Bank mergers, credit supply and financial stability: Evidence from the Spanish banking sector restructuring program[1]

Sergio Mayordomo
Bank of Spain

Nicola Pavanini
Tilburg University and CEPR

Emanuele Tarantino
University of Mannheim and CEPR

[1]The views expressed are of the authors and do not necessarily reflect those of the Bank of Spain.

Motivation

▶ Financial crisis pushed policy makers to reform their banking sector.

▶ In countries with many (small) banks, like Germany and Spain, restructuring led to policies advocating for bank consolidation.

▶ Ample empirical evidence documenting that bank mergers generate:
  − Increased market power.
  + Informational and organizational efficiencies.

▶ However, claim was (and still is!) that bank mergers can solve financial stability issues, such as accumulation of NPL.

▶ Unfortunately, it is still unanswered whether mergers' market power enhances financial stability. *This is the goal of our paper.*

The Spanish banking sector restructuring program

▶ During 2009–2012, Spanish government fostered banks' consolidation, to improve their solvency and profitability. Main target: savings banks.

▶ Why? By end of 2009, their assets represented 40% of total bank assets. Two main issues:

   1. Poor investment choices: 100BE/217BE of loans to construction sector problematic as of 2010.

   2. Regulation restricted access to capital markets, thus scarce high-quality capital.

▶ Deal: merger in exchange of injection of public capital.

▸ Relevance

Bank mergers and market power

- ▶ Research question: identify market power effect of mergers on credit policies and performance.

- ▶ Banks could choose between standard M&A and *sistema institucionales de protección* (SIP).

- ▶ Crucial difference: SIP banks remained separate legal entities.

- ▶ Independence of business units implies that SIP banks do not take coordinated lending decisions.

- ⇒ With respect to M&A banks, SIP banks produce less of a change in market power, but are otherwise comparable.

- ▶ Hence, to identify market power effect, we compare M&A to SIP banks.

▸ List of mergers

Analytical framework

▶ Stylized price-theoretic setting building on Einav and Finkelstein (2011). Goal: illustrate how market power affects supply and selection of borrowers.

▶ Banks offer symmetric loans. Borrowers binary choice: take loan or not.

▶ $q \in [0,1]$: fraction of borrowers (of given observable type) taking a loan.

▶ $P(q)$: cumulative distribution of borrowers' willingness to pay.

▶ $C(q)$: total cost, with $MC(q) = C'(q)$ and $AC(q) = C(q)/q$.

Analytical framework

▶ Crucial difference with traditional markets: demand and cost are not independent objects.

▶ Specifically, shape of cost curve driven by borrower selection.

▶ Assume that expanding q implies lending to borrowers with higher prob. of default, this means higher marginal cost and lower profit margin.

▶ This situation is captured by increasing MC and AC schedules, $MC'(q), AC'(q) > 0$.

▶ Compare two market outcomes: perfect competition ($P(q) = AC(q)$) and monopoly ($MR(q) = MC(q)$).
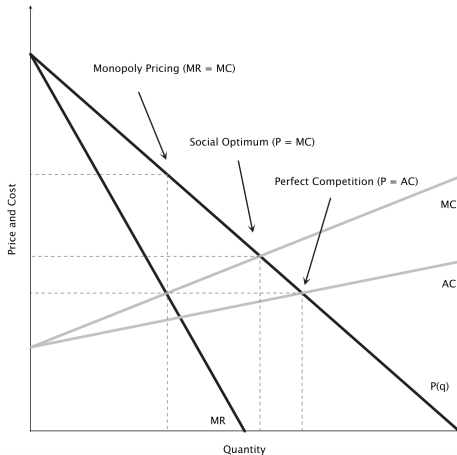
- Perfect competition: banks chase bad risk, excess supply.
- Monopoly: reduction in supply, but also better selection.
- So market power generates better selection, on top and beyond any efficiency due to better risk management practices.

Results

Compared to SIP banks, M&A banks:

1. Reduce credit supply q, increase interest rates $P(q)$. Effects stronger for SME.

2. Ask for more collateralized credit, less long term lending.

3. Report less NPL and defaulted loans (lower $AC(q)$).

- Results document novel trade-off: static allocative inefficiency v. enhanced financial stability.

Market power and efficiencies

- Merger likely to produce several contemporaneous effects:

    - Market power: standard upward pricing pressure effect.

    - Cost efficiencies: due to business reorganization.

    - Informational efficiencies: due to improved risk assessment practices.

- Ideal: merger types that are (i) comparable in terms of informational efficiencies, but (ii) different in terms of market power change.

M&A v. SIP

M&A	SIP
○ Lending decisions: coordinated	○ Lending decisions: uncoordinated
○ Risk management: coordinated	○ Risk management: coordinated
○ Results and regulatory duties: joint	○ Results and regulatory duties: consolidated
○ Solvency: joint	○ Solvency: mutual pacts of assistance (100%)

▶ Then, in empirical analysis:

  ▶ Use SIP to control for the level of informational efficiencies (i.e., impact on selection) generated absent market power.

  ▶ Estimate differential impact of M&A v. SIP on (i) lending conditions and (ii) feedback effect produced on selection.

▸ FROB

Information and cost efficiencies

▶ Regulator's guidelines: SIP and M&A expected to produce same efficiencies.

> *Los SIPs tienen que obtener las mismas mejoras en organización, eficiencia, economas de alcance, diversificación y calidad y unidad de la gestión que las fusiones tradicionales. Deben hacerlo en el mismo plazo que se lograría con una fusión clásica y han de esforzarse porque estos resultados sean claramente percibidos por el mercado como permanentes. (Javier Aríztegui, December 2010)*

▶ Since cost efficiencies arise only after 2 years (Focarelli and Panetta, 2003), we restrict the sample period accordingly.

Non-coordinated credit policies

SIP 1	0.200*
	(0.117)
SIP 2	0.252*
	(0.131)
SIP 3	0.065
	(0.117)
SIP 4	0.038**
	(0.016)
SIP 5	-
	-
SIP 6	-
	-
Observations	1,005
R-squared	0.8835
Bank-Firm FE	YES

▶ Dependent var: dummy = 1 if information request followed by credit rise.

▶ Independent var.s: each SIP bank dummy and SIP group-firm FE.

▶ Identification from banks submitting request of information on same firm.

▶ No evidence of differential lending policies wrt average bank in same SIP.

Data

Bank of Spain credit register: matched bank-firm level observations.

- ▶ Information on stock of credit exposure, its characteristics, firm and bank balance sheets.

- ▶ Covers universe of bank-firm relationships in Spain.

- ▶ Unit of observation: bank-firm-month.

- ▶ Period: 11.2007 to 11.2011.

Final sample: 343,133 bank-firm relationships, 258,564 firms.

▸ Descriptive Statistics

BE

Semesters before/after 11-2009
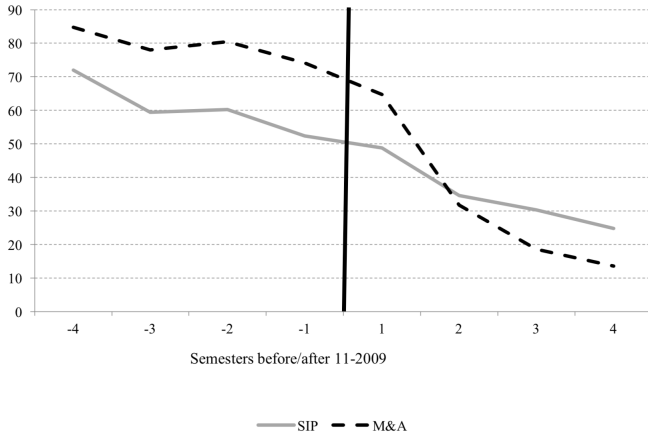
SIP — — M&A

▶ Evolution of new credit granted by M&A v. SIP banks.

▶ Placebo

	Panel A: Average			Panel B: Median		
	Means		Dif	Means		Dif
	M&A	SIP		M&A	SIP	
NPL (%)	2,718	2,694	0,023	2,911	2,856	0,055
			(0,358)			(0,407)
TA (BE)	41,400	22,000	19,500	38,900	15,800	23,100
			(18,900)			(18,800)
Capital Ratio (%)	4,720	5,749	-1,032	4,694	5,735	-1,041
			(0,717)			(0,694)
ROA (%)	0,483	0,372	0,111	0,506	0,345	0,160
			(0,164)			(0,162)
Credit / TA (%)	70,056	70,370	-0,315	70,624	69,927	0,697
			(1,891)			(1,706)
FROB I Funds / TA (%)	1,115	1,016	0,099	1,115	1,016	0,099
			(0,528)			(0,528)

	Panel C: Max/min			Pancel D: Main bank		
	Means		Dif	Means		Dif
	M&A	SIP		M&A	SIP	
NPL (%) (min)	1,906	1,405	0,501	3,336	3,768	-0,432
			(0,201)			(0,713)
TA (BE) (max)	74,300	51,200	23,100	74,300	51,200	23,100
			(45,800)			(45,800)
Capital Ratio (%) (max)	4,265	4,068	0,197	4,265	4,068	0,197
			(0,971)			(0,971)
ROA (%) (max)	0,593	0,810	-0.217*	0,593	0,810	-0.217*
			(0,118)			(0,118)
Credit / TA (%) (max)	72,847	75,073	-2,226	72,847	75,073	-2,226
			(2,657)			(2,657)
FROB I Funds / TA (%)	1,115	1,016	0,099	1,115	1,016	0,099
			(0,528)			(0,528)

▶ Merger type seems uncorrelated with (observable) bank financials.

Geographical distribution

New institution	SIP	Max Regional Share	HHI	# Main Regions
ID1	0	0.945	0.895	1
ID2	0	0.550	0.351	1
ID3	0	0.392	0.252	1
ID4	0	0.647	0.473	1
ID5	0	0.336	0.202	1
ID6	0	0.455	0.269	1
Average	0	0.554	0.407	
ID7	1	0.372	0.247	2
ID8	1	0.255	0.171	4
ID9	1	0.311	0.194	4
ID10	1	0.334	0.184	5
ID11	1	0.463	0.280	3
ID12	1	0.365	0.275	2
Average	1	0.350	0.225	

▶ From 22 banks to 6 banking groups via SIP, from 14 to 6 via M&A.

▶ SIP main operations are across regions, they are within region for M&A.

▶ Political connections

Consider bank b dealing with firm j and time t:

$$
\begin{aligned}
y_{bjt} = \quad & \alpha(\text{M\&A}_b \times \text{Post}_t) \quad + \quad \beta X_{bt-1} + \gamma Z_{jt-1} + \zeta \text{FROB}_{bt} \\
& + \quad \textit{Industry} \times \textit{Location} \times \textit{Size} \times \textit{Time FE} \\
& + \quad \textit{Bank FE} + \epsilon_{bjt}
\end{aligned}
$$

▶ y_{bjt}. Bank credit characteristics: growth rate and average level of lending, interest rates, NPL and defaults.

▶ Post_t. Equals 1 between 11/2009–11/2011, 0 between 11/2007–11/2009.

▶ $\text{M\&A}_b$. Whether bank consolidation happened via M&A or SIP.

   ▶ α: how M&A and SIP differentially affect y.

▶ Firm and bank controls, pre-determined.

   ▶ X_{bt-1}: NPL, total assets (TA), credit/deposits, capital ratio, ROA.

   ▶ Z_{jt-1}: total assets, equity/TA, liquid assets/TA, ROA.

▶ FROB_{bt}: FROB capital investments.

Identification

- FE{Industry×Location×Time×Size}:
    - Variation across firms with same size within same: year, SIC-3 industry, province.
    - Excludes time-varying firm-specific shocks from local markets.

- FE{Bank}: Excludes bank-specific shocks.

- Study robustness to FE{Firm×Time}:
    - Only firms that took credit before and after the restructuring program.
    - Limit worry that results driven by change in demand composition.

- And FE{Firm×Bank}:
    - Only firms that took credit before and after the restructuring program *from the same bank*.

Results on lending

	All		Before June 2010		All (Avg Level)	
	(1)	(2)	(3)	(4)	(5)	(6)
Post x M&A	-0.133***	-0.221***	-0.313***	-0.516***	-0.055***	-0.111***
	[0.031]	[0.039]	[0.045]	[0.058]	[0.013]	[0.020]
Observations	476,235	203,384	449,778	185,893	483,914	215,216
R-squared	0.223	0.727	0.222	0.731	0.425	0.604
Industry-Location-Size-Time FE	YES	NO	YES	NO	YES	NO
Firm-Time FE	NO	YES	NO	YES	NO	YES
Bank FE	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES
Firm Controls	YES	NO	YES	NO	YES	NO

- ▶ (1)–(4): differential change in (log) total credit.
- ▶ With respect to SIP banks, M&A banks reduced lending by 13.3% ≈ 28,884 euro per firm.
- ▶ (5)–(6): average quarterly value of (log) total credit.

▸ Firm size   ▸ Collateral and maturity   ▸ Intensive and extensive margin   ▸ Alternative FE

Interest rates

	Weighted average IR		Three maturity buckets and weighted OLS	
	(1)	(2)	(3)	(4)
VARIABLES	Loans < 1M	Loans > 1M	Loans < 1M	Loans > 1M
Post x M&A	0.174***	0.089	0.224***	0.094
	[0.034]	[0.059]	[0.036]	[0.088]
Observations	586	586	1,751	1,387
R-squared	0.923	0.735	0.799	0.663
Bank FE	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
Maturity FE	NO	NO	YES	YES

▶ Information on rates reported at bank level, by maturity and loan size.

▶ A < 1ME loan granted by a M&A bank is 17.4 b.p. more expensive than a loan of similar size granted by a SIP bank.

NPL and defaults

	ΔLog(Amount NPL)		ΔLog(Amount Def)		Δ(% NPL)		Δ(% Def)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post x M&A	-0.050***	-0.059***	-0.006**	-0.014**	-0.007***	-0.009***	-0.002***	-0.003**
	[0.009]	[0.012]	[0.003]	[0.006]	[0.001]	[0.002]	[0.001]	[0.001]
Observations	157,746	62,477	116,780	36,654	157,746	62,477	116,780	36,654
R-squared	0.179	0.694	0.138	0.507	0.170	0.663	0.156	0.502
Industry-Location-Size-Time FE	YES	NO	YES	NO	YES	NO	YES	NO
Firm-Time FE	NO	YES	NO	YES	NO	YES	NO	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	YES	NO	YES	NO	YES	NO	YES	NO

▶ Focus on sample of firms without NPL or defaults throughout 2007–2009.

▶ Results confirm conjecture that M&A extend credit to a better selection of borrowers.

▶ NPL and systemic risk ▶ In-market mergers

Discussion

▶ Active debate in business press around need of bank mergers in the EU.

▶ ECB Banking Supervision Authority (e.g., Hakkarainen, Angeloni):
support bank mergers to alleviate financial stability issues, such as volume
of NPL.

▶ We provide evidence consistent with trade-off between market power and
improved financial stability.

▶ Next: establish welfare effects – structural approach.

Structural model - Overview

- Develop and estimate equilibrium model of:

  - Borrowers' demand for credit from differentiated banks.

  - Banks' Bertrand-Nash interest rate competition, rationing, and endogenous default.

- Use model estimates and equilibrium assumptions for counterfactuals to:

  - Simulate scenarios with only M&A v. only SIP.

  - Compare welfare (borrowers' surplus, banks' profits) and stability (banks' default probabilities) across scenarios.

Structural model - Demand

▶ Borrower's $i = 1, .., I$ demand for credit in month $t = 1, ..., T$ from bank $j = 1, ..., J_t$ given by indirect utility

$$U_{ijt} = X'_{jt}\beta + \alpha P_{jt} + \xi_{jt} + \varepsilon_{ijt}.$$

  ▶ X_{jt} bank characteristics (assets, ROA,..).

  ▶ P_{jt} average loan interest rate.

  ▶ ξ_{jt} unobserved bank characteristics.

  ▶ ε_{ijt} type 1 extreme value shocks.

  ▶ Normalize utility from choosing small banks (outside option) to $U_{i0t} = \varepsilon_{i0t}$.

▶ Banks' market share given by:

$$S_{jt}(P_{jt}, P_{-jt}) = \frac{\exp\left(X'_{jt}\beta + \alpha P_{jt} + \xi_{jt}\right)}{1 + \sum_\ell \exp\left(X'_{\ell t}\beta + \alpha P_{\ell t} + \xi_{\ell t}\right)}.$$

Structural model - Pricing and rationing

▶ Banks compete Bertrand-Nash on interest rates P_{jt}.

▶ Banks decide on rationing:

  ▶ Given distribution of expected default rates $F_{jt} \sim N(\mu_F, \sigma_F)$,

  ▶ Banks decide on cutoff $\overline{F}_{jt}$ above which borrowers are rejected.

  ▶ This determines number of potential admissible borrowers as

  $$M_{jt}(\overline{F}_{jt}) = M_t \times \Pr\left(F_{jt} \leq \overline{F}_{jt}\right) = M_t \Phi\left(\frac{\overline{F}_{jt} - \mu_F}{\sigma_F}\right).$$

    ▶ M_t is total potential amount that could be borrowed in t.

Structural model - Pricing and rationing

- Banks set interest rates P_{jt} and rationing $\overline{F}_{jt}$ that maximize expected profit function:

$$\max_{P_{jt}, \overline{F}_{jt}} \Pi_{jt} = \left[P_{jt} - MC_{jt} \right] S_{jt}(P_{jt}, P_{-jt}) M_{jt}(\overline{F}_{jt})$$

- Expected marginal costs are defined as

$$MC_{jt} = C_{0jt} + C_{1jt} \overline{F}_{jt}$$

  - C_{1jt} slope of cost curve w.r.t. threshold default
  - $C_{0jt} \sim N(\mu_{jt}, \sigma_{jt}^2)$ are expected cost shocks

- Use demand estimates $\widehat{\alpha}, \widehat{\beta}$ and FOC to back out $\widehat{C}_{0jt}, \widehat{C}_{1jt}$

Structural model - Bank default

- Bank's equity holders will finance shortfall and not go bankrupt if

$$\Pi_{jt} - B_{jt} + \frac{1}{1+r}E_{jt} > 0.$$

  - B_{jt} financing costs.
  - E_{jt} bank's franchise value.
  - r discount rate.

- Threshold of bank's cost shock $\overline{C}_{0jt}$ at which bank's equity holders are indifferent between financing shortfall and going bankrupt:

$$B_{jt} - \left[P_{jt} - \overline{C}_{0jt} - C_{1jt}\overline{F}_{jt} \right] S_{jt}M_{jt} = \frac{1}{1+r} \underbrace{\Phi\left(\frac{\overline{C}_{0jt} - \mu_{jt}}{\sigma_{jt}} \right)}_{\text{Bank survival prob}} S_{jt}M_{jt} \overbrace{\underbrace{\left[\overline{C}_{0jt} - \mu_{jt} + \sigma_{jt}\lambda\left(-\frac{\overline{C}_{0jt} - \mu_{jt}}{\sigma_{jt}} \right) \right]}_{\text{Bank's expected return on survival}}}^{\text{Bank franchise value}}$$

- From this equilibrium condition can infer banks' default probability (as in Egan, Hortaçsu, Matvos, 2017).

Appendix

Why studying Spanish restructuring program?

1. Prompted by EC worries regarding crisis' impact on financial stability in EU, thus allowing Spain to do the bail-out.

2. Very fast! Number of savings banks went from 36 to 12 in just 18 months (11/2009–12/2010).

3. Massive: banks that merged during 11/2009–12/2010 were worth 1,300BE in 12/2008.

4. Similar to restructuring programs contemporaneously considered in, e.g., Germany, Greece and Italy.

▸ Back

Timing

1. Early 2009: EcoFin agreed to transfer the EU rescue program money directly to a bank fund set up by Spanish government.

2. June 2009: Royal Decree 9/2009 set up FROB with initial fund of 9BE, then raised to 99BE.

3. November 2009: first merger – start of restructuring program.

4. November 2009–December 2010: 12 mergers.

Overall, total number of banks went from 59 to 18 in about three years.

▸ Back

Date	Merging parties	New bank	Type	FROB
November 2009	Caja Castilla la Mancha, Cajastur	Cajastur	SIP	0
January 2010	Caja Guadalajara, Caja Sol	*Caja Sol-Caja Guadalajara*	M&A	0
March 2010	Unnim, Caixa Sabadell, Caixa Terrassa, Caixa Manlleu	Unnim	M&A	380
March 2010	Catalunya Caixa, Caixa Tarragona, Caixa Manresa	Catalunya Caixa	M&A	1,250
March 2010	Caja España, Caja Duero,	Ceiss	M&A	525
April 2010	Caja Navarra, Caja Canarias, Caja Burgos	*Banca Cívica*	SIP	977
May 2010	Unicaja, Caja Jaén	Unicaja	M&A	0
May 2010	La Caixa, Caixa Girona	La Caixa	M&A	0
June 2010	Caja Murcia, Caixa Penedés, Sa Nostra, Caja Granada,	BMN	SIP	915
June 2010	Caja Madrid, Bancaja, Caja Ávila, Caja Segovia, Caja Rioja, Caixa Laietana, Caja Insular de Canarias,	Bankia	SIP	4,465
June 2010	Caixa Galicia, Caixanova,	Novacaixagalicia	M&A	1,162
July 2010	CAI, Caja Círculo de Burgos, Caja Badajoz	Caja 3	SIP	0
July 2010	Bilbao Bizkaia Kutxa, CajaSur	Bilbao Bizkaia Kutxa	SIP	800
December 2010	*Caja Sol-Caja Guadalajara, Banca Cívica*	*Banca Cívica*	SIP	977

FROB

- ▶ Be it a M&A or a SIP, the merger receives public money from the *fondo de reestructuración ordenada bancaria* (FROB).
- ▶ FROB intervention conditional to submission of plan making specific merger proposal.
- ▶ Partial bail-out system: FROB to subscribe, on a transitory basis, the capital of the new institution.
- ▶ In its first phase (2009–2011), FROB made investments for about 10BE, and targeted those banks that were not on the brink of bankruptcy.

▶ Back

Literature

▶ Redistributional effects of bank mergers: Berger, Saunders, Scalise and Udell (1998); Sapienza (2002), among others.

▶ Merger-generated cost and informational efficiencies: Focarelli and Panetta (2003); Panetta, Schivardi and Schum (2009); Erel (2011).

▶ IO of selection markets: work by Einav, Finkelstein, Levin and coauthors; Mahoney and Weyl (2017); Egan, Hortaçsu and Matvos (2017); Crawford, Pavanini and Schivardi (2018); Allen, Clark and Houde (forthcoming).

▶ Concentration and risk taking: among *many* others, Keeley (1990); Boyd and De Nicolo (2005).

Descriptive statistics

Panel A: Banks

	Dec 2006						Dec 2008					
	Mean	Median	SD	P5	P95	N	Mean	Median	SD	P5	P95	N
TA (BE)	22.90	10.70	38.00	1.26	137.00	37	30.60	13.60	51.10	1.62	191.00	36
Total liabilities / TA	0.94	0.95	0.02	0.90	0.96	37	0.95	0.95	0.02	0.91	0.96	36
NPL	0.01	0.00	0.00	0.00	0.01	37	0.03	0.02	0.01	0.01	0.05	36
Credit / TA	0.74	0.75	0.05	0.66	0.82	37	0.71	0.70	0.05	0.62	0.79	36
ROA	0.01	0.01	0.00	0.00	0.01	37	0.00	0.00	0.00	0.00	0.01	36

Panel B: Firms

	Dec 2006						Dec 2008					
	Mean	Median	SD	P5	P95	N	Mean	Median	SD	P5	P95	N
TA (ME)	1.71	0.50	4.66	0.05	5.74	171,359	1.93	0.59	4.68	0.06	7.35	188,784
Total liabilities / TA	0.71	0.74	0.35	0.15	1.20	171,359	0.70	0.73	0.34	0.13	1.18	188,784
Liquid assets / TA	0.14	0.07	0.18	0.00	0.53	171,359	0.13	0.06	0.18	0.00	0.51	188,784
ROA	0.10	0.09	0.15	-0.08	0.36	171,359	0.09	0.08	0.14	-0.08	0.33	188,784

Panel C: Banks-Firms (Credit)

	Nov 07 - Nov 09						Nov 09 - Nov 11					
	Mean	Median	SD	P5	P95	N	Mean	Median	SD	P5	P95	N
ΔLog(Credit)	1.57	0.36	2.80	-2.56	6.17	230,480	1.68	0.32	2.83	-2.20	6.40	246,322
ΔLog(Credit) if previous rel.	-0.56	-0.18	1.38	-3.91	0.86	130,444	-0.55	-0.20	1.26	-3.47	0.66	135,759
LTCredit/TotCr	0.32	0.00	0.44	0.00	1.00	230,480	0.37	0.00	0.46	0.00	1.00	246,322
LT_NoCollCredit/TotCr	0.08	0.00	0.25	0.00	1.00	230,480	0.09	0.00	0.26	0.00	1.00	246,322
LT_CollCredit/TotCr	0.24	0.00	0.41	0.00	1.00	230,480	0.29	0.00	0.44	0.00	1.00	246,322

Panel D: Banks-Firms (NPL)

	Nov 09 - Nov 11					
	Mean	Median	SD	P5	P95	N
ΔLog(Amount NPL)	0.14	0.00	0.84	0.00	0.00	161,755
Δ(% NPL)	0.02	0.00	0.13	0.00	0.00	161,755

▸ Back

Political connections

	Δlog(Credit)	LT&Coll_Credit	ΔNPL
	(1)	(2)	(3)
Same political party municipality - region	0.022	0.004	-0.007
	[0.017]	[0.011]	[0.005]
Same political party municipality - region x M&A	-0.023	-0.006	0.004
	[0.019]	[0.012]	[0.005]
Observations	47,176	47,175	47,048
R-squared	0.161	0.399	0.171
Industry-Location-Size-Time FE	YES	YES	YES
Bank FE	YES	YES	YES
Firm Controls	YES	YES	YES

‣ Back

DiD assumptions

	(1) Pre	(2) Post
M&A	0.001	-0.230***
	[0.022]	[0.021]
Observations	229,949	246,286
R-squared	0.206	0.236
Industry-Location-Size FE	YES	YES
Bank FE	NO	NO
Bank and Firm Controls	YES	YES

▶ Back

Lending by firm size

	All	SME	Large	All	SME	Large
	(1)	(2)	(3)	(4)	(5)	(6)
Post x M&A	-0.133***	-0.133***	-0.162	-0.221***	-0.225***	-0.236
	[0.031]	[0.031]	[0.239]	[0.039]	[0.039]	[0.210]
Observations	476,235	467,485	8,449	203,384	195,534	7,850
R-squared	0.223	0.226	0.371	0.727	0.734	0.654
Industry-Location-Size-Time FE	YES	YES	YES	NO	NO	NO
Firm-Time FE	NO	NO	NO	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	NO	NO	NO

▶ Reduction of credit bigger for SME. Consistent with previous literature.

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Credit maturity and collateral

	LT Credit	LT Non-Coll Credit	LT Coll Credit	LT Credit	LT Non-Coll Credit	LT Coll Credit
	(1)	(2)	(3)	(4)	(5)	(6)
Post x M&A	-0.020***	-0.032***	0.012***	-0.022***	-0.033***	0.011***
	[0.003]	[0.002]	[0.003]	[0.004]	[0.003]	[0.004]
Observations	483,914	483,914	483,914	215,216	215,216	215,216
R-squared	0.318	0.211	0.341	0.594	0.492	0.623
Industry-Location-Size-Time FE	YES	YES	YES	NO	NO	NO
Firm-Time FE	NO	NO	NO	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	NO	NO	NO

▶ Fall in long-term and increase in collateralized lending in banks' portfolio.

▶ Findings suggest market power produces stricter screening.

▶ To confirm this intuition, we will check for evidence of better selection.

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Results on lending

	Baseline	Intensive Margin	Extensive Margin	Baseline	Intensive Margin	Extensive Margin
	(1)	(2)	(3)	(4)	(5)	(6)
Post x M&A	-0.133***	-0.133***	-0.162	-0.221***	-0.225***	-0.236
	[0.031]	[0.031]	[0.239]	[0.039]	[0.039]	[0.210]
Observations	476,235	467,485	8,449	203,384	195,534	7,850
R-squared	0.223	0.226	0.371	0.727	0.734	0.654
Industry-Location-Size-Time FE	YES	YES	YES	NO	NO	NO
Firm-Time FE	NO	NO	NO	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	NO	NO	NO

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Results on lending

	Firm operating with just one bank in 2007	Firm operating with more than one bank in 2007	Firm operating with just one bank in 2007	Firm operating with more than one bank in 2007
	(1)	(2)	(3)	(4)
Post x M&A	0.018	-0.304***	.	-0.256***
	[0.046]	[0.043]	.	[0.039]
Observations	221,167	243,336	13,543	189,841
R-squared	0.255	0.336	0.414	0.744
Industry-Locat.-Size-Time FE	YES	YES	NO	NO
Firm-Time FE	NO	NO	YES	YES
Bank FE	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES
Firm Controls	YES	YES	NO	NO

▶ Reduction in credit growth to firms with multi-bank relations.

▶ Intuition: sub-sample likely to be plagued by adverse selection.

▶ Back

Results on lending

	(1)	(2)	(3)
Post x M&A	-0.133***	-0.221***	-0.172***
	[0.031]	[0.039]	[0.022]
Observations	476,235	203,384	285,330
R-squared	0.223	0.727	0.623
Industry-Location-Size-Time FE	YES	NO	NO
Firm-Time FE	NO	YES	NO
Firm-Bank FE	NO	NO	YES
Time FE	NO	NO	YES
Bank FE	YES	YES	NO
Bank and Firm Controls	YES	YES	YES

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NPL and defaults

	(1) CoVaR_Mergers	(2) CoVaR_All	(3) CoVaR_All
Sample	Mergers	Mergers	All
NPL	0.034***	0.049***	0.059***
	[0.009]	[0.008]	[0.006]
Observations	519	519	1,052
R-squared	0.505	0.562	0.642
Bank FE	YES	YES	YES
Bank Controls	YES	YES	YES
Global Variables	YES	YES	YES

▶ Study effect of NPL on contribution of each bank to systemic risk using CoVaR methodology (Adrian and Brunnermeier, 2016).

▶ CoVaR: value at risk (VaR) of financial system conditional on a bank being under distress based on evolution of its bond yields.

▶ Results: increase of NPL ratio in the portfolio of a bank → increase in contribution of this institution's risk to risk of the banking system.

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Results from in-market mergers

	Δlog(Credit)	LT&Coll_Credit	ΔNPL	Δlog(Credit)	LT&Coll_Credit	ΔNPL
	(1)	(2)	(3)	(4)	(5)	(6)
Post x M&A	-0.249***	0.023***	-0.010***	-0.304***	0.014*	-0.008**
	[0.064]	[0.006]	[0.003]	[0.077]	[0.007]	[0.004]
Observations	210,253	210,253	70,357	98,417	98,417	30,528
R-squared	0.213	0.363	0.154	0.716	0.637	0.666
Industry-Location-Size-Time FE	YES	YES	YES	NO	NO	NO
Firm-Time FE	NO	NO	NO	YES	YES	YES
Bank FE	YES	YES	NO	YES	YES	NO
Bank and Firm Controls	YES	YES	YES	YES	YES	YES

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