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

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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 crisis. This result holds when we consider also the firm characteristics, the shape of the bank-firm relationship, and the features of the local credit market where the firm is located. This result supports 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.

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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 crisis. According to the recent literature on the issue (Panetta and Signoretti, 2010(26); Caivano, Rodano and Siviero, 2010(10)), the sharp increase in the borrowers' riskiness and funding problems faced by several banks have been the major causes of a strong contraction both of credit demand and credit supply. 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; considering only the 5 major banking groups in Italy, the credit growth rate slowed from 3.3 to -4.5 per cent over the same period. However, despite the financial crisis, evidence suggests that local banks have increased their market shares.

According to the conventional research paradigm on community banks, local banks traditionally have a comparative advantage at collecting local information: the idea is that the personal interaction between bankers and (small) borrowers creates informational benefits that allow credit to flow more efficiently (see Berger and Udell, 2002(5); Stein, 2002(31)). A more recent strand of literature suggests that significant advances in information and communication technologies, financial markets, and banking production techniques may have eroded community banks' traditional advantages (see DeYoung *et al.*, 2004(13); 2011(14)). Anyway, the recent financial crisis would have revived the role of local banks: in fact, a natural implication from the body of literature on information asymmetries in credit markets (Stiglitz and Weiss, 1981(32)) is that, in a period of high risk aversion - as in a financial crisis -, one would expect the comparative advantage in collecting information to become far more relevant.

Against this background, the present paper focuses on the supply side of the Italian credit market by testing the prediction that, during the crisis, firms which rely 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 use 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 collects information on a stratified sample - by sector, size and geographical localization - of Italian firms[1] operating in manufacturing and services. Third, we build an indicator at

[1]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

firm level which expresses to what extent each firm is financed by local or not local banks[2]

The main result of the paper is that firms mostly 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 "information advantage" by local banks either to the milder liquidity shocks they faced during the crisis since they do not rely on international wholesale funding. To this respect, we control for a series of variables at bank level, such as liquidity constraints (measured as the bank's total disbursed credit over supervisory capital), membership of banking groups, credit concentration as well as the main bank's characteristics. Our analysis thus suggests that the hypothesis of the privileged informational channel between the local bank and the 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 banks, especially during the financial crisis, by constructing an indicator at firm level. Section 6 concludes.

2 Related Literature

The relevance of financial intermediaries' organizational structure is not new in the banking literature. That small, closely-held banks, with relatively short distance from managers and bottom-level employees can overcome more easily information asymmetries than large banks, is a well-established result (Berger and Udell, 2002(5); Stein, 2002(31)). The key intuition is that, as information is transmitted at bank level across hierarchical levels, the closer is the distance between higher and lower ranks, the easier is for bottom-level employees to collect tacit information about clients and to share it with the management in a cheaper way. To this respect, while some contributions consider the bank as a whole (Stein, 2002(31); Berger et al., 2005(7)), others rather focus on the distance between the bank headquarter and local branches, where information is collected and first processed, before being sent to the decisional center (Alessandrini, Presbitero and Zazzaro, 2009(3); Jiménez, Salas and Saurina, 2009(22)).
Most of the literature on bank size looks at the impact of size on banks' competition, that is, on the ability of large and small banks to provide retail services such as loans to small business and deposits. To this respect, the main empirical finding is that large

[2]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.

and small banks do specialize in different lending technologies: while large banks rely on "hard" quantitative information (namely statement lending, asset-based lending, credit scoring) and have less personal relationship with the borrower (Berger *et al.*, 2005(7)), small banks make more use of relationship lending. The intuition behind is that small banks facilitate relationship lending through the use of "soft information" (Petersen and Rajan, 2002(29); Albareto *et al.*, 2008(1)). This result has been also confirmed by a vast empirical evidence (Cole, Goldberg, and White 2004(11), Berger *et al.*(7)), though not without exceptions: Berger and Rice (2010)(9), for example, find no evidence to support the paradigm of a privileged relationship between opaque small businesses and community banks. Related to this issue, evidence on bank consolidation shows that large banks tend to reduce their small business lending (Berger *et al.*, 1998(6)). Moreover, as an effect of bank industry consolidation, large, multimarket banks, not relying on soft information, may tighten more severely the credit than the local banks they replace. This could result in a strong credit contraction by large banks, especially during the financial crisis of 2007-2009 (Panetta *et al.*, 2009(25); Berger and Rice, 2010(9)), when most firms' creditworthiness rapidly declined (Caivano *et al.*, 2010(10)). This paper addresses the issue by providing evidence that during the financial crisis, firms mainly financed by local banks (not necessarily small) have been less credit rationed than other firms, and the main driving force of this result is the informative advantage local banks can benefit of. Our research is also related to the (recent) stream of research on the effects of the financial crisis on relationship lending, particularly focusing on Italian credit market. Close to our focus are De Mitri, Gobbi and Sette (2010)(12), who, by observing a sample of more than 30.000 Italian corporate firms, find a positive correlation between multiple-bank links and credit contraction. This could be explained by the fact that firms borrowing from a small number of banks establish closer relations with their lending banks, so as to be more protected during supply shocks. Finally, our research is in line with Vacca (2011)(33)'s analysis of Italian credit market during the financial crisis: our paper provides further evidence that local banks have an information advantage over large banks.

3 Which banks are local?

Defining which financial intermediaries are *local* is a puzzling question. This could be accounted for different reasons: first, credit markets constantly face new and deep transitions (mergers and acquisitions, expansions at branch level, entry and exit), which continuously shape the structure of local credit markets; second, the definition of "local bank" certainly lacks of uniqueness. At one end of the spectrum, bank size has often been associated to the notion of bank localism - for which small banks are also defined as "community banks" (DeYoung, Hunter, and Udell, 2004(13)): under this view, small banks have a comparative advantage at providing services - and enhancing innovation -

to the local community than larger banks. Indeed, by analyzing data at province level, Alessandrini, Presbitero and Zazzaro (2010)(2) 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.

At the other end, bank localism has not only been related to size, but also to geographic dispersion (Hannan and Prager 2006(20), 2009(21); Berger, Dick, Goldberg, and White 2007(8)): small, single-market banks are able to collect and process soft information from firms better than multi-market banks.

However, while the literature on the effects of bank size on performance has lead to well-established results, the literature on competition between multi-market banks versus single-market banks is less developed. Hannan and Prager (2006)(20), 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)(19) and Hannan (2006)(18) 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)(27) argue that within the same metropolitan statistical area (MSA), deposit interest rates offered by large multi-market banks are significantly lower.

Using as a reference point for local credit markets the Italian "Local Labour Market Areas" (LLMAs, "Sistemi Locali del Lavoro")[3], our index classifies Italian banks according to their "multi-market" dimension and credit concentration across LLMAs.

To this respect, we adopt an index similar to the one used by Farabullini and Gobbi (2000)(16). The index they design, however, attempts at measuring the bank's degree of territorial specialization rather than localism[4]. We build a "relative" measure of credit concentration at bank level, defined as follows:

$$l_{jt} = \sum_k \left(\frac{c_{jkt}}{c_{jt}} - \frac{c_{kt}}{c_t}\right)^2$$

where j denotes the bank, k the LLMA and t the year.

The indicator is computed as an Herfindahl index of credit concentration at local market

[3]LLMAs are defined by the Italian National Statistics Institute (Istat) as a set of adjacent municipalities linked by daily commuter flows for work purposes. According to the 2001 Census, Italy counts 686 LLMAs.

[4]To this respect, Farabullini and Gobbi adapt Williams' index, built at firm level (Williams, 1991(34)), to the credit market. Indeed, Williams classifies firms into more or less specialized according both to their production share(s) over one or several sub-markets and to the relative size of these sub-markets with respect to the overall production market. Similarly, in Farabullini and Gobbi, the higher is the number of local labour systems a bank operates in (in terms of loans, deposits, and bank offices), and the lower is the weight of these local labour systems on the national credit market, the more specialized the bank will be.

level; in particular, in order to capture the bank's effective credit concentration across local credit markets, we take away any effect which may exclusevely depend on the weight of the LLMAs in which the bank operates on the overall market (i.e. the term $\frac{c_{kt}}{c_t}$)[5]. In other words, according to our index, a bank will be "more" local: i) the higher is its credit concentration over LLMAs; ii) the lower is the weight of these LLMAs on the overall credit market. The index ranges from zero to two: 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. High values of the index, on the contrary, indicate a bank which tends to concentrate its credit over fewer, and smaller, LLMAs[6]
We compute our index using data from the Central Credit Register (CR) matched with Istats LLMAs database in order to describe all the local labour market areas the $j-th$ bank 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 value fall above the median and not local those intermediaries whose index value fall below the chosen threshold[7].

If "small" is synonymous for "local", we should expect all small banks being local and all large banks being not local. However, our results go against this hypothesis by rejecting the "small-local" paradigm:

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

	major banks	*big banks*	*medium banks*	*minor and small banks*	Total
not local banks	5	3	25	140	173
local banks	0	1	1	179	181
Total	5	4	26	319	354

The most striking result from Table (a) is that almost half of the minor and small banks in our sample are classified as not local. On the other way round, one big bank out of four is classified as local, and so it is one medium bank. Thus, we can depart from the conventional definition of a local bank as a small bank: as we can see, the definition of local bank goes well beyond the mere dimensional aspect[8].

[5]We are extremely grateful to Massimo Omiccioli and Marcello Pagnini for pointing this out.

[6]For robustness, we also try a different measure where, instead of $\sum_k(\frac{c_{jkt}}{c_{jt}}-\frac{c_{kt}}{c_t})^2$, we take $\sum_k \mid \frac{c_{jkt}}{c_{jt}}-\frac{c_{kt}}{c_t} \mid$. Results are similar to those presented.

[7]While in the empirical analysis we keep the index as a continuous variable

[8]Indeed even within the same category of "minor and small banks", differences in terms of credit concentration are remarkable. For example, the least local (small) bank (i.e. with the lowest l_{jt}) lends across 25 LLMAs and has a H-index value of 0.072. On the contrary, the most local (small) bank (i.e.with the highest l_{jt}) lends across 3 LLMAs and has a H-index value of 0.587.

A similar exercise is done in Table (b), where we look at bank's type:

Table (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	110	4	19	40	173
local banks	25	21	10	125	181
Total	135	25	29	165	354

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 joint-stock companies (Italian "Societa' 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 do operate in a very small number of LLMAs; therefore, they are relatively more local than other institutions[9].

With respect to the existing literature on banking geography, our classification of financial intermediaries makes a further step in defining local, community banks, along two lines of contributions: from one side, we show that the conventional paradigm of "small implying local[10]" doesn't necessarily hold; from the other, we show that even multi-market banks could be local, as long as the weight of the LLMAs in which they operate is relatively small with respect to the overall market.

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 maintened 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 Italy[11]. The second source of data is

[9]It has to be noticed, however, that the value of the index for most of foreign-owned banks is very close to the median: by choosing the 60th percentile instead of the median, the majority of them would turn out being classified as "not local".

[10]And, on the other way round, local implying small.

[11]At this stage, we exclude from our data set foreign-owed 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.

the CERVED dataset, a proprietary database maintained by a consortium of banks. 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 Survey of Industrial and Service Firms ("Indagine sulle Imprese Industriali e dei Servizi", INVIND). 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's 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. This amounts to 3281 firms, observed from 2006 to 2009.

The dependent variable of our empirical analysis (i.e. the probability that a firm is credit rationed, ($p(cred\_rat)$) is obtained by combining the outcomes of two separate questions of the survey: the first asked the firm if further funding was needed; the second, on the contrary, asked whether banks denied credit, when requested[12]. We classified as financially constrained those firms who reported a positive answer to both questions.

As regressors, we use firm 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:

$$firm\_lcl_{i,t} = \sum_j (\frac{c_{i,j,t}}{c_{i,t}} * l_{j,t})$$

  that is, a weighted average of the (continuous) value of the index of localism ($l_{j,t}$) for each bank, as it is computed in section 3, where the weight is each bank's share on the overall 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 local credit market characteristics and the firm bank relationship. We include the average distance between banks and firms in the local credit market where the

[12]Answers to both questions are reported in binary form. Both questions are from Part 5 (Firm Funding) of the survey. The firms were asked to answer first to question V316 *"you should indicate if, given the firm's cost and collateral conditions, you ask for more debt load"*; then to question V267 *"please indicate if the contacted financial intermediaries proved not to be willing to increase your funding volume"*.

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 banks characteristic is included to control for the bank supply response to the financial crisis (see Gambacorta and Mistrulli(17) for a recent survey). The variables include: i) the share of credit the firm receives from the top five bank groups[13] ($share\_top5$); ii) the degree of capital constraint 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 to the firm on the total of credit the firm receives (Jiménez et al., 2010(23)). 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 ($mainbanktop5$), 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% of the firms in our sample are credit constrained. 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 borrowed by banks from the five top groups is as high as 35%. Table 2 shows further descriptive statistics about firms in our sample. Consistent with INVIND sample statification, the manifacturing 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' riskinessn 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".

5 Empirical Strategy

The core prediction we want to test is that, during the financial turmoil, local banks responded better than not-local banks by smoothing credit conditions. One of the main driving force for this result is that, given their advantage in collecting information on borrowers, local banks may play a far more relevant role in a financial crisis, when adverse

[13]That is, Unicredit, Intesa San Paolo, UBI, MPS group and Banco Popolare.

selection problems 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 effect of local banks on firm's credit tightening, especially during the crisis. Credit relaxation from local banks may be due to less severe liquidity constrains faced by local banks as compared to not-local banks. To this respect, we control for the degree of capital constraint faced by the bank, expressed as an aggregate measure at firm level, and for the share of credit by the main five bank groups.
We estimate the main equation on a panel of firms observed from 2006 to 2009 and we model the probability of the *i-th* firm to be credit rationed as follows:

$$\begin{aligned} \text{p(cred\_rat)}_{it} &= \alpha + \beta firm\_lcl_{it-1} + \gamma B_{it-1} + \delta X_{it-1} + \zeta I_{it-1} + \eta crisis_t \\ &+\theta(firm\_lcl_{it-1} \times crisis_t) + \lambda(B_{it-1} \times crisis_t) + \mu(X_{it-1} \times crisis_t) + \nu(I_{it-1} \times crisis_{tit}) + \epsilon_{it} \end{aligned} \quad (1)$$

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_{it-1} is the set of control variables to account for bank characteristics effects; I_{it-1} is the set of variables which characterize bank-firm relationship and the structure of the local credit market; finally, X_{it-1} is the set of variables at firm level.

We expect the measure for local banks at firm level ($firm\_lcl$) to have negative sign; on the contrary, the financial risk (Altman z-score, *score* in our model) to have a positive impact on the firm's probability of being credit rationed. To this respect, one of the main reasons why banks tighten credit supply to firms is their risk aversion (Panetta and Signoretti, 2010), which has increased during the crisis. Therefore, we expect the sign of the interaction between *crisis* and *score* to be positive, as well. Among other firm's characteristics, we also expect a negative correlation between *roa* and the dependent variable. On the contrary, the *size* of the firm might have an ambiguous effect on the probability of being credit rationed: from one side, small businesses are expected to have more consolidated lending relationships with local banks than larger firms; from the other, in a global scenario of credit crunch, local banks might have privileged larger, more diversified businesses than the smaller ones.
Consistent with the findings in literature, we expect the controls at bank level (*cap_ratio* and *share_top*5) to have either a positive or a null impact on credit rationing, especially during the crisis. In line with the work by De Mitri *et al.* (2010), we expect those firms with more concentrated borrowing to experience less credit rationing.

5.1 Results

Table 4 shows results from our base regression, which includes the $firm\_lcl$ 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. Moreover, in order to test the appropriateness of the random-effect model versus the fixed-effect one, we use the Hausman' s specification test in order to verify the appropriateness of the random-effects estimator[14].

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 the firms primarily financed by local banks. As Column 2 displays, after controlling for the share of credit of the main top five groups, our coefficient of interest, θ, is still negative and significant, and so it is even after controlling for the *cap_ratio* variable: all results are similar. 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 small number of banks experience less credit contraction with their lending banks, as they establish closer relations 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, liquidity constraints.

Finally, Table 5 reports results of the estimates which include firms' characteristics: balance sheet variables have the expected sign in all regressions. Firms with higher *roa* (colums 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.

5.1.1 Robustness checks

We further test the robustness of our results, controlling for the structure of the LLMA where the firm is located, firm's geographic localization and sector. Results are shown in Table 6: our variable of interest, $firm\_local \times crisis$, is negatively and significantly correlated to the dependent variable in all three model specifications.

[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 can not 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 ($Prob > \chi^2 = 0.20$). As a robustness check, we have also performed our estimation using both a linear probability model and logit model with fixed effects.

In order to check whether sample attrition affects our results, we also test our model with a balanced panel, by taking 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, from one side, that our main result holds; from the other side, 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 firm's *roe*, $EBITDA/assets$ and *leverage* on the probability of being credit rationed. Results are displayed in Table 8: $firm\_local \times crisis$ is negative and significant in all model specifications. As expected, firms with better financial indicators are 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 complex: 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 the effect turns to be null[15]. This 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 past history of the firm affects the probabilty 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. Including these variables in the model means to control for the evolution of credit in the past, as well as the firms banking relations. 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.

6 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(5); Stein,

[15]In order to check for the correct sign of the interaction effect 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(24)).

2002(31)): this information advantage, in turn, results into a specializiation 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 have less personal relationship with the bank (Berger *et al.*, 2005(7)), small banks make a larger use of relationship lending. At the same time, evidence on 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 Banking Lending Survey, 2010(4)). In light of these findings, we want to study whether, and how, local banks have changed their behavior in lending to firms during the crisis.

By using a panel of 3281 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 on larger, not-local banks. The result holds controlling for a large number of firm and bank characteristics. Our results also suggest that firms that borrow from a small 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 have been fully rationed from firms which just received less credit than requested. Second, as we do not have information on banks at branch level, we cannot exactly identify the determinants of the firm-bank matching, neither its length. Therefore, further research is needed in this direction. However, our findings hold for a number of models specifications, including panel balancing and firms past history.

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Table 1: Descriptive Statistics

Variables	definition	mean	median	sd
Dependent Variable				
$p(cred\_rat)$	=1 if the firm is rationed	0.0517	0	0.221
Firm's balance sheet and characteristics				
age	The number of years since the firm was set up	34.57	30	20.54
size	=1 if number employees $\geq$ 50	0.642	1	0.480
roa	The firms profit over total assets	1.455	0.72	5.859
score	Altman Z-score	0.153	0	0.360
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	0.180
nbank	Number of bank relationships	4.378	3	4.350
$cred\_LLMA$	Self-containment Index	0.608	0.634	0.130
Bank's characteristics				
$mainbanktop5$	=1 if the main bank is a top 5 group	0.370	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	0.560
$share\_top5$	share of total credit held by the top 5 groups	0.348	0.28	0.347
Number of firms			3,281	

Table 2: Descriptive Statistics: Composition of the Sample

SECTOR		SIZE		LOCATION		RATING	
AGRIC	0.72	Small	34.9	North	66.8	Sound	26.05
COSTR	1.08	Large	65.1	South	33.2	Vulnerable	58.69
ENERG	1.48					Risky	15.41
EXTRAC	0.97						
MANIF	68.44						
SERV	27.31						

Table 3: Correlation matrix of regressors

	$firm\_lcl$	$nbank$	$score$	age	roa	$size$	$mainbank$ $top5$	$share\_$ $top5$	$capratio$
$firm\_lcl$	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			
$mainbanktop5$	-0.112	0.276	-0.011	0.023	-0.008	0.022	1		
$sharetop5$	-0.118	0.274	-0.015	0.019	-0.011	0.020	0.850	1	
$capratio$	0.115	0.120	0.007	0.013	-0.038	0.034	0.183	0.214	1

Table 4: Baseline equation (marginal effects displayed)

	(1) $p(cred\_rat)$	(2) $p(cred\_rat)$	(3) $p(cred\_rat)$
$firm\_local$	0.005	0.005	0.005
	(0.009)	(0.009)	(0.012)
$crisis$	0.009***	0.010***	0.010***
	(0.003)	(0.003)	(0.003)
$firm\_local \times crisis$	-0.023*	-0.026*	-0.026*
	(0.013)	(0.013)	(0.013)
$nbank$	0.010	0.012	0.010
	(0.015)	(0.015)	(0.015)
$nbank \times crisis$	0.047**	0.052**	0.054**
	(0.020)	(0.021)	(0.021)
$share\_top5$		0.000	-0.004
		(0.002)	(0.003)
$share\_top5 \times crisis$		-0.004	0.001
		(0.003)	(0.004)
cap_ratio	0.001	0.001	0.001
	(0.004)	(0.004)	(0.004)
$cap\_ratio \times crisis$	-0.003	-0.001	-0.001
	(0.004)	(0.004)	(0.004)
Other Bank controls	No	No	Yes
Observations	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)

	(1) $p(cred\_rat)$	(2) $p(cred\_rat)$	(3) $p(cred\_rat)$
$firm\_lcl$	0.001	0.003	0.001
	(0.017)	(0.018)	(0.019)
$crisis$	0.012***	0.013***	0.014***
	(0.004)	(0.004)	(0.004)
$firm\_lcl \times crisis$	-0.031*	-0.037*	-0.035*
	(0.018)	(0.019)	(0.019)
$nbank$	0.025	0.019	0.018
	(0.020)	(0.022)	(0.022)
$nbank \times crisis$	0.057**	0.063**	0.065**
	(0.025)	(0.027)	(0.027)
age	-0.008**	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)
$size$	-0.063	-0.076	-0.063
	(0.110)	(0.118)	(0.119)
roa	-0.056***		-0.047***
	(0.019)		(0.018)
$roa \times crisis$	-0.002		-0.002
	(0.015)		(0.017)
$score$		1.035***	0.870***
		(0.308)	(0.283)
$score \times crisis$		-0.090	-0.161
		(0.219)	(0.234)
$share\_top5$	-0.007	-0.006	-0.007
	(0.005)	(0.005)	(0.005)
$share\_top5 \times crisis$	0.002	0.002	0.003
	(0.005)	(0.006)	(0.006)
cap_ratio	0.002	0.003	0.003
	(0.006)	(0.006)	(0.007)
$cap\_ratio \times crisis$	-0.002	-0.002	-0.003
	(0.006)	(0.007)	(0.007)
Other Bank controls	Yes	Yes	Yes
Observations	8,925	8,919	8,919
Number of codfn	3,193	3,193	3,193

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Firm's balance sheet variables are rescaled by a factor of 100 in order to have economically-meaningful coefficients. Since marginal effects are displayed, this procedure does not affect the validity of the results

Table 6: Adding LLMA, sector and geographic controls

	(1) $p(cred\_rat)$	(2) $p(cred\_rat)$	(3) $p(cred\_rat)$
$firm\_lcl$	0.003	0.005	0.006
	(0.014)	(0.014)	(0.013)
$crisis$	0.014***	0.013***	0.013***
	(0.004)	(0.004)	(0.004)
$firm\_lcl \times crisis$	-0.035*	-0.032*	-0.032*
	(0.019)	(0.019)	(0.018)
$nbank$	0.018	0.020	0.019
	(0.022)	(0.022)	(0.022)
$nbank \times crisis$	0.065**	0.064**	0.063**
	(0.028)	(0.027)	(0.027)
age	-0.007**	-0.005*	-0.006*
	(0.003)	(0.003)	(0.003)
$size$	-0.063	-0.015	-0.004
	(0.119)	(0.117)	(0.116)
roa	-0.047***	-0.044**	-0.043**
	(0.018)	(0.017)	(0.017)
$roa \times crisis$	-0.002	-0.003	-0.002
	(0.017)	(0.017)	(0.017)
$score$	0.874***	0.861***	0.877***
	(0.285)	(0.281)	(0.283)
$score \times crisis$	-0.176	-0.190	-0.167
	(0.235)	(0.231)	(0.229)
$share\_top5$	-0.007	-0.007	-0.007
	(0.005)	(0.005)	(0.005)
$share\_top5 \times crisis$	0.003	0.003	0.002
	(0.006)	(0.006)	(0.006)
cap_ratio	0.003	0.003	0.002
	(0.007)	(0.006)	(0.006)
$cap\_ratio \times crisis$	-0.003	-0.003	-0.003
	(0.006)	(0.007)	(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	3,182

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regressions with 2007 and 2009 only

	(1) $p(cred\_rat)$	(2) $p(cred\_rat)$	(3) $p(cred\_rat)$
$firm\_lcl$	0.019	0.017	0.043
	(0.020)	(0.019)	(0.032)
$crisis$	0.018**	0.020**	0.019**
	(0.008)	(0.009)	(0.008)
$firm\_lcl \times crisis$	-0.088*	-0.094*	-0.091*
	(0.047)	(0.049)	(0.048)
$nbank$	0.061	0.062	0.057
	(0.039)	(0.038)	(0.037)
$nbank \times crisis$	0.057	0.062	0.060
	(0.042)	(0.043)	(0.042)
$share\_top5$		-0.003	-0.009
		(0.005)	(0.008)
$share\_top5 \times crisis$		-0.007	0.001
		(0.008)	(0.009)
cap_ratio	0.012	0.014	0.014
	(0.011)	(0.013)	(0.012)
$cap\_ratio \times crisis$	-0.013	-0.013	-0.012
	(0.011)	(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

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Regressions with *roe*, $EBITDA/assets$ and *leverage*

	(1) $p(cred\_rat)$	(2) $p(cred\_rat)$
$firm\_lcl$	0.003	0.004
	(0.016)	(0.013)
$crisis$	0.012***	0.012***
	(0.004)	(0.004)
$firm\_lcl \times crisis$	-0.028*	-0.024*
	(0.016)	(0.014)
$nbank$	0.022	-0.010
	(0.019)	(0.016)
$nbank \times crisis$	0.052**	0.053**
	(0.023)	(0.023)
age	-0.008**	-0.005**
	(0.003)	(0.002)
$size$	-0.049	-0.004
	(0.102)	(0.084)
roe	-0.061	-0.041
	(0.056)	(0.043)
$roe \times crisis$	0.041	0.029
	(0.057)	(0.045)
$EBITDA/assets$	-0.031***	-0.021**
	(0.011)	(0.009)
$EBITDA/assets \times crisis$	-0.010	-0.009
	(0.010)	(0.009)
$leverage\_low$		-0.005**
		(0.002)
$leverage\_low \times crisis$		-0.000
		(0.002)
$leverage\_high$		0.008**
		(0.003)
$leverage\_high \times crisis$		-0.002**
		(0.001)
$share\_top5$	-0.006	-0.005
	(0.005)	(0.004)
$share\_top5 \times crisis$	0.002	0.002
	(0.005)	(0.004)
cap_ratio	0.002	0.001
	(0.006)	(0.005)
$cap\_ratio \times crisis$	-0.002	-0.001
	(0.006)	(0.005)
Other Bank controls	Yes	Yes
Observations	8,924	8,924
Number of codfn	3,193	3,193

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Past credit history

	(1) $p(cred\_rat)$	(2) $p(cred\_rat)$
$p(cred\_rat)_{2008}$	-0.000	-0.000
	(0.001)	(0.001)
$p(cred\_rat)_{2007}$	-0.002*	-0.002*
	(0.001)	(0.001)
$firm\_lcl$	0.006	0.004
	(0.011)	(0.011)
$crisis$	0.009***	0.009***
	(0.003)	(0.003)
$firm\_lcl \times crisis$	-0.022*	-0.022*
	(0.013)	(0.013)
$nbank$	0.010	0.008
	(0.014)	(0.013)
$nbank \times crisis$	0.046**	0.048**
	(0.021)	(0.021)
$share\_top5$	0.000	-0.004
	(0.002)	(0.003)
$share\_top5 \times crisis$	-0.004	0.001
	(0.002)	(0.003)
cap_ratio	0.001	0.001
	(0.004)	(0.004)
$cap\_ratio \times crisis$	-0.004	0.001
	(0.002)	(0.003)
Other Bank controls	Yes	Yes
Observations	9,766	9,766
Number of codfn	3,281	3,281

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1