

Finance and Creative Destruction: Evidence for Italy

Francesca Lotti and Francesco Manaresi

Bank of Italy

Finance, Capital Reallocation and Growth

St. Gallen

October 23rd, 2015

The opinions expressed herein do not necessarily reflect those of the Bank of Italy

Motivation

- Firm dynamics (firm selection through entry, exit, churning):
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 - job creation and destruction (Haltiwanger et al. 2013)
 - resource reallocation (Melitz and Polanec 2014)
 - productivity growth (Clementi and Palazzo 2014, Hsieh and Klenow 2014)

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 - In Italy, in particular:
 - small contribution of entry and young firms to JC
 - larger share of old firms (also among micro firms)
 - flat hazard function of exit over age distribution

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 - In Italy, in particular:
 - small contribution of entry and young firms to JC
 - larger share of old firms (also among micro firms)
 - flat hazard function of exit over age distribution
- Understanding which factors foster/hinder these process is crucial:
 - credit market is of primary importance (Midrigan and Xu 2014)

Research Question

*How does **bank competition** affect firm dynamics?*

Bank competition: degree of market concentration (e.g. Herfindahl-Hirschmann index) - different from financial *integration* or *deregulation*.

- Theoretically ambiguous:
 - price effects (lower interest rates)
 - risk-taking effects (Allen-Gale 2004, Boyd-De Nicolò 2005, Martinez-Mieira and Repullo 2010)
 - relationship lending effects (Cetorelli and Peretto 2014)

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- Theoretically ambiguous:
- Empirically:
 - Large literature focus on bank deregulation/financial integration
 - Literature on HHI and risk-taking (Jimenez et al. 2013)
 - Papers on correlation between HHI and firm dynamics (Bonaccorsi and Dell'Arriccia 2003, Cetorelli and Gambera 2001, Inklaar et al. 2015)

This Paper

- we develop a new RD identification strategy
 - exploit the sale of branches imposed by the Italian antitrust authority to banks involved in an M&A;
- we study its impact on lending to firms, firm dynamics, resource allocation and productivity, using detailed data on:
 - firm-bank relationships: credit type, quantity, price
 - firm dynamics: entry/exit, employment, value added

Preview of Main Results

Antitrust intervention:

- induces a significant sale of branches by banks involved in M&A;
- this reduces the impact of the M&A on bank competition;

A smaller decrease in bank competition:

- reduces interest rates and improves allocation of credit towards new firms (similar to Jayaratne and Strahan 1996);
- new entrants increases;
- inducing some incumbents to shrink and ultimately exit;
- as a result, allocative efficiency (covariance btw firm size and productivity) improves.

The Institutional Setting

- The Italian banking system: privatized since 1992-1993;
- Intense credit mkt restructuring afterwards:
 - around 60 M&A's per year over the following 15 years
 - with significant impact on mkt concentration [▶ Figure](#)
- M&A's had to be preemptively authorized by the Bank of Italy: case-by-case basis, Bol received consultancy from Antitrust Authority regarding the potential competitive impact (PCI).

The Regulatory Framework

- The Agreement between Bol and AA (1996) established that PCI:
 - in the **deposits market**, must be evaluated at the **province level**;
 - in the **credit market**, must be evaluated at the **regional level**;
 - ▶ figure
 - must be measured by the **joint deposits/credit share** of the banks involved in M&A;
 - if the joint share exceeds 15%, then Bol-AA *may* condition the authorization on the **sale of some branches**, to reduce competitive impact back to 15%.
- PCI in credit market never exceeded 15% at regional level, while the one in deposits market did so.

What happens when a branch is sold by bank A to bank B

- Employees are usually transferred to bank B;
- Owners of a current account in the branch are notified by mail (tacit consent rule: current account moves to bank B);
- Loans are maintained by bank A;
- Credit lines are linked to current account.

The Data

We combine data from several sources:

- Supervisory Reports: total deposits of each bank-province;
- SIOTEC: no. of branches of each bank-province;
- Register of banks: banking groups and M&A events;
- Credit Register: firm-bank data on credit quantity granted;
- TAXIA: firm-bank data on interest rates charged ;
- National Social Insurance Agency: census of firms with least one employee, and their employment levels;
- CERVED: value added for all incorporated firms.

Final dataset:

- all M&A events over the period 1996-2007 (763 M&Ac's);
- a sample of 3,763 province-M&A couples;
- all variables computed before (average over $t - 1$ and $t - 2$) and after (average over $t + 1$ and $t + 2$) the event. [▶ Des. Stats.](#)

Did the 15% threshold work, in practice?

Consider the RD model, for province p , M&A event m , taking place in year t , we estimate:

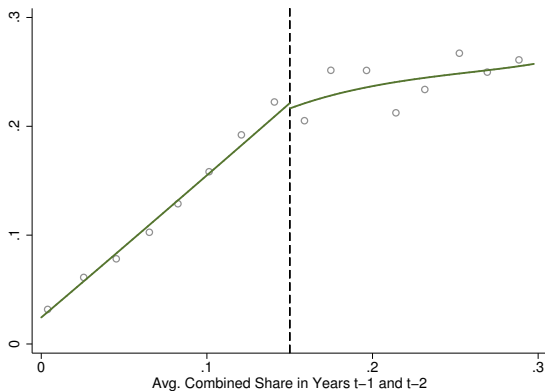
$$s_{pmt+1} = \alpha + \delta K_{pmt} + g(|\tilde{s}_{t-1} - 0.15|) + \varepsilon_{pmt} \quad (1)$$

- s_{t+1} : deposits share of the merged bank *after* the M&A - \tilde{s}_{t-1} : joint deposits share of the two merged banks *before* the M&A (PCI)
- $K_{pmt} = 1(\tilde{s}_{t-1} > 0.15)$
- $g(\cdot)$: linear or polynomial function

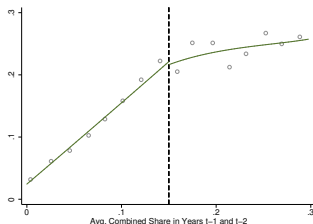
Expected Result

- before the threshold, no intervention $\Rightarrow s_{t+1} = \tilde{s}_{t-1} + \epsilon$
- after the threshold, intervention $\Rightarrow s_{t+1} = 0.15 + \epsilon$

Dep. Var.: Bank Share After the M&A

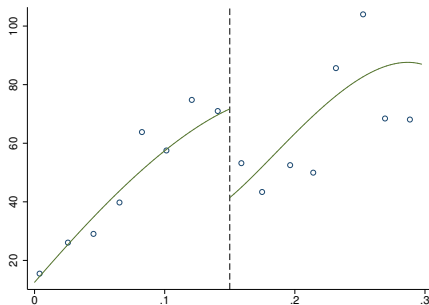


Bank Share After the M&A



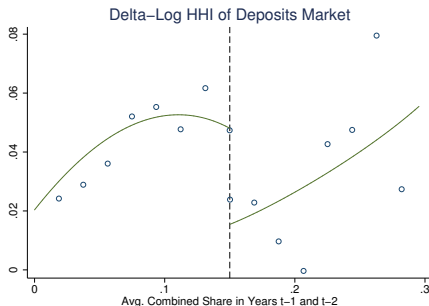
	Optimal Bandwidths			
	IK	CCT	DM	CV
<i>Dep. Var.: Share After the M&A</i>				
Threshold	-0.022 (0.013)	-0.017 (0.014)	-0.010 (0.015)	-0.020 (0.014)
Change in Slope	-0.728*** (0.177)	-0.823*** (0.173)	-0.813*** (0.169)	-0.796*** (0.182)
Constant	0.241*** (0.010)	0.234*** (0.009)	0.227*** (0.008)	0.237*** (0.009)
No. of Obs.	826	1265	2940	1071

Number of Branches After the M&A



	Optimal Bandwidths			
	IK	CCT	DM	CV
<i>Dep. Var.: Avg. No. of Branches at $t + 1$ and $t + 2$</i>				
Threshold	-11.865** (5.169)	-8.034* (4.105)	-7.046** (3.546)	-10.256*** (3.170)
Constant	61.941*** (3.322)	58.528*** (5.686)	59.273*** (2.005)	60.574*** (1.873)
No. of Obs.	1341	510	3731	3658

Delta-Log HHI in Deposits Mkt



	Optimal Bandwidths			
	IK	CCT	DM	CV
<i>Dep. Var.: $\Delta\text{Log HHI}$ in Deposits Mkt</i>				
Threshold	-0.047** (0.022)	-0.036* (0.020)	-0.047** (0.022)	-0.044* (0.023)
Constant	0.050** (0.022)	0.038 (0.024)	0.051** (0.022)	0.046** (0.023)
No. of Obs.	3688	1305	3703	3636

An Unintended (?) Consequence: Delta-Log HHI in Credit Mkt

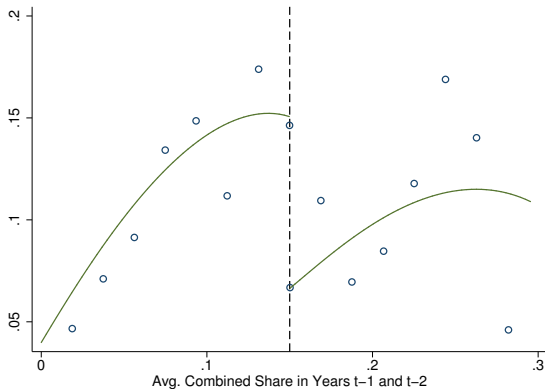


Table: Effect of antitrust intervention on credit mkt.

	IK	Optimal Bandwidths CCT	DM	CV
<i>Dep. Var.: $\Delta\text{Log HHI}$ in Credit Mkt</i>				
Threshold	-0.105** (0.035)	-0.095** (0.035)	-0.112*** (0.033)	-0.093** (0.038)
Constant	0.174** (0.058)	0.164** (0.056)	0.185** (0.058)	0.162*** (0.058)
<i>Dep. Var.: $\Delta\text{Log HHI}$ of Credit Lines & Backed by Receivables</i>				
Threshold	-0.124** (0.046)	-0.131** (0.064)	-0.085* (0.044)	-0.101** (0.035)
Constant	0.145*** (0.032)	0.141** (0.043)	0.132** (0.051)	0.141*** (0.054)
<i>Dep. Var.: $\Delta\text{Log HHI}$ of Loans</i>				
Threshold	-0.060 (0.034)	-0.045 (0.028)	-0.032 (0.033)	-0.053* (0.028)
Constant	0.195** (0.057)	0.181** (0.065)	0.188** (0.061)	0.172*** (0.061)
No. of Obs.	1814	1923	2866	1128

Empirical Model for Firm-level Outcomes

Lending to firms and firm dynamics can be analyzed at the sector-province-M&A level:

$$DV_{psmt} = \alpha + \delta K_{pmt} + g(|\tilde{s}_{t-1} - 0.15|) + \gamma_p + \lambda_s + \theta_t + \varepsilon_{pmt} \quad (2)$$

robustness of δ to the inclusion/omission of γ_p , λ_s , and θ_t provides indirect evidence of unconfoundedness (in the spirit of Altonji et al. 2009).

Effect on Credit Quantity Granted

<i>Dep. Var.: ΔLog-Credit Granted</i>				
Threshold	0.001 (0.007)	-0.003 (0.005)	0.003 (0.008)	0.006 (0.008)
Constant	0.011** (0.005)	–	–	–
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	21437	21437	21437	21437

No Effect on total credit granted

Effect on Interest Rates

<i>Dep. Var.: Δ Interest Rates</i>				
Threshold	-0.028*	-0.029**	-0.030*	-0.033**
	(0.015)	(0.013)	(0.016)	(0.015)
Constant	-0.242*	–	–	–
	(0.125)			
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	20413	20413	20413	20413

Negative Effect on interest rates (though small in size)

Effect on Interest Rates

Banks Involved and Not Involved in the M&A

<i>Dep. Var.: Δ Interest Rates of M&A Banks</i>				
Threshold	-0.021 (0.012)	-0.024** (0.011)	-0.028* (0.014)	-0.025* (0.014)
Constant	-0.052 (0.134)	-	-	-
<i>Dep. Var.: Δ Interest Rates of Other Banks</i>				
Threshold	-0.032** (0.015)	-0.032** (0.013)	-0.035** (0.013)	-0.033** (0.015)
Constant	-0.297** (0.104)	-	-	-
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y

Both banks involved and not involved in M&A display interest rate reduction \Rightarrow evidence that effect is mkt-wide

Effect on Credit to New Firms

<i>Dep. Var.: Δ Log No. of De-Novo Relationships</i>				
Threshold	0.028*	0.031*	0.032**	0.025
	(0.015)	(0.016)	(0.014)	(0.018)
Constant	0.047*	–	–	–
	(0.025)			
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	20842	20842	20842	20842

Higher no. of *de-novo* credit relationships (i.e., credit to firms appearing in the CR for the first time).

To Sum Up: Banks do not necessarily lend more, yet they seem to lend at lower prices and more to new firms (consistently with Jayaratne and Strahan 1996).

Effect on Firm Dynamics

<i>Dep. Var.:</i>	Entry Rate	Survival at 5	Log-Size of Incumbents
Threshold	0.040** (0.018)	0.038** (0.016)	-0.030** (0.015)
Year FE	Y	Y	Y
Sector FE	Y	Y	Y
Province FE	Y	Y	Y
No. of Obs.	20767	17482	76236

<i>Dep. Var.:</i>	Log-Size of Micro Inc.	Exit Rate	Exit Rate [$t + 3, t + 4$]
Threshold	-0.032** (0.014)	0.022 (0.044)	0.018** (0.008)
Year FE	Y	Y	Y
Sector FE	Y	Y	Y
Province FE	Y	Y	Y
No. of Obs.	72801	17577	37862

► Detailed Results

Effect on Allocative Efficiency

Recall Olley-Pakes decomposition:

$$\bar{\phi}_w = \bar{\phi}_{uw} + AE$$

where $AE = Cov(\phi_i - \bar{\phi}_{uw}, S_i - \bar{S}_{uw})$

<i>Dep. Var.:</i>	$\Delta\phi_w$	$\Delta\phi_{uw}$	ΔAE
Threshold	0.004 (0.005)	-0.003 (0.004)	0.010** (0.004)
Year FE	Y	Y	Y
Sector FE	Y	Y	Y
Province FE	Y	Y	Y
No. of Observations	15190	15190	15190

Some Back-of-the-Envelope

The intervention induces:

- the sale of around 10 branches per province (1/7th of the newly formed banking group);
- an aggregate impact at province level of around 50 new firms per year (avg. yearly inflow of new firms is 1,200 per province);
- a downsizing of incumbent firms, which balance increased job creation by entrants;
- improvement on allocative efficiency ≈ 1 p.p. of covariance (6% of a st.dev.).

Effect is **small**, though somehow reasonable given the size of the policy intervention.

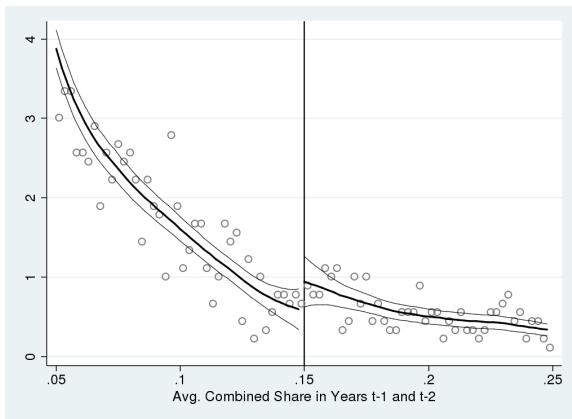
Validity of the Identification Strategy

Is this setting a good natural experiment to study the effects of bank concentration on firm dynamics?

Two sets of evidence:

1. banks do not position their market share strategically above or below the threshold (no strategic manipulation);
2. there are no other confounding factors affecting bank competition that change discontinuously at the threshold (unconfoundedness).

McCrary Test



No evidence of discontinuity in the density function around the threshold.

Strategic Positioning in the Years Before the M&A?

Table: Δ joint market share from $t - 4$ to t

	Optimal Bandwidths			
	IK	CCT	DM	CV
Threshold	0.001 (0.021)	-0.002 (0.053)	0.001 (0.040)	-0.001 (0.039)
Constant	0.004* (0.002)	0.005 (0.03)	0.006** (0.002)	0.005* (0.002)
No. of Obs.	1812	2011	2652	1083

No evidence of strategic changes in market share prior to the M&A.

Unconfoundedness test

	HHI	No. of Branches	VA p/c	Population
Threshold	0.015 (0.014)	2.656 (4.976)	0.365 (2.310)	5.231 (86.282)
Constant	0.153*** (0.008)	35.349*** (4.309)	7.974*** (2.413)	531.370*** (103.890)
No. of Observations	802	628	904	827
	Working Age Pop.	Share of Savings Banks	No. of Firms	No. of Entrants
Threshold	8.234 (85.761)	0.003 (0.035)	-16.747 (45.817)	-2.307 (5.276)
Constant	376.371*** (96.202)	0.253*** (0.076)	505.138*** (56.658)	54.185*** (5.862)
No. of Observations	902	938	36495	21107

- Observable pre-M&A variables are **balanced** across the threshold.
- Results are unaltered by the inclusion/exclusion of sector, province, year FEs. [▶ Results](#)

Conclusions

We provide a novel identification strategy to gauge the causal effect of a change in bank competition on firm dynamics.

Antitrust-induced reduction of the anti-competitive impact of M&A's positively affects firm dynamics:

- interest rates decline
- new firms are more likely to be financed
- number of entrants increase
- which are more likely to survive (at least 5 years)
- size of incumbent firms (smaller ones) shrinks,
- positive effect on reallocation

Where to go next:

- in-depth study of bank risk-taking;
- identifying impact on corporate finance;
- long-term effects?

Thank You!

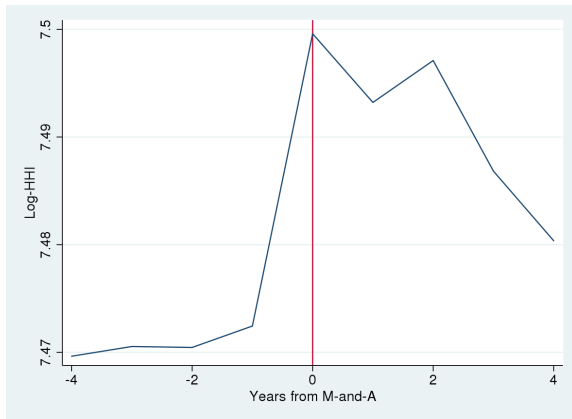
Provinces and Regions



- As of 2009, 107 provinces
- A province is a locality in Italy more or less equivalent to a non-sparsely-populated county in the United States
- with a minimum of 89 thousand and a maximum of 3.5 million inhabitants
- on avg. around 2,000 km² wide

[▶ Back](#)

Figure: Average log-HHI in province-level deposits market by year of distance from an M&A event.



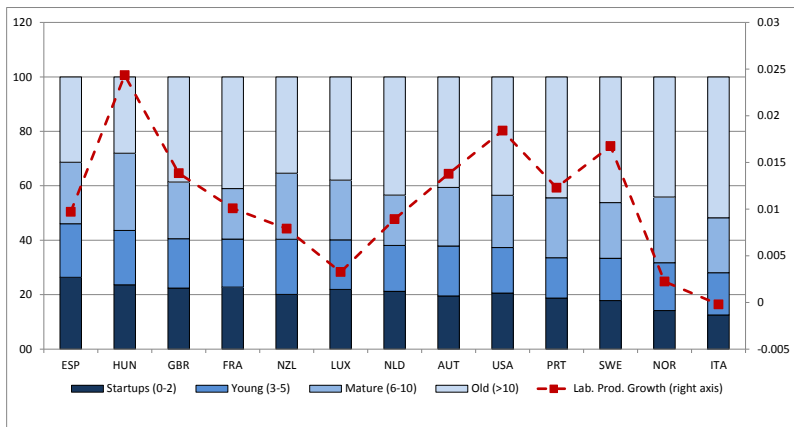
▶ Back

Table: Descriptive statistics.

Variable	Mean	Std. Dev.	Median	N
Joint Share of Banks Before the M&A	0.043	0.073	0.012	3763
No. of Branches of the acquired bank	14.674	33.016	4	3763
HHI of deposits mkt before the M&A	0.175	0.078	0.161	3763
HHI of credit mkt before the M&A	0.123	0.046	0.113	2894
Entry Rate	0.516	1.116	0.145	79573
Exit Rate	0.502	1.061	0.155	79573
Avg. Size of Incumbents	13.161	35.331	6.981	79482
Avg. Size at Entry	3.609	15.857	1.613	74302
Survival Rate at 5 Years Old	0.161	0.234	0.061	58694

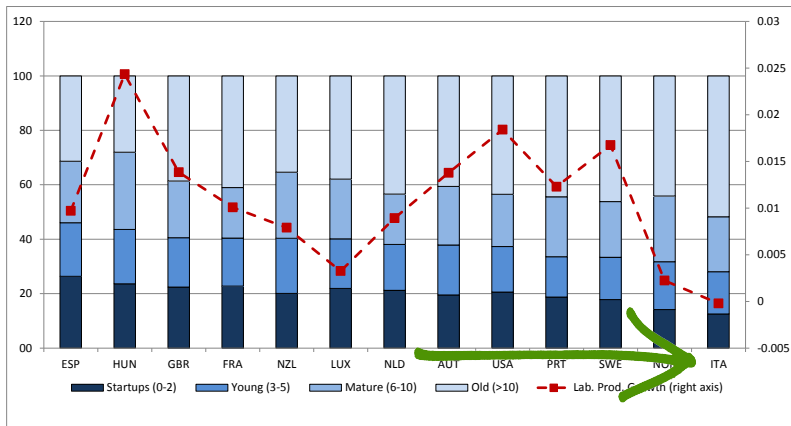
▶ Back

Figure: Age distribution of firms and yearly labor prod. growth - 2001-2011



▶ Back

Figure: Age distribution of firms and yearly labor prod. growth - 2001-2011



▶ Back

Effect on firm entry

<i>Dep. Var.: ΔLog Entrants</i>				
Threshold	0.038*	0.043**	0.043**	0.040**
	(0.020)	(0.018)	(0.018)	(0.018)
Constant	0.068***	–	–	–
	(0.025)			
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	20767	20767	20767	20767

▶ [Back to Main Results](#)

▶ [Back to Instrument Validity](#)

Effect on firm exit

<i>Dep. Var.: ΔLog Exitors</i>				
Threshold	0.011 (0.022)	0.004 (0.012)	0.011 (0.030)	-0.004 (0.028)
Constant	0.054* (0.031)	–	–	–
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	17577	17577	17577	17577

▶ Back to Main Results

▶ Back to Instrument Validity

Effect on size at entry

<i>Dep. Var.: ΔLog Size at Entry</i>				
Threshold	0.019 (0.050)	0.025 (0.046)	0.016 (0.033)	0.022 (0.044)
Constant	-0.073** (0.031)	–	–	–
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	16534	16534	16534	16534

▶ [Back to Main Results](#)

▶ [Back to Instrument Validity](#)

Effect on size of incumbents

<i>Dep. Var.: ΔLog Size of Incumbents</i>				
Threshold	-0.022** (0.010)	-0.033*** (0.010)	-0.033*** (0.010)	-0.030** (0.015)
Constant	0.024*** (0.008)	–	–	–
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	13179	13179	13179	13179

▶ [Back to Main Results](#)

▶ [Back to Instrument Validity](#)

The effect on size of incumbents - micro-firms only

<i>Dep. Var.: ΔLog Size of Micro Firms</i>				
Threshold	-0.024** (0.011)	-0.035*** (0.008)	-0.034*** (0.011)	-0.032** (0.014)
Constant	0.026*** (0.010)	–	–	–
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	76236	76236	76236	76236

▶ [Back to Main Results](#)

▶ [Back to Instrument Validity](#)

Survival rate of cohorts entered after the M&A

<i>Dep. Var.: Δ Survival at 5 of Entrants</i>				
Threshold	0.045** (0.019)	0.041** (0.019)	0.041** (0.019)	0.040** (0.018)
Constant	-0.120*** (0.022)	–	–	–
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	37862	37862	37862	37862

▶ [Back to Main Results](#)

▶ [Back to Instrument Validity](#)

Exit rates in the medium term

<i>Dep. Var.: $\Delta\text{Log Exitors}$ at $t+3,t+4$</i>				
Threshold	0.019** (0.009)	0.016* (0.009)	0.016* (0.009)	0.018** (0.008)
Constant	-0.120*** (0.022)	–	–	–
Year FE	N	Y	Y	Y
Sector FE	N	N	Y	Y
Province FE	N	N	N	Y
No. of Observations	37862	37862	37862	37862

▶ [Back to Main Results](#)

▶ [Back to Instrument Validity](#)