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Does your neighbour know you better? Local banks and credit tightening in the financial crisis

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Does your neighbour know you better? Local banks and credit tightening in the financial crisis *

Giorgia Barboni†, Carlotta Rossi‡

Abstract

This paper is a study about local banks in Italy, with a special focus on the role these financial intermediaries have played before and during the crisis in lending to firms. Although in the literature there is not a clear consensus on the link between local banks and access to credit, our paper shows that the firms predominantly funded by local banks have been less rationed during the 2008-09 financial crisis. This result holds when we consider also the firm and bank characteristics, the shape of the bank-firm relationship, and the features of the local credit market where the firm is located. Our findings support the view that local banks may address firms' financial needs in a better way than not local banks because of their comparative advantage at collecting local information. This advantage appears to be relevant in a period of high risk aversion as the recent financial crisis.

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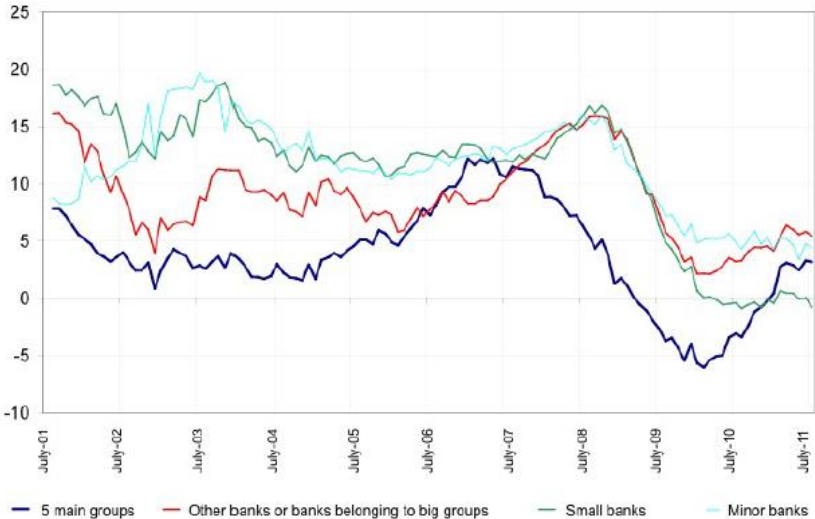
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1. Introduction

This paper explores the consequences, on the Italian credit market, of the financial turmoil following the default of Lehman Brothers by focusing on the role of local banks before and during the financial crisis. The annual rate of growth of credit to the private sector slumped from 7.8 per cent in October 2008 to -0.7 per cent in December 2009. Large banks experienced a more severe contraction in credit than smaller banks: if we only consider the 5 major banking groups in Italy, the credit growth rate slowed from 3.3 to -4.5 per cent over the same period (Figure 1).. Also, evidence from the Regional Bank Lending Survey (2010), a survey conducted over a sample of almost 400 Italian banks, suggests that, in the period immediately following the financial crisis, large banks tightened credit standards by a larger extent than small banks.

Figure 1

Annual growth rate of credit in Italy



According to the conventional wisdom, the central principle of community banking is “relationship finance”, the idea that personal interaction between bankers, small borrowers and small depositors creates information efficiency that allow credit to flow more efficiently and commerce to grow more quickly (Berger and Udell, 1995; DeYoung et al., 2004).

A more recent strand of literature suggests that significant improvements in information and communication technologies, financial markets, and banking production techniques may have eroded community banks' traditional advantages (see Petersen and Rajan 2002; De Young et al., 2011 and Degreyse and Ongena, 2005). In a nutshell, the Petersen and Rajan’s conjecture is that as information technology made less expensive to produce, process, and disseminate hard information, the soft information production (that is at the bulk of relationship lending) is no longer worth paying for.

On the contrary, the recent financial crisis would have revived the role of relationship lending: a natural implication of information asymmetries in credit markets (Stiglitz and Weiss, 1981) is

that, in a period of high risk aversion and borrowers' opaqueness- as it is in a financial crisis-, the comparative advantage of producing soft information should become far more relevant.

Against this background, this paper focuses on the supply side of the Italian credit market by testing the prediction that, during the financial crisis, firms relying more on local banks have been less credit rationed than other firms.

Our empirical strategy is as follows. First, we develop an index, based on banks' credit concentration across local credit markets, which helps us to identify local financial intermediaries. Second, we develop a sample of 3.281 firms from 2006 to 2009 for which we have full information on credit rationing from the Survey of Industrial and Service Firms from Bank of Italy (INVIND survey), as well as balance sheet data from the Cerved dataset, and relationship lending information from the Credit Register (CR) dataset. Our measure of credit rationing is a self-reported information of credit restriction collected through the INVIND survey, a database which contains information on a stratified sample - by sector, size and geographical localization - of Italian firms⁴ operating in manufacturing and services. Third, we build an indicator at firm level which expresses to what extent each firm is financed by local banks⁵.

The main result of the paper is that firms mainly financed by local banks have been less credit constrained than other firms during the crisis. In principle, this result could be due either to the informational advantage of local banks or to the milder liquidity shock they faced during the crisis. To this respect, we control for a series of variables at bank level, such as capital constraints, membership of banking groups, credit concentration as well as the main bank characteristics. Our analysis suggests that the hypothesis of the privileged informational channel between local banks and the financed firm as the driving force of credit relaxation, even after controlling for the above mentioned variables, is not to be rejected.

Therefore, the paper is organized as follows: after a brief literature review on local banks and the effects of the financial crisis on relationship lending in section 2, section 3 explains how the index is built and how our classification applies to the financial intermediaries in our dataset; in section 4, we illustrate the dataset and descriptive statistics. In section 5 we study, through an empirical analysis, the role of local financial intermediaries, especially during the financial crisis. Section 6 concludes.

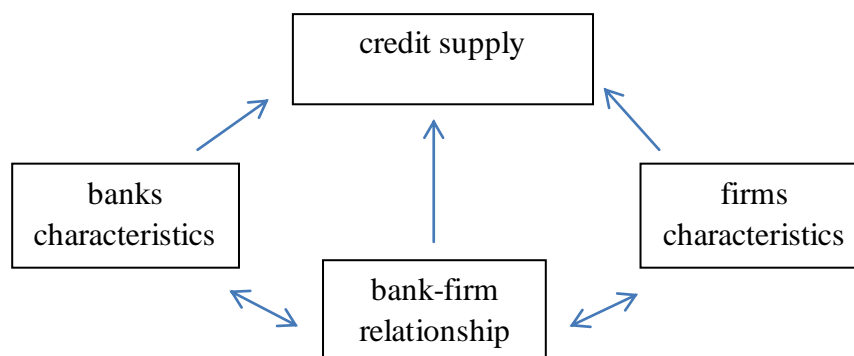
⁴ Data are collected by Bank of Italy on a yearly basis, from September to October each year. For further details on INVIND see: www.bancaditalia.it/statistiche/indcamp/sondaggio/bird/metodi.pdf

⁵ This variable, constructed at firm level, is obtained by weighting each bank's index of localism by its share on the total credit of the firm.

2. Literature

A fast growing strand of empirical literature has investigated the role relationship lending in determining the credit granted and its cost during the 2008-09 financial crisis.

Figure 2



As for Italy, De Mitri et al. (2010), by focusing on a sample of small and medium-sized Italian firms and their lending banks, show that after Lehman's default, banks provided a steadier flow of credit and charged lower interest rates to those firms they had established a closer relation with. Gambacorta and Mistrulli (2011), using a large sample of loans from Italian banks to non-financial firms, conclude that close lending relationships kept firms more insulated from the financial crisis as the cost of lending increased less than for other firms.

An analysis of the role of relationship lending cannot neglect bank and firm characteristics (Figure 2). Bank balance sheets are key determinant of credit supply. Moreover, the banks' willingness to lend may vary depending on the perceived riskiness of firms. There is extensive evidence that, in the recent financial crisis, credit supply has been driven by bank characteristics as well as by firm characteristics, according to a flight to quality mechanism (Lang and Nakamura, 1995).

A number of works on the recent financial crisis has focused on the relationship between credit supply and bank characteristics, mainly the funding structure, capital level/capital deterioration, liquidity ratio, and pre-crisis securitization activity. Bonaccorsi di Patti and Sette (2012), using a data set based on individual bank-firm observations for Italy, find that in the 2007 credit supply and cost conditions worsened particularly for the banks that were more exposed to the interbank market and for those that had made most use of securitization before the turmoil (firms fixed effect is used to control for firm-level heterogeneity). This result is in line with that of Gambacorta and Marques (2011) on a sample of European Banks. Bonaccorsi di Patti and Sette (2012) even find that the initial level of capital ratio was not significant in directly explaining supply and interest rates heterogeneity among banks, but played a role in explaining the sensitivity of funding characteristics to lending growth. Albertazzi and Marchetti (2010), by using a data set based on individual bank-firm observations investigate whether capital related

contraction of credit supply had a diversified impact across firms, in particular according to their riskiness.

Even firm characteristics have been deeply analyzed in the recent literature on the effect of financial crisis over credit availability (see Ferrando and Grieshaber, 2011 for the Euro Area). As for Italy, Albareto and Finaldi Russo (2012), by using the same self-reported measure of credit tightening that we use in our analysis, conclude that firm balance sheet conditions have been an important driver in credit availability during the crisis while firm economic perspectives have become far less relevant.

Against this background, the paper focuses on the role of relationship lending in determining credit availability. The main novelty of the paper is that we propose an original measure of relationship lending based on the intensity of the relationship of firms with local banks (see section 3). Moreover, while the majority of the empirical analysis on credit rationing use the credit dynamic as a proxy of credit rationing, we directly address the supply side of credit market by focusing on a direct (self-reported) measure of credit tightening.

3 Which banks are local?

Defining with banks are local is a puzzling question.

Traditionally bank size has often been associated to the notion of bank localism - for which small banks are also defined as “community banks”: under this view, small banks have a comparative advantage at providing services - and enhancing innovation – to the local community than larger banks⁶. A second group of works suggests that bank localism has not only been related to size, but also to geographic dispersion (Hannan and Prager, 2006, Hannan and Prager, 2009; Berger et al., 2007): small, single-market banks are able to collect and process soft information from firms better than multi-market banks⁷.

To our purpose, using as a reference point for local credit markets the Italian Local Labour Market Areas" (LLMAs⁸), we classifies a bank as local or not according to the relevance of a

⁶ Indeed, by analyzing data at province level, Alessandrini, Presbitero and Zazzaro (2010) find that the larger is the organizational distance within the local banking system, the less firms introduce innovation. This result depends by the fact that in provinces where the distance between headquarter and branches is large, firms experience a stronger credit contraction

⁷ While the literature on the effects of bank size on performance has led to well- established results, the literature on competition between multi-market banks versus single-market banks is less developed. Hannan and Prager (2006), by looking at U.S. banking industry, find that, even after controlling by size, deposit interest rates decrease as the number of local markets in which the bank operates increases. Studying the effect of banking competition on the same local banking market, Hannan and Prager (2004) and Hannan (2006) find that not local banks (what they call POMB, that is “Primarily-Out- of-Market-Banks”) tend to offer lower deposit interest rates and charge higher deposit fees than single-market banks. Similarly, Park and Pennacchi (2009) argue that within the same “Metropolitan Statistical Area” (MSA), deposit interest rates offered by large multi-market banks are significantly lower.

⁸ LLMAs are defined by the Italian National Statistics Institute (Istat) as a set of adjacent municipalities linked by daily commuter ows for work purposes. According to the 2001 Census, Italy counts

given local credit market for the bank and according to the relevance of the bank for that market. To this respect, we adopt a simplified version of the index used by Farabullini and Gobbi (2000) and based on the Williams’ specialization index (Williams, 1991). We build a “relative” measure of credit concentration at bank level, defined as follows:

$$l_j = \sum_k \left(\frac{c_{jk}}{c_j} - \frac{c_k}{c} \right)^2$$

where j denotes the bank and k the LLMA where the bank operates.

The index ranges from zero to one. Low levels of the index are associated to a bank which spreads equally its credit across local credit markets in accordance with their relative sizes (not local bank). High values of the index, on the contrary, indicate a bank which tends to concentrate its credit over fewer, and smaller, local credit markets (local bank).

With respect to the simple dimensional definition, the index has the advantage to evaluate the importance of a single bank in a single market. For instance, a bank that is classified as small according to the dimensional criteria, may be local or not according to its relevance in the local credit markets where it operates: let us consider the case of a bank (Bank 4, in Figure 3) and two local credit markets (A and B).

Figure 3

Which banks are local?

a)	Market A	Market B	A+B	index
Bank 1	10	100	110	0.00
Bank 2	10	100	110	0.00
Bank 3	10	100	110	0.00
Bank 4	10	0	10	0.78
Total credit	40	300	340	

b)	Market A	Market B	A+B	index
Bank 1	10	100	110	0.00
Bank 2	10	100	110	0.00
Bank 3	10	100	110	0.00
Bank 4	0	10	10	0.01
Total credit	30	310	340	

In the first scenario (Figure 3.a), Bank 4 is a very small bank (its total credit is low in comparison to that other banks) and operates only in one market (market A). This market is very relevant for the bank (as all of its credit is concentrated there) and even the bank is relatively important for the local market as the bank’s market share in market A is 25 per cent. Therefore, the index of localism has a high value as the bank may be considered local, according to our purpose. At the opposite, let us consider the case of the same bank operating in a different (and

larger) credit market (Market B, Figure 3.b). In this case, while the market is still very important for the bank (as all its credit is concentrated there), the bank is no longer relevant for the market as the bank's market share of market B is below 3 per cent. In this case, our index will not categorise the bank as local.

We compute our index using data from the Central Credit Register (CR) matched with Istat's LLMA's database in order to describe all the local labour market areas bank *j* operates in at time *t*. In order to give a preliminary view of the results, we now consider the median of the index distribution and we classify as local those intermediaries whose index falls above the median and not local those intermediaries whose index falls below the chosen threshold⁹.

Figure 4

(a) Bank classification based on size (source: Bank of Italy) and localism

	major banks	big banks	medium	minor and small banks	Total
not local banks	5	3	25	144	177
local banks	0	1	1	175	177
Total	5	4	26		

(b) Bank classification based on type (source: Bank of Italy) and localism

	Joint-stock companies	Foreign-owned banks	Mutual banks	Cooperative banks	Total
not local banks	108	4	20	45	177
local banks	27	21	9	120	177
Total	135	25	29	165	354

According with the construction of the index, Figure 4.a shows that almost half of the minor and small banks in our sample are classified as not local. Conversely, one big bank out of four is classified as local, and so it is one medium bank. A similar exercise is done in Figure 4.b, where we look at banks' type: not surprisingly, three-fourths of Italian cooperative banks are classified as local; on the contrary, only one-third of mutual banks fall under this definition. Similarly, about one-fifth of limited companies (Società per azioni) are local, as well. What might appear odd at first, on the contrary, is that 21 out of 25 foreign-owned banks are classified as local. This is mainly explained by the fact that all these financial intermediaries operate in a very small number of LLMA's; therefore, they are, according to our index, relatively more local than other institutions.

⁹ In the empirical analysis we keep the index as a continuous variable

4 Data and Descriptive Statistics

4.1 Data

Our dataset is built by matching data from different sources. The first is the Italian Credit Register (Centrale dei Rischi, CR). The Credit Register is maintained by the Bank of Italy and contains information about all single relationships and all forms of debt loans between borrowers and all financial intermediaries (banks, special purpose vehicles, other financial institutions providing credit) operating in Italy¹⁰. The second source of data is the CERVED dataset, including official records filed to the Italian Chambers of Commerce and reported by Cerved Group. This dataset contains balance sheet information of Italian companies, mostly private owned, including credit risk evaluation. Finally, the third set of data is obtained through the Bank of Italy's Survey of Industrial and Service Firms (Invind) with, at least, 20 employees. This survey is administered, on a yearly basis, to a stratified sample - by sector, size and geographical localization - of Italian firms and contains questions addressed at detecting firms' financing needs as well as credit rationing. We include in our sample firms for which we have complete information on relationship lending and balance sheets: 3281 firms, observed from 2006 to 2009.

The dependent variable of our empirical analysis (i.e. the probability that a firm is credit rationed, $p(\text{cred_rat})$) is obtained by combining the outcomes of two separate questions of the Invind survey: the first asked the firm if further funding was needed; the second, on the contrary, asked whether banks denied credit, when requested. We classify as financially constrained those firms reporting a positive answer to both questions¹¹.

As regressors, we use firms' financial characteristics (which we took from the CERVED database), and the data concerning firm-bank relationships (from CR). Regressors include (see Table 1 for summary statistics):

- an index, at firm level, which we use to test for the causal relationship between local banks and credit rationing. This measure expresses to what extent the firm is financed by local banks, and it is computed as follows:

$$firm_lcl_{i,t} = \sum_j \left(\frac{c_{i,j,t}}{c_{i,t}} * l_{j,t} \right)$$

¹⁰ At this stage, we exclude from our data set foreign-owned banks. According to our index, foreign banks are (rightly) classified as local as they typically concentrate their loans in few credit markets. Nonetheless, foreign banks do not share the in-depth local knowledge that local banks use to assess character and conditions when making credit decisions and that is at the core of community banking.

¹¹ The decision to use, as a dependent variable, the probability of credit rationing as reported in the Invind survey has several costs. The most relevant is that we are not including in our analysis small firms (firms with less than 20 employees) that, during the crisis may have suffered particularly in finding external financing funds. Anyway the advantage is that our dependent variable reflect only supply-side factor. Other works, for Italy, analyze the credit rationing by using the evolution of credit as a dependent variable (De Mitri et al (2010) and Bonaccorsi di Patti and Sette (2012)). In this case, the variable of interest represents the convolution of demand and supply side factors.

that is, a weighted average of the (continuous) value of the index of localism (l_{jt}) for each bank, as it is computed in section 3, the weights being banks' shares of the total credit borrowed by firm i at time t ;

- a set of control variables at firm level, like *size* (a dummy for the number of employees), the *age* of the firm, the location (*geography*) and the *industry sector*; most important, this set of regressors include firm's balance sheet characteristics, like *ROA* and financial risk (*score*);

- the characteristics of the local credit market, as well as of the firm-bank relationship. We include the average distance between banks and firms in the local credit market where the firm is based (the distance is proxied by an index of self-containment of the local market, *cred_LLMA*), and the number of banks the firm has banking relationships with (*nbank*).

- a set of control variables for bank characteristics is included to control for the bank supply response to the financial crisis. These variables include: i) the share of credit the firm has received from the top five bank groups (*share_top5*); ii) the degree of capital constraints faced by the set of the financing banks (*cap_ratio*) computed as a weighted average of the capital ratio of the banks financing each firm, using as weights the shares of credit each financing bank lends the firm on the overall credit the firm receives (Jimenez et al., 2010).

We also include two control variables for the main banks: a dummy which takes the value of one if the main bank belongs to the five main banking group (*mainbank_top5*)¹², and the index of localism of the main bank (*l_mainbank*).

4.2 Descriptive Statistics

Table 1 describes our sample firms. Firms have relatively high size (65% have more than 50 employees) and age (the mean is 30 years). Table 1 also includes statistics on credit rationing and credit concentration: about the former, 5.2% of the firms in our sample are credit constrained¹³. This share may appear modest; however, it is consistent with findings in other studies, such as ECB's SAFE survey in the EU countries or surveys conducted in France by Insee or OSEO15. The average number of bank relationships is 4; the main financing bank of 37% of firms in our sample belongs to the main five Italian bank groups. Besides, the average share of credit lent by banks belonging to the five top groups is as high as 35%.

Table 2 shows further descriptive statistics about firms in our sample. Consistent with INVIND sample stratification, the Manufacturing is the most common sector (68%) followed by Services (27%), while firms in the Energy, Construction, Extraction and Agriculture sectors are just a niche (respectively with 1.5%, 1%, 0.95% and 0.7%). The largest fraction of firms (67%) is based in North Italy, the richest area of the country. According to the classification of borrowers' riskiness based on Altman Z-score, most of the firms in our sample (about 60%) are rated as "vulnerable", 15% as "risky" and only one-fourth as "sound".

¹² This variable is included to control for the size of liquidity shock. There is a wide evidence that the top 5 top five bank groups faced an more severe liquidity shocks since they have a higher share of assets that were funded by wholesale sources (see Bonaccorsi di Patti and Sette, 2012)

¹³ For descriptive statistics on credit rationing from the Invind Survey see Banca d'Italia,

5 Empirical Strategy

The core prediction we want to test is whether, during the financial turmoil, local banks responded better than not local banks to the credit tightening by smoothing credit conditions. Our main hypothesis is that, given their advantage in collecting information upon borrowers, local banks played a far more relevant role in the financial crisis, when adverse selection problems have become more severe.

Therefore, by comparing information on credit rationing and a measure of the relevance of local banks at firm level, over a time span of four years, that is from 2006 to 2009, we can investigate the impact of local banks on firm's credit rationing, especially during the crisis. Credit relaxation from local banks may be due to less severe liquidity constraints faced by local banks as compared to not local banks. To this respect, we control for the degree of capital constraint and the reliance on the interbank market of banks, expressed as an aggregate measure at firm level. We estimate the main equation on a panel of firms observed from 2006 to 2009 and we model the probability of firm i to be credit rationed in year t as follows:

$$p(\text{cred_rat})_{i,t} = \alpha + \beta \text{firm_lcl}_{i,t-1} + \gamma B_{i,t-1} + \delta X_{i,t-1} + \zeta I_{i,t-1} + \eta \text{crisis}_t + \theta (\text{firm_lcl}_{i,t-1} * \text{crisis}_t) + \lambda (B_{i,t-1} * \text{crisis}_t) + \mu (X_{i,t-1} * \text{crisis}_t) + \nu (I_{i,t-1} * \text{crisis}_t) + \varepsilon_{it}$$

where the crisis variable is a dummy which takes the value of one in 2008 and 2009. All other regressors refer to the period 2005-2008: we use lagged variables in order to avoid problems of endogeneity. $B_{i,t-1}$ is the set of control variables to account for bank characteristics effects; $I_{i,t-1}$ is the set of variables which characterize bank-firm relationship and the structure of the local credit market; finally, $X_{i,t-1}$ is the set of variables at firm level. Finally, we interact all the variables with the crisis dummy.

We expect: (1) the coefficient of the crisis dummy (η) to be positive, as descriptive evidence suggest that the financial crisis favored tighter credit conditions; (2) the coefficient of the index of localism to be positive or not significant over the whole sample size (β), and to be positive and significant during the financial crisis (θ) as, in this period, the role of local banks in collecting soft information has become, according to our prediction, far more relevant); (3) in line with the work by De Mitri et al. (2010), we expect firms with more concentrated borrowing to experience less credit rationing; (4) according to Albareto and Finaldi Russo (2012) firms characteristics to be relevant in determining the probability to be credit rationed: in particular, according to the theory of fly to quality, we expect an higher *score* to be relevant in increasing the probability to be credit rationed; (5) capital and liquidity constraints faced by the financing bank to have a sizable effect over credit availability.

6 Results

Table 4 shows results from our base regression, which includes the firm local variable and bank controls. In order to study the impact of local banks on the probability of the firm to be credit rationed during the financial downturn, we also include in the model the crisis dummy and all covariates. We use a Probit model with random effects and, in order to test the appropriateness of the random-effect model versus the fixed-effect one, we use the Hausman's specification test¹⁴.

Using the random-effects estimator, our main finding is that, controlling for the above explained variables, the probability of being rationed during the crisis is always smaller and statistical significant for firms which are more intensely financed by local banks. From Table 4 we can also observe that the effect of the number of bank links, *nbank*, on the dependent variable is, in line with De Mitri et al. (2010), positive and significant: firms borrowing from a smaller number of banks have experienced a lower credit contraction, as they establish closer relationships so as to be more protected during supply shocks.

Interestingly, none of the controls at bank level are significant: this result is very important as it suggests that the causal relationship between being financed by local banks and the probability of being credit rationed does not depend on banks characteristics like, for example, capital constraints or liquidity conditions (proxied by the share of credit held by the top 5 groups).

Finally, Table 5 reports results of the estimates which include firms' characteristics: balance sheet variables have the expected sign in all the regressions. Firms with higher *ROA* (columns 1 and 3) and lower score (columns 2 and 3) are less likely to be credit rationed, even after controlling for banks' characteristics. In both cases, the interaction with the crisis dummy is not significant: this result suggests that the importance of borrowers' profitability and riskiness in the decision of banks to grant credit did not increase in the period immediately following the financial crisis. The result is in line with Albareto and Finaldi Russo (2012): firms with fragile financial conditions have been more credit rationed than other firms. As in Albareto and Finaldi Russo (2012), the size of the firms is not relevant for credit availability.

6.1 Robustness checks

We further test the robustness of our results, controlling for the structure of the LLMA where the firm is located, firms' geographic localization and sector. Results are shown in Table 6: our

¹⁴ Given the small degree of variability in our dependent variable, we use the Linear Probability Model to perform the Hausman test. After having performed the test, we cannot reject the null hypothesis that the difference between the two estimators is not significant and therefore both the fixed effect estimator and the random-effects estimator are consistent, although the random-effects estimator is more efficient ($\text{Prob} > \chi^2 = 0.20$). As a robustness check, we have also performed our estimation using both a linear probability model and logit model with fixed effects.

variable of interest, *firm_local * crisis*, is negatively and significantly correlated to the dependent variable in all three model specifications.

In order to check whether sample attrition affects our results, we also test our model with a balanced panel, by considering firms for which we have observations both in 2007 and in 2009, that is, before and after the crisis. Estimates are displayed in Table 7: they confirm, on the one hand, that our main result holds; on the other, they show that sample attrition is not systematic.

In order to have a further check that local banks, during the crisis, have relaxed credit more than the other banks, we use the same model as in Table 5 but with different financial indicators: instead of the Altman z-score and ROA, we consider the impact of firms' ROE, EBITDA/assets and leverage on the probability of being credit rationed. Results are displayed in Table 8: *firm_local* crisis* is negative and significant in all model specifications. As expected, firms with better financial indicators have been less credit rationed. In particular, we observe that the EBITDA/assets has a significant and negative effect on the dependent variable. The impact of the firm's leverage on the probability of credit rationing is, on the contrary, more controversial: as column 2 of Table 8 shows, a lower level of debt increases credit availability during the whole period; the size of this effect does not change if we focus only on the financial crisis period. On the contrary, highly leveraged firms have faced a higher credit contraction over the whole period; by focusing only on the financial crisis years, however, the effect turns out to be null¹⁵. This result calls for the existence of an asymmetric effect of debt level on credit access in the financial crisis: while a low level of debt favours credit availability, a high level of debt does not impact on credit access. Finally, we control for the possibility that the firms' past credit history affects the present probability of being credit rationed. To this extent, using a similar approach to that by De Mitri et al. (2010), we include the probability of being credit rationed in 2008 and 2007 among the regressors. This allows to control for the evolution of credit in the past, as well as firms' lending relationships. If these variables heavily affect the probability of being credit rationed at present, then there could be an omitted variable bias underlying our model. However, as we can see from columns 1 and 2 of Table 9, results are very similar to the main estimation in Table 4 and 5, indicating very little correlation with past credit rationing.

7 Conclusions

This paper studies the role of local banks before and during the financial crisis following the default of Lehman Brothers. According to the literature on bank localism, the peculiar organizational structure of local banks allows these financial intermediaries to overcome information asymmetries more easily than large banks (Berger and Udell, 2002; Stein, 2002): this information advantage, in turn, results into a specialization in different lending technologies by local and not local banks: while large, national banks rely on "hard" quantitative information (namely statement lending, asset-based lending, credit scoring) and do not maintain personal

¹⁵ In order to check for the correct sign of the interaction between *high_leverage* and *crisis*, we perform the *inteff* command with Stata, and we conclude that the interaction effect is null (see Norton et al. (2004)).

relationships with their clients (Berger et al., 2005), small banks make a larger use of relationship lending. At the same time, evidence from the Italian credit market suggests that, in 2009, immediately after the financial distress, small banks tightened their credit standards by a lower extent than large banks (Regional Bank Lending Survey, 2010). In light of these findings, we study whether, and how, local banks have played a significant role in favoring credit availability during the crisis.

Using a panel of 3.281 Italian firms, observed from 2006 to 2009, we provide evidence that firms predominantly financed by local banks have been less credit rationed during the crisis than firms relying more intensely on larger, not local banks. The result holds controlling for a large number of firm and bank characteristics. Our results also suggest that firms borrowing from a smaller number of banks are more insulated from supply shocks in credit markets. Nevertheless, the database we use has some limitations: first, we cannot distinguish between firms which were fully rationed from firms which just received less credit than requested. Second, as we do not have information on banks at branch level, we can neither exactly identify the determinants of the firm-bank matching, nor its length. Therefore, further research is needed in this direction.

However, our findings hold for a number of model specifications, including panel balancing and firms' past history.

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Appendix

Table 1

Descriptive statistics a) all firms

Variables	Definition	mean	median	sd
Dependent Variable				
p(cred rat)	=1 if the firm is rationed	0.0517	0	0.221
Firm variables				
Age	the number of years since the firm was set up	34.57	30	20.54
size	=1 if number employees >49	0.642	1	0.48
ROA	the firms profit over total assets	1.455	0.72	5.859
score	Altman Z-score	0.153	0	0.36
Firm's relation with local credit market and bank-firm relationship				
firm_lcl	bank share weighted for bank's index of localism	0.0336	0.015	0.18
nbank	number of bank relationships	4.378	3	4.35
cred LLMA	self-containment Index	0.608	0.634	0.13
Bank variables				
mainbanktop5	=1 if the main bank is a top 5 group	0.37	0	0.483
L_mainbank	index of localism of the main bank	0.034	0.007	0.097
cap_ratio	weighted average of the capital ratio of the banks financing each firm	0.213	0.14	0.56
share top5	share of total credit held by the top 5 groups	0.348	0.28	0.347

Number of firms

3,281

b) credit rationed firms

Variables	Definition	mean	median	sd
Dependent Variable				
p(cred rat)	=1 if the firm is rationed	1	1	0
Firm variables				
Age	the number of years since the firm was set up	31.19	27	19.25
size	=1 if number employees >49	0.646	1	0.48
ROA	the firms profit over total assets	-1.440	0.84	5.798
score	Altman Z-score	0.378	0	0.48
Firm's relation with local credit market and bank-firm relationship				
firm_lcl	bank share weighted for bank's index of localism	0.0330	0.017	0.048
nbank	number of bank relationships	6.046	5	5.75
cred LLMA	self-containment Index	0.597	0.623	0.13
Bank variables				
mainbanktop5	=1 if the main bank is a top 5 group			
L_mainbank	index of localism of the main bank	0.029	0.006	0.085
cap_ratio	weighted average of the capital ratio of the banks financing each firm	0.229	0.18	0.24
share top5	share of total credit held by the top 5 groups	0.344	0.32	0.304

Table 2

Descriptive statistics: composition of the sample

SECTOR		SIZE		LOCATION		RATING	
Agric.	0.72	Small	34.9	North	66.8	Sound	26.05
Constr.	1.08	Large	65.1	South	33.2	Vulnerable	58.69
Emerg	1.48					Risky	15.41
Extract	0.97						
Manuf.	68.44						
Serv.	27.31						

Table 3

Correlation Matrix of regressors

	firm_lcl	nbank	score	age	roa	size	mainb. top5	share top5	cap_r atio
firm_lcl	1								
nbank	0.097	1							
score	0.044	0.124	1						
age	0.004	0.026	-0.109	1					
ROA	-0.025	-0.078	-0.317	0.037	1				
size	-0.018	0.153	-0.025	0.091	0.052	1			
mainb.top5	-0.112	0.276	-0.011	0.023	-0.008	0.022	1		
sharetop5	-0.118	0.274	-0.015	0.019	-0.011	0.02	0.85	1	
cap_ratio	0.115	0.12	0.007	0.013	-0.038	0.034	0.183	0.214	1

Table 4

Baseline equation
(*Probit, random effects, marginal effect displayed*)

	(1)	(2)	(3)
	p(cred_rat)	p(cred_rat)	(cred_rat)
main variables			
firm_local	0.005 (0.009)	0.005 (0.009)	0.005 (0.012)
crisis	0.009*** (0.003)	0.010*** (0.003)	0.010*** (0.003)
firm_local*crisis	-0.023* (0.013)	-0.026* (0.013)	-0.026* (0.013)
bank-firm relationship			
nbank	0.01 (0.015)	0.012 (0.015)	0.01 (0.015)
nbank*crisis	0.047** (0.020)	0.052** (0.021)	0.054** (0.021)
bank variables			
share_top5		0.000 (0.002)	-0.004 (0.003)
share_top5*crisis		-0.004 (0.003)	0.001 (0.004)
cap_ratio	0.001 (0.004)	0.001 (0.004)	0.001 (0.004)
cap_ratio*crisis	-0.003 (0.004)	-0.001 (0.004)	-0.001 (0.004)
other bank controls	No	Yes	Yes
observation	9,766	9,766	9,766
number of codfn	3,281	3,281	3,281

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5

Baseline equation with firm-level variables

(Probit, random effects, marginal effect displayed;)

	(1) p(cred_rat)	(2) p(cred_rat)	(3) p(cred_rat)
main variables			
firm_local	0.001 (0.017)	0.003 (0.018)	0.001 (0.019)
crisis	0.012*** (0.004)	0.013*** (0.004)	0.014*** (0.004)
firm_local*crisis	-0.031* (0.018)	-0.037* (0.019)	-0.035* (0.019)
bank-firm relationship			
nbank	0.025 (0.020)	0.019 (0.022)	0.018 (0.022)
nbank*crisis	0.057** (0.025)	0.063** (0.027)	0.065** (0.027)
firm variables			
age	-0.008** (0.003)	-0.007** (0.003)	-0.007** (0.003)
size	-0.063 (0.110)	-0.076 (0.118)	-0.063 (0.119)
ROA	-0.056*** (0.019)		-0.047*** (0.018)
ROA*crisis	-0.002 (0.015)		-0.002 (0.017)
score		1.035*** (0.308)	0.870*** (0.283)
score*crisis		-0.09 (0.219)	-0.161 (0.234)
bank variables			
share_top5	-0.007 (0.005)	-0.006 (0.005)	-0.007 (0.005)
share_top5*crisis	0.002 (0.005)	0.002 (0.006)	0.003 (0.006)
cap_ratio	0.002 (0.006)	0.003 (0.006)	0.003 (0.007)
cap_ratio*crisis	-0.002 (0.006)	-0.002 (0.007)	-0.003 (0.007)
other bank controls	Yes	Yes	Yes
observation	8,925	8,919	8,919
number of codfn	3,193	3,193	3,193

Table 6

Adding LLMA, sector and geographic controls

(Probit, random effects, marginal effect displayed; with firm-level variables)

	(1)	(2)	(3)
	p(cred_rat)	p(cred_rat)	p(cred_rat)
main variables			
firm_lcl	0.003 (0.014)	0.005 (0.014)	0.006 (0.013)
crisis	0.014*** (0.004)	0.013*** (0.004)	0.013*** (0.004)
firm_lcl*crisis	-0.035* (0.019)	-0.032* (0.019)	-0.032* (0.018)
bank-firm relationship			
nbank	0.018 (0.022)	0.02 (0.022)	0.019 (0.022)
nbank*crisis	0.065** (0.028)	0.064** (0.027)	0.063** (0.027)
firm variables			
age	-0.007** (0.003)	-0.005* (0.003)	-0.006* (0.003)
size	-0.063 (0.119)	-0.015 (0.117)	-0.004 (0.116)
ROA	-0.047*** (0.018)	-0.044** (0.017)	-0.043** (0.017)
ROA*crisis	-0.002 (0.017)	-0.003 (0.017)	-0.002 (0.017)
score	0.874*** (0.285)	0.861*** (0.281)	0.877*** (0.283)
score*crisis	-0.176 (0.235)	-0.19 (0.231)	-0.167 (0.229)
bank variables			
share_top5	-0.007 (0.005)	-0.007 (0.005)	-0.007 (0.005)
share_top5*crisis	0.003 (0.006)	0.003 (0.006)	0.002 (0.006)
cap_ratio	0.003 (0.007)	0.003 (0.006)	0.002 (0.006)
cap_ratio*crisis	-0.003 (0.006)	-0.003 (0.007)	-0.003 (0.007)
other bank controls	Yes	Yes	Yes
sector	No	No	Yes
geography	No	Yes	Yes
cred_LLMA	Yes	Yes	Yes
observations	8,901	8,901	8,901
number of codfn	3,182	3,182	3,183

Table 7

Regression with 2007 and 2009 only

	(1)	(2)	(3)
	p(cred_rat)	p(cred_rat)	p(cred_rat)
main variables			
firm_lcl	0.019 (0.02)	0.017 (0.019)	0.043 (0.032)
crisis	0.018** (0.008)	0.020** (0.009)	0.019** (0.008)
firm_lcl*crisis	-0.088* (0.047)	-0.094* (0.049)	-0.091* (0.048)
bank-firm relationship			
nbank	0.061 (0.039)	0.062 (0.038)	0.057 (0.037)
nbank*crisis	0.057 (0.042)	0.062 (0.043)	0.06 (0.042)
bank variables			
share_top5		-0.003 (0.005)	-0.009 (0.008)
share_top5*crisis		-0.007 (0.008)	0.001 (0.009)
cap_ratio	0.012 (0.011)	0.014 (0.013)	0.014 (0.012)
cap_ratio*crisis	-0.013 (0.011)	-0.013 (0.012)	-0.012 (0.012)
other bank controls	No	No	Yes
observations	4,765	4,765	4,765
number of codfn	2,921	2,921	2,921

Table 8

Regression with roe, EBITDA/assets and leverage

	(1) p(c._rat)	(2) p(c._rat)
main variables		
firm_lcl	0.003 (0.016)	0.004 (0.013)
crisis	0.012*** (0.004)	0.012*** (0.004)
firm_lcl*crisis	-0.028* (0.016)	-0.024* (0.014)
bank-firm relationship		
nbank	0.022 (0.019)	-0.01 (0.016)
nbank*crisis	0.052** (0.023)	0.053** (0.023)
firm variables		
age	-0.008** (0.003)	-0.005** (0.002)
size	-0.049 (0.102)	-0.004 (0.084)
ROE	-0.061 (0.056)	-0.041 (0.043)
ROE*crisis	0.041 (0.057)	0.029 (0.045)
EBITDA/assets	-0.031*** (0.011)	-0.021** (0.009)
EBITDA/assets*crisis	-0.01 (0.01)	-0.009 (0.009)
leverage_low		-0.005** (0.002)
leverage_low*crisis		-0.000 (0.002)
leverage_high		0.008** (0.003)
leverage_high*crisis		-0.002** (0.001)
bank variables		
share_top5	-0.006 (0.005)	-0.005 (0.004)
share_top5*crisis	0.002 (0.005)	0.002 (0.004)
cap_ratio	0.002 (0.006)	0.001 (0.005)
cap_ratio*crisis	-0.002	-0.001

	(0.006)	(0.005)
other banks controls	Yes	Yes
observations	8,924	8,924
number of codfn	3,193	3,193

Table 9

Past credit history

	(1)	(2)
	p(cred_rat)	p(cred_rat)
<i>past credit history</i>		
P(cred_rat)2008	-0.000 (0.001)	-0.000 (0.001)
P(cred_rat)2009	-0.002* (0.001)	-0.002* (0.001)
<i>main variables</i>		
firm_lcl	0.006 (0.011)	0.004 (0.011)
crisis	0.009*** (0.003)	0.009*** (0.003)
firm_lcl*crisis	-0.022* (0.013)	-0.022* (0.013)
<i>bank-firm relationship</i>		
nbank	0.010 (0.014)	0.008 (0.013)
nbank*crisis	0.046** (0.021)	0.048** (0.021)
<i>bank variables</i>		
share_top5	0.000 (0.002)	-0.004 (0.003)
share_top5*crisis	-0.004 (0.002)	0.001 (0.003)
cap_ratio	0.001 (0.004)	0.001 (0.004)
cap_ratio*crisis	-0.004 (0.002)	0.001 (0.003)
other banks controls	Yes	Yes
observations	9,766	9,766
number of codfn	3,281	3,281