ability to comply with covenants.

- Very understudied topic (almost only US). Nothing for Australia.

This paper:

- Constructs a database of debt covenants for non-financial listed firms in Australia
- Examines the microeconomic direct effects and disentangles the channels
- Examines the macroeconomic indirect effects via transmission of monetary policy shocks
- Quantifies macroeconomic implications of the use and structure of covenants

Data

- No comprehensive database of corporate covenants in Australia.
- Use text analysis on companies annual reports from Connect4

> In addition to the eligible collateral, the Group has several general and financial undertakings which it must comply with including an Equity Ratio covenant, a Leverage Ratio covenant and an Interest Cover Ratio covenant.

> During the year ended 31 December 2006, a controlled entity of AHG, Cottman, breached certain financial covenants under its finance facilities with GE Capital Finance Pty Ltd ("GE Capital") and has continued to breach those covenants in the period to the date of this report.

- Caveats:
  - Self-selection in reporting.
  - Lack of details on the terms.
- Morningstar: balance sheet info.

Types of debt covenants

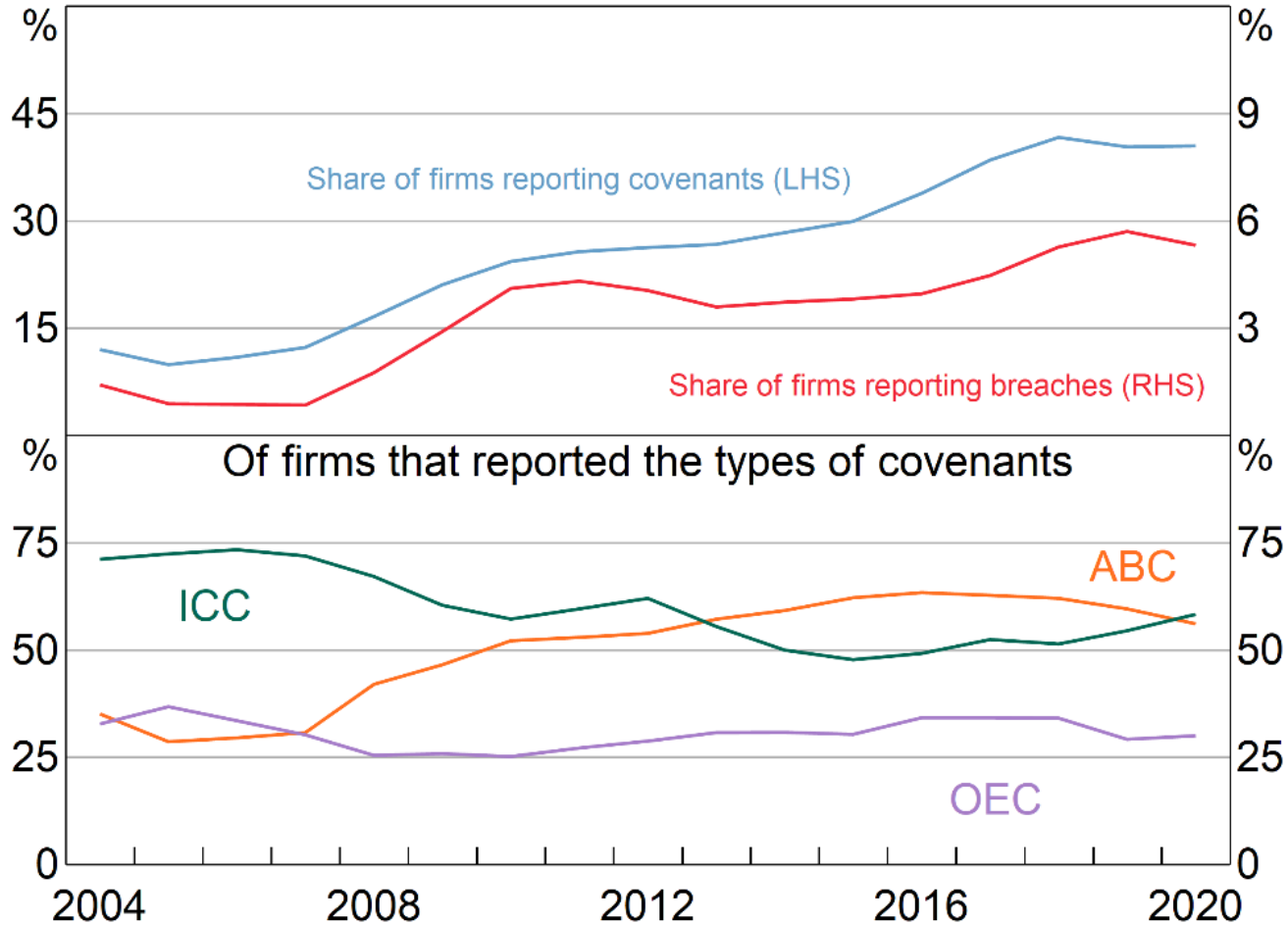
- Interest coverage covenants (ICC): minimum earnings to interest payments ratio.

- Other earnings-based covenants (OEC): maximum debt to earnings ratio.

- Asset-based covenants (ABC): maximum debt to equity or debt to asset ratio.

Trends in Corporate Debt Covenants

Australian non-financial listed firms, three-year moving average



Sources: Author's calculations; Connect4; Morningstar

Direct effects

- Ex-post punishing channel => focus of existing literature
  - Following violation
  - Punishment: transfer of control rights, increase in IR, renegotiation

  => Force firms to cut back activity

- Ex-ante disciplining channel => focus of this paper
  - Prior to violation
  - Can be written explicitly to limit business actions
  - Firms try to avoid breaches by cutting back activity

  $\Rightarrow$ Can have real effects even in the absence of violations.

Direct effects

- Baseline model:

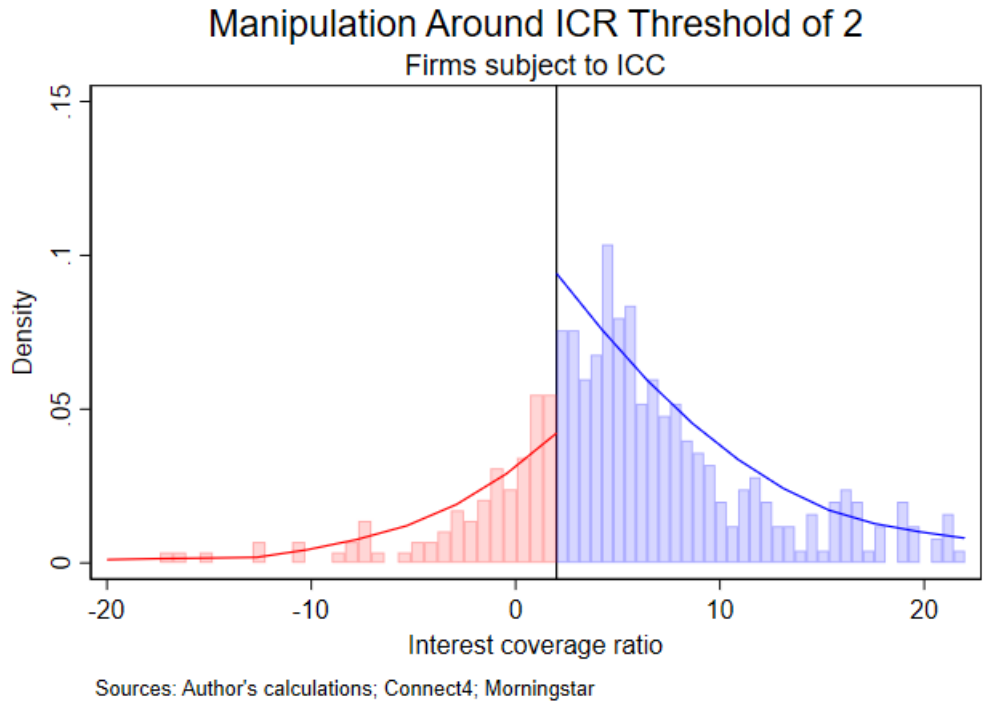
$$\Delta y_{i,t} = \alpha_i + \beta_0 \, Cov_{i,t-1} + \boldsymbol{X}'_{i,t-1}\mu + \sum_c \theta_c^h I_{i,c} t + \varepsilon_{i,t} \; (1).$$

- $\Delta y_{i,t}$: real business activity of firm i in year t.
  - Investment: log difference in fixed assets
  - Employment: log difference in staff and employees expenses

- $Cov_{i,t-1}$ indicates whether firm i was subject to debt covenants in time $t-1$.

Ex-ante vs Ex-post

- Evidence of manipulation in the data => role of ex-ante disciplining channel



- Ex-ante treatment:

$$\Delta y_{i,t} = \alpha_i + \beta_1 Dis_{i,t-1} + \boldsymbol{X'}_{i,t-1}\mu + \sum_c \theta_c I_{i,c} t + \varepsilon_{i,t} \quad (2)$$

$$\text{Where } Dis_{i,t-1} = \begin{cases} 1, & Cov_{i,t-2} = 0 \;\&\; Cov_{i,t-1} = 1 \;\&\; Breach_{i,t-1} = 0 \\ 0, & Cov_{i,t-2} = 0 \;\&\; Cov_{i,t-1} = 0 \end{cases}$$

- Ex-post treatment:

$$\Delta y_{i,t} = \alpha_i + \beta_2 Pun_{i,t-1} + \boldsymbol{X'}_{i,t-1}\mu + \sum_c \theta_c I_{i,c} t + \varepsilon_{i,t} \quad (3)$$

Where

$$Pun_{i,t-1} = \begin{cases} 1, & Cov_{i,t-2} = Cov_{i,t-1} = 1 \;\&\; Breach_{i,t-2} = Breach_{i,t-1} = 0 \\ 0, & Cov_{i,t-2} = Cov_{i,t-1} = 1 \;\&\; Breach_{i,t-2} = 0 \;\&\; Breach_{i,t-1} = 1 \end{cases}$$

Table 1: Direct effects debt covenants on investment and employment

Overall and across different channels

	Equation (1)	Equation (2)	Equation (3)
	Overall (β_0)	Ex-ante (β_1)	Ex-post (β_2)
Investment	-0.114***	-0.118**	0.0205
	(0.0367)	(0.0553)	(0.132)
Observations	5577	2966	1120
Staffing expenses	-0.0654***	-0.0920*	0.0946*
	(0.0243)	(0.0496)	(0.0570)
Observations	4007	2069	846
Firm FE	Yes	Yes	Yes
Financial measures	Yes	Yes	Yes
Industry time trends	Yes	Yes	Yes

Note: Clustered standard errors at firm level, ***p<0.01, **p<0.05, *p<0.1.

Sources: Author's calculations; Connect4; Morningstar.

Indirect effects: MP transmission

- Depends on the structure of covenants

- ICC can amplify MP
  - Interest payment component
  - Borrowing capacity and buffer highly sensitive to IR

- ABC and OEC may dampen MP
  - OEC: indirectly via earnings; ABC: book values, preventing feedback
  - At debt limits, MP loosening/tightening does not facilitate expansion/restrict further

Indirect effects: MP transmission

- Built on Greenwald (2019)
- Transmission of MP to investment and staff expenses:

$$\Delta_h y_{i,t+h} = \alpha_i^h + \sum_{cov} I_{i,t-1,cov} \left(\beta_{0,cov}^h + \beta_{1,cov}^h \epsilon_t\right)$$
$$+\left(\gamma_0^h + \gamma_1^h \epsilon_t\right) \boldsymbol{X}'_{i,t-1} + \theta^h t + \sum_k \delta_k^h \epsilon_{t-k} + \eta_{i,t+h} \quad (4)$$

- 3 covenants configurations:
  1. ICC
  2. No ICC but OEC or ABC or both (NICC)
  3. No covenants (NC)

- Using MP shocks (Becker 2020) instead of changes in cash rates.

Indirect effects: MP transmission

- Statistics of interest:

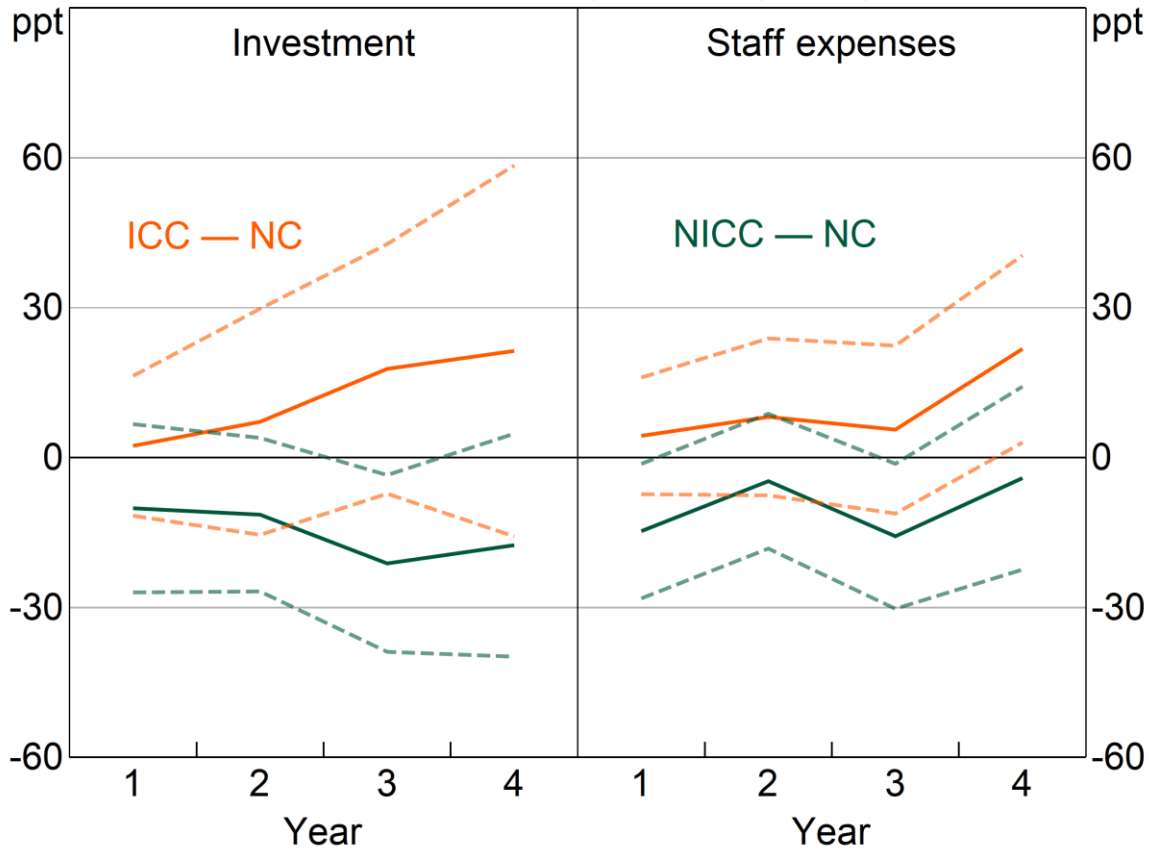
$$D^h_{ICC-NC} = \beta^h_{1,\mathrm{ICC}} - \beta^h_{1,\mathrm{NC}}$$

$$D^h_{NICC-NC} = \beta^h_{1,N\mathrm{ICC}} - \beta^h_{1,\mathrm{NC}}$$

$$D^h_{ICC-NICC} = \beta^h_{1,\mathrm{ICC}} - \beta^h_{1,\mathrm{NICC}}$$

Differential Responses by Covenant*

To a 100bps expansionary monetary policy shock



* Measured as the differences between the coefficients attached to each covenant configuration dummy interacting with monetary policy shock. Dashed lines depict 95 per cent confidence intervals

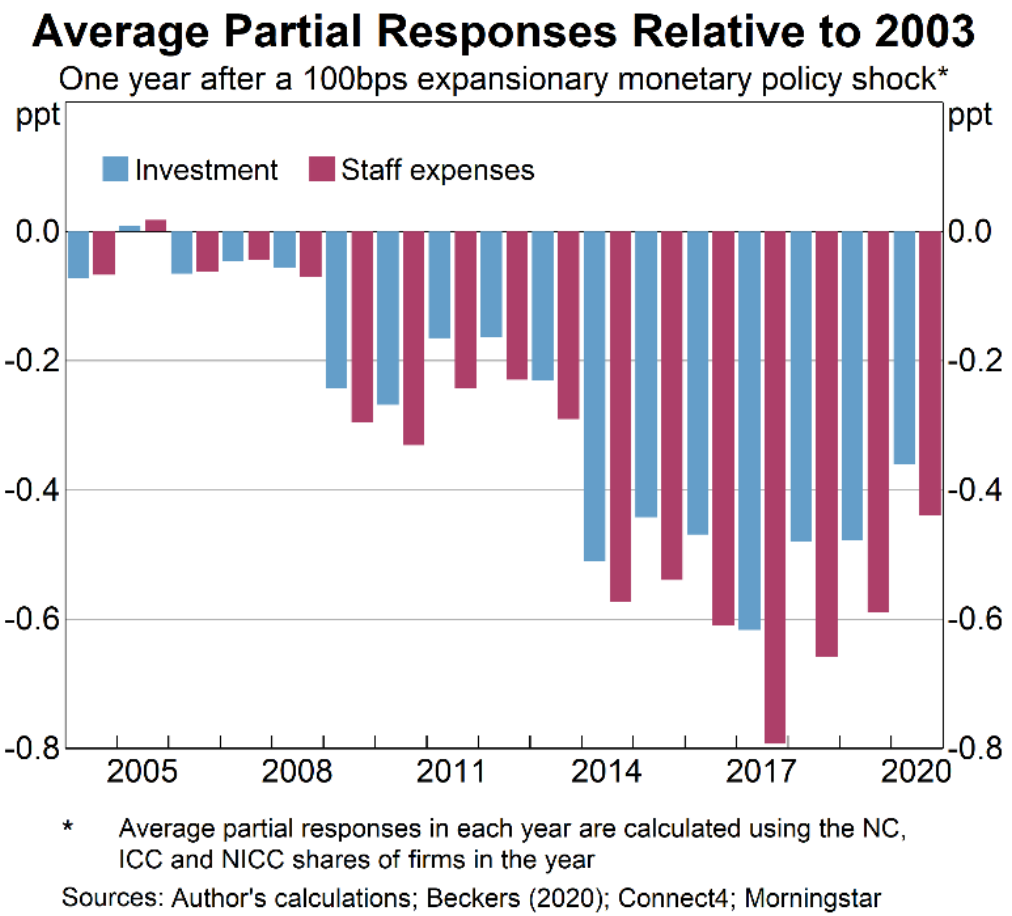
Sources: Author's calculations; Beckers (2020); Connect4; Morningstar

Aggregate effects of covenants composition

- Prevalence of ICC relative to NICC has declined over the past decade.
- Quantify the impact of the shift in covenants composition on monetary policy pass-through.
- Average partial responses of business activity in year t:

$$Responses_t^h = ICC\ share_{t-1} * \beta_{1,ICC}^h + NICC\ share_{t-1} * \beta_{1,NICC}^h + NC\ share_{t-1} * \beta_{1,NC}^h.$$

- Compare with that in 2003.



- Response of investment 1 year after 100 bps MP shock is 0.2 - 0.35 ppt smaller in 2020.
- Response of investment is 1.3% over 1 year (MARTIN)

⇒The shift lowered responsiveness by 15-25%

- Pretty much same estimates for non-mining investment (mostly from listed firms)

Recap

- Novel dataset of corporate debt covenants in Australia
- Evidence that debt covenants affect firm's business activity over and beyond breaches
- Evidence that MP transmission is amplified with interest coverage covenants and mitigated with debt-capping covenants.
- Compositional change in covenants over time has a sizeable impact on MP transmission to aggregate non-mining investment in Australia
  - potentially explaining part of the surprising weakness in non-mining investment in the 2010s.

Limitations and future works

- Caveats of data construction: reporting bias
- No info on credit supply/access to credit
- Listed firms only
- Identification strategies depend on underlying assumptions

Limitations and future works

- Directions for future works:
  1. The role of firm heterogeneity on the direct effects of covenants, e.g. by size and leverage
  2. Impacts on firm productivity
  3. Private vs public debt; secured vs. unsecured
  4. Other sources of text of higher frequency (e.g. transcripts, half-yearly reports, etc.)

Spares

Key findings

- Exposure to debt covenants disciplines firm's investment and staffing expenses
  $\Rightarrow$ Effects of debt covenants operative even in the absence of breaches.

- Transmission of MP shocks to firm's investment and staffing expenses:
  - amplified by interest coverage covenants
  - dampened by debt-capping covenants

  $\Rightarrow$ Structure of debt covenants pertinent to effectiveness of MP transmission

- The shift away from interest coverage covenants over the past decade has lowered the aggregate responsiveness of non-mining investment by 15-25%.

Table 1: Financial Statistics by Usage and Type of Debt Covenants

Australian non-financial listed firms, from 2002 to 2020, median

	None[a]	Covenants[b]	Breaches	ICC	OEC	ABC
Revenue (A$ million)	14	104.5	108.9	93.5	91.7	119.8
Debt (A$ million)	6	61.7	63.3	68.5	44.6	79.3
Cash (A$ million)	5	15.2	13.7	13.7	10.5	17.9
Asset (A$ million)	53	290.4	315.7	362.0	236.8	412.5
Investment (A$ million)	6.5	44.5	39.8	36.8	32.6	55.9
Staff expenses (A$ million)	2.5	18.4	21.5	18.8	18.8	25.1
Return-on-equity ratio	0.09	0.18	0.18	0.18	0.23	0.17
Debt-to-equity ratio	0.2	0.5	0.5	0.5	0.5	0.4
Debt-to-EBITDA ratio	0.1	3.0	3.1	3.4	3.4	3.2
Interest coverage ratio	2.5	6.1	5.7	5.7	6.6	5.7
Share of breaches (%)	N/A	13	N/A	11	8	8
Observations (No.)	12567	4613	592	726	485	686

(a) Firms without covenants but having debt in the year.

(b) Including firms not specifying the types of covenants and not equal to the total of ICC, OEC and ABC since they are not mutually exclusive.

Sources: Author's calculations; Connect4; Morningstar.

Table A1: Summary Statistics

Non-financial listed companies, 2002-2020

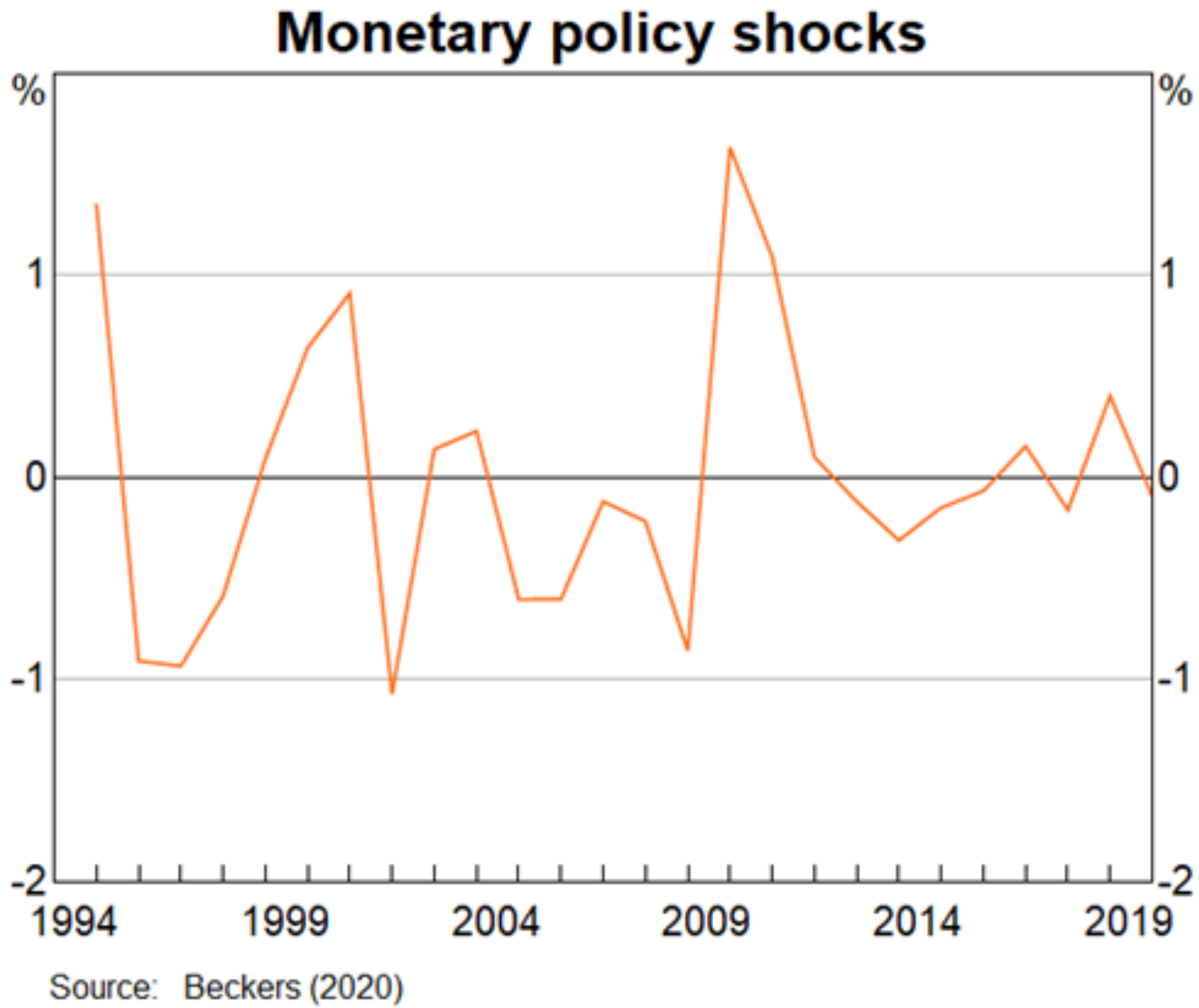
	Mean	Median	Standard deviation
Revenue (A$ million)	378	15	2189
Debt (A$ million)	321	4	2018
Cash (A$ million)	87	6	648
Asset (A$ million)	1135	59	6802
Investment (A$ million)	463	5	4270
Staff expenses (A$ million)	55	3	267
Return-to-equity ratio	0.08	0.08	13
Debt-to-equity ratio	1	0	15
Debt-to-EBITDA ratio	0	0	132
Interest coverage ratio	-5282	4	329514

Sources: Author's calculations; Connect4; Morningstar.

	ICC	NICC[(a)]
Revenue (A$ million)	93.5	124.5
Debt (A$ million)	68.5	66.4
Cash (A$ million)	13.7	16
Asset (A$ million)	362.0	334.7
Investment (A$ million)	36.8	51.8
Staff expenses (A$ million)	18.8	22
Return-on-equity ratio	0.18	0.16
Debt-to-equity ratio	0.5	0.5
Debt-to-EBITDA ratio	3.4	3.1
Interest coverage ratio	5.7	5.0
Observations (No.)	726	485

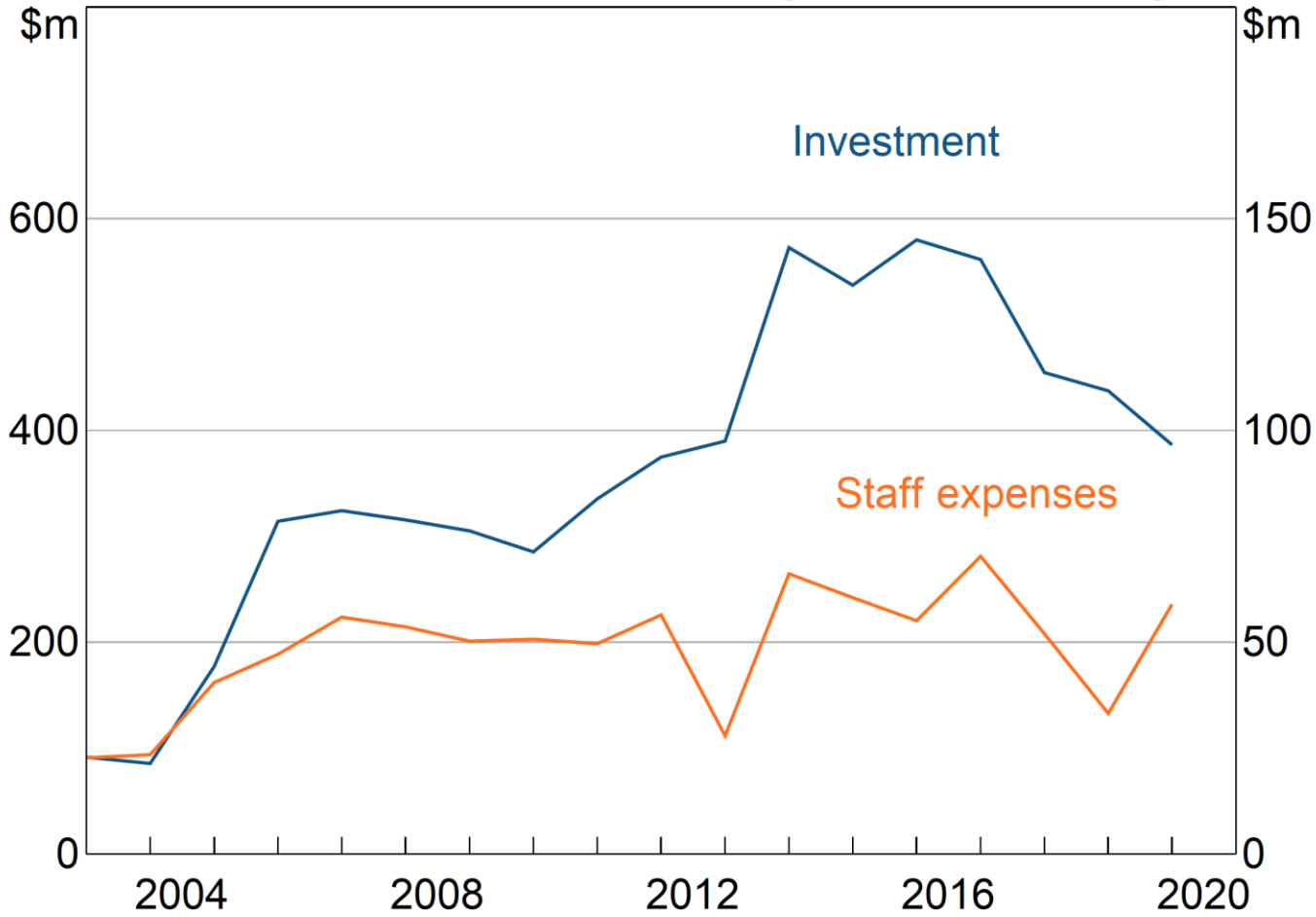
(a) Firms subject to ABC or OEC or both, and not subject to ICC

Sources: Author's calculations; Connect4; Morningstar


Monetary policy shocks
%
%
1
0
-1
-2
1
0
-1
-2
1994
1999
2004
2009
2014
2019
Source: Beckers (2020)

Business Investment and Staff Expenses

Australian non-financial, non-mining listed firms, average

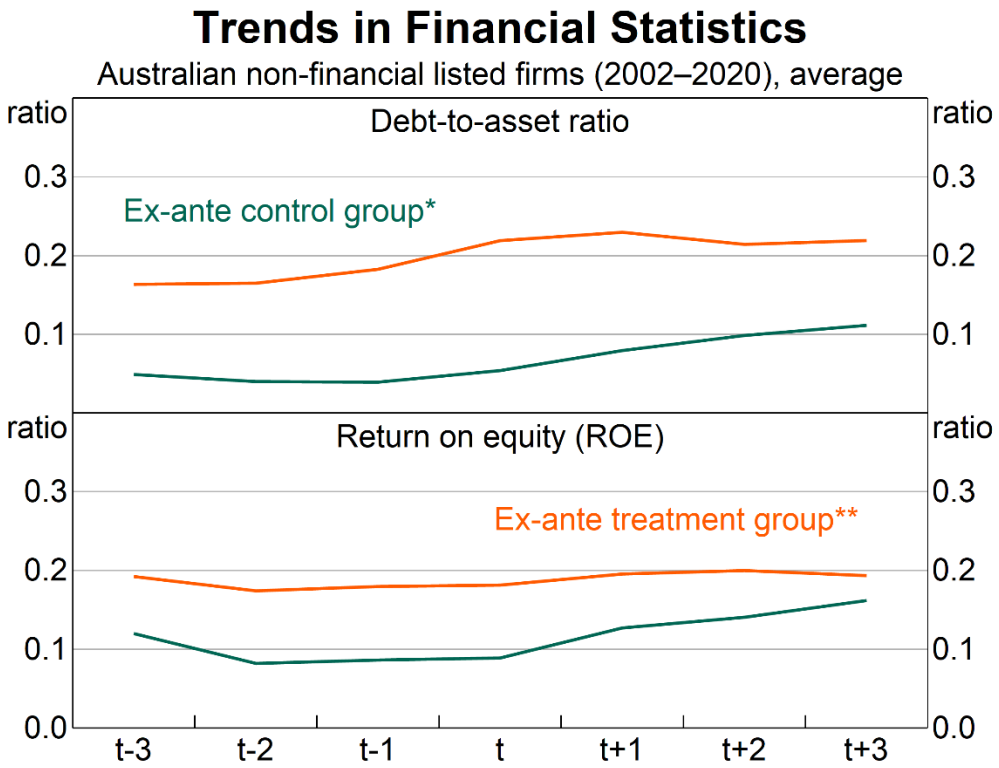


Sources: Author's calculations; Morningstar

Identification issues

- Reversed causality:
  - Creditors anticipated future negative shock
  - Firms anticipated increase in future activity
- Reporting bias:
  - Incentives (disincentives) to report by financially strong (troubled) firms
  - Trends in reporting standards
- Controls: firm-level financial characteristics, fixed effects, industry-level time trends.
- Endogeneity remains if coincides with temporary firm-level shocks not captured by controls.

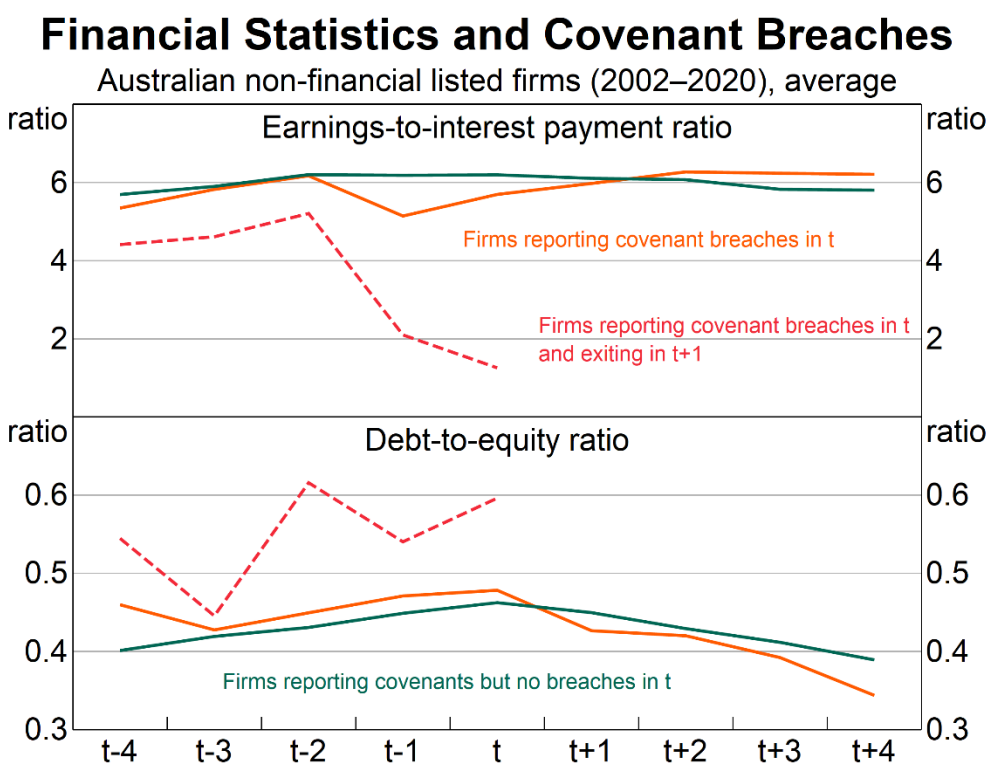
Parallel trends



* Defined as firms not exposed to debt covenants in both t-2 and t-1

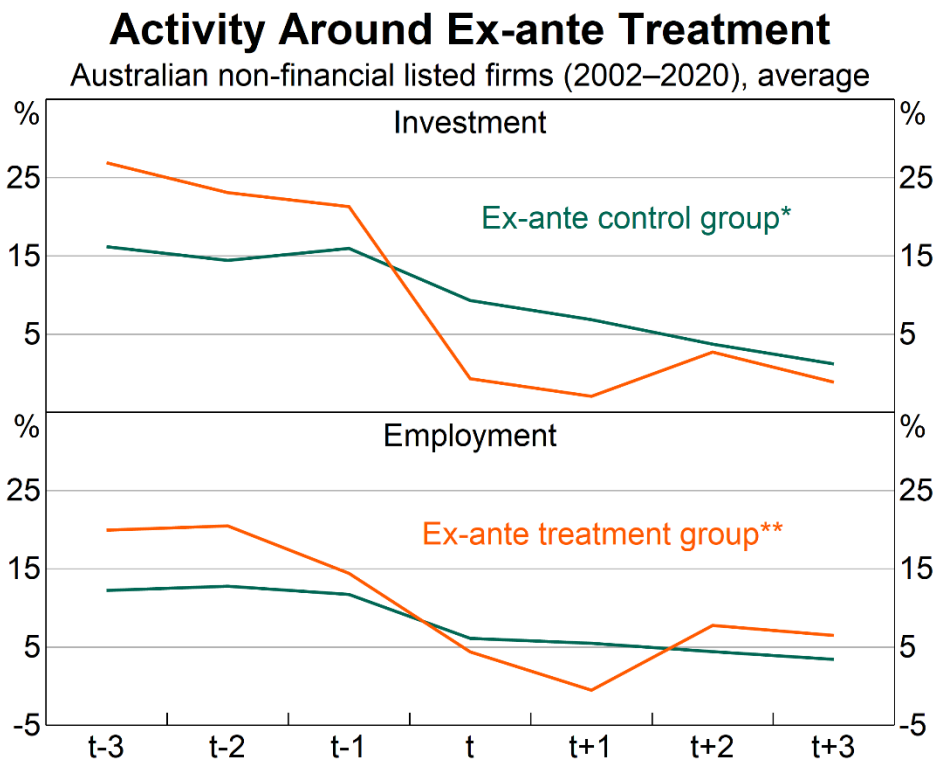
** Defined as firms not exposed to debt covenants in t-2, exposed in t-1 but no breaches in t-1.

Sources: Author's calculations; Connect4; Morningstar



Sources: Author's calculations; Connect4; Morningstar

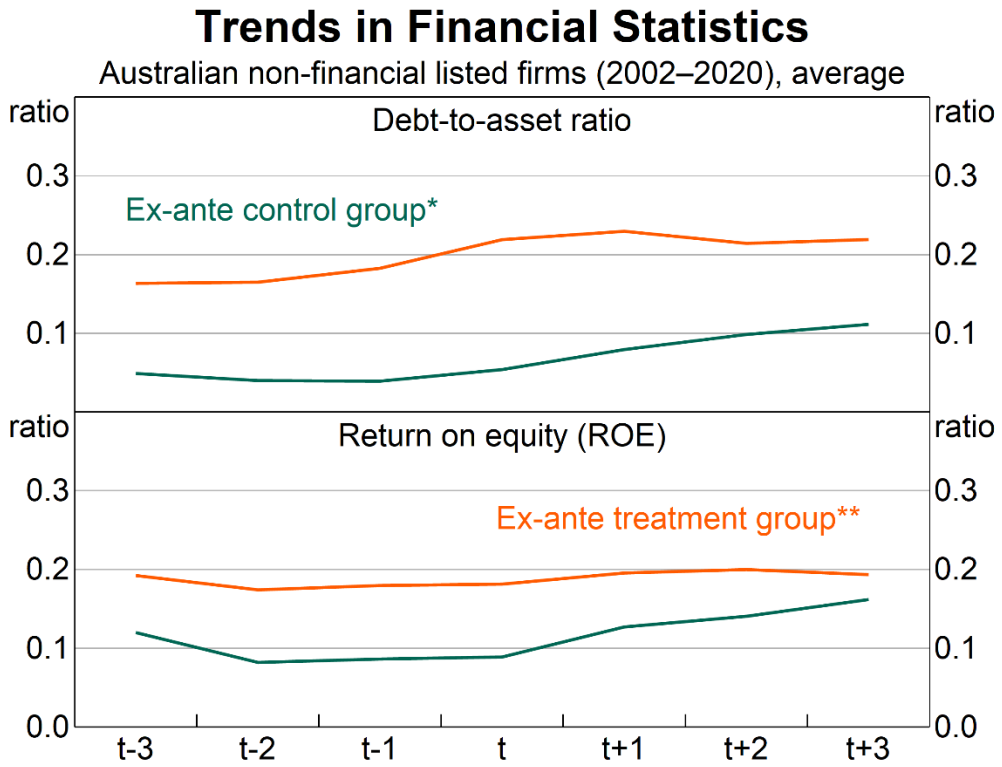
Parallel trends



* Firms not exposed to debt covenants in both t-2 and t-1

** Firms firms not exposed to debt covenants in t-2, exposed in t-1 but no breach in t-1.

Sources: Author's calculations; Connect4; Morningstar

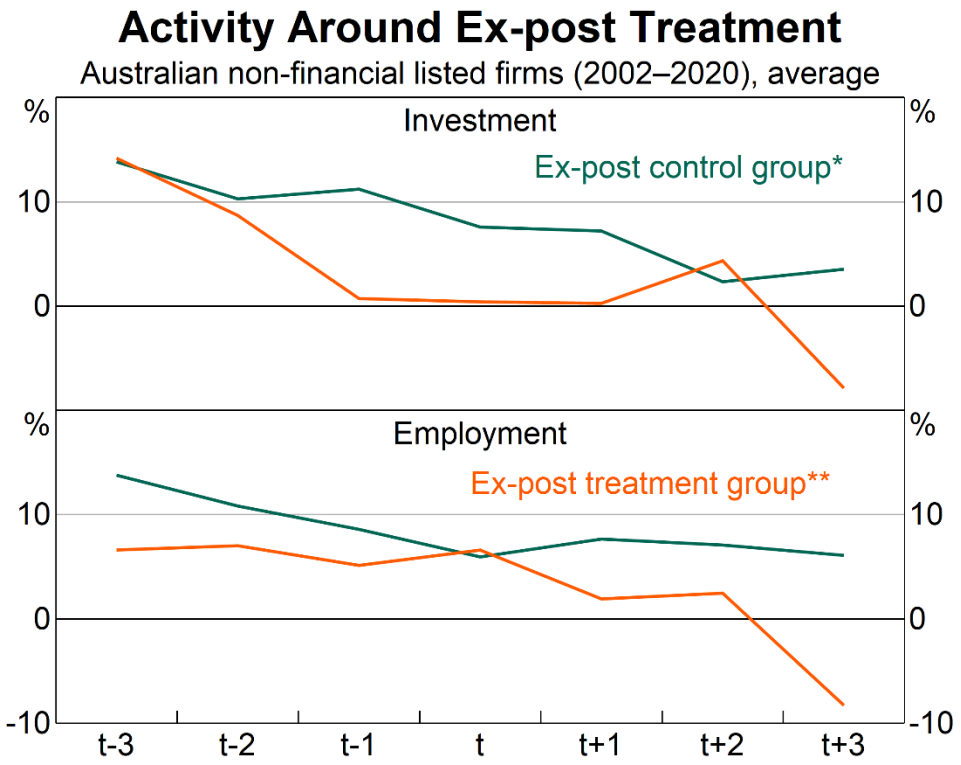


* Defined as firms not exposed to debt covenants in both t-2 and t-1

** Defined as firms not exposed to debt covenants in t-2, exposed in t-1 but no breaches in t-1.

Sources: Author's calculations; Connect4; Morningstar

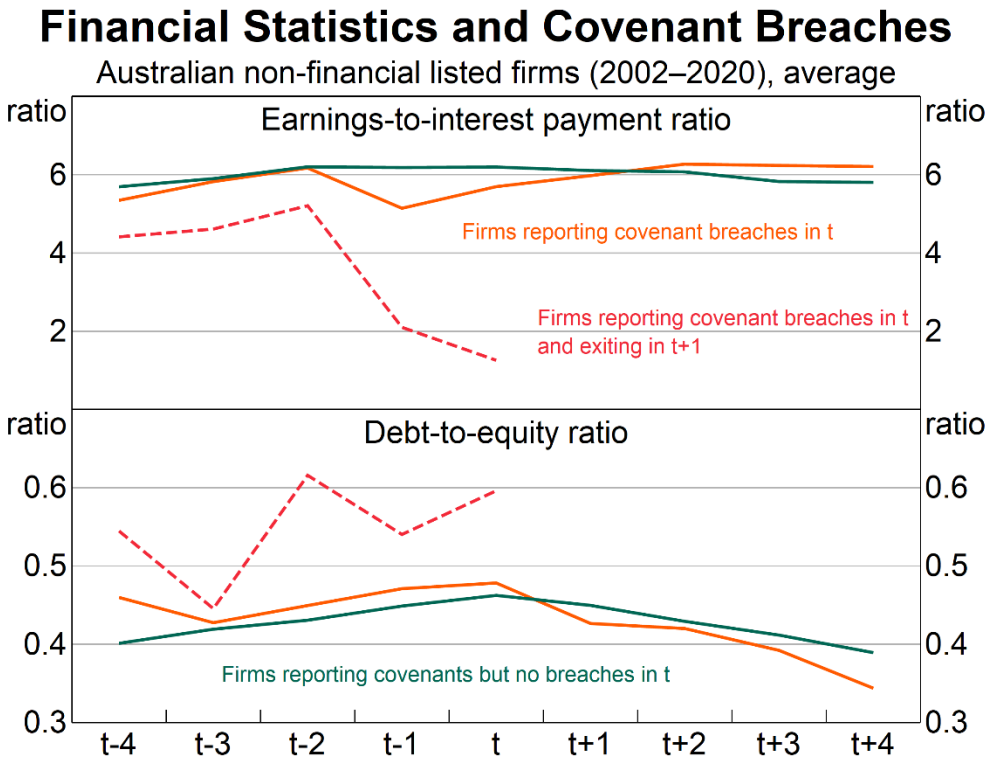
Parallel trends



* Firms exposed to covenants but no breach in both t-2 and t-1

** Firms exposed to covenants in both t-2 and t-1, no breach in t-2 but breaches in t-1

Sources: Author's calculations; Connect4; Morningstar



Sources: Author's calculations; Connect4; Morningstar

Appendix ATest for Parallel Trends

To test for parallel trends before the covenants exposure treatment, I estimate the following regression on investment and staff expenses the years before the treatment:

$$\Delta y_{i,t} = \alpha_i + \beta_0 NoDis_{i,t-1} * trend + \beta_1 Dis_{i,t-1} * trend + \boldsymbol{X}'_{i,t-1}\mu + \varepsilon_{i,t}$$

The parameter of interest is the differential time trend coefficients: $\beta_0 - \beta_1$. The two groups follow parallel trends if the parameter is statistically significantly zero.

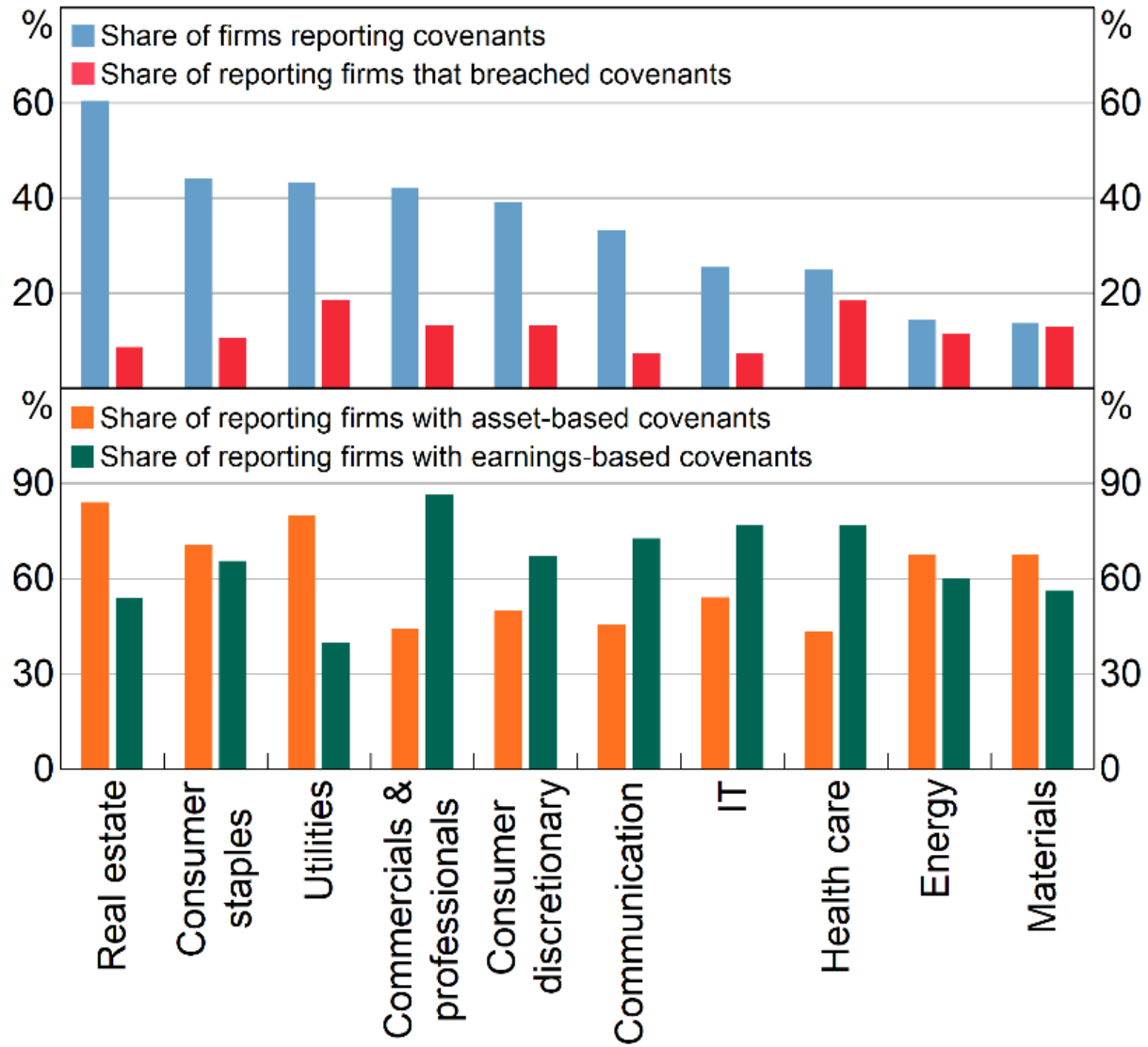
Table B1: Test for Parallel Trends between Control and Treatment Groups

Wald test for the difference between time trends

	Time trend coefficients		Difference
	Control group (β_0)	Treatment group (β_1)	$\beta_0 - \beta_1$
Investment	-0.0065863	-.0066515	.0000652
	(0.0071332)	(.0071293)	(.0000284)
Staff expenses	-.0114725	-.0115148	.0000423
	(.0065714)	(.006566)	(.0000206)
Note: Clustered standard errors at firm level in parentheses. Sources: Author's calculations; Connect4; Morningstar.			

Reported Debt Covenants by Industry

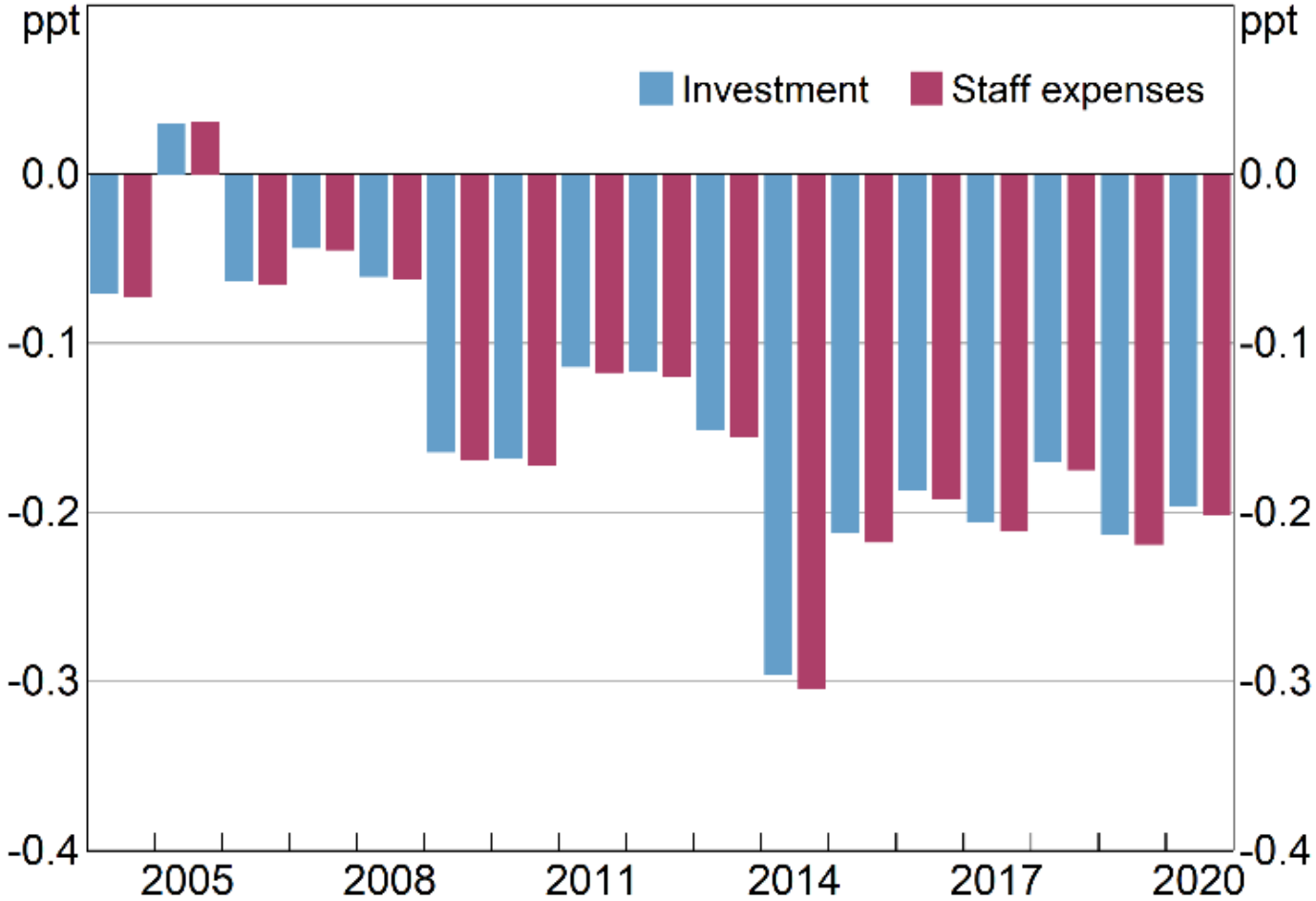
Australian non-financial listed firms (2002–2020)



Sources: Connect4; RBA

Average Partial Responses Relative to 2003

One year after a 100bps expansionary monetary policy shock*

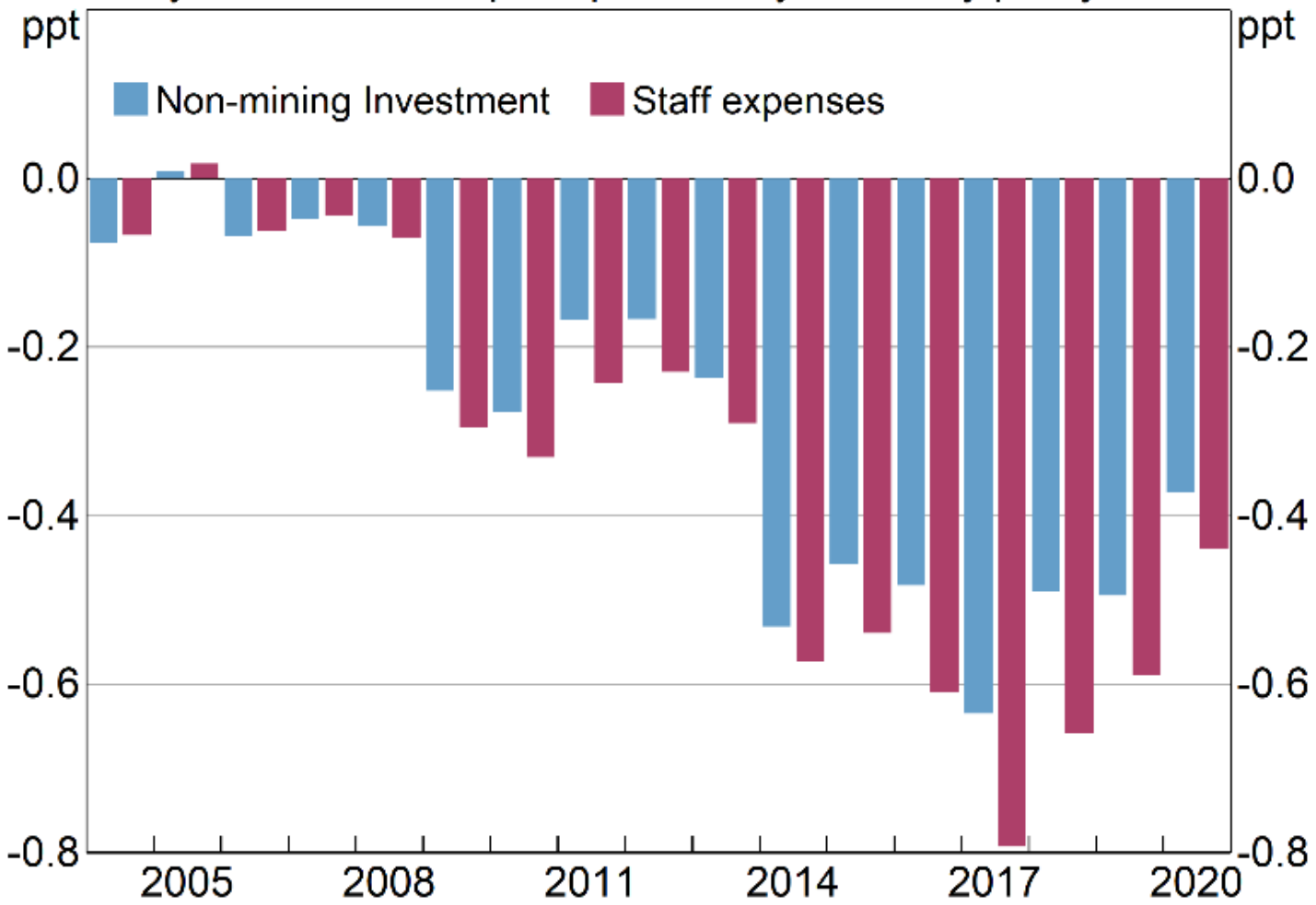


* Average partial responses in each year are calculated using the NC share of firms in 2003 and the ICC and NICC shares of firms subject to covenants in the year

Sources: Author's calculations; Beckers (2020); Connect4; Morningstar

Average Partial Responses Relative to 2003

One year after a 100bps expansionary monetary policy shock*

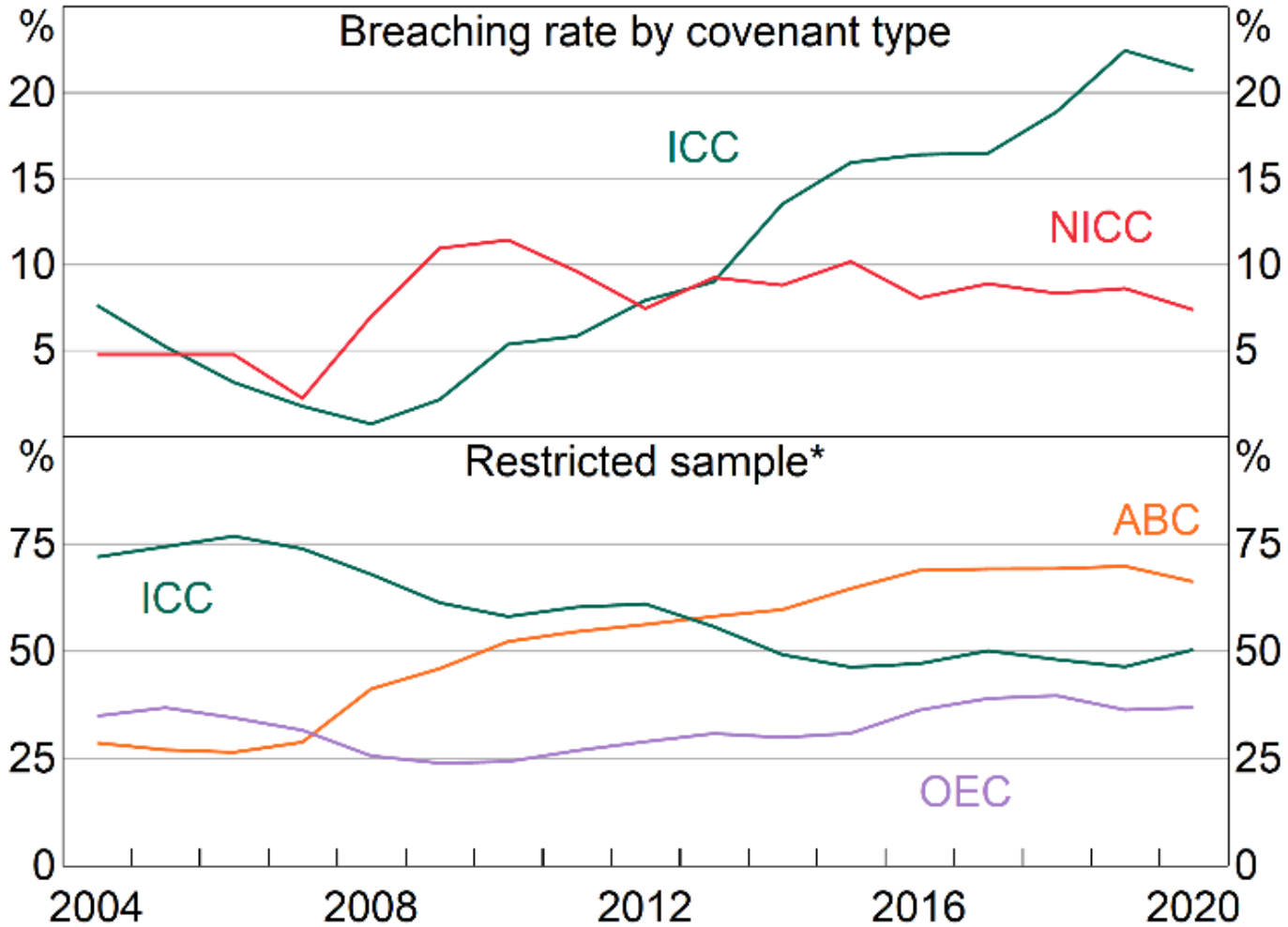


* Average partial responses in each year are calculated using the NC, ICC and NICC shares of firms in the year

Sources: Author's calculations; Beckers (2020); Connect4; Morningstar

Trends in Corporate Debt Covenants

Australian non-financial listed firms, three-year moving average



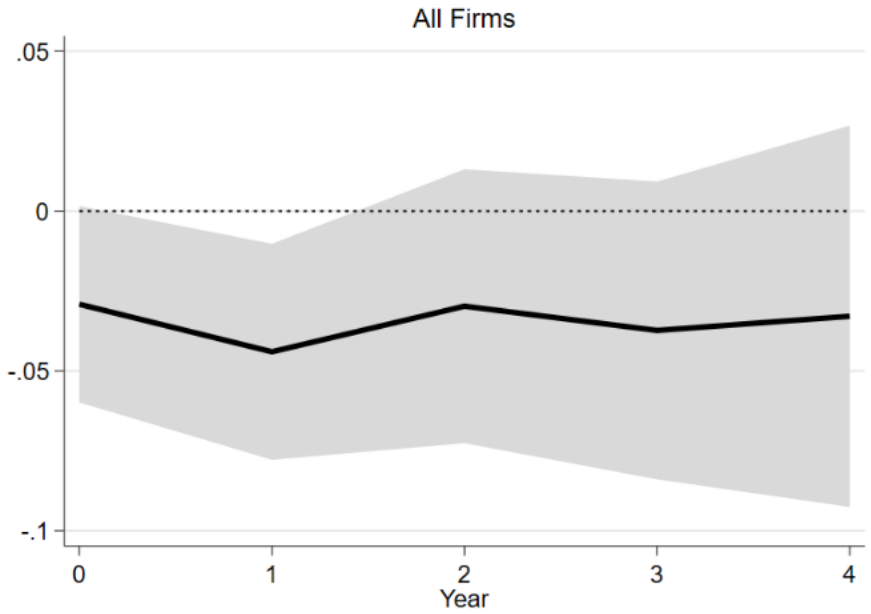
* Firms that routinely reported debt covenants. Breaching instances and observations with no mention of covenant types were removed

Sources: Author's calculations; Connect4; Morningstar

Graph C1: Aggregate Responses of Business Activities

To a 100bps contractionary monetary policy shock

Investment



Staff Expenses