

OUT WITH THE NEW, IN WITH THE OLD? BANK SUPERVISION AND THE COMPOSITION OF FIRM INVESTMENT

MIGUEL AMPUDIA

THORSTEN BECK

ALEXANDER POPOV

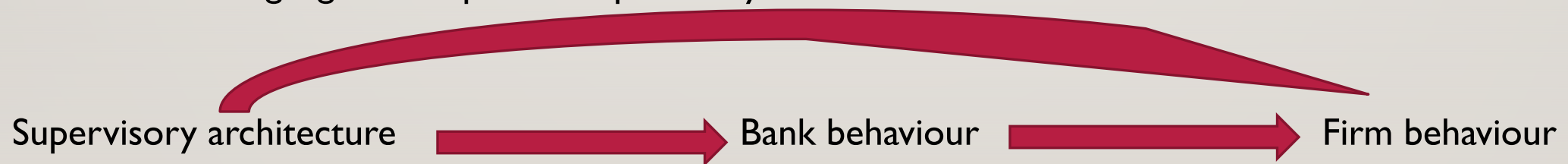


Changing more than a name




MOTIVATION

- Distance between supervisors and banks has important implications for banks' risk-taking
- **Does it also have implications for firm borrowing investment and thus sectoral composition of economies?**
- We use the change in supervisory architecture in 2014 in the euro area as exogenous shock to the supervisory architecture (LSI vs. SIs, euro vs. non-euro area countries)
- We link firm-level investment data to the firm's main lender and use a difference-in-differences estimation to gauge the impact of supervisory architecture on firm investment



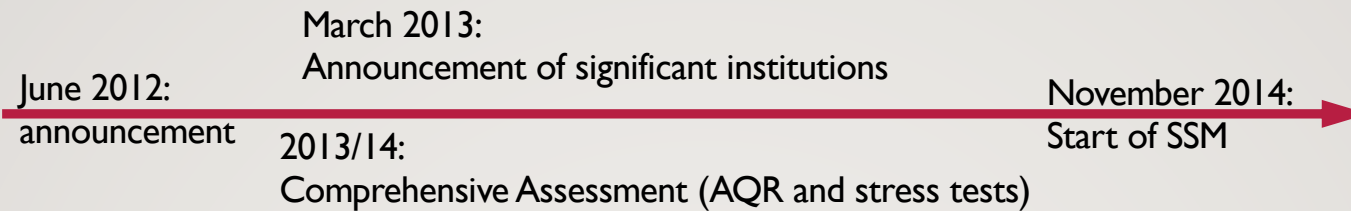
WHAT DOES THEORY/LITERATURE PREDICT?

- Centralised supervision benefits from scale economies, reduces regulatory arbitrage and increases independence (Eisenbach, Lucca and Townsend, 2016; Dell’Arriccia and Marquez, 2006; Rochet, 2008)
- Decentralised (local) supervision more effective in obtaining information (Laffont and Tirole, 1993; Colliard, 2020); local supervisors might have reduced incentives to collect data if supervisory decisions are centralized
- Implications for bank lending and firm investment:
 - More rigorous supervision  tighter lending standards
 - Stronger focus on tangible collateral
 - Implications for composition of firms’ investment

LITERATURE

- Literature on optimal supervisory architecture in a world with cross-border banking and international spill-over effects: Beck, Todorov and Wagner (2013); Haselmann, Kick and Vig (2017); Calzolari, Colliard and Loranth (2019); Repullo (2018)
- Literature on the effect of supervisory architecture on bank behaviour: Agarwal et al. (2014); Gopalan, Kalda and Manela (2017); Delis and Staikouras (2011); Granja and Leuz (2017); Ivanov and Wang (2020)
- Literature specifically on introduction of SSM: Fiordelisis, Ricci and Stentella Lopes (2017); Eber and Minoiu (2016); Altavilla, Boucinha, Peydro, and Smets (2020)

THE CHANGE IN SUPERVISORY ARCHITECTURE



- As reaction to Global Financial and euro debt crises, decision to move towards a euro area financial safety.
- June 2012: Decision to establish Single Supervisory Mechanism (complemented with Single Resolution Mechanism; outstanding: deposit insurance)
- SSM directly supervises significant institutions and indirectly less significant institutions
- In run-up to start of SSM: Comprehensive Assessment that included Asset Quality Review and Stress Tests, between November 2013 and October 2014

DATA

Firm-level data from Orbis

- 2010-17
- Large variation in coverage across countries; compare number of firms in Orbis with Eurostat (drop countries with less than 10% coverage)
- Only firms in manufacturing, construction, wholesale and retail trade, transportation and storage, accommodation and food service activities, information and communication, professional and scientific and technical activities.
- Left with 188,600 firms (and 294 lending banks) in 10 euro area countries
- Use data on firm investment and characteristics and the main lender of the firm (time-invariant for 2013; assumption that limited changes)

DATA

Bank-level data

- IBSI: data on 247 financial institutions, starting in 2007 in 18 EU countries, unconsolidated, total lending to NFCs, households, governments
- We use data on 186 banks in 11 euro area countries, where we have at least one SI and one LSI

DESCRIPTIVE STATISTICS

	(1)	(2)	(3)	(4)
	Mean	St. dev.	Min.	Max.
Δ Tangible assets	-0.0443	0.2089	-1.00	1.00
Δ Intangible assets	-0.1170	0.2873	-1.00	1.00
Δ Other fixed assets	0.0260	0.2022	-1.00	1.00
Δ Current assets	0.0267	0.1606	-1.00	1.00
Δ Employment	0.0038	0.1425	-1.00	1.00
Δ Labor productivity	0.0118	0.1762	-1.00	1.00
Δ Total debt / Assets	-0.0682	0.6941	-1.00	1.00
Δ Short-term debt / Assets	-0.0405	0.9289	-1.00	1.00
Δ Long-term debt / Assets	-0.1197	0.6646	-1.00	1.00
# firms	188,600			

Panel B. Firm-specific factors, pre-treatment

	(1)	(2)	(3)	(4)
	Full sample	SI = 0	SI = 1	Difference
Log (Assets)	14.2729	14.3168	14.2630	0.0538***
Sales / Assets	1.6509	1.5218	1.6798	-0.1580***
Debt / Assets	0.2327	0.2727	0.2240	0.0486***
Cash / Assets	0.0665	0.0583	0.0684	-0.0101***
Age	20.1915	18.8533	20.4917	-1.6384***
# firms	188,600	34,567	154,033	

METHODOLOGY

$$\frac{I_{fbcs,t}}{K_{fcs,t-1}} = \beta_1 SI_{fbcs} \times Post2012_t + \beta_2 SI_{fbcs} \times Post2014_t + \mu_f + \phi_{cst} + \varepsilon_{fbcs,t}$$

- Firm f , in country c , operating in sector s , borrowing from bank b , in year t
- Dependent variables: total assets, (in)tangible assets, current assets, other assets
- $SI = 1$ if firm borrows from a significant institution
- $Post2012 = 1$ 2013/14, $Post2014 = 1$ starting in 2015
- Standard error clustered at the country-year level

MAIN RESULTS

	Δ Tangible assets	Δ Intangible assets	Δ Other fixed assets	Δ Current assets
Post 2012 \times SI	0.0030 (0.0020)	-0.0053*** (0.0015)	-0.0001 (0.0010)	0.0043*** (0.0012)
Post 2014 \times SI	0.0026* (0.0014)	-0.0049*** (0.0016)	0.0003 (0.0013)	0.0025*** (0.0008)
Firm FEs	Yes	Yes	Yes	Yes
Country \times Sector \times Period FEs	Yes	Yes	Yes	Yes
Clustering		Country \times Period		
Observations	531,446	201,287	369,289	558,580
R-squared	0.43	0.44	0.36	0.36

MAIN RESULTS

5.9% faster growth



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MAIN RESULTS

4.5/4.2% slower growth



	Δ Tangible assets	Δ Intangible assets	Δ Other fixed assets	Δ Current assets
Post 2012 × SI	0.0030 (0.0020)	-0.0053*** (0.0015)	-0.0001 (0.0010)	0.0043*** (0.0012)
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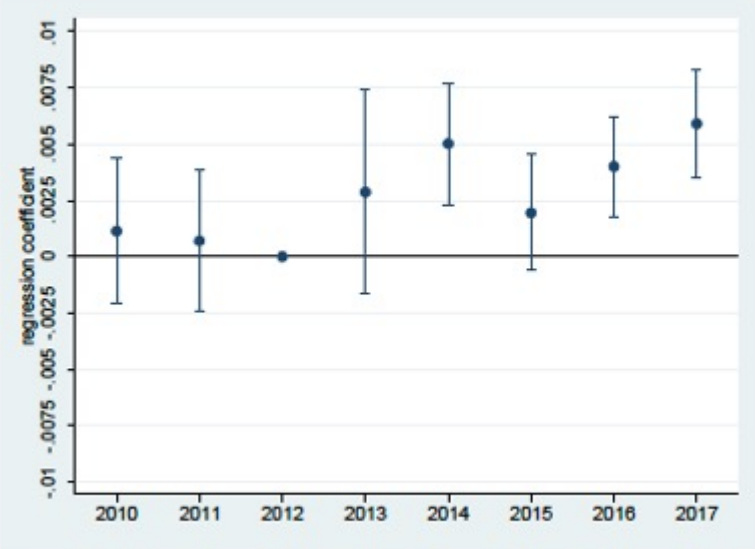
MAIN RESULTS

16.1%/9.4 faster growth

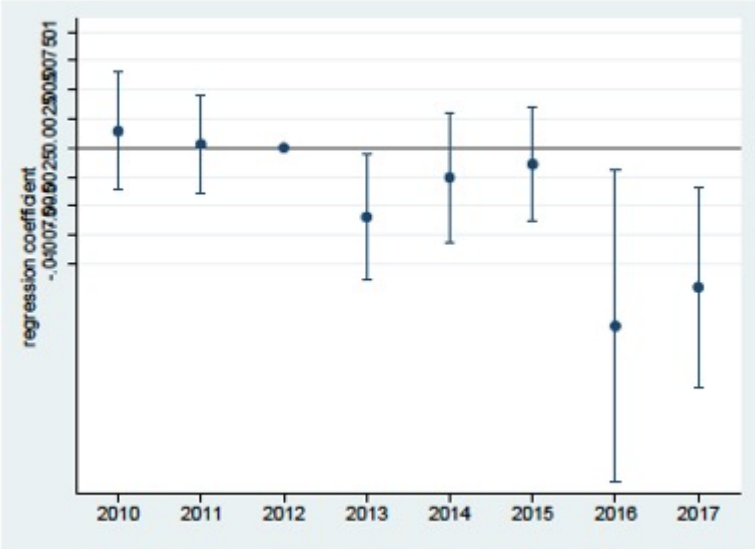
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PARALLEL TRENDS?

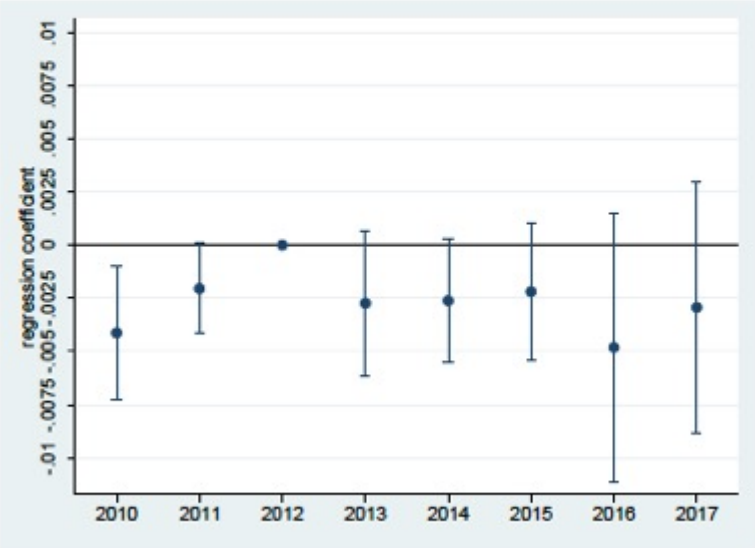
Tangible assets



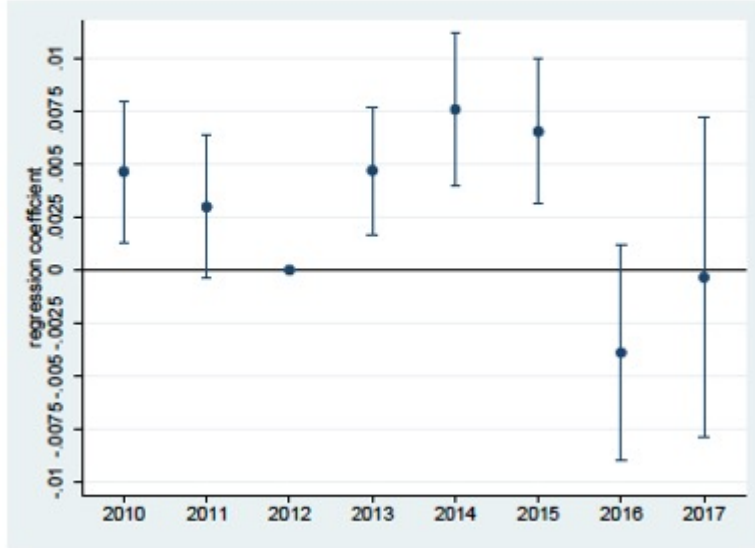
Intangible assets



Other fixed assets



Current assets



PLACEBO TEST: DENMARK, HUNGARY AND UK

	(1)	(2)	(3)	(4)
	Δ Tangible assets	Δ Intangible assets	Δ Other fixed assets	Δ Current Assets
Post 2012 \times SI	-0.0127** (0.0057)	-0.0007 (0.0211)	-0.0126 (0.0145)	0.0016 (0.0061)
Post 2014 \times SI	-0.0066 (0.0058)	-0.0027 (0.0218)	0.0081 (0.0157)	0.0034 (0.0073)
Firm FEs	Yes	Yes	Yes	Yes
Country \times Sector \times Period FEs	Yes	Yes	Yes	Yes
Clustering		Country \times Period		
Observations	51,900	4,911	4,752	59,328
R-squared	0.40	0.51	0.45	0.34

ROBUSTNESS TEST: MATCHED SAMPLE

Propensity score matching based on pre-treatment firm-level data on total assets, sales/assets, cash flow/assets and firm age

	(1)	(2)	(3)	(4)
	Δ Tangible assets	Δ Intangible assets	Δ Other fixed Assets	Δ Current assets
Post 2012 \times SI	0.0030 (0.0020)	-0.0052*** (0.0014)	-0.0003 (0.0010)	0.0043*** (0.0011)
Post 2014 \times SI	0.0028*** (0.0014)	-0.0045*** (0.0014)	0.0002 (0.0013)	0.0023*** (0.0007)
Firm FEs	Yes	Yes	Yes	Yes
Country \times Sector \times Period FEs	Yes	Yes	Yes	Yes
Clustering		Country \times Period		
Observations	523,364	198,715	365,433	548,438
R-squared	0.43	0.44	0.36	0.36

OTHER ROBUSTNESS TESTS

- Control for lagged firm characteristics
- Clustering at country-level
- Clustering at bank-period level
- Control for bank-fixed effects
- Reallocation of investment is driven by a joint process? Use SUR

FIRM INVESTMENT: INDUSTRY VARIATION

$$\frac{I_{fbcs,t}}{K_{fbcs,t-1}} = \beta_1 SI_{fbcs} \times Post2012_t + \beta_2 SI_{fbcs} \times Post2012_t \times Innovation_s$$

$$+ \beta_3 SI_{fbcs} \times Post2014_t + \beta_4 SI_{fbcs} \times Post2014_t \times Innovation_s$$

$$+ \mu_f + \phi_{cst} + \varepsilon_{fbcs,t}$$

	(1)	(2)	(3)	(4)
	Δ Tangible assets	Δ Intangible assets	Δ Other fixed assets	Δ Current Assets
Post 2012 × SI	-0.0013 (0.0036)	0.0048 (0.0071)	-0.0036 (0.0023)	0.0032 (0.0033)
Post 2012 × SI × R&D	0.0012 (0.0025)	-0.0124*** (0.0047)	0.0052* (0.0027)	0.0006 (0.0027)
Post 2014 × SI	0.0034 (0.0033)	-0.0114 (0.0098)	0.0052** (0.0021)	0.0006 (0.0023)
Post 2014 × SI × R&D	0.0012 (0.0019)	0.0044 (0.0066)	-0.0053** (0.0026)	0.0018 (0.0021)
Firm FEs	Yes	Yes	Yes	Yes
Country × Sector × Period FEs	Yes	Yes	Yes	Yes
Clustering		Country × Period		
Observations	91,850	37,014	61,662	94,595
R-squared	0.43	0.42	0.37	0.36

EMPLOYMENT AND LABOUR PRODUCTIVITY

$$\Delta Employment_{fbcs,t} = \beta_1 SI_{fbcs} \times Post2012_t + \beta_2 SI_{fbcs} \times Post2014_t + \mu_f + \phi_{cst} + \varepsilon_{fbcs,t}$$

$$\Delta \frac{Output_{fbcs,t}}{Employment_{fbcs,t}} = \beta_1 SI_{fbcs} \times Post2012_t + \beta_2 SI_{fbcs} \times Post2014_t + \mu_f + \phi_{cst} + \varepsilon_{fbcs,t}$$

	(1)	(2)
	Δ Employment	Δ Labor productivity
Post 2012 \times SI	-0.0013** (0.0006)	0.0002 (0.0008)
Post 2014 \times SI	0.0018*** (0.0005)	-0.0018** (0.0007)
Firm FEs	Yes	Yes
Country \times Sector \times Period FEs	Yes	Yes
Clustering		Country \times Period
Observations	449,766	446,179
R-squared	0.38	0.27

FIRM DEBT

$$\frac{Debt_{fbcst}}{Assets_{fcst-1}} = \beta_1 SI_{fbcst} \times Post2012_t + \beta_2 SI_{fbcst} \times Post2014_t + \mu_f + \phi_{cst} + \varepsilon_{fbcst},$$

	(1)	(2)
	Δ Short-term debt / Assets	Δ Long-term debt / Assets
Post 2012 \times SI	0.0085** (0.0040)	-0.0003 (0.0029)
Post 2014 \times SI	0.0041 (0.0060)	-0.0059* (0.0036)
Firm FEs	Yes	Yes
Country \times Sector \times Period FEs	Yes	Yes
Clustering		Country \times Period
Observations	135,906	148,710
R-squared	0.33	0.34

	(1)	(2)
	$\Delta \text{ Loans / Assets}$	
Post 2012 × SI	-0.0654*** (0.0254)	-0.1185*** (0.0313)
Post 2014 × SI	-0.0060 (0.0225)	-0.0133 (0.0318)
Post 2012 × Capital		-0.3466* (0.1882)
Post 2014 × Capital		0.1695 (0.2155)
Post 2012 × SI × Capital		0.6536*** (0.2352)
Post 2014 × SI × Capital		0.1058 (0.1850)
Bank FEs	Yes	Yes
Country × Period FEs	Yes	Yes
Observations	520	520
R-squared	0.49	0.49

CONFIRMED
BY BANK-
LEVEL DATA

Use of bank-level (IBSI) data for 186 euro area banks across 11 countries and 3 periods (Jan 10 – Dec 12; Jan 13 - Dec 14; Jan 15 – Dec 17)

$$\Delta N F C L e n d i n g_{b c t} = \beta S I_{b c t} \times P o s t 2 0 1 2_t + \gamma S I_{b c t} \times P o s t 2 0 1 4_t + \mu_b + \phi_{c t} + \varepsilon_{b c t},$$

CONCLUSIONS

- Firms borrowing from significant institutions reduce investment in intangible assets and increase investment in tangible assets
- Robust to many sensitivity analyses
- Stronger in industries more reliant on intangible assets
- Negative effect on labour productivity and long-term debt
- Reduction in bank lending, especially for less capitalised banks
- **In summary: trade-off/tension between stability and growth**

THANK YOU

THORSTEN BECK

WWW.THORSTENBECK.COM

@TL_BECK_LONDON



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