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LENDING ORGANIZATION AND CREDIT SUPPLY DURING THE 2008-09 CRISIS

by Silvia Del Prete[*], Marcello Pagnini[♠], Paola Rossi[♣] and Valerio Vacca[♦]

Abstract

Using a dataset that combines bank organizational variables with information on firms' credit demand and balance-sheet indicators, we investigate the impact of how bank lending was organized on credit dynamics during the 2008-09 financial crisis. Our main findings suggest that the organization of lending to non-financial firms had an impact on the ability of banks to expand credit. Those that made substantial use of credit scoring techniques actually moderated the pace of credit growth during the economic downturn. At the same time, banks that delegated more power to branch managers were likely to expand lending at a faster rate. Finally, contrary to the evidence from the pre-crisis period, we find that lengthy branch manager tenure in the same branch was detrimental to the rate of credit growth. These findings are robust to a broad set of robustness checks.

JEL Classification: G21, L15.
Keywords: banking organization, lending techniques, financial crisis, bank heterogeneity.

Contents

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1. Introduction[1]

A recent strand of the literature shows that the adoption of different lending technologies is associated with heterogeneous credit policies and performance. In this paper, we contribute to this literature by investigating the nexus between heterogeneity in bank organization and lending towards firms during the recent economic and financial crisis.

Internal organization, lending techniques and the extension of credit by Italian banks have recently been addressed by Cannari, Pagnini and Rossi (2010). Both the use of quantitative methods to assess borrowers' creditworthiness, and the autonomy granted to local loan managers are factors which could affect banks' willingness and ability to collect, circulate and employ different types of information about their borrowers (Stein, 2002). The impact of rating models on the amount (and quality) of credit to small businesses is still an open question; it may depend on the degree of flexibility adopted by banks when using quantitative models to assess customer creditworthiness (Berger, Cowan and Frame, 2011; Berger, Frame and Miller, 2005). Information and communication technology, in turn, may have modified the costs and benefits underlying banks' decentralization decisions (Acemoglu et al., 2007; Bloom et al., 2009; Mocetti, Pagnini and Sette, 2016).

Banks are heterogeneous in the internal organization of lending activity: even if bank size appears a major driving force behind organizational choices, there is still a lot of residual heterogeneity even within the same size category (Albareto et al., 2011 and Section 3).

Using a survey specifically designed to capture some organizational features of Italian banks and the lending techniques they adopted, this paper analyses the link between organization of the lending process and the dynamics of credit granted to different kinds of firm after the financial crisis, in order to investigate how this heterogeneity affected the credit slowdown in 2009-10 following the collapse of Lehman Brothers. Since weak economic growth and tight liquidity may negatively affect both loan demand and supply, disentangling the impact of credit demand from changes in lending policies is crucial in

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[1] The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of Italy. We thank Massimiliano Affinito, Monica Andini, Simone Casellina, Alessio d'Ignazio, Massimo Gangeri, Giorgio Gobbi and participants at workshops held at the Bank of Italy (October 2011 and February 2013) for insightful comments. We are also grateful for their comments to Paolo Coccorese and the participants at the Conference "Prestare in tempo di crisi: economie locali e credito nella grande recessione del 2008-09", held at Modena University on 21-22 March 2013, and to participants at the Annual Conference of "Società Italiana degli Economisti", held in Trento on 23-25 October 2014. Any remaining errors are exclusively the responsibility of the authors.

order to correctly identify the effect of more structural factors, such as organizational characteristics.

The main results of our paper are as follows. We control for short-term variations in credit demand, which are positively correlated with firms' credit growth rate, and bank performance, finding evidence that sounder institutions had higher credit growth rates. Focusing on the banking organizational channel – on the supply-side – we argue that the simple adoption of scoring is irrelevant for the dynamics of credit granted to both small and large firms (Berger et al., 2011), while its use as a crucial factor in evaluating customers' creditworthiness negatively affects the growth rate of bank credit. Yet, this negative effect might be compensated through an improvement of credit allocation brought about by credit scoring technologies. At the same time, decentralization of decision-making power to local branch managers (henceforth, LBMs) fosters credit expansion, with a significant effect on lending to both small and large firms (see Cannari, Pagnini and Rossi, 2010). During the crisis period, and in contrast with previous evidence (Benvenuti et al., 2010), branch managers' tenure had a negative effect on credit dynamics for all kinds of borrowing firms. This apparently counterintuitive result suggests that the economic downturn may have exacerbated agency costs and the risk of misconduct of LBMs, driven by their possible collusion with the local economic community at the expense of the goals of the bank as a whole. Consequently, a faster turnover of LBMs might be used to reduce asymmetric information between CEOs and branch managers and to monitor the latter's behavior, in order to prevent loss of control over decisions in a more uncertain economic context, even though this might discourage soft information gathering. In the view of the chain of events triggered by the crisis in 2008, our results have to be evaluated with caution since the analysis is conditional on that particular crisis period. Actually, the great recession that followed those events had effects that were heterogeneous by country and for different subperiods. Yet, our results concern an important economy like Italy and refer to a crucial period occurring with that time span.

The paper is organized as follows. In Section 2 we summarize the main findings of the literature on economic crises and lending techniques and organization, while in Section 3 we describe the dataset we use for the analysis, which includes an *ad hoc* organizational survey on a large sample of Italian banks. In Section 4 we present the econometric exercise, and explain our estimation strategy, while in Section 5 we discuss the main findings stemming from our econometric setup. These results undergo a few robustness checks, which are reported in Section 6. In Section 7 we draw some conclusions.

2. The theoretical background

The global, mostly unexpected, financial crisis which erupted in 2008 was a huge "natural experiment" to assess the role of financial frictions in shaping economic activity. After the collapse of Lehman Brothers in September 2008 the financial crisis triggered a sharp decline in loan amounts and an extraordinary increase in credit frictions. Although both the Federal Reserve and the ECB reacted by injecting liquidity into the system, the contraction in output and employment that followed was unprecedented and is now known as the Great Recession.

This outcome wiped out every possible doubt on the importance of the *lending channel* in the transmission of financial shocks to the real economy. Informational problems are pervasive in financial markets and hamper firms' access to external finance. The equilibrium in credit markets may be characterized by adverse selection and credit rationing. By means of repeated interactions with their customers, banks acquire valuable information on borrowing firms, which makes bank loans special compared with other sources of financing, especially for borrowers faced with greater agency problems.

The literature emphasizes that endogenous pro-cyclical movements in borrowers' balance sheets can amplify and propagate business cycles (financial accelerator), with an heterogeneous impact according to firms' characteristics: in their flight-to-quality reaction to downturns, banks tend to favour wealthier firms, which have more assets to pledge as collateral (Bernanke, Gertler and Gilchrist, 1996).[2] Other papers stressed the importance of a *supply side channel* based on banks' balance sheets as a mechanism propagating the crisis.

We go beyond these bank balance sheet channels and argue that the mechanism may be further amplified by changes in lending technologies and in banking organizational choices in terms of decentralization of power (henceforth, the *organizational channel*).

Credit scoring and rating techniques are now widely adopted by banks (Berger, Cowan and Frame, 2011; Albareto et al., 2011). Furthermore, before the financial crisis large banks improved their competitive position in small business lending by using scoring techniques based on 'hard' information (de la Torre, Martínez Pería and Schmukler, 2008; Berger and Black, 2011). The widespread use of these techniques in assessing borrowers' creditworthiness may produce some automatic reactions in loan supply as a consequence of

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[2] Empirical evidence has confirmed that firms with low capital or liquidity are less likely to get a loan during an economic recession (Jiménez et al., 2010).

the reduction in firm's wealth, thus affecting the borrowing capacity of the firm.[3] Hasumi and Hirata (2010) provide some evidence of the negative lending attitude during the global financial crisis towards loans to small businesses granted using credit scoring techniques. Similarly, Albertazzi and Marchetti (2010), analyzing bank lending in Italy after the Lehman Brothers collapse, provide evidence that banks that rely extensively on credit scoring did reallocate credit away from risky (bad) borrowers, while the others did not. They suggest also that additional factors related to organizational aspects played a role: among others, they point to the relevance of agency costs in major banking groups during the financial crisis that might have induced a tendency to centralize the decision process.

The negative effect of a more codified – and therefore more inelastic – lending process on the amount of extended loans may be smoothed by the use of 'soft' information acquired by the bank through repeated interactions with its customers. However, this knowledge is gathered mainly by LBMs, who develop a lending relationship with the borrowing firms (Berger and Udell, 2006). Soft information is not codified by nature and, as a consequence, is difficult to transmit along the hierarchal structure of the bank (Stein, 2002). Liberti and Mian (2009) find empirically that a greater distance between the information-collecting agent and the loan-approving officer leads banks to rely more on hard (objective) rather than soft (subjective/proprietary) information.

Decentralized organizations, by delegating more authority to branch managers, may acquire a competitive advantage in lending, especially during economic recessions. The empowerment of branch managers and compensation schemes tailored to these managers provide incentives to gather alternative, less codified, information, which could supplement the lack of standard financial data. Qian, Strahan and Yang (2011) assess how increased delegated power to lower decision-making levels and accountability of loan officers in China improved the quality of information produced. Decentralization is a tool through which larger banks might improve their ability to process soft information, whereas smaller banks have a comparative advantage in this respect (Uchida, Udell and Yamori, 2012). Furthermore, the process might be conditional on the characteristics of the loan portfolio: Benvenuti et al. (2010) show that the degree of decentralization is related to banks' specialization in small business lending.

However, substantial delegation to local loan officers can get along with the adoption of credit scoring techniques: according to Bloom, Garicano, Sadun and Van

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[3] This negative effect on credit availability could be more than compensated by an improvement in credit quality, see the point discussed down in this Section.

Reenen (2009) better information technologies are associated with more autonomy at the lower levels of the hierarchy, having an 'empowering' effect on local managers. Mocetti, Pagnini and Sette (2016) confirm that banks resorting to credit-scoring techniques and with more ICT capital tend to delegate more decision-making powers to local managers.

Yet, the optimal degree of decentralization is subject to a trade-off: a closer link between the lender and its borrowers reduces bank-firm information asymmetry, enhances the gathering of soft information, but magnifies information asymmetries between a bank's LBM and its headquarters. The partial loss of control by the principal entails a risk of moral hazard, since LBMs may be 'captured' by local community interests and their actions become less consistent with the main goals of the bank. Managers can use their superior information to pursue private benefits, making choices that are not in line with the goals of the principal (Acemoglu et al., 2007), both in terms of bank performance and risk monitoring. Risk is amplified by the increased difficulty of evaluating the prospects of the economy and the creditworthiness of borrowers during cyclical downturns.

Similar considerations apply to branch managers' turnover (Scott, 2006). Stable branch managers tend to build up close ties with entrepreneurs, thus improving the creditor capabilities of properly assessing their projects and repayment capacity. However, longer tenures could exacerbate the risks of 'capture' by the local community. Therefore, banks tend to adopt well-defined turnover policies for loan officers, in order to mitigate agency problems. The other side of the coin is a reduced incentive to acquire and process soft information, which will be wasted in the turnover process. According to Hertzberg, Liberti and Paravisini (2010), rotation policies affect officers' reporting behavior: when officers anticipate rotation, their reports are more accurate and contain more bad news about borrower's repayment prospects, since the principal can compare current reports with future reports issued by the successor. This behavior has a cyclical pattern: internal evaluation tends to be more optimistic during the first two years of a loan officer's tenure, while this bias disappears when rotation becomes imminent.

Moreover, Demma (2017) shows that resorting to the scores improves credit quality by reducing the riskiness of loan portfolios. Therefore, credit scoring adoption – besides having a negative effect on credit expansion – may also improve credit allocation due to the ability of those lending technologies to reduce the room for inappropriate behavior on LBMs side. We will come back to this issue in Section 5.

Summing up, the direction of the effect stemming from heterogeneous bank organizations during the crisis might *a priori* be mixed because of a trade-off between the

need for more accurate and qualitative information (i.e. *soft information*) to better assess the riskiness of borrowers, especially of SMEs, which are more financially constrained during a turmoil (De Mitri et al., 2010), and the enhanced uncertainty of the economic environment, which strengthens the need to monitor the lending approval process to avoid moral hazard behavior.

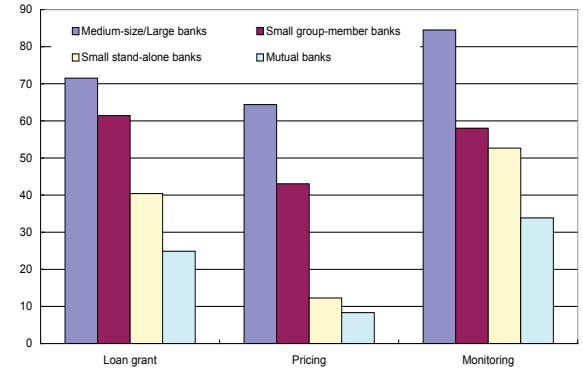
3. Data description

In order to investigate the impact of banks' organizational choices on their lending behavior towards firms, we use a data set that merges information from several sources.

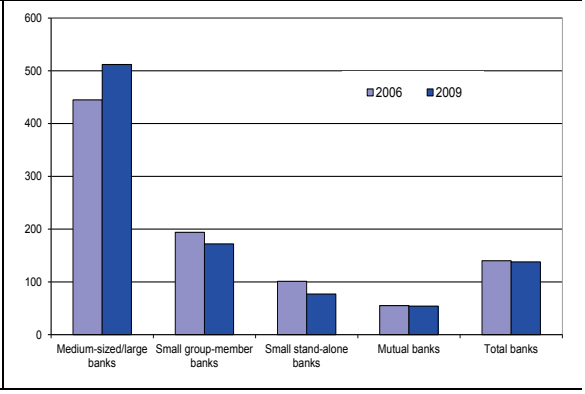
Firstly, we employ an organizational survey conducted by the Bank of Italy on almost 400 Italian banks that provide about 80 per cent of the outstanding credit to Italian firms. The survey was carried out in March 2010 with reference to the situation at the end of 2009 and covered issues dealing with bank organization and lending techniques. A similar survey had been carried out at the beginning of 2007 with reference to 2006: since the topics within the two surveys overlapped to a large extent, the results of the older survey can be used as instrumental variables for the features of banks in the more recent one. Figure 1 reports descriptive evidence on credit scoring use and on power delegation collected in the two Surveys (see Del Prete et al., 2013).

Figure 1

a) Importance of rating models in the lending process to SMEs (1)
(percentage values at the end of 2009)



b) Powers delegated to branch managers (2)
(values in thousands of euros)



Source: Based on the Bank of Italy's survey on organization and lending techniques.

(1) Frequency at which rating models are defined as "crucial" or "very important" during the granting, pricing or monitoring of a loan to SMEs. Frequencies are weighted by the loans extended by the responding banks to firms. – (2) The maximum amount of loans a branch manager can autonomously grant to non-financial firms, applying to a given lending bank for a loan for the first time.

Since the end of 2008, and twice per year in regular waves, the same large sample of Italian banks has been asked to report on variations in credit supply and demand conditions at bank level (the Regional Bank Lending Survey - RBLS). This survey is carried

out in much the same way as the ECB's Bank Lending Survey. In each survey the questions refer to the current and lagged half-year, and therefore offer an updated representation of credit market conditions. Moreover, they allow disentangling short-term demand variations from those in supply factors at bank level.

Finally, we use the Bank of Italy's supervisory reports on the same sample of banks to capture their balance sheet conditions, for instance the extent to which they are capital constrained, the dependency from the interbank market to cover their lending activity, the average riskiness of their credit portfolio and the composition by sector and firm dimension of outstanding loans, etc. We make resort also to proxies describing the governance of the bank, such as the average age and the number of members of the Board of Directors and other Top Boards of each bank.

Data obtained from supervisory reports allows us to gauge the amount of credit actually extended by each bank to customer firms. Hence, the credit growth rate at bank level can be used as a dependent variable in our econometric exercise in order to investigate how different bank organizational models might have affected the dynamics of credit to non-financial firms during the crisis period.

4. Specification and variable definition

The relationship between organizational variables and the growth of the credit extended to Italian firms is investigated by means of the following reduced form:

$$GrowthCreditFirms_{bt} = \alpha + \beta ORG_b + \gamma DC_{bt} + \delta BSI_{bt} + \varepsilon Date + \mu_{bt} \qquad (1)$$

where $GrowthCreditFirms_{bt}$ is the yearly loan growth rate for bank b in period t and t denotes half-years within the time span 2008 II-2010 II. We consider loans extended to non-financial firms and run separate econometric exercises for small borrowers (i.e. enterprises with less than 20 employees). In order to smooth erratic changes, we use an average growth rate as the dependent variable, equal to the mean of the half-year growth in credit in half-year t and half-year $t-1$. To lower the impact of potential biases on accounting data, the effects of mergers and acquisitions have been removed, together with other distorting factors. Nevertheless, the use of a rather large panel of banks for a number of time periods inevitably entails the presence of some outliers which could bias econometric findings. Therefore, in the econometric exercises we trimmed observations by dropping loan growth rates outside the 5^{th} – 95^{th} percentiles of the same variable.

The time period encompassed by our analysis has been chosen with a view to covering the initial phase of the economic downturn, which also caused credit volumes to slow down, and the following phase of moderate recovery in the pace of credit growth for Italian firms. In order to evaluate the effect of bank organization on credit dynamics during the financial crisis, we only focus on the first part of the cyclical downturn (2008-09). This allows us to use a broadly unexpected event as a 'natural experiment', whereas it is likely that the subsequent recession episode (approximately since late 2011) was progressively incorporated by both banks and firms in their behavior and organizational choices, thus confounding the identification strategy.

The set of explicative variables on the left hand side can be summarized as follows:

(a) ORG_b is a vector of time invariant organizational variables as observed at the end of 2009:

- *Scoring* and *Scoring_Grant*: these variables provide two definitions for the use of quantitative rating models, and as such will be used alternatively. *Scoring* is a dummy variable for credit rating/scoring adoption (1 = adoption), whereas *Scoring_Grant* is a dummy variable indicating whether the bank considers credit rating/scoring as 'crucial' or 'very important' for granting credit (=1);
- *Branch manager_delegation*: the amount of credit that a branch manager may extend to firms without asking for a formal authorization from higher levels in the bank hierarchy, as observed in 2009. This variable is a proxy for the delegation in favor of the bank peripheral units of the power to grant credit. For reasons explained in Albareto et al. (2011), we normalize that quantity with the corresponding loan amount that the CEO can grant autonomously (relative delegation). [4]
- *Branch manager_tenure:* (log of) branch managers' tenure in the same branch, measured as managers' average tenure (in months) at the end of 2009;
- *Bank classification*: is a vector of categorical variables (dummies) accounting for bank size and legal nature; we use four different groups of banks: 1) medium-sized and large banks (our benchmark), 2) small banks belonging to a banking group, 3) stand-alone small banks, and 4) mutual banks (very small local banks).[5]

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[4] Our measure of power delegation could in principle vary across branches within the same bank. In the few cases in which this occurred in our sample, banks had to indicate the level of delegation adopted in the majority of branches.

[5] Our classification is obtained by crossing two types of criteria: a) one based on size categories defined in terms of bank total assets; b) another one based on the bank institutional nature (group membership and legal form).

- *Bank area*: is a vector of categorical variables (dummies) indicating the Italian macro-region in which the bank's headquarters are located; in particular, we use four dummy variables: 1) North West (as the base-category), 2) North East, 3) Centre and 4) South and Islands. It is important to notice that some large banks extend credit throughout Italy, regardless of where their headquarters are located.

(b) DC_{bt} is a vector of synthetic indicators of the demand for credit as reported by each bank in the several waves of the aforementioned Regional Bank Lending Survey. The *Demand* indexes we use in the econometric analysis represent qualitative bank assessments about the intensity of the variations in loan demand (higher positive values of the indicator stand for stronger demand expansion; the range is set between –1 and +1). The survey reports also demand variations by small sized firms.[6]

(c) BSI_{bt} is a vector of time-varying bank characteristics including:

- *Portfolio riskiness*: represents the ratio of bad loans to total outstanding loans, lagged by one half-year; the ratio refers either to total loans to non-financial firms or to loans to small firms, according to the relationship to be investigated. This variable proxies the riskiness of a bank loan portfolio;
- *Return on assets*: is the lagged return on assets (ROA);
- *Interbank funds*: is the lagged share of interbank funds over total assets;
- *Capital ratio*: is the lagged ratio of net equity and reserves to total assets.
- *Share SMEs; Share Services; Share Building Sector*: these are specialization indexes, measuring the share of total loans extended respectively to SMEs, to the Service Sector and to the Building sector;
- *Age* and *Size of the Board*: represent the average age and number (both in logs) of the members of the bank's top boards (namely, the Board of Directors and the Supervisory Board). Those variables were introduced into the specification in order to control for the role that board characteristics might have on the bank propensity to expand loans. For instance, younger managers could have a different risk appetite as compared to older ones thereby influencing credit dynamics.

(d) *Date*: is a vector representing time (half yearly) fixed effects. The latter are introduced to control for the common shocks affecting all the banks through the cycle.

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[6] In some (unreported) regressions, we also control for short-term supply-side indicators; in particular, we consider variations in supply conditions averaged over two consecutive half yearly responses (higher values stand for tighter lending criteria, the range is from –1 to +1) and we get similar results.

(e) Finally, α, β, γ, δ and ε are parameters to be estimated while μ_{bt} is an error term for which we assume $\mu_{bt} = \upsilon_b + e_{bt}$

The variables in ORG_b, and their effects on credit dynamics are the focus of our analysis, since we are trying to disentangle the bearing that a given organizational model or the use of some lending technologies have on a bank's ability (or willingness) to extend credit to firms, especially during a severe cyclical downturn. This set of variables also included dummies picking up the governance structure (bank size and group affiliation) and the location of the banks' headquarters.

DC_{bt}, denotes short-run variations in credit demand that in turn reflect idiosyncratic factors such as the economic conditions of the local credit markets in which the bank operates, the performance of the main industries financed and the type of loan contracts offered. Since we observe dynamics that are an equilibrium point between credit demand and supply, through this variable it is possible to control for several important potential determinants of the loan dynamics related to borrowing firms' characteristics.[7] The set of demand indicators drawn from the Regional Bank Lending Survey are not very common in the banking literature, mainly because they are rarely available.

Several studies addressed the link between banks' balance sheet conditions and credit growth.[8] Against this background, the third set of variables, BSI_{bt} is aimed at ensuring that we control for bank balance sheet indicators. In particular, portfolio riskiness allows us to control for possible flight-to-quality strategies, which might display different patterns according to the current quality of the bank's portfolio. Bank profitability and capital endowment account for potential economic, liquidity and capital constraints, which could affect lending decisions.

Table a[1] reports summary statistics for the dependent variable, with a breakdown for the values of the credit demand variable as recorded in the Regional Bank Lending

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[7] For the same reason, and in order to check the robustness of our main findings, in some unreported regressions we separately consider the influence of the credit standards applied by the bank in the short-term and we obtain similar results to those presented in the paper. Hence, we are confident that our main findings, above all those on the organizational variables, are robust with respect to controlling for supply credit standards.

[8] See Kashyap and Stein (2000) and Angeloni et al. (2003) for a review. Recent empirical evidence confirms that banks' balance sheet conditions influenced the lending supply reaction after Lehman collapse (Albertazzi and Marchetti, 2010; Puri et al., 2010; Popov and Udell, 2010; Jiménez et al., 2010; Gambacorta and Marques-Ibanez, 2011; Hempell and Sørensen, 2010, Ivashina and Sharfestein, 2010). According to Del Giovane, Eramo and Nobili (2010), in Italy one fourth of the reduction in lending activity after the Lehman collapse, i.e. a drop of 2.2 percentage points to 3.1 per cent in growth rates, can be attributed to banks' balance sheet position.

Survey. These statistics show a positive correlation between the perceived dynamics of credit demand, as reported in the survey, and the actual growth rate of loans to Italian firms.[9]

Table a[2] summarizes the descriptive statistics related to the explanatory variables and reports their definition. In our data, we observe that the median bank shows: *a)* a credit growth rate that is 2-3 percentage points lower for small firms than for the whole sample; *b)* low bank profitability (as suggested by a ROA close to zero) and a slightly higher portfolio riskiness for SMEs. Focusing on organizational variables, on average around 70 per cent of the banks in our sample had adopted a credit scoring or internal rating system, but only 16 per cent attributed it a prominent role in the decision to grant credit to non-financial firms. Table a[3] provides correlations across the main variables used in our estimates, highlighting the absence of significant collinearity problems in the econometric analysis.

5. Main findings

5.1 Random effects model

We run the regression in equation (1) for a sample of slightly more than 300 banks participating in the Bank of Italy's Banking Organization and Regional Bank Lending Surveys and reporting information on their internal organization of lending activity. Our baseline specification allows for bank random effects. We resort first to random rather than to fixed effects as the latter would bring about the elimination of the bank organization variables that are time invariant in our data set. Although we deem the random effect specification to be consistent with the nature of the dependent variable, for the sake of completeness we also report a fixed effect specification (see also Section 5.2), which shows similar results.

Tables a[4] and a[5] report the estimates.

Firstly our findings indicate that the mere adoption of rating models for assessing firms' creditworthiness is irrelevant to the dynamics of the credit granted to non-financial firms in the crisis period. This holds both for the entire sample and for the credit dynamics specifically referred to small sized businesses. However, when we redefine the variable setting the dummy equal to 1 only when the banks actually assign a major role to scoring

[9] This is why we prefer to investigate the effects of demand and supply behavior on actual credit growth directly, instead of taking as our dependent variable the survey's proxies of credit demand, reflecting banks' sentiments.

systems in their lending process and 0 otherwise (columns [2] and [4]),[10] its effect is significant and negative: a pervasive use of credit scoring models dampens credit growth, with a similar impact for both the entire sample and for the group of small firms alone. Thus, our evidence provides support for the idea that banks that rely heavily on codified information had a negative attitude towards lending during the crisis.

The effect of credit scoring adoption or its actual use on credit availability has been confirmed by other studies for different countries and time spans.[11] Moreover, we emphasize again that this negative effect on credit availability could have been compensated through an improvement in credit allocation allowed by credit scoring technologies.[12]

Delegating more decision-making power to branch managers had a positive effect on loan dynamics during the crisis, even when controlling for short-term variations in demand conditions, bank size and governance models, as well as specific random shocks hitting individual banks. This positive impact was also marked for the dynamics of credit to small businesses. The latter piece of evidence is consistent with branch managers being less closely involved in the decision to lend to large firms, for which approval is handled directly by the bank's CEO or an intermediate level between the CEO and the branch manager.

Against this background, it is somewhat surprising that branch managers with a comparatively longer tenure reduced banks' credit expansion during the crisis. One would have expected a longer tenure to be a crucial condition for mitigating the effects of the crisis on the availability of credit to firms. Earlier empirical evidence emphasized a positive correlation between branch managers' tenure and small business lending and supported this view through the econometric evidence collected for the pre-crisis period (Benvenuti et al., 2010). However, the economic downturn and the associated higher uncertainty probably exacerbated the agency costs between headquarters and the periphery: long-established branch managers, owing to their longer tenure, might more easily collude with the local

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10 Please note that this stricter definition of the 'scoring' dummy includes all the banks that according to the organizational survey considered ratings 'crucial' or 'very important', regardless of whether they had had their internal rating based systems validated by the Supervisory Authority at the time of the organizational survey.

11 See Berger et al. (2005) and Berger et al. (2011) for the US.

12 In the aforementioned paper, Demma (2017) provides evidence that, after controlling for other supply factors, Italian banks using credit scorings displayed a higher-credit quality of the loan portfolio towards non-financial corporations. Whether this finding might be due either to a better screening technology associated with credit scoring models or to the fact that the latter might limit free riding on LBMs side is an uncertain issue that we leave for a future research agenda.

community of borrowing firms. This might have increased the intensity of the control of the peripheral network from the headquarters. Hertzberg, Liberti and Paravisini (2010) find that, when local officers anticipate rotation, such is the case when they have had a longer tenure, their reports are more accurate and contain more bad news about borrower's repayment prospects, since the principal can compare current reports with future reports issued by the successor. This may negatively affect lending activity. According to our estimates, the size of the (negative) effect of a longer branch manager tenure is similar for credit to both SMEs and other firms.

The estimated coefficients make it possible to gauge the economic importance of the factors driving credit growth, besides their statistical significance. Assigning a key role to quantitative methodologies (rating and credit scoring) in the credit allocation process triggers a reduction of about 1 percentage point in the yearly credit growth rate, depending on the sample of firms considered. Moreover, the change in the delegated power of branch managers from the first to the third quartile of the distribution in our sample entails an estimated 0.5 percentage point increase in the growth rate. Finally, moving from the first to the third quartile of the log of the average tenure of branch managers would yield a 0.5 per cent decrease in the yearly expansion of credit to firms. According to these estimates, the effects on credit aggregates of the 'organizational channel' were by no means negligible.

Moreover, having controlled for bank size and other legal and institutional characteristics, our findings on the impact of organizational variables on bank lending corroborate and extend those in Albareto et al. (2011). While they found a substantial heterogeneity in bank organization that goes beyond that of the traditional dichotomy between large and small sized banks, we show that this heterogeneity does matter for bank strategies and performance in a crucial time span, such as that represented by the recent economic crisis. In other words, different banking organizational models also behaved differently in terms of firm credit dynamics during the 2008-09 credit slowdown.

As far as the other control variables are concerned, the credit demand conditions are significant and, as expected, boost loan growth.[13] The findings confirm those reported in similar studies based on the equivalent ECB survey (De Bondt et al., 2010), as well as the simultaneous presence of demand and supply side factors behind the recent credit slowdown (Panetta and Signoretti, 2010).

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[13] In unreported regressions, we also find that, *ceteris paribus*, the fine-tuning of credit supply standards applied by the bank in the short run has the expected effect of depressing the expansion of credit volumes.

Turning to the balance sheet indicators, a flight-to-quality phenomenon seems to emerge; this effect appears to be stronger for banks whose portfolio underwent a sharper deterioration in the previous periods: the banks with the greatest idiosyncratic risk in their portfolio slowed their credit expansion more sharply, especially for loans to larger firms. The same is true for banks more dependent from the interbank market to fund their lending activity. Bank profitability does not exhibit a significant impact on credit dynamics. Furthermore, the impact of capital endowments is positive but the estimated parameter is not statistically significant, suggesting that the crisis did not produce a capital-induced credit crunch, at least for the period covered by our analysis. The specialization indices are not significant except for the share of loans to the building sector (but only at the 10 percent significance level). The share of loans towards SMEs becomes significant in the estimates referred to small firms (table a[5]), pointing to a stronger support of banks specialized in this clientele also during the global financial crisis.

The average age of the top boards' members has a (slightly) negative impact on lending (again only at the 10 percent significance level), whereas their number is never significant.

Finally, the institutional/size features of the banks appear to be important: credit expansion was faster for smaller banks than that for larger ones, in line with previous empirical findings (Panetta and Signoretti, 2010) and with the evidence emerging from regional economic analysis. These results support the view that size and organizational complexity exert a powerful influence on lending behavior, both in normal periods and during economic crises. The location of a bank's headquarters does not have a significant impact, apart from a slower expansion of lending for banks established in the North-Eastern regions.

5.2 Fixed effects model

In order to check our results, we verify our findings by introducing fixed effects, assuming individual, time-invariant differences for individual lenders. These idiosyncratic effects allow us to control for bank-specific characteristics potentially correlated with other bank explanatory variables different from the organizational features that we consider.

As already mentioned, our main variables of interest are time-invariant. Therefore, we use a two-stage estimation procedure (Baltagi, 2008): in the first stage the dependent variable is regressed upon the time-dependent variables (i.e. credit demand indexes, balance sheet or governance indicators and time dummies) and bank-level fixed effects; in the

second stage, average residuals from the first stage at bank level are explained through the bank time-invariant regressors, especially those related to the organization and lending techniques we focus on. In Panel *b* of Tables a[4] and a[5], we report equation (1) estimated with bank fixed effects.

Focusing on the effects derived from a tighter use of credit models (Tables a[4] and a[5], column (4) in Panel *b*), we find that the outcome of the fixed-effect estimation broadly confirms the findings of our preferred specification with random effects. In particular, the significance, sign and magnitude of the estimated parameters picking up organization and lending technologies validate our previous conclusions that – ceteris paribus – (i) an intense use of rating/scoring models tended to diminish lending, (ii) decentralization of decision-making power to branch managers fostered credit flows to all kind of firms, and (iii) slower turnover of branch managers was detrimental to faster credit growth. The control variables also appear robust under this alternative specification, with the exception of a reduction in the significance of the balance-sheet indicators when we focus on the subsample of small firms.

6. Robustness checks

An important concern is the possibility that our results are biased by the fact that some of the organizational variables we use to account for credit supply may be determined by the credit dynamics we try to explain on the basis of organization and lending techniques. In order to tackle this potential endogeneity problem related to reverse causality between the dependent variable and our core explicative factors, we run an IV regression. To this end, we employ the values of the set of organizational characteristics derived from a similar survey carried out at the beginning of 2007, which recorded organizational variables (particularly the use of scoring, delegating power to branch managers and the average and maximum tenure of branch managers) for Italian banks at the end of 2006, well in advance with respect to the crisis. The identification strategy based on our proposed instruments hinges on the fact that the financial crisis was largely unpredictable in 2006. Hence, it is likely that organizational variables in that year will be uncorrelated with the credit dynamics during the crisis period. At the same time, the organization variables should be strongly and positively correlated across the two years due to the slackness in the organization design. Unfortunately, the sample coverage of the survey was lower in the 2006 than in 2009 and therefore we lose some observations.

To assure the validity of these instruments, we perform the usual diagnostic tests. In the Hansen-Sargan test of over-identifying restrictions, the joint null hypothesis is that

the instruments are valid instruments (i.e. uncorrelated with the error term) and that the excluded instruments are correctly dropped from the estimated equation in the second stage. Hence, a rejection of the hypothesis based on the Hansen-Sargan test suggests bad instruments or the wrong specification. We also report the Kleibergen-Paap test for under-identification. This test controls whether the first stage equation is identified or not, i.e. that the instruments are significantly correlated with the endogenous regressors; thus, a rejection of the null hypothesis indicates that the model is identified. Estimators can perform poorly when instruments are weak. We control also for weak identification by using the robust Kleibergen-Paap Wald statistics (even if we do not have the critical values), when a rejection of the null hypothesis suggests a robust instrument.

Table a[6] reports the first stage estimations and table a[7] the results from our IV estimate. In the first stage our identification variables are significant in predicting the corresponding dependent variable. The Hansen J statistic accepts the hypothesis that our instruments are valid and the Kleibergen-Paap test shows that the model in the first stage is identified, even if we cannot rule out that we are using weak instruments.

In table a[7] our main findings from the previous random effect model are essentially confirmed, even if they often present a lower statistical significance due to less efficient IV estimations and the loss of observations.

Short-term credit demand variations are positively correlated with those in credit volumes, even if the magnitude of the estimated coefficients and their statistical significance are lower when we restrict the analysis to the sample to small business lending (Panel *b*). The ex post riskiness of the loan portfolio plays a clear role in constraining the further expansion of loans to non-financial firms, while the other balance sheet indicators or governance measure (age and size of top boards) are not statistically significant. All other things being equal, smaller banks record faster credit growth, while banks headquartered in the North-Eastern regions record slower credit growth for the whole sample.

As for lending technologies, the use of rating models hampered credit activity whenever banks assigned them a key role in their loan processing. The size of the coefficient is very similar to the previous estimations, but the statistical significance is lower than in GLS models and valid only for the whole sample of firms and not for opaque, smaller ones, whose screening requires extensive use of soft information.

Turning to bank organization, the power delegated to branch managers has a positive effect on credit growth, but – differently from the baseline estimations – it is not statistically significant both in the whole sample of firms and in the subsample of smaller ones. Finally, a longer tenure for branch managers tends to hold back the extension of loans to firms (both on average and on the subsample of smaller borrowers), once again after controlling for bank size, balance sheet, and governance features.

All in all, findings from this alternative IV econometric setup broadly confirm our baseline results obtained from the GLS bank random effect model. In particular, the credit demand index and the bank balance sheet indicators preserve their impact on the credit dynamics, which is significant at the usual confidence levels. Focusing on bank organizational characteristics, the coefficient on the power delegated to branch managers is not significant, while the crucial role of credit scoring in granting credit and branch manager tenure are robust and negatively affect the actual credit dynamics, supporting further our previous results.

7. Conclusions

After the collapse of Lehman Brothers in September 2008, the uncertainty of the economic environment and financial turmoil influenced the lending process and the credit relationship paradigm, above all for lending to smaller and opaque firms.

The literature has made a major effort to clearly disentangle the demand and supply factors behind the credit slowdown. In this paper we take a further step in this direction, and attempt to isolate the bank heterogeneity stemming from organizational choices as a distinct channel of transmission of financial distress to the credit markets for firms. To this end, we use a dataset based on the Bank of Italy's surveys on bank lending demand and supply, heterogeneous lending techniques and organizational data. Our analysis of this dataset allows us to go beyond the traditional credit channel literature (Bernanke and Blinder, 1988), which magnifies the role of changes in the borrowing firms' balance sheets, and to argue that the observed tightening in credit conditions could also be explained by a sort of "banking organizational channel".

Our main findings can be summarized as follows. On the one hand, short-term controls for firms' credit demand are positively correlated with the actual credit dynamics, in line with the literature (Panetta and Signoretti, 2010), supporting the view that credit dynamics has also been dampened by flatness in loan demand. Secondly, we find evidence

of heterogeneous behavior among banks according to their diverse organizational complexity and the lending techniques they mainly use in the loan approval process.

Other things being equal, the assignment of a crucial role to scoring or internal ratings to assess borrower's creditworthiness dampened credit dynamics. By contrast, more decentralized banks (in terms of the share of decision-making power delegated to branch managers) generally over-performed in extending credit to both small and large firms. Finally, contrary to previous evidence in 'normal times', we found that longer branch manager tenure hampered credit growth: our interpretation of this result is that, during the crisis, uncertainty in evaluating creditworthiness amplified, thus exacerbating the risks that long-established branch managers be "captured" by their local communities. This, in turn could have increased the intensity of the banks' headquarters control over their branch networks, thus slowing down or hampering the overall lending process. The findings on the effect of an intense use of hard information (through credit scoring) and branch manager tenure are robust to different identification strategies, whereas the effect of delegation to branch managers fades away with instrumental variables estimation.

All in all, this evidence supports the view that banks should make an effort to find an optimal mix between quantitative and qualitative information in assessing borrowers' creditworthiness, especially during a deep recession. A strong reliance on the use of codified information in assessing creditworthiness apparently thwarts loan extension to firms, especially small ones. On the other hand, as far as the usage of soft information is concerned, decentralisation (i.e. keeping decision powers close to the place where the borrower is established) is conducive to prevent a credit crunch, while during the crisis the extensive recourse to soft information gathered through long-term tenures at local branches increased the cost for banks of moral hazard at local level and caused a loss of control over lending decisions.

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Tables

Table a[1]

Summary Statistics: Credit to non-financial firms

(annual growth rates)

Credit demand situation (1)	Mean	Median	Inter-quartile range	Number of observations
Strong contraction	0.055	0.043	0.110	78
Contraction	0.049	0.042	0.100	478
Neutral	0.060	0.048	0.110	620
Expansion	0.096	0.085	0.110	597
Strong expansion	0.120	0.110	0.082	68
Total	**0.071**	**0.060**	**0.110**	**1,841**

Source: Based on Bank of Italy, Regional Bank Lending Survey data and supervisory reports.
(1) The variable is a judgement of the banks about the demand for credit by non-financial firms, ranging from –1 (strong contraction) to 1 (strong expansion).

Table a[2]

Descriptive statistics: whole sample

Variables	Variable definition	Mean	P25	Median	P75
Credit growth rate (all firms)	Average yearly growth of credit to whole sample of firms	0.092	0.012	0.070	0.132
Credit growth rate (small firms)	yearly growth of credit to small firms (with less than 20 employees)	0.063	-0.002	0.051	0.111
Credit demand index (all firms)	Credit demand index for all kinds of firms, as recorded by each bank in the RBL survey (ranging between -1 and +1)	0.028	-0.500	0.000	0.500
Credit demand index (small firms)	Credit demand index for small firms, as recorded by each bank in the RBL survey (ranging between -1 and +1)	0.046	-0.500	0.000	0.500
Portfolio riskiness (all firms)	Bad loans on firms' total loans	0.050	0.018	0.034	0.061
Portfolio riskiness (small firms)	Small firms' bad loans on small firms' total loans	0.095	0.019	0.039	0.076
ROA	Earnings before taxes on total assets	0.003	0.001	0.003	0.005
Capital ratio	Capital and Reserves on Total assets	0.110	0.082	0.102	0.131
Interbank funds	Interbank funds on Total assets	0.063	0.0045	0.017	0.045
Age Boards' Members	Log of the average age of members of the Board of Directors (and Supervisory board when present)	4.014	3.961	4.015	4.068
Size of Top Boards	Log of the number of members of the Board of Directors (and Supervisory board when present)	2.841	2.708	2.890	3.045
Share SMEs	Share of total loans extended to SMEs	0.402	0.252	0.397	0.534
Share Building Sector	Share of total loans extended to firms operating in the Building Sector	0.111	0.000	0.114	0.189
Share Service Sector	Share of total loans extended to firms operating in the Service sector	0.304	0.000	0.403	0.524
Scoring	Dummy equal to 1 in case of adoption of credit scoring or internal rating systems to evaluate firms creditworthiness	0.684	0.000	1.000	1.000
Scoring_grant	Dummy equal to 1 if the adoption of credit scoring or internal rating systems is crucial or very important to grant credit to firms	0.165	0.000	0.000	0.000
Branch manager delegation	Max Loan LBM on Max loan CEO	0.162	0.040	0.125	0.240
Branch manager tenure	Log. of months a LBM stays in charge at the same branch	3.595	3.219	3.584	4.094
Bank Size	Log of total assets	20.108	19.001	19.883	21.023

Source: Based on Bank of Italy, Regional Bank Lending Survey data and supervisory reports.

Table a[3]

Correlation table (1)

(dependent variable: credit growth to all Italian firms. Pair-wise correlation statistics)

	Depend. variable	Organisational variables				Demand/Supply variables		Governance variables	
Variables	Credit growth rate	Scoring	Scoring grant	Branch manager delega-tion	Branch manager tenure	Credit demand	Credit supply	Age	Size
Credit growth rate	1.0000								
Scoring	0.0050	1.0000							
Scoring_Grant	-0.0446*	0.4104*	1.0000						
Branch manager delegation	0.1237*	-0.0881*	-0.1789*	1.0000					
Branch manager tenure	-0.0857*	-0.0540*	-0.0750*	-0.1180*	1.0000				
Credit demand	0.2047*	-0.0174	0.0132	0.0869*	-0.0467	1.0000			
Credit supply	0.0102	-0.0171	-0.0467*	-0.0011	0.0337	-0.1660*	1.0000		
Age Boards' Members	0.0386*	0.0837*	0.1850*	-0.2662*	-0.0342	-0.0013	-0.0136	1.0000	
Size of Top Boards	0.0009	0.0600*	0.1717*	-0.2060*	0.0234	-0.0050	-0.0891*	0.3000*	1.0000
Portfolio riskiness	0.0474*	0.0263	-0.0092	0.0042	-0.0296	0.0014	-0.0161	-0.0131	-0.0018
Return on assets	-0.1136*	0.0346	0.0302	0.0235	-0.0107	-0.0161	-0.0466*	-0.0092	0.0109
Capital ratio	0.0119	-0.0433	-0.0503*	0.1631*	-0.0290	0.0341	-0.0679*	0.1024*	-0.0947*
Interbank funds	-0.0050	0.1403*	0.0628*	-0.2608*	-0.1054*	-0.0872*	-0.0269	-0.4488*	0.0219
Size of the bank (Log managed funds)	-0.0990*	0.2226*	0.3632*	-0.4947*	-0.0311	-0.0790*	-0.0453	0.2241*	0.4429*
Share SMEs	-0.0281	-0.0660*	-0.1518*	0.3469*	0.0616*	0.0365	0.0063	0.1419*	-0.2870*
Share Building Sector	0.0792*	-0.0291	-0.0094	0.0624*	0.0140	-0.0854*	0.1253*	0.0592*	-0.0014
Share Service Sector	0.1271*	0.0184	0.0120	-0.0412	0.0066	-0.0741*	0.1241*	0.0202	-0.0017

	Balance Sheet variables							
	Portfolio riskiness	Return on assets	Capital ratio	Interbank funds	Size of the bank	Share SMEs	Share Building Sector	Share Service Sector
Capital ratio	0.0360*	-0.1559*	1.0000					
Interbank funds	0.0073	-0.0443*	-0.2911*	1.0000				
Size of the bank (Log managed funds)	-0.0014	0.0184	-0.4000*	0.3614*	1.0000			
Share SMEs	0.0419*	0.1516*	0.2160*	-0.2655*	-0.5779*	1.0000		
Share Building Sector	-0.0209	0.1443*	-0.1373*	-0.1228*	-0.0910*	0.0022	1.0000	
Share Service Sector	0.0210	0.1105*	-0.1661*	-0.0171	0.0233	0.0014	0.5810*	1.0000

Source: Based on Bank of Italy Organizational Survey and Regional Bank Lending Survey data and supervisory reports.

(1) * denote statistical significance p<0.05.

Table a[4]

Yearly growth rate of credit to Italian firms: whole sample of firms (1)

Dependent variable: yearly growth rate of credit to Italian firms	a) Bank random effects (GLS)		b) Bank fixed effects	
	Baseline	Rating very important	Baseline	Rating very important
Credit demand	0.0129***	0.0129***	0.0135***	0.0135***
	(0.002)	(0.002)	(0.002)	(0.002)
Portfolio riskiness (lag1)	-0.1467**	-0.1504***	-0.1259***	-0.1259***
	(0.060)	(0.058)	(0.043)	(0.043)
Return on assets (lag1)	-0.5458	-0.5367	-0.1487	-0.1487
	(0.431)	(0.435)	(0.399)	(0.399)
Capital ratio (lag1)	0.1012	0.1125	0.1460*	0.1460*
	(0.080)	(0.080)	(0.076)	(0.076)
Interbank funds	-0.0823***	-0.0774***	-0.0555***	-0.0555***
	(0.027)	(0.027)	(0.017)	(0.017)
Age Boards' Members	-0.0401	-0.0439*	-0.0293	-0.0293
	(0.025)	(0.025)	(0.023)	(0.023)
Size of Top Boards	-0.0021	-0.0018	-0.0062	-0.0062
	(0.008)	(0.008)	(0.006)	(0.006)
Share SMEs	-0.0058	-0.0049	-0.0307**	-0.0307**
	(0.018)	(0.018)	(0.014)	(0.014)
Share Building Sector	0.0466*	0.0468*	0.0427	0.0427
	(0.027)	(0.027)	(0.026)	(0.026)
Share Service Sector	0.0281	0.0285	0.0182	0.0182
	(0.022)	(0.022)	(0.022)	(0.022)
Scoring	0.0017		0.0016	
	(0.004)		(0.003)	
Scoring_grant		-0.0089**		-0.0074**
		(0.005)		(0.003)
Branch manager delegation	0.0275*	0.0285**	0.0217*	0.0227**
	(0.015)	(0.014)	(0.012)	(0.011)
Branch manager Tenure	-0.0058**	-0.0059**	-0.0048**	-0.0050**
	(0.003)	(0.003)	(0.002)	(0.002)
Small banks in groups	0.0117	0.0090	0.0123**	0.0098*
	(0.008)	(0.008)	(0.006)	(0.006)
Independent small banks	0.0156	0.0107	0.0167**	0.0121
	(0.011)	(0.010)	(0.008)	(0.008)
Mutual banks	0.0005	-0.0062	0.0073	0.0018
	(0.010)	(0.010)	(0.006)	(0.006)
North-East	-0.0104**	-0.0103**	-0.0072*	-0.0069*
	(0.005)	(0.005)	(0.004)	(0.004)
Centre	-0.0049	-0.0046	-0.0027	-0.0026
	(0.005)	(0.005)	(0.004)	(0.004)
South	-0.0022	-0.0014	-0.0004	0.0002
	(0.007)	(0.007)	(0.005)	(0.005)
Constant	0.2129*	0.2344**	0.1662*	0.0143
	(0.110)	(0.108)	(0.096)	(0.010)
Time dummies	Yes	Yes	Yes	Yes
R-sqr			18.94 (2)	18.94 (2)
Wald - Chi2	396.57	393.86	416.55 (2)	416.55 (2)
Number of observations	1,536	1,536	1,536	1,536
Number of banks	327	327	327	327

(1) Stars denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in brackets are clustered at bank-level. – (2) 1st stage with fixed effects.

Table a[5]

Yearly growth rate of credit to Italian firms: Small firms (1)

Dependent variable: yearly growth rate of credit to small Italian firms (less than 20 employees)	a) Bank random effects (GLS)		b) Bank fixed effects	
	Baseline	Rating very important	Baseline	Rating very important
Credit demand small firms	0.0056**	0.0065***	0.0060***	0.0060***
	(0.002)	(0.002)	(0.002)	(0.002)
Portfolio riskiness small firms (lag1)	-0.1001***	-0.0813***	-0.0813***	-0.0813***
	(0.037)	(0.028)	(0.023)	(0.023)
Return on assets (lag1)	-1.1216*	-0.1322	-0.1698	-0.1698
	(0.632)	(0.384)	(0.336)	(0.336)
Capital ratio (lag1)	-0.0542	-0.0148	0.0148	0.0148
	(0.079)	(0.071)	(0.078)	(0.078)
Interbank funds	-0.0253	-0.0227	-0.0142	-0.0142
	(0.030)	(0.027)	(0.039)	(0.039)
Age Boards' Members	-0.0295	-0.0414*	-0.0122	-0.0122
	(0.027)	(0.024)	(0.023)	(0.023)
Size of Top Boards	0.0015	0.0036	-0.0143	-0.0143
	(0.008)	(0.007)	(0.014)	(0.014)
Share SMEs	0.0688***	0.0328**	0.0078	0.0078
	(0.026)	(0.016)	(0.015)	(0.015)
Share Building Sector	0.0417	0.0327	0.0150	0.0150
	(0.032)	(0.027)	(0.031)	(0.031)
Share Service Sector	0.0459	0.0347*	0.0156	0.0156
	(0.032)	(0.020)	(0.022)	(0.022)
Scoring	0.0033		0.0023	0.0023
	(0.004)		(0.003)	(0.003)
Scoring_grant		-0.0107**		-0.0087**
		(0.005)		(0.004)
Branch manager delegation	0.0221	0.0285**	0.0220*	0.0234**
	(0.017)	(0.014)	(0.012)	(0.011)
Branch manager Tenure	-0.0066**	-0.0060**	-0.0046*	-0.0048*
	(0.003)	(0.003)	(0.002)	(0.002)
Small banks in groups	0.0099	0.0087	0.0088	0.0059
	(0.010)	(0.008)	(0.007)	(0.007)
Independent small banks	0.0153	0.0125	0.0120	0.0064
	(0.015)	(0.011)	(0.008)	(0.008)
Mutual banks	-0.0027	-0.0060	0.0031	-0.0036
	(0.012)	(0.010)	(0.007)	(0.007)
North-East	-0.0134***	-0.0109**	-0.0074**	-0.0071**
	(0.005)	(0.004)	(0.004)	(0.004)
Centre	-0.0096*	-0.0061	-0.0045	-0.0045
	(0.006)	(0.005)	(0.004)	(0.004)
South	-0.0103	-0.0045	-0.0021	-0.0013
	(0.008)	(0.007)	(0.005)	(0.005)
Time dummies	Yes	Yes	Yes	Yes
R-sqr			8.48 (2)	8.48 (2)
Wald - Chi2	142.96	173.44	131.01 (2)	131.01 (2)
Number of observations	1,523	1,504	1,523	1,504
Number of banks	324	323	324	323

(1) Stars denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01. Standard errors are clustered at bank-level. The estimates include also a constant (not reported). – (2) 1st stage with fixed effects.

Table a[6]

Robustness checks: IV estimation (2SLS) (first stage equations)

	Branch manager delegation			Scoring_grant			Branch manager Tenure		
	Coefficient		Std. Err.	Coefficient		Std. Err.	Coefficient		Std. Err.
Credit demand	0.0125	*	0.0065	-0.0073		0.0244	-0.0304		0.0326
Portfolio riskiness (lag1)	0.1959	*	0.1118	-1.0885	**	0.4560	-2.0091	***	0.5411
Capital ratio (lag1)	0.5300	***	0.1183	1.4672	***	0.4491	-0.2876		0.5520
Interbank funds	0.0948	**	0.0432	0.4524	**	0.2138	0.2944		0.2035
Return on assets (lag1)	1.6582	**	0.6771	-0.8209		3.8146	-0.5584		3.7422
Age Boards' Members	0.0911	**	0.0450	-0.2801	*	0.1588	-0.0412		0.2606
Size of Top Boards	-0.0222		0.0153	0.0127		0.0619	0.0779		0.0754
Share SMEs	0.0143		0.0306	0.0400		0.0925	0.3574	**	0.1699
Share Building Sector	0.0942		0.0788	0.3367		0.2289	0.1136		0.3370
Share Service Sector	-0.1510	***	0.0424	0.1394		0.1716	-0.0018		0.2577
Small banks in groups	0.0176	**	0.0071	-0.2509	***	0.0541	0.2987	***	0.0472
Independent small banks	0.0456	***	0.0131	-0.3852	***	0.0675	0.4781	***	0.0683
Mutual banks	0.0808	***	0.0122	-0.6452	***	0.0592	0.3515	***	0.0699
North-East	-0.0037		0.0068	0.1284	***	0.0279	0.0102		0.0375
Centre	0.0251	***	0.0093	0.0468		0.0294	-0.0563		0.0413
South	0.0022		0.0099	0.1059	*	0.0542	-0.0614		0.0525
d20082	0.0569	*	0.0302	-0.1449		0.1138	-0.0420		0.1669
d20091	0.0659	**	0.0306	-0.1522		0.1141	-0.0564		0.1675
d20092	0.0577	*	0.0307	-0.1420		0.1144	-0.0388		0.1669
d20101	0.0017		0.0091	-0.0062		0.0348	-0.0018		0.0460
Branch manager delegation in 2006's survey	**0.3942**	*******	**0.0387**	**0.5463**	*******	**0.0865**	**-0.3616**	******	**0.1409**
Scoring relevant in granting a loan in 2006's Survey	**-0.0151**	*****	**0.0063**	**0.1453**	*******	**0.0289**	**-0.0137**		**0.0338**
Maximum Branch manager Tenure in 2006's Survey	**-0.0100**		**0.0066**	**-0.1679**	*******	**0.0344**	**0.0646**	*****	**0.0396**
Average Branch manager Tenure in 2006's Survey	**-0.0086**	******	**0.0037**	**-0.0299**		**0.0188**	**0.0826**	*******	**0.0256**
Constant	-0.2847		0.2053	2.2745	***	0.7325	2.7763	**	1.1737

Stars denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01. Statistics robust to heteroskedasticity.

Table a[7]

Robustness checks: IV estimation (2SLS)				
Dependent variable: yearly growth rate of credit to Italian firms	a) Total firms		b) small firms	
	Baseline	Rating very important	Baseline	Rating very important
Credit demand	0.0145***	0.0137***	0.0080***	0.0083***
	(0.003)	(0.003)	(0.003)	(0.003)
Portfolio riskiness (lag1)	-0.2582***	-0.3149***	-0.3741***	-0.4334***
	(0.069)	(0.078)	(0.077)	(0.093)
Return on assets (lag1)	-0.3341	-0.3848	-0.8459	-0.9179
	(0.407)	(0.444)	(0.707)	(0.731)
Capital ratio (lag1)	0.0506	0.0810	-0.1040	-0.0644
	(0.049)	(0.059)	(0.067)	(0.075)
Interbank funds	-0.0264	-0.0100	-0.0001	0.0186
	(0.025)	(0.028)	(0.026)	(0.030)
Age Boards' Members	-0.0194	-0.0312	-0.0192	-0.0183
	(0.020)	(0.023)	(0.024)	(0.025)
Size of Top Boards	0.0020	0.0040	0.0049	0.0061
	(0.007)	(0.007)	(0.008)	(0.009)
Share SMEs	0.0301**	0.0345**	0.0496***	0.0497***
	(0.013)	(0.015)	(0.015)	(0.016)
Share Building Sector	0.0616**	0.0688**	0.0329	0.0527
	(0.029)	(0.030)	(0.033)	(0.033)
Share Service Sector	0.0524**	0.0572**	0.0485*	0.0500*
	(0.020)	(0.022)	(0.026)	(0.028)
Scoring	-0.0019		-0.0129	
	(0.006)		(0.014)	
Scoring_grant		-0.0250*		-0.0217
		(0.015)		(0.021)
Branch manager delegation	-0.0036	0.0183	0.0126	0.0212
	(0.029)	(0.033)	(0.031)	(0.038)
Branch manager Tenure	-0.0343**	-0.0501**	-0.0487**	-0.0663**
	(0.017)	(0.021)	(0.022)	(0.027)
Small banks in groups	0.0175**	0.0145*	0.0135	0.0134
	(0.008)	(0.008)	(0.010)	(0.010)
Independent small banks	0.0301**	0.0254**	0.0253	0.0280*
	(0.012)	(0.013)	(0.016)	(0.016)
Mutual banks	0.0160	0.0015	0.0113	0.0044
	(0.011)	(0.014)	(0.012)	(0.017)
North-East	-0.0122***	-0.0092**	-0.0084**	-0.0061
	(0.003)	(0.004)	(0.004)	(0.005)
Centre	-0.0048	-0.0054	-0.0032	-0.0050
	(0.004)	(0.004)	(0.005)	(0.004)
South	0.0020	0.0031	0.0181***	0.0194***
	(0.005)	(0.005)	(0.006)	(0.007)
Constant	0.2085**	0.3165**	0.2792**	0.3337**
	(0.101)	(0.126)	(0.120)	(0.144)
Time dummies	yes	yes	yes	yes
Kleibergen-Paap Underidentification test	13.604	10.959	18.053	15.112
(p values in brakets)	(0.0011)	(0.0042)	(0.0001)	(0.0005)
Hansen J statistic for overidentification test of all	0.007	1,390	1.912	1.418
instruments (p values in brakets)	(0.9335)	(0.2385)	(0.1667)	(0.2338)
Weak identification test (Cragg-Donald Wald test)	3.584	2.884	4.607	4.049
Number of observations	1,085	1,085	1,083	1,083

Stars denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in brackets. Statistics robust to heteroskedasticity.

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