



BANCA D'ITALIA
EUROSISTEMA

Financial fragility and growth prospects: credit rationing during the crisis

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*CompNet Workshop
Frankfurt, 24-25 June 2013*



OUTLINE

- 1. Motivations**
- 2. Bank lending and credit rationing during the crisis**
- 3. The analysis of credit rationing**
- 4. Conclusions**



Motivations / 1

- In most European countries banks play a crucial role in selecting creditworthy borrowers and monitoring their activity. This function is an important engine for the future economic growth
- During the crisis banks' allocation of funds becomes more important than in normal times, as productive system need restructuring, refocusing on sectors and activities with better growth prospect
- The sharp increase in credit rationing during the crisis raised a lot of questions about banks' ability to identify "good" firms...

Motivations / 2

- Which kind of firms have been more frequently rationed by banks?
- Did the soundness of firms' balance-sheets and their growth opportunities affect the ability of obtaining credit?
- Did something change in credit rationing during the crisis compared with the previous period?
- Did relationship lending affect the probability of credit rationing?

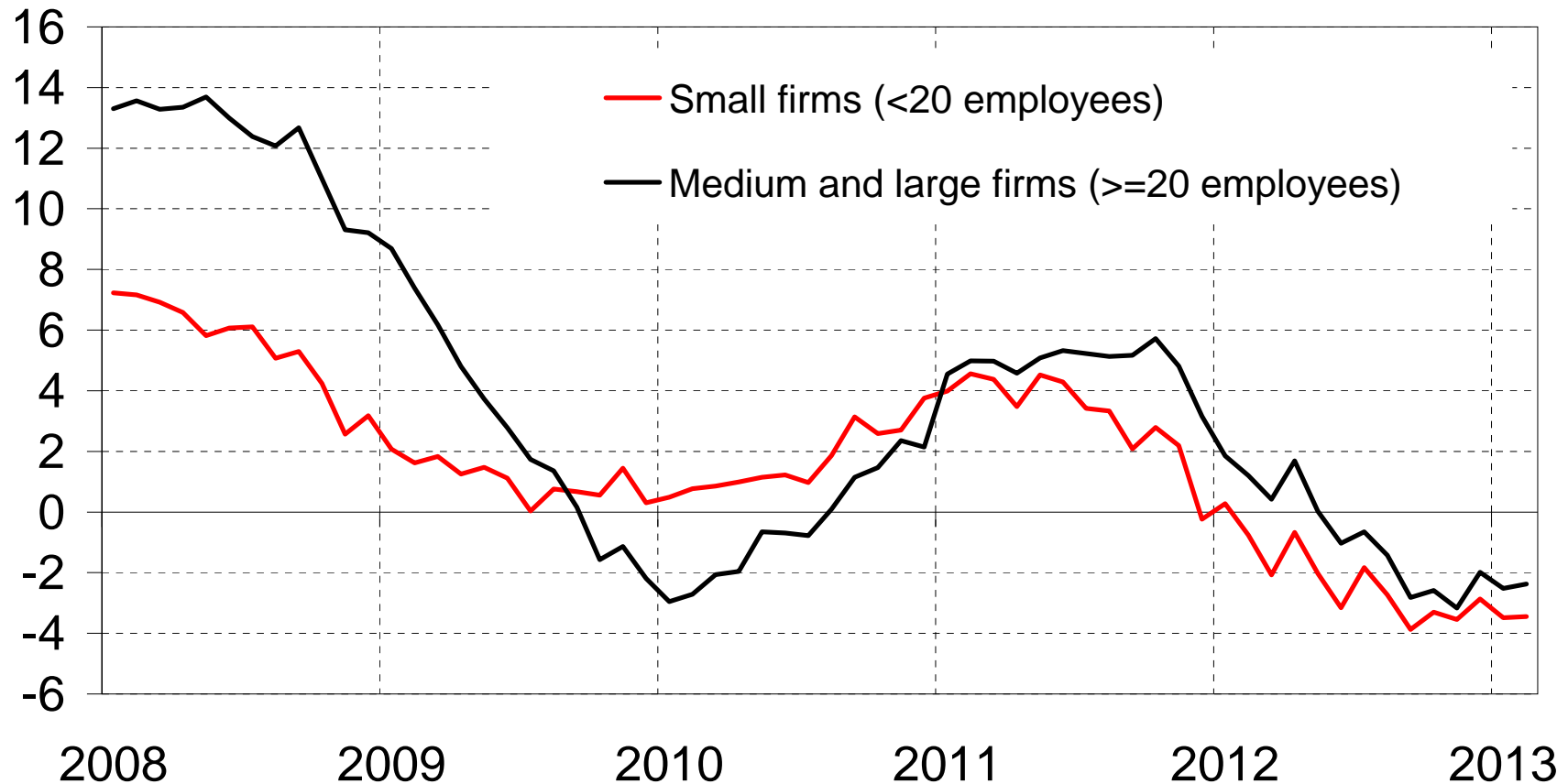
We try to give an answer to these questions. We contribute to the literature on credit rationing and on the effects of the crisis by focussing on firms' heterogeneity



OUTLINE

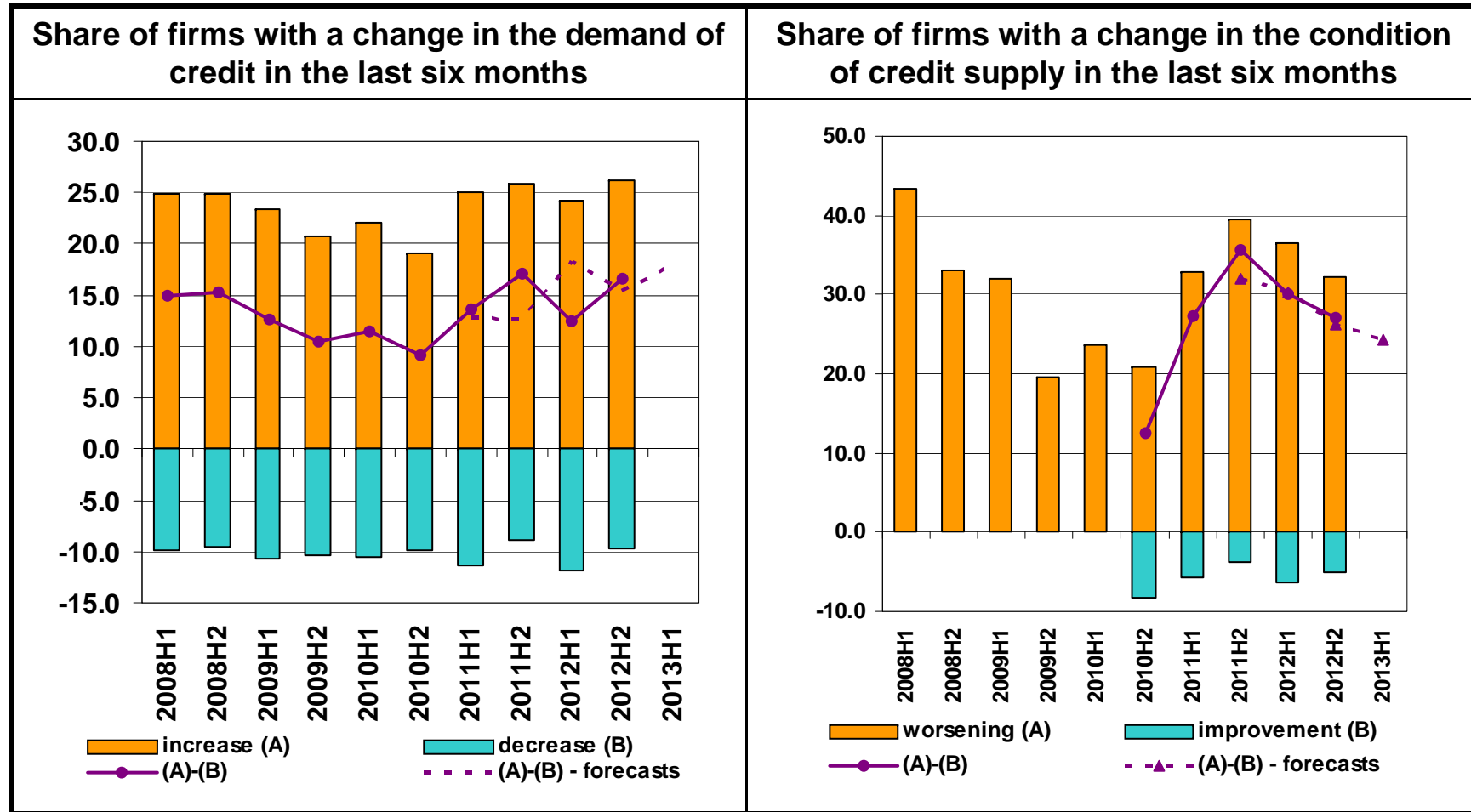
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Bank lending to firms (monthly data - 12 month percentage changes)



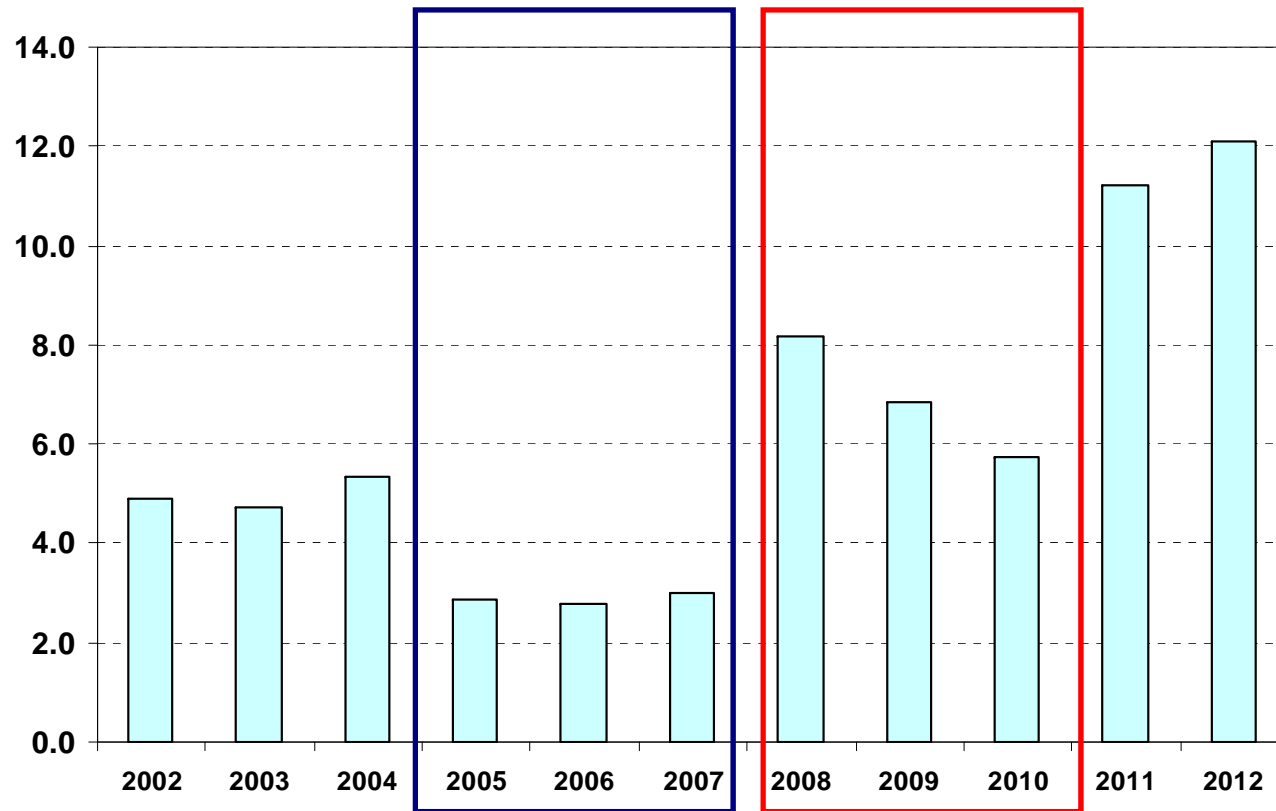
Source: Bank of Italy, Supervisory data. Loans include repos and bad debts.

Demand and supply of credit



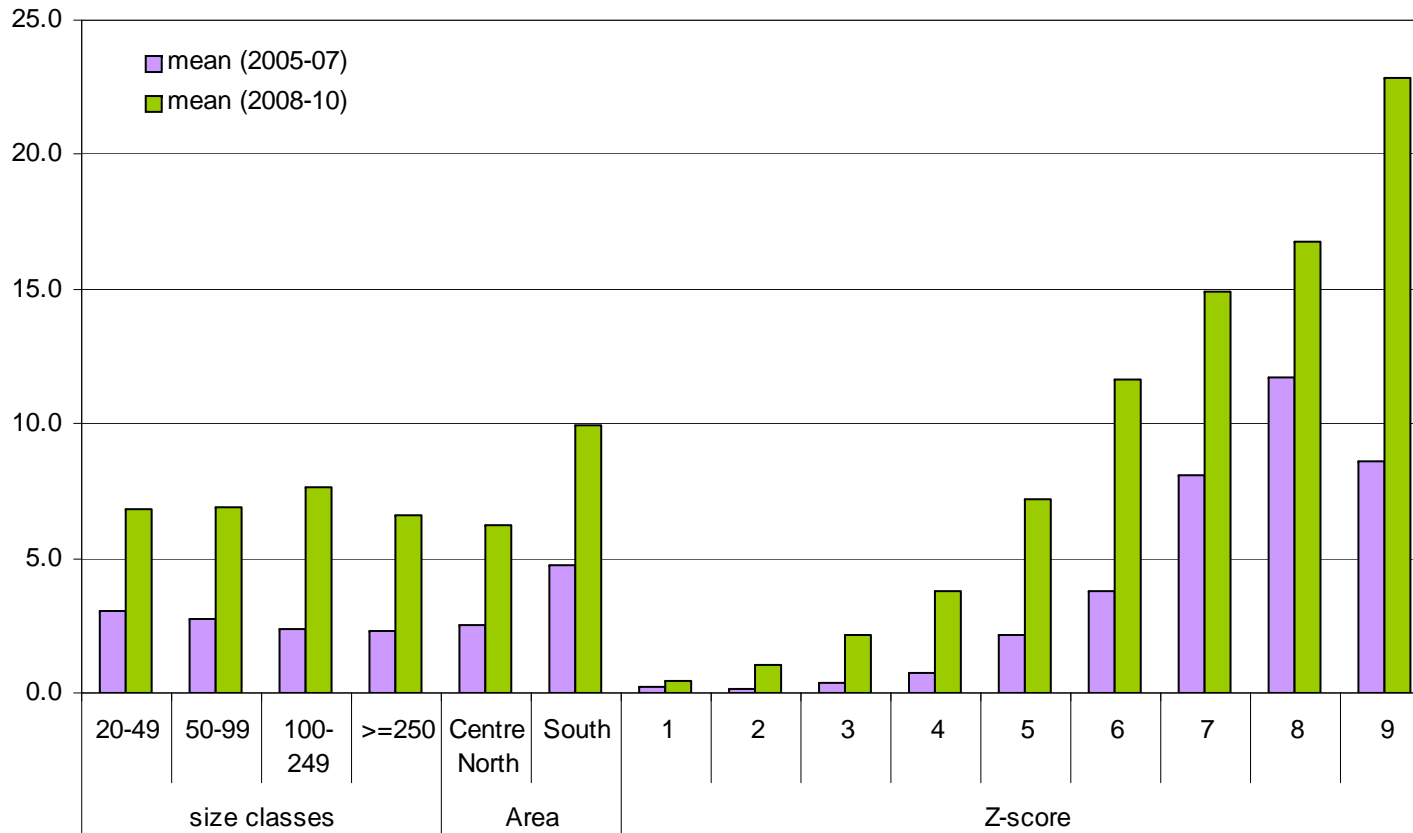
Sources: Banca d'Italia (Survey on industrial and services firms with at least 20 employees)

Share of rationed firms / 1



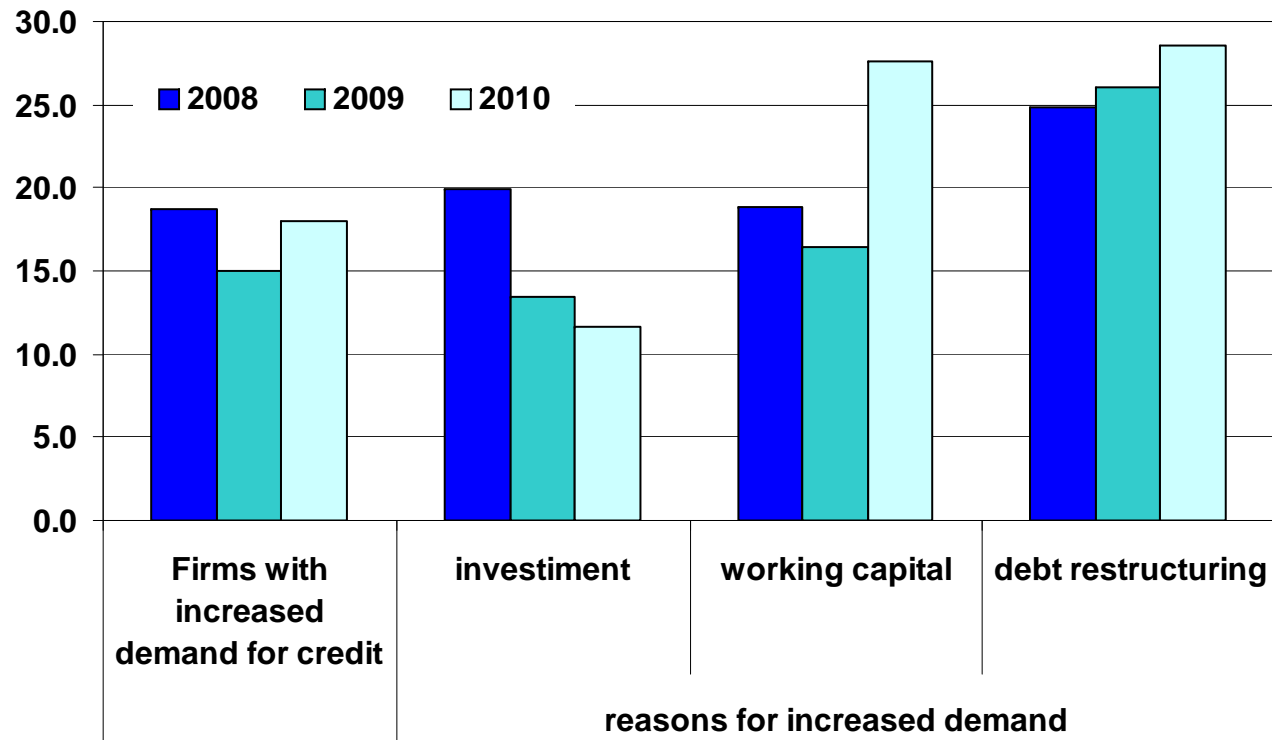
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Share of rationed firms / 2



Sources: Banca d'Italia (Survey on industrial and services firms with at least 20 employees)

Share of rationed firms / 3



Sources: Banca d'Italia (Survey on industrial and services firms with at least 20 employees)



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Data

Sources:

Survey on industrial and services firms ≥ 20 employees (Bank of Italy)

- *credit rationing*
- *innovation*
- *export*
- *industrial strategies*

Balance-sheet information (Cerved Group)

- *financial fragility*
- *growth*
- *productivity*

Credit register and supervisory reports (Bank of Italy)

- *bank size*
- *lending relationships*

The model

- **Sample:** about 8.000 firm-year observations; only firms that applied for new loans, identified through information of the Credit Register and the Survey

- **Model:**

$$\begin{aligned}
 \text{prob}(\text{rationing})_{j,t} = & a + \theta \text{size}_{j,t} + \beta \text{south}_j + \xi l_qbanj_{t-1} + \pi l_rm_{j,t-1} + \varphi \\
 & l_rgar_{j,t-1} + \gamma \mathbf{FRAGILITY}_{j,t-1} + \delta \mathbf{GROWTH}_{j,t-1} + \nu \text{sector}_j + \text{time}_t + \\
 & \varepsilon_{j,t}
 \end{aligned}$$

- Two periods (2005-07 and 2008-10), with the aim of verifying if firms' difficulty in obtaining new credit changed during the crisis compared with the previous period
- Lagged variables
- Pooled probit estimations (marginal effects)

Main variables

Dependent variable

- *dummy = 1 for firms whose application for new loans has been rejected by banks*

Indicators of financial fragility

- *dummy = 1 for “vulnerable firms”, Z-score =5-6 (**mzscore**)*
- *dummy = 1 for “risk firms”, Z-score =7-8-9 (**hzscore**)*

Quantitative indicators of growth prospects (firms' average in previous 3 years)

- *rate of growth of sales (**m_sales**)*
- *rate of growth of investments (**m_investment**)*
- *added value per employee (**m_addval**)*
- *share of export (**m_export**)*

Qualitative indicators of growth prospects (dummies)

- *changed strategy in 2000-06 (**newstrat**)*
- *R&D expenses (**R&D**)*
- *expenses for brands or patents (**brand/patent**)*
- *innovation in processes, products, organization (**inn_proc, inn_prod, inn_org**)*

Probability of credit rationing: Baseline

(pooled probit estimations; marginal effects)

	2005-07	2008-10
mzscore	0.0582 *** (0.0079)	0.0876 *** (0.0111)
hzscore	0.2477 *** (0.0608)	0.2441 *** (0.0583)
m_investment	-0.00004 * (0.00002)	-0.00003 (0.00004)
m_addval	-0.0001 * (0.0001)	-0.0002 (0.0001)
m_sales	-0.0006 ** (0.0002)	-0.0012 *** (0.0004)
m_export	-0.0002 * (0.0001)	-0.0001 (0.0002)
Predicted prob.	0.0253	0.0955
Pseudo R2	0.1425	0.0741
N.	3,855	4,068

Probability of credit rationing: soft information

(pooled probit estimations; marginal effects)

	2005-07	2008-10
mzscore	0.0562 ***	0.1006 ***
hzscore	0.2129 ***	0.3732 ***
m_investment	-0.00003	-0.0001 *
m_addval	-0.0002 **	-0.0002
m_sales	-0.0004 *	-0.0011
m_export	-0.0002	0.0001
newstrat	0.0010	
R&D		-0.0008
brand / patent		-0.0281
inn_proc		0.0508 *
inn_org		-0.0172
inn_prod		-0.0391
Predicted prob.	0.0201	0.0740
Pseudo R2	0.1635	0.1381
N.	3,271	1,056

Probability of credit rationing: Lending relationships

(pooled probit estimations; marginal effects)

	Sub-sample firms with tight lending relationships	
	2005-07	2008-10
mzscore	0.0618 *** (0.0100)	0.0891 *** (0.0126)
hzscore	0.2324 *** (0.0614)	0.1859 *** (0.0626)
m_investment	-0.00005 ** (0.00002)	-0.0001 * (0.00004)
m_addval	-0.0001 (0.0001)	-0.0003 ** (0.0001)
m_sales	-0.0005 * (0.0003)	-0.0013 ** (0.0005)
m_export	-0.0002 * (0.0001)	0.00006 (0.0002)
Predicted prob.	0.0264	0.0880
Pseudo R2	0.1536	0.0743
N.	2,786	3,155

Probability of credit rationing: Bank type

(pooled probit estimations; marginal effects)

	Sub-sample firms with tight lending relationships	
	2005-07	2008-10
mzscore	0.0643 *** (0.0075)	0.1044 *** (0.0104)
hzscore	0.2693 *** (0.0495)	0.3141 *** (0.0507)
smallbank	-0.00539 (0.00800)	-0.0302 * (0.01462)
Predicted prob.	0.0290	0.0945
Pseudo R2	0.1304	0.0752
N.	4,744	4,864



Summary

1. Fragile financial conditions are associated with a much higher than average probability of rationing, both before and during the crisis
2. Indicators linked to firms' growth prospects favored the access to credit before financial crisis; during the crisis, instead, credit rationing was more widespread and less related to firms' potential growth
3. Firms' business strategies that could foster firms' growth do not seem to influence the probability of credit rationing; soft information difficult to introduce in the screening models used by banks?
4. Relationship lending facilitated access to the credit market, especially for firms with better growth prospects; banks more involved in firms' financing have better information and stronger incentives to use it



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Concluding remarks

- During the crisis credit rationing was more widespread across firms, and less related to firms' potential growth
- The current situation of credit market (2011-13) is in many aspects similar to that analyzed in the paper (2008-09)
- Impaired banks could have incentives to reduce the impact of loans to risky borrowers on capital ratios (minimization of probability of default, limited role of firms' growth prospect in the calculation of pd, short-term view)
- Potential effects on the aggregate level of economic growth cannot be excluded
- Supply-side effects support the view that policy measures could be adopted to favor the access to the credit market of firms with better growth opportunities



Thanks