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Family Firms, Soft Information and Bank Lending in a Financial Crisis

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Abstract

This paper studies how access to bank lending differed between family and non-family firms in the 2007-2009 financial crisis. The theoretical prediction is that family block-holders' incentive structure results in lower agency conflict in the borrower-lender relationship. Using highly detailed data on bank-firm relations, we exploit the reduction in bank lending in Italy following the crisis in October 2008. We find statistically and economically significant evidence that the contraction in credit for family firms was smaller than that for non-family firms. Results are robust to ex-ante observable differences between the two types of firms and to time-varying bank fixed effects. We further show that the difference in the amount of credit granted to family and non-family firms is related to an increased role for soft information in Italian banks' operations, following the Lehman Brothers' failure. Finally, by identifying a match between those banks and family firms, we can control for time-varying unobserved heterogeneity among the firms and validate the hypothesis that our results are supply driven.

Keywords: Family firms, Financial crisis, Soft information, Bank lending

JEL Classification: C81, D22, E44, G21, G32, L26

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1. Introduction

The global financial crisis in 2008 and the subsequent recession in the world economy highlighted that capital markets can represent an important source of business cycle fluctuations.[1] Adverse shocks hitting the banking sector propagate to the real economy through a reduction in credit supply. In particular, an increase in asymmetric information problems in the bank-firm relationship tend to amplify negative shocks, by disproportionately affecting some types of borrowers more than others (Bernanke *et al.* (1996)). Problems of moral hazard (Holmstrom and Tirole (1997)) and adverse selection (Stiglitz and Weiss (1981)) make lenders less willing to supply credit to firms facing high agency costs.

Information asymmetry in the borrower-lender relationship is typically lower for banks than for public debt-holders; while the latter must rely mostly, if not exclusively, on publicly available information (balance-sheets, ratings, etc., the so-called hard information), the former have access to "inside" information, which is transmitted through repeated interactions between the loan officer and the firm's manager (Fama (1985); Diamond (1989); Petersen and Rajan (1994)). Such information relates to the lending officer's subjective evaluation of the firm's creditworthiness and is commonly labeled as soft (Berger and Udell (2002); Petersen (2004)). Soft information is an important determinant of corporate lending, especially for small businesses (Garcia-Appendini (2011)). In addition, it has been recently shown that it helps to mitigate the adverse consequences of aggregate credit contractions (Jiangli *et al.* (2008); De Mitri *et al.* (2010)). The reason is that hard information, such as past results and standardized risk measures, are less powerful in predicting firm risk profiles during a crisis. Soft information about a firm's pending results and future plans can reduce this uncertainty, as it is continuously updated and more targeted to the characteristics of the borrower.

However, despite the interest of scholars in examining the importance of soft information in banks' lending decisions, it is still unclear which types of firms can benefit most from an established relation with a bank. In this paper, we address this issue by focussing on firms' heterogeneity in corporate ownership structure, namely the existence of a family block-holder within the company. In particular, we address the following empirical question: does the existence of a family block-holder mitigate bank-firm agency conflicts during a financial crisis? The answer is strongly related to differences in the incentive structures of family and non-family firms, and thus to the problem of risk-shifting potentially faced by banks (Jensen and Meckling (1976)).

Burkart *et al.* (2003), and more recently Bandiera *et al.* (2012), highlighted the fact that family block-holders attach a value to firm control which is not only represented by the monetary return of their investment, but also includes an amenity component, that is, utility gained though control *per se*. This amenity component can be thought as the personal status acquired thanks to the identification of the family name

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[1]See Quadrini (2011) for a review.

with the firm's success, or as the desire to transfer the firm to descendants. It translates into higher non-monetary costs of default that lowers the incentive to strategically default (Anderson *et al.* (2003)). On the other hand, as pointed out by Villalonga and Amit (2005), Ellul *et al.* (2009) and Lins *et al.* (2013), family block-holders may have a higher incentive to extract private benefits from the firm at the expenses of the other shareholders and of the stakeholders[2]. In fact, in contrast to the case with non-family block-holders, the gains from misbehavior are concentrated in the hands of a single family group.

In a financial crisis, a lower expected return to investments can exacerbate the incentive to divert resources out of the company, thus reducing a family firm's investment in the future, and lowering the probability that it will repay its loans. On the other side, family firms may be perceived as more creditworthy by banks because of the lower incentive to default in the future. The evaluation of the overall impact of family ownership on credit allocation will depend on the distribution of "good" and "bad" family firms relative to non-family ones. Therefore, even if the family status of firms is observable to all banks, only soft information, collected through personal interactions with firms' managers, can enable a loan officer to assess whether, given the same publicly available characteristics, a family firm is more creditworthy than a non-family one. In other words, soft information complements hard information by revealing the different objective functions of family and non-family firms.

We answer our research question by using highly detailed data from the Credit Register (CR), which covers all loans granted to non-financial firms by the universe of banks operating in Italy. This information is matched with firm-specific data, including the identification of family status. In our analysis we are able to include family firms of different sizes, including SMEs (small and medium sized enterprises), for which detailed information on corporate structure is not typically available. We cover the 2007-2009 period, which enables to compare results before and after the Lehman Brothers bankruptcy. The choice of October 2008 as the start of the financial crisis is driven by the nature of the shock represented by the Lehman Brothers failure. This event was exogenous and largely unexpected by Italian banks, inducing a lower propensity to lend (Albertazzi and Marchetti (2010)). At the same time, capital shortages characterizing the onset of the financial crisis of many OECD economies, were not a major concern for Italy (but also Japan), where banks relied primarily on resident deposits and less on wholesale funding[3].

For the purpose of our analysis, Italy represents an ideal laboratory. Firstly, bank lending represents the most important category of debt for firms in the sample (85% of total debts) both for family and non-family firms. Moreover, there was substantial heterogeneity in the use of soft information by Italian banks following the crisis. By exploiting the information provided by a special survey conducted by the Bank of

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[2]All these papers focus their empirical investigation on listed firms, which are characterized by the existence of agency conflicts between controlling and minority shareholders. Our analysis, instead, regards firms that are smaller in size and very few went public. Accordingly, this type of agency conflict is less of a concern in the present context.

[3]See Panetta *et al.* (2009) for a cross-country comparison and the Financial Stability Assessment of the IMF (2013) for a focus on the Italian banking system during the crisis.

Italy in 2009, we find that about 35% of surveyed banks (representing about 36% of total aggregate credit) increased the relative weight given to qualitative information and direct knowledge of the borrower in the lending decision, as a result of the financial crisis.

The empirical analysis reveals that both family and non-family firms, one year after the failure of Lehman Brothers, experienced a decline in the aggregate growth rate of loans. However, the contraction was statistically significantly lower for family firms by around 5 percentage points. This result is robust to the inclusion of a rich set of observable characteristics aimed at excluding the correlation of family-ownership with other firm characteristics. By exploiting the presence of multiple lending relationships, we also control for time varying bank fixed effects. We show that this differential effect is not driven by the controlling shareholder's nationality, nor by firms' group affiliation, nor by different concentrations of share ownership. We find no differences between family and non-family firms in the interest rates on their loans and in the amount of physical collateral provided by the companies (these two results are shown in the Appendix). The economic interpretation of these findings is that the existence of a family block-holder in the firm reduced the expected risk of default borne by banks, all other things being equal. Given that family firms are, on average, of smaller size, this alternative flight to quality mechanism towards family firms is consistent with recent findings by Presbitero *et al.* (2012) who show that, in Italy, in the 2007-2009 financial crisis, smaller firms experienced lower contractions in loan availability relative to larger ones.

By exploiting the information on bank lending practices provided by the special survey by the Bank of Italy (previously mentioned), we also show that the banks that increased the role of soft information accounted for the observed difference between family and non-family firms. Starting from this finding, we estimate a time varying firm fixed-effect model in which a family firm dummy interacts with an identifier of those banks that increased the use of personal information in their lending practices. This empirical strategy enables us to control for unobserved heterogeneity between firms (e.g. demand shocks) and validate the hypothesis that results are driven by changes in credit supply. The results suggest that banks, conditional on having increased the relative weight given to soft information, re-allocated credit towards family firms.

The relevance of our results is twofold. Firstly, family firms are widespread all around the world, among SMEs and also among big listed companies[4] (Bertrand and Schoar (2006)). Therefore, their ability to access financial markets has a potentially significant impact on the real economy, as financially constrained firms tend to reduce investments and employment levels (Campello *et al.* (2010)), exacerbating the negative effects of a credit supply shock[5]. Accordingly, in the last section of the paper, we show to what extent the different access to bank lending has been mirrored by differences in real outcomes in the 2007-2009 period. We do not find significant differences in terms of capital expenditure, while we do find that the employment

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[4]In our representative sample of Italian firms, family firms represent about 60% of the total population and about 40% of total sales in 2008.

[5]See also Kahle and Stulz (2013) for a review of the empirical literature on the effects of the recent financial crisis.

policies of family and non-family firms were substantially heterogeneous. In particular, the reduction in the total workforce was 2.6 percentage points lower for family firms. Finally, we find evidence that profitability, as measured by the ROE, declined less in family firms. Taken together, these results suggest that the credit re-allocation towards family firms has had significant effects for the real economy and appears to have been ex-post efficient from the perspective of the banking system.

A second contribution relates to the debate in the banking literature about the efficiency of relationship lending. In the last two decades, hard information has had an increasingly important role in lending practices due both to regulatory pressure and to the diffusion of information technologies in the financial sector. However, this paper shows that soft information can mitigate the negative effects of an aggregate credit contraction, being a valuable resource for banks in times of increased uncertainty.

The rest of the paper is organized as follow: section 2 presents the data used for the analysis and provides some descriptive statistics of the sample of firms under investigation; section 3 analyzes the trends in aggregate granted loans, showing how they differ depending on firm corporate structure; section 4 looks at bank-firm relationship, focusing on the interaction between bank lending technologies and family firm status; section 5 documents the ex-post differences in real outcomes between family and non-family firms; section 6 concludes.

2. Data sources and descriptive statistics

In this paper we exploit information about bank-firm relationships, firm corporate governance, firm balance-sheet data and bank organization. Accordingly, our dataset comes from four main databases: Invind, Cerved, Centrale dei Rischi (CR) and a special survey on the Italian banks, that was run by the Bank of Italy in 2009. Each observation is therefore a firm-quarter-bank triplet, for the years 2007-2009.

The Invind survey is conducted yearly by the Bank of Italy (Bank of Italy (2011)), on a representative sample of Italian non-financial companies with more than 20 employees[6]. It collected information on the variables concerning the family status of the firms for three consecutive waves in the years 2007-2009[7]. The family firm status is attributed on the basis of the following question:

"Is the firm controlled (directly or indirectly) by a single individual or a group of persons linked by family relationships?"[8]

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[6]This cut-off is set by the Bank of Italy in order to collect information for a representative sample of firms belonging to the industrial and service sectors: firms above this threshold represent 70.5 and 59.2 % of the total payroll employment in the industrial and non-financial service sectors respectively.

[7]When the information for a firm was not available in all the waves of the survey, we check the information from previous years, using Amadeus and on-line search from the company's websites. Amadeus is a European database that provides qualitative and quantitative information on firm ownership structure.

[8]Translated from Italian.

This approach to the definition of family firms relies on self-reported information and can overcome the typical identification problem in which the stake of each shareholder must be measured in order to determine who controls the firm (see Ellul *et al.* (2010)). Additionally, for a sub-sample of observations (industrial firms with at least 50 employees) we are also able to assess the stakes of controlling shareholders quantitatively. In order to recover balance-sheet data (total assets, leverage, and ROE among others), we used the local Italian Chambers of Commerce's official information collected in the CERVED archives.

We match our firm-level information with the Centrale dei Rischi (CR) database, containing observations on all loans granted by the Italian banking system to firms, with quarterly frequency. These data enable us to construct unique variables based on each bank-firm relationship, with quarterly frequency. In the empirical analysis, we focus on revocable credit lines. This choice is due to the homogeneity underlying this type of contract and because this form of credit can be renegotiated unilaterally by banks.[9] Thus, the loans under scrutiny exclude long-term, collateralized loans. As argued by Sapienza (2004), borrowers may have contemporaneous relations (deposits, personal loans) with their bank that could affect the lending decision and for which we can't control by using the credit lines[10].

Finally, we integrated the above firm-year-bank observations with the information provided by a special survey conducted by the Bank of Italy's regional branches in 2009 on about 400 banks, accounting for 80% of outstanding bank credit to Italian firms. This survey contains a variable referred to the relative change in the use of soft information in the lending decision as a result of the financial crisis. In particular, banks were asked the following question:

"Starting from October 2008, as a result of the economic and financial crisis, indicate whether the importance accorded to qualitative information and direct knowledge of the borrower increased, decreased or remained the same " [11]

After removing state-owned companies and those firms for which we were unable to recover the structure of the corporate ownership, we were left with 1,808 family firms and 1,101 non-family firms. Panel A of table 1 provides a summary description of the characteristics of our sample, with family and non-family firms presented separately. We notice that family firms were much smaller on average at the end of 2008

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[9]The CR database distinguishes between call loans and term loans. When call loans are granted, banks can call them unilaterally at any moment in time, while with term loans the bank typically has to wait until the end of term before renegotiation occurs. Thus, when using the term "revocable credit lines", we are implicitly referring to call loans only, because lines of credit within the term loans group are not considered. However, in order to be sure that results are not driven by the specific nature of the financial instrument considered, we also re-estimated all of the empirical models with the call and term loan data summed together. Results are qualitatively the same, and statistically significant

[10]Unfortunately, this information is never observable, and all the results must be interpreted under this *caveat*.

[11]Translated from Italian.

(a result well known in the literature), slightly older and had a lower penetration in the North of Italy (and conversely a higher penetration in the South) compared to non-family firms. Moreover, family firms were more indebted on average prior to the crisis, suffered slightly more from the contraction in sales relative to non-family firms [12] and generated less cash-flow for each euro earned (the last two differences are weakly significant). Family and non-family firms, on the contrary, did not differ significantly in terms of profitability as measured by the ROE.

Panel B of table 1 provides summary statistics regarding firm-bank relationships. We notice that family and non-family firms had similar risk profiles, as measured by the Altman Z-score[13] (the difference in rating is statistically significant but economically negligible). In line with other works using Italian data (Detragiache *et al.* (2000) and Ongena and Smith (2000)), multiple lending is a common phenomenon within our sample, with more than 87% of firms having relations with at least three different banks. Family firms have a higher average number of relationships with banks than non-family firms, a result which is in line with with recent findings by Guiso and Minetti (2010)[14]. This finding explains a different degree of loan concentration for family firms, as measured by the Herfindal index and also by the relative share of each bank financing the firms' activity (in particular the first bank).

Insert Table 1 here

3. Bank lending and corporate ownership

In this section we establish whether the degree to which firms suffered a contraction in bank lending was affected by their corporate ownership structure. In order to address this empirical question, we first look at the overall exposure of the firms to the banking sector, in terms of the total amount of credit lines they have been granted. In particular, we aggregate data from each firm's banking relationships into a single observation.

3.1. Graphical inspection

Figure 1 examines the bank lending channel non parametrically by plotting the dynamics of average granted loans for FF and NFFs separately. Specifically, we take the mean of the logarithm of the outstanding loans granted to family and non-family firms in each quarter, from September 2007 up to September 2009[15], and

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[12]The difference in sales contraction between family and non-family firms is not statistically significant once we control for sector, size, year of foundation and geographical area.

[13]This index is built on balance-sheet figures and can take integer values between 1 and 9. Higher values imply a higher probability of default.

[14]The authors use concentrated ownership as a proxy for the degree of informational opacity and the debt restructuring costs for banks in case of corporate reorganization. With both types of interpretation, ownership concentration predicts a positive probability of engaging in multiple lending.

[15]In each quarter we excluded the first and last percentile of the distribution of the relative change in the logarithm of loans, in order to control for extreme observations.

we normalize to zero the observations, using the end of the third quarter of 2008 as a base. The y-axis can then be interpreted as the growth rate of outstanding loans relative to that quarter.

Figure 1: Bank lending before and after the Lehman Brothers' bankruptcy: overall adjustments
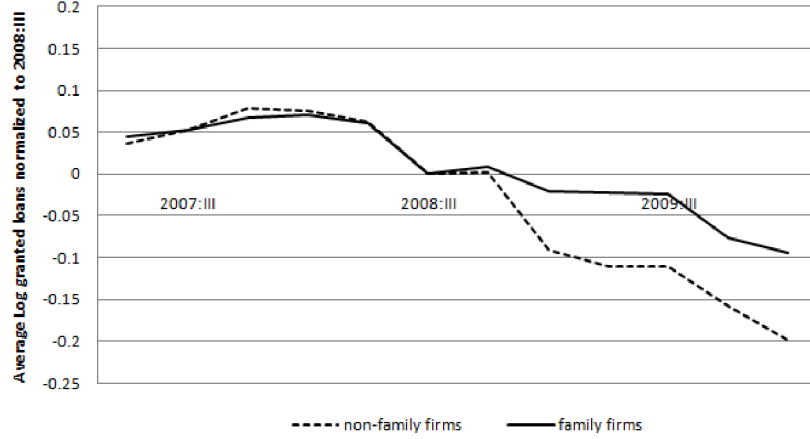
The figure confirms that the choice of Lehman Brothers' bankruptcy for the identifying date of the credit shock in Italy is reasonable, as the average growth rates in outstanding loans started to decline during the third quarter 2008. Moreover, the figure shows that, before and immediately after the sudden drop occurred in October 2008, there was no significant difference in the dynamics of loans granted between family and non-family firms. An important divergence between the two types of firms began after the first quarter of 2009.

3.2. Econometric analysis

In this subsection we test whether the different patterns observed in figure 1 can be rationalized by differences in *ex-ante* characteristics between family and non-family firms. Given the nature of the exogenous shock we are analyzing in this paper, we estimate the following model:

$$\triangle_t logLoans_i = \alpha + \beta_0 Family_i + \beta_1 X_i + \epsilon_i \tag{1}$$

where subscript *i* refers to the firm, and X_i is a vector of controls. The set of control variables captures possible channels which have been identified in the literature as determinants of bank lending behavior, and that could be correlated with the family-firm status. Given that family firms are, on average, smaller than non-family ones, we include the firm size (expressed by the *log* of the number of employees) at the end of 2008, as this characteristic may explain a difference in access to the credit market. We also control for the geographical area of the firm's headquarters by using three geographical dummies, corresponding to the

North, the Center and the South of Italy. This is justified by the uneven geographical diffusion of family and non-family firms: a factor that could result in different demand shocks, and in different conditions for the access to credit, due to differences in the distances between firms' headquarters and their financing banks.

We also include the share of credit granted by the first bank (evaluated at the third quarter of 2008), as it can potentially affect the capability of a company to substitute across banks and, consequently, to hedge bank-specific shocks. For each firm, we construct the weighted average length of the relationship with its financing banks (up until October 2008), weighted by the share of each banking relationship in total borrowing. In such a way, we control for the average intensity of the bank-firm relationships, which may not be fully captured by the share of credit granted by the first bank. Firm's year of foundation, sector of activity, level of total leverage, cash-flow over sales, risk (captured by the Z-score being greater than 5) are also included as natural controls. Finally, we include the change in sales that occurred between 2008 and 2009 to control for any different change in the demand for loans resulting from differences in the impact of the crisis on family and non-family firms.

Our dependent variable is the *log* difference of average granted loans between two time windows: the 1st of October 2007 - 30th of September 2008 and the 1st of October 2008 - 30th of September 2009. Within the 'pre-crisis' and a 'post-crisis' windows, we summed up each firm's loans. The two time windows have the same length in order to avoid problems of seasonality, as loan applications may vary during the year for economic and fiscal reasons. We have selected the last quarter of 2008 as the beginning of the post-crisis period both because Lehman Brothers' default occurred at the very end of the third quarter of 2008, and because by doing so we avoid an arbitrary choice of the time windows to compare. An observation period immediately "after the Lehman Brothers event" helps us capture mostly supply-side effects in the dynamics of granted loans, since credit lines respond rapidly to a change in bank portfolio composition. Our results are derived after excluding the top and the bottom percentiles of the distribution of the dependent variable, in order to control for outliers and to increase the accuracy of the estimations. Summary statistics of the change in *log* of loans are reported in the first line of table 2

Insert Table 2 here

Column (1) estimates the basic model without controls; column (2) includes the basic set of controls; column (3) adds the share of the first bank as a bank-firm characteristic; column (4) looks at the sample of small and medium-sized firms (SMEs) only[16]. Results are shown in table 3.

Insert Table 3 here

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[16]SMEs are defined as having no more than 250 employees and 50 millions euro of annual sales. This definition is commonly used not only in Italy but also in the rest of the European Union.

Table 3 shows that family firms experienced a 5 percentage points lower decline in the growth rate of loans than non-family firms. The coefficient is robust to different specifications of the model, and is both highly statistically significant and economically relevant. We notice that the β_0 estimates in column (1), without controls, and column (3), with the complete set of controls, are close. This confirms that the observed differences in the amount of granted loans for family and non-family firms cannot be fully explained by standard mechanisms and require further investigation. Moreover, our results are not driven by the change in granted loans for very large firms (where the comparability between family and non-family firms is lower, as shown in Table 1): the coefficient of β_0 is almost unchanged in column (4), where the sample is restricted to SMEs only.

A higher risk (measured by the Z-score) is associated with a lower amount of granted loans, as theory predicts. Moreover, the growth of loans is lower when borrowing is more concentrated in the first bank. The negative sign of this coefficient, as previously discussed, may be explained by the fact the higher concentration of borrowing in the first bank negatively affects the firm's ability to hedge bank specific shocks. It is also consistent with the empirical evidence that the first financial institution more frequently belongs to the major five Italian banking groups, which cut their credit, on average, more than the other banks (see Albertazzi and Marchetti (2010)).

We argue that the estimated difference between family and non-family firms is mostly driven by a change in the supply of credit. It is true that the change in outstanding loans derived from the financial crisis cannot be directly interpreted as the effect of a credit supply contraction, but the coefficient β_0 of the regression model captures any additional difference on top of that observed for non-family firms. Therefore, we could interpret the difference between family and non-family firms as a supply-driven effect, assuming that the rich set of observable characteristics included in the analysis captures firms' demand for credit[17].

3.3. Robustness checks

We have documented so far the existence of divergent patterns in the aggregate dynamics of credit for family and non-family firms. We have also controlled for a set of observable characteristics, potentially correlated with the existence of a family block-holder, able to influence the dynamics of credit. However, some concerns must still be addressed.

3.3.1. Foreign firms

The first relates to the foreign status of the firm. In fact, the large majority of foreign firms (they account for around 8% of our sample) are controlled by non-family block-holders and could follow patterns of credit different from those observed for Italian companies. Foreign firms may in principle substitute domestic

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[17]The following results are robust to i) the inclusion of the interaction term between the family firm dummy and the change in sales; ii) the inclusion of the square of *log* size; iii) measuring size in terms of total assets, instead of number of employees.

credit with foreign credit by exploiting their multinational group affiliation, or may be systematically discriminated against by local banks. In order to be sure that our results are not driven by a difference in the nationalities of the companies, column (1) of table 4 adds a dummy for the firm's foreign status to the full specification in column (3) in table 3. Reassuringly, our family dummy is still statistically significant, even if the magnitude of the coefficient is slightly lower than before (the foreign status is negatively correlated with the change in loans, but the difference is not significant).

Insert Table 4 here

3.3.2. Group affiliation

A second concern, partially related to the first one, arises because of the possibility that firms could substitute bank credit with intra-group financing transactions. If group affiliation is negatively correlated with family firms status, then our results could be explained by a lower demand for bank loans by non-family firms. In order to control for that, column (2) of table 4 adds to the full specification of column (3) in table 3 a dummy to distinguish group-affiliated and independent firms. Again, our previous results are robust to this additional control and the group dummy has the expected negative sign, which is also statistically significant.

3.3.3. Ownership concentration

Furthermore, we want to be sure that our results are not driven by a difference in the ownership concentration of the controlling shareholder, which has been found to play an adverse effect on the risk of default (see Aslan and Kumar (2012)) and may vary between family and non-family firms. The cleanest available information is the fraction of shares held by the first shareholder; unfortunately this information is only available for relatively large firms (with 50 employees or more). This reduces the number of observations by more than half. Column (3) of table 4 adds the ownership concentration of the first shareholder to the full specification in column (3) in table 3. In line with theory, higher degrees of ownership concentration in the dominant shareholder reduce the amount of loans granted (even if the coefficient is only weakly significant), but the existence of a family block-holder (*ceteris paribus*) significantly reduces this negative effect (the coefficient associated with family firm status is positive and around 6 percentage points).

3.3.4. Lock-in effects

The last hypothesis we want to test is whether the observed difference between family and non-family firms can be simply explained by *ex-ante* matching with different types of financial institutions. In other words, because it is costly to switch banks, and the switching costs may be proportional to loans concentration, non-family firms might have been "locked-in" with those banks that cut down more during the crisis. In order to address this issue, we need to check whether family and non-family firms have been treated differently by the same bank. By exploiting information at the level of individual bank-firm relationships we can

compare the change in *log* loans for family and non-family firms, controlling for bank fixed-effects (thus for time-varying bank fixed effects)[18]. We estimate the following model:

$$\triangle_t logLoans_{ij} = \alpha + \beta_0 Family_i + \gamma X_{ij} + f_j + \epsilon_{ij} \tag{2}$$

where $\triangle_t logLoans_{ij}$ is the *log* difference in the average value of loans granted (the averaging procedure is identical to the one used before) for firm i, by bank j. X_{ij} includes not only the firm-specific characteristics used in the previous analysis, but also the share of loans from bank j to firm i, relative to total loans for firm i and the length of the bank-firm relationship, both measured at the third quarter of 2008. The addition of these two variables is important, as they control for very large percentage variations in the dependent variable, induced by loans of a small size. Finally, f_j represents the bank j fixed effect. Results are reported in column (4) and (5) of table 4. In column (4), we report the analog of the aggregate results presented in column (3) of table 3 at the individual bank-firm level. Column (5) adds bank fixed effects.

The estimates of β_0 in the specifications with and without bank fixed-effects are almost identical and very similar to those obtained at the aggregate level. They confirm that divergent trends in the amount of loans granted for family and non-family firms are not driven by "lock-in" effects induced by an *ex-ante* sorting of family firms with particular banks.

4. Heterogeneity among banks in lending practices

In the previous section we observed that, following October 2008, the credit contraction was significantly lower for family firms, after controlling for a rich set of observable characteristics, hence conditioning on hard information. This finding is consistent with the idea that an additional piece of information, namely soft information acquired through the personal interaction of the firms' managers with loan officers, played a substantial role in explaining the observed difference[19]. In particular, it might have allowed banks to better assess the borrower's risk, revealing that it was lower, on average, for family firms.

To test for this hypothesis, we rely on a special survey conducted by the Bank of Italy in 2009 (see section 2), and in particular on a variable referred to the change in the use of soft information in the lending decision after September 2008. We find an increase in the relative importance of soft information for around 35% of surveyed banks (representing about 36% of total aggregate credit), while a decrease in less than 5% of the cases. The increased importance of this type of information following an adverse aggregate shock is consistent with the idea, recently formalized by Bolton *et al.* (2013), that soft information collected at the branch level can partially substitute hard information in the assessment of borrower's risk, as it is continuosly updated thanks to frequent contacts with the firm. At the same time, the degree of such change over

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[18]Summary statistics of the change in *log* loans at the individual bank-firm level are reported in the second line of table 2.

[19]Examples of soft information comprise the degree of cohesiveness among firm's shareholders, their personal history, or the existence of hidden personal assets.

time in the screening technology depends on the existing bank's organizational structure. In particular, soft information is costly to collect: in the extreme case of a bank that only processed hard information before the crisis, a sudden shift to soft information-based screening technologies would probably be unfeasible. Regulatory interventions played a role in shaping the optimal mix of hard and soft information adopted by banks before the crisis; for instance, the Basel II reform in 2004 recommended an expansion in the use of standardized criteria for company default risk evaluation in order to increase the transparency and comparability of national banking sectors. For the Italian case, Albareto *et al.* (2008) show that hard-information based practices have been consequently adopted by almost all larger Italian banks, and by the majority of all other banks.

Table 5 shows that when the sample of banks is split between those that increased the use of soft information, labeled as "soft-type" banks, and those that did not, labeled as "non soft-type" banks[20], no difference in the pre-crisis levels of capitalization (measured as the ratio of total equity over total asset) is observed. Similarly, results reveal that the weighted averages of the net interest rates and of the length of the bank-firm relationships do not differ between the two types of banks[21].

Finally, and most importantly for our purposes, the last two lines of the table 5 report the pre-crisis share of credit granted to family firms by the two groups of banks[22]. In particular, the ex-ante share of credit granted to family firms is not statistically different both considering revocable loans only and the overall financial exposure. Family firms have a relatively high share of total credit granted, both by "soft" and "non-soft" banks, primarily because they represent about 60% of our sample and are, on average, more leveraged. This last piece of evidence supports the assumption that the magnitudes of banks' shocks, which are likely correlated with the endogenous choice of increasing the importance of soft information in the screening process, are invariant to the family firm characteristic.

Insert Table 5 here

By splitting the sample of surveyed banks between those that increased the use of soft information and those that did not, we replicate the graphical analysis of figure 1. This is shown in figure 2; the dashed line refers to non-family firms, the other to family firms.

The growth rate of credit appears very different before and after the crisis for the two types of banks. This implies that the decision to change lending technology is likely correlated with the severity of the

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[20]It is important to remind that we are measuring changes in the relative importance of soft information, not absolute levels. Hence, "non soft-type" banks could be those that were attaching, already before October 2008, a high value to soft information in their lending decision. However, the estimates of the Z-score variable in table 6 suggest that there is a strong positive association between the relative and the absolute measures of soft information.

[21]Weights are equal to the relative share of credit granted to firm *i* by bank *j* over the total amount of credit granted to that firm, in the time window 1st of October 2007 - 30th of September 2008

[22]The first of the two lines considers revocable loans only, while the second lines sums up revocable loans with term loans

Figure 2: Bank lending and heterogeneity in screening technologies
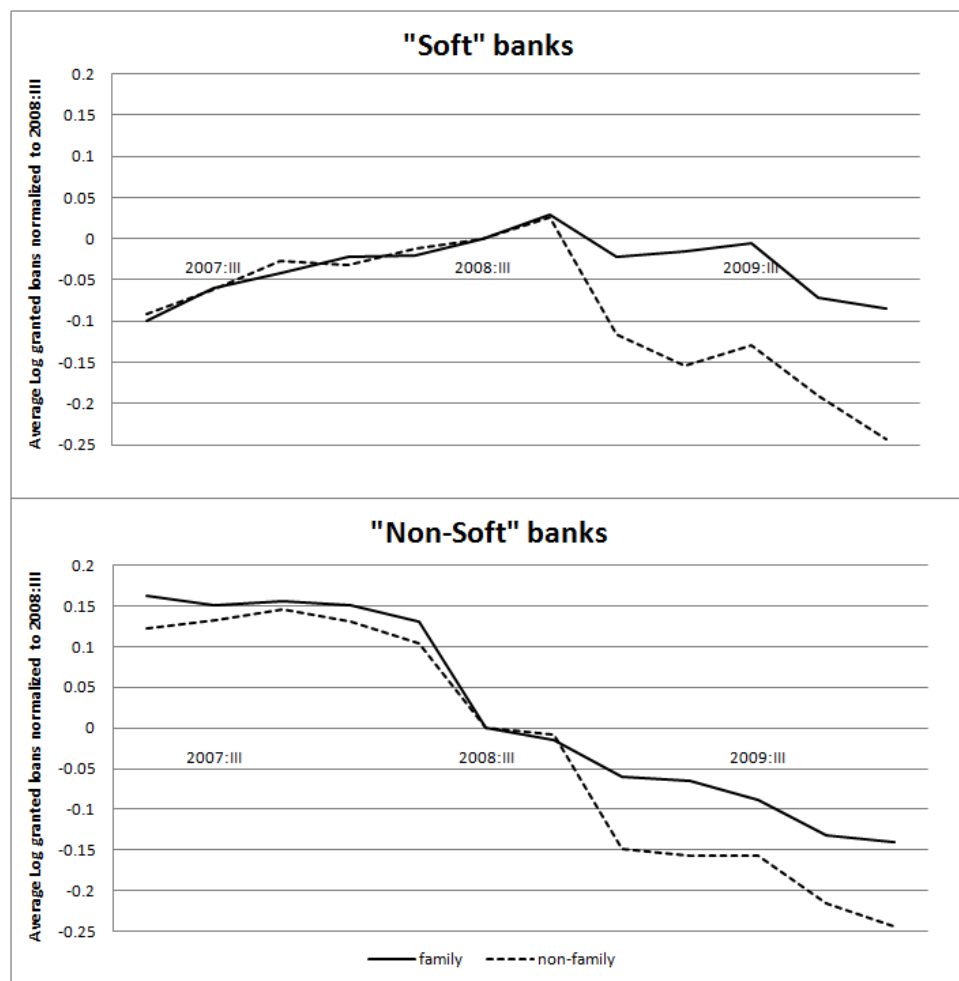
shock suffered by those banks. While the credit granted by "non-soft" banks was already declining in the period preceding October 2008, the growth rate of credit granted by "soft" banks was increasing until the end of 2008 and then, at the onset of the recession, started shrinking. In particular, we can observe that for the latter banks, there was no difference between family and non-family firms before the Lehman brothers bankruptcy shock; following October 2008, the difference emerged. For the "non-soft" group, it seems that a difference between family and non-family firms already existed before the crisis and that, following the shock, the difference weakly started to widen.

To test whether the differences in figure 2 are statistically significant after controlling for observed heterogeneities between family and non-family firms, we can re-estimate equation (1), splitting the total amount of loans granted for each firm into two groups, corresponding to loans from "soft" and "non-soft" banks. Results are reported in table 6.

Insert Table 6 here

Results suggest that the difference between family and non-family firms is statistically significant only for those banks that reported an increase in the use of soft information, following October 2008. In particular, family firms experienced a drop in the growth rate of credit that was of about 6 percentage points lower than for non-family firms, *ceteris paribus*. This result validates the prior that soft information played a crucial role in explaining the observed difference in access to bank lending for family firms. Consistently with the previous discussion, we find that high values of the Z-score, captured by the risk dummy, negatively (and significantly) affect the dynamics of credit granted for "non-soft" banks, while it plays no role in explaining the lending decision of banks that rely more on soft information. This last piece of evidence is also in line with Garcia-Appendini (2011), showing that, for banks that do not have access to soft information, the propensity to grant a loan is more sensitive to changes in the values of publicly available variables.

4.1. Controlling for unobserved firm heterogeneity

The final set of results fully controls for unobserved time-varying heterogeneity at the firm level, and in particular for demand-side effects. We exploit the existence of multiple lending within our sample and we include firm fixed-effects in the following regression model:

$$\triangle_t logLoans_{ij} = \alpha + \beta_0 \triangle_t Soft_j + \beta_1 Family_i \triangle_t Soft_j + \gamma Z_{ij} + f_i + \epsilon_{ij} \qquad (3)$$

where $\triangle_t logLoans_{ij}$ is the change in *log* loans for firm *i* from bank *j*; $\triangle_t Soft_{ij}$ is a dummy equal to one if bank *j* increased the importance attached to soft information after October 2008; Z_{ij} includes the share of loans from bank *j* to firm *i*, relative to total loans for firm *i* and the length of the bank-firm relationship, both measured at the end of September 2008 and controls for loan-specific demand effects that may vary between banks for family and non-family firms, due to heterogeneity in the banks' screening processes; f_i

is the firm fixed-effect. This estimation strategy is analogous to that proposed by Khwaja and Mian (2008), as the firm fixed-effect controls for demand effects that are invariant with respect to bank characteristics.

Our estimate of interest is now represented by the coefficient β_1, which identifies the interaction between the family firm dummy and $\triangle_t Soft_{ij}$. This parameter captures whether, after controlling for unobservable firm characteristics, banks' use of soft information affected the supply of credit to family and non-family firms. Intuitively, the coefficient β_1 measures whether the difference in the family firm dummies between the two columns of table 6 is supply-driven. Given the evidence in table 5, the identifying assumption, similar in spirit to that of Rajan and Zingales (1998), is that the different lending behavior of the two types of banks to family and non-family firms is caused by the change in the use of soft information. Results are shown in table 7.

Insert Table 7 here

Results in columns (1) and (2) show that, for those banks that increased the importance attached to soft information, family firms experienced a relatively smaller credit contraction compared to non family firms. The effect is statistically significant and economically relevant (the difference is around 8 percentage points). Therefore, we can credibly argue that soft information, by uncovering their higher degree of reliability, helped family firms mitigate the adverse consequences of the financial crisis.

5. Investments, employment and economic performance

In this last section we analyze the real effects of the financial crisis to see whether differences arise between family and non-family firms in the 2007-2009 period. As highlighted in the introduction, we relate our results to the growing literature, that followed the 2008 financial crisis, about the effects of bank lending shocks to the real economy. Specifically, in table 8, columns (1) to (4), we use as dependent variable the log difference in physical capital expenditures, in intangible asset investments, in the number of employees and in the average wage respectively; in column (5), instead, the dependent variable is the absolute difference in the return on equity (ROE). We use balance sheet figures at the end of 2007 and of 2009, that is the year the preceded and the one that followed the bankruptcy of Lehman Brothers. We control for the sector of activity, the geographical area where headquarters are established, the year of foundation, the size and the total leverage of the firm. Unfortunately, due to missing balance-sheet data on the dependent variables for some firms, the number of observations is not constant throughout the analysis.

Insert Table 8 here

Results show that while family and non-family firms did not differ significantly in terms of investments (both in tangible and intangible assets), a negative and significant difference emerges in terms of the change

in the number of workers. In particular, the reduction in the number of employees has been 2.6 percentage points lower for family firms compared to non-family ones. This difference is not mirrored by a change in the average wage, suggesting that the reduction in the employment levels was homogenous across classes of workers. These results are consistent with recent findings by Sraer and Thesmar (2007), Bassanini *et al.* (2013) and D'Aurizio and Romano (2013), showing that workforce levels in family firms tend to be less sensitive to negative shocks. Finally, the reduction in ROE was less severe for family firms by 2 percentage points, and this difference is statistically significant at conventional levels. These results tend to corroborate the hypothesis that the credit re-allocation towards family firms has been ex-post efficient from the banks perspective, rejecting the alternative explanation of a matching between family owners trying to tunnel resources out of the company and opportunistic loan officers gaining private benefits at the expense of bank's shareholders[23].

6. Conclusions

In this paper we have studied the credit allocation decisions of Italian banks following Lehman Brothers' failure. We have found that corporate ownership is an important source of firm heterogeneity. In particular, the presence of a family block-holder had a positive effect in mitigating the agency conflict in the borrower-lender relationship. This effect was strongly related to an increase in the use of soft information by Italian banks in their lending practices following October 2008. The main result is robust to different specifications of our empirical model. We have been able to control for *ex-ante* observable differences between family and non-family firms and also to exclude the existence of significant "lock-in" effects that could potentially reduce the capabilities of firms to hedge bank specific shocks, thanks to the highly detailed data available on bank-firm relations. Finally we controlled for unobserved heterogeneity, confirming that the credit allocation was driven by a change in the credit supply. At the same time, this difference in credit availability was not mirrored by a contenporaneus difference in capital investments, while it was associated with a lower contraction in the total workforce for family firms.

Our results indicate that it is crucial to look at heterogeneity on both sides of the borrower-lender relationship when studying the propagation of adverse shocks through bank lending. Moreover, our paper, in line with other recent contributions in the literature, highlights the importance of soft information during crises in mitigating the negative effects of a credit crunch.

Finally, notice that our results are not inconsistent with the standard flight-to-quality of credit from smaller (and relatively more opaque) firms to larger (and relatively more transparent) ones as a result of negative shocks hitting the banking sector. We complement the existing evidence (including the recent

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[23]We also checked that the *ex-post* ratio of delinquent loans over total granted loans and the default rate between family firms and non-family firms were not significantly different.

contribution by Iyer *et al.* (2014)) showing that, within the same firm size class, there is a difference in the dynamics of credit supply depending on the corporate ownership structure. Nonetheless, our analysis primarily concerns the effects of an uncertainty shock hitting the Italian banking sector at the end of 2008 that did not involve also a negative liquidity shock (except for some larger banks). Therefore, a natural extension of our analysis is to explore whether the different lending behavior to family and non-family firms is observed also in times when the financial stability of the banking sector gets weakened. In this case, the demand by financial markets and regulators for more transparency into the banks' operating performances may induce a higher reliance on hard information in the screening process, lowering the relative advantage of family firms in accessing bank lending in times of crisis.

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7. Appendix

7.1. Data construction

The CR database records all the loans granted by Italian banks that exceed a minimum threshold. The threshold is determined by summing up all the types of loans granted to an individual firm by a bank into three main categories:

1. short-term lines of credit (analyzed in this paper),

2. collateralized credit lines, mortgages, etc.,

3. advances, etc.

The threshold changed over time: it was 75,000 euros up to September 2008 and then reduced to 30,000 euros. For missing observations we proceed as follows:

- when an observation for a specific line of credit at the bank-firm level is missing in some of the quarters between 1st October 2007 and 30 September 2009, we consider the total value of loans issued by the individual bank,

- if the total amount of loans is above the threshold, we assign zero to that observation,

- if the total amount of loans is below the threshold, we compute its expected value (37,500 before October 2008 and 15,000 afterwards) and divide it by three (the number of components in the total amount) and assign the resulting value to the observation.

The inclusion of zeros poses a problem when we estimate the *log* difference in loans granted at the individual bank-firm level. We therefore exclude these observations from the sample, instead of arbitrarily changing their values to a positive integer. However, the occurrence of these observations is limited both in terms of their number and their economic relevance, as table 9 clearly shows.

Insert Table 9 here

7.2. Collateral channel

The observed differences in the change of credit granted to family and non-family firms could also be the result of the different abilities of these two types of firms to provide hard and verifiable collateral to banks. Although our analysis is conducted on call loans only (not directly affected by the ability of firms to provide collateral assets), some degree of substitutability with collateralized term loans could exist. To overcome this type of concern, we confirmed our findings by re-estimating the empirical models in the paper, using the sum of call and term loans as dependent variable. As already outlined in section 2, the estimates were qualitatively similar and statistically significant. An alternative hypothesis is that a certain degree of

complementarity could exist between call loans and collateralized term loans. In particular, a bank may be more willing to grant call loans to firms that have already pledged collateral on their term loans. Given that we cannot insert the change in collateral for each firm as regressor in the analysis due to endogeneity issues, we address this concern by estimating a model where the dependent variable is the *log* difference of the average amount of collateral pledged for each firm between two time windows: the 1st of October 2007 - 30th of September 2008 and the 1st of October 2008 - 30th of September 2009. Results from table 10, columns (1) and (2), clearly show that the family firm dummy has no explanatory power on the change in the dependent variable. This finding reassures us that the results outlined in the paper are not driven by systematic differences between family and non-family firms in the elasticity of collateral provision.

Insert Table 10 here

7.3. Interest rate

In table 10, columns (3) and (4), we analyze the cost of borrowing, to check whether differences in the change in the (net) interest rate charged to family and non-family firms exist. In order to do so, we exploit the information contained in a special survey conducted by the Bank of Italy on a subsample of Italian banks (about 200). Unfortunately, this comes at the cost of reducing significantly the number of observations we can include in our estimation. In the regression analysis, the dependent variable is the difference of average interest rates charged on outstanding loans between two time windows: the 1st of October 2007 - 30th of September 2008 and the 1st of October 2008 - 30th of September 2009. Interest rates are weighted by the relative amount of granted credit for each bank-firm relationship. Results show that interest rates went down in the period under consideration (as a result of ECB interventions in the interbank market), but no differences emerged between family and non-family firms.

7.4. Other financing channels

Given that family and non-family firms differ on average in terms of size, it is possible that the biggest firms may finance their activities by directly accessing the capital market through equity or bond issuance. Therefore, despite we already control for size in our analysis, for the sake of completeness, we re-estimate the main model, excluding firms that in the period 2008-2009 proceeded with equity or bond issuances/payouts. This is the most precise information that we can obtain from the dataset Invind regarding all the firms in the sample. We find that 16% of the firms in our sample changed at least 0.1% of their capital financing structure; in particular the percentage of family firms is 14.5% while for non-family firms it is 20%. By re-estimating equation 1 and by excluding those firms that accessed the capital market directly, we find that our findings are still robust; the significance and the magnitude of the family dummy is always strong for all the specification of the model. This finding further reassures us that the size of the firms is not the main driving force behind our findings.

8. Tables

Table 1: Summary Statistics for family and non-family firms, prior to the shock

	Non-Family			Family			Mean Diff.	
	Mean	St. Dev.	Median	Mean	St. Dev.	Median		Obs.
Panel A:*Firm characteristics:*								
Foundation	1976.88	22.79	1981.00	1973.88	24.20	1979.00	3.00***	2909
Employees (2008)	421.63	1324.20	100.00	170.06	422.20	60.00	251.60***	2909
SMEs (%)	.63	.48	1	.78	.41	1	-0.15***	2909
North (%)	.46	.50	0	.39	.49	0	0.07***	2909
Center (%)	.24	.43	0	.22	.41	0	0.02	2909
South (%)	.31	.46	0	.40	.49	0	-0.09***	2909
Roe (2007)^a (%)	6.25	6.97	4.9	6.40	6.13	5.26	-0.15	2741
Leverage (2007)^a (%)	.44	.49	.31	.51	.51	.40	-0.07***	2200
Cashflow/Revenues (2008)	.06	.12	.05	.04	.42	.05	0.02*	2781
Change in sales$_{2008-09}$ (%)	-.14	.29	-.09	-.16	.27	-.12	0.02*	2909
Panel b:*Bank-Firm relation:*								
Zscore (2008)	4.50	1.82	4	4.30	1.76	4	0.20***	2641
Bank Leverage (2007) (%)	.39	.46	.27	.44	.42	.35	-0.05**	1710
N bank relations	6.64	5.01	5.00	7.60	5.03	6.00	-0.96***	2848
Share first bank (%)	.56	.24	.51	.48	.21	.44	0.08***	2909
Share second bank (%)	.22	.11	.21	.22	.09	.22	-0.00	2763
Share third bank (%)	.12	.07	.12	.13	.06	.13	-0.01***	2535
Share fourth bank (%)	.08	.05	.08	.09	.05	.09	.01***	2253
Herfindal index	.45	.21	.30	.36	.23	.32	0.09***	2909

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. SMEs are defined as having 250 employees or less and annual sales less than 50 millions euro. Rating takes values between 1 and 9, increasing in the borrower's risk. ^{a} extreme values were recoded at the 1th e 99th percentiles because of outliers in these variables. Leverage is measured as total debt over total assets in 2007; ROE is calculated as net profit over total equity in 2007. N of bank relations and Herfindal index (measured in terms of loans concentration at the firm level) measured at the end of September 2008.

Table 2: Summary statistics of the change in *log* lending

log(loans)$_{09}$-log(loans)$_{08}$:	Mean	St. Dev.	Median	Observations
aggregated at the firm level	-.08	.42	-.03	2851
at the bank-firm level	-.15	1.01	0	15212

log(loans)$_{09}$-log(loans)$_{08}$ is the log difference of the average granted loans in the time windows 1st October 2007 - 30th September 2008 and 1 October 2008 - 30 September 2009. When aggregated at the firm level, it implies that in each quarter all bank loans for each firm are summed, and then the *ex-ante* and *ex-post* averages computed. When considered at the bank-firm level, it implies that, for each loan from a single bank to a single firm, the ex-ante and ex-post averages are computed. At the aggregate level, we cut the distribution at the 1th e 99th percentiles of the distribution to control for outliers. At the bank-firm level we consider only those observations relative to firms analyzed at the aggregate level.

Table 3: Granted loans and family firms

	Dependent variable: $\Delta_t logLoans_i$			
	(1)	(2)	(3)	(4)
Family	0.0577***	0.0625***	0.0481**	0.0514**
	(0.0168)	(0.0204)	(0.0203)	(0.0234)
log(Size)		-0.0206**	-0.0203**	-0.0196
		(0.0093)	(0.0092)	(0.0174)
Risk		-0.0416**	-0.0543***	-0.0323
		(0.0190)	(0.0189)	(0.0203)
Leverage		0.0110	0.0132	0.0005
		(0.0185)	(0.0186)	(0.0016)
% Change in sales$_{2008-09}$		0.0584	0.0643	0.0694
		(0.0449)	(0.0450)	(0.0513)
Year of foundation		0.0001	0.0001	0.0009**
		(0.0004)	(0.0004)	(0.0004)
Share first			-0.2585***	0.2119***
			(0.0483)	(0.0549)
Constant	-0.1180***	-0.2190	-0.1568	-1.7296
	(0.0139)	(0.8890)	(0.8770)	(0.9545)
Other controls	No	Yes	Yes	Yes
Observations	2851	2026	2026	1473

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Leverage is measured at the end of 2007. Share first measured at the end of Sep. 2008. Other variables are measured at Dec. 2008. Other controls include 11 sector dummies, 3 geographical dummies, cash-flow over revenues and weighted length of the relations. SMEs are defined as having 250 employees or less and annual sales less than 50 millions euro. For all the specifications we cut the 1th e 99th percentiles of the dependent variable to control for outliers.

Table 4: Robustness checks

Dependent variable	$\Delta_t logLoans_i$			$\Delta_t logLoans_{ij}$	
	(1)	(2)	(3)	(4)	(5)
Family	0.0447**	0.0451**	0.0578*	0.0416**	0.0446***
	(0.0201)	(0.0204)	(0.0340)	(0.0197)	(0.0164)
Foreign	-0.0338				
	(0.0569)				
Group affiliation		-0.0451**			
		(0.0211)			
Concentration			-0.0009*		
			(0.0005)		
Controls	Yes	Yes	Yes	Yes	Yes
Bank fixed-effects	No	No	No	No	Yes
Observations	2026	2009	911	15212	15212

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. For columns (1) and 3: Robust standard errors in parentheses. Controls are those included in column (3) of table **??**. We cut the 1 and 99 percentile of the dependent variable to control for outliers. For columns (4) and (5): controls are those included in column (3) in table table **??**, plus the share of loans from bank j to firm i, relative to total loans for firm i, and the length of the bank-firm relation, both measured at the end of September 2008. In column (4) we compute robust standard errors clustered at the firm level, while in column (5) clusters are derived at the bank level.

Table 5: Summary Statistics for Non-Soft and Soft banks

	Non-Soft		*Soft*		*Difference*
	Mean	Obs.	Mean	Obs.	
Pre-crisis capital ratio	.126	210	.120	117	.006
	[.062]		[.0.05]		
Pre-crisis weighted average length of the bank-firm relationship (measured in years)	7.353	213	6.852	119	.501
	(3.334)		(3.720)		
Pre-crisis weighted average net interest rate (%)	2.882	213	3.127	119	-.245
	(4.836)		(4.458)		
Pre-crisis share of granted credit to family firms (1)	.614	213	.649	119	-.035
	(.352)		(.326)		
Pre-crisis share of granted credit to family firms (2)	.606	213	.626	119	.020
	(.345)		(.316)		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Granted credit amounts are labeled with (1) or (2). (1) refers only to revocable loans. (2) refers to the sum of revocable loans plus term loans. Pre-crisis period refers to average values in the time window: 1st of October 2007 - 30th of September 2008. Capital ratio is defined as total equity over total assets for each banks; it is measured at the second quarter of 2008. % of big banks is the share of big banks as defined by the bank of Italy. Weighted average length of credit relation is measured as the number of years of each bank-firm relationship at October 2008. Weights are equal to the relative share of credit granted to firm i by bank j, over the total amount of loans granted to that firm, in the time window 1st of October 2007 - 30th of September 2008. Weighted average net interest rate is the average interest rate in the time window 1st of October 2007 - 30th of September 2008 for each bank-firm relationship which it is observable; weights are constructed as explained above. Standard deviations in square brackets.

Table 6: Estimation results: Soft information and family firms

	Dependent variable: $\Delta_t logLoans_i$	
	"Non-Soft"-type banks	"Soft"-type banks
	(1)	(2)
Family	0.0046	0.0731**
	(0.0343)	(0.0344)
log(Size)	-0.0679***	-0.0072
	(0.0149)	(0.0156)
Risk	-0.0804***	-0.0088
	(0.0295)	(0.0293)
Leverage	-0.0003	-0.0122*
	(0.0050)	(0.0069)
% Change in sales$_{2008-09}$	0.1078*	-0.0597
	(0.0646)	(0.0719)
Year of foundation	-0.0004	-0.0003
	(0.0006)	(0.0009)
Share first	-0.2925***	0.0318
	(0.0810)	(0.0920)
Constant	1.1092	0.6528
	(1.2401)	(1.7806)
Other controls	Yes	Yes
Observations	1970	1827

Robust standard errors in parentheses, clustered at the firm level.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Length of the relation and Share of the bank measured at the end of Sep. 2008. Other controls include 11 sector dummies, 3 geographical dummies, cash-flow over revenues and weighted length of the relations.

Table 7: Banks' heterogeneity in the screening process

	Dependent variable: $\Delta_t logLoans_{ij}$	
	(1)	(2)
Δ_tSoft	0.0995***	0.0642*
	(0.0353)	(.0352)
Δ_tSoft x Family	0.0797*	0.0845**
	(.0424)	(0.0420)
Share of the bank		-1.0583***
		(0.0773)
Length of the relation		-0.0094***
		(0.0030)
Constant	-0.1804***	-0.0530**
	(0.0082)	(0.0240)
Firm fixed-effects	Yes	Yes
Observations	12864	12864

Robust standard errors in parentheses, clustered at the firm level.* $p <$ 0.10, ** $p < 0.05$, *** $p < 0.01$. Length of the relation and Share of the bank measured at the end of Sep. 2008.

Table 8: Estimation results: Real outcomes

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	$\Delta_t logTang.Inv_i$	$\Delta_t logIntang.Inv_i$	$\Delta_t logEmploym._i$	$\Delta_t logWage_i$	$\Delta_t ROE_i$
Family	-0.0690	-0.0364	0.0259***	0.0128	2.028*
	(0.0830)	(0.108)	(0.00998)	(0.0134)	(1.113)
log(Size)	-0.0837	-0.363*	0.0955***	0.0149	-1.114
	(0.178)	(0.217)	(0.0213)	(0.0367)	(2.720)
Leverage	-0.0995	-0.0413	0.00376	-0.00184	0.381
	(0.0889)	(0.0777)	(0.00773)	(0.0114)	(0.950)
Year of foundation	-0.00181	-0.000439	0.000414***	0.000227	0.0126
	(0.00158)	(0.00206)	(0.000158)	(0.000249)	(0.0248)
Constant	3.999	1.966	-1.116***	-0.436	-25.17
	(3.253)	(4.242)	(0.313)	(0.499)	(49.32)
Other controls	Yes	Yes	Yes	Yes	Yes
Observations	1801	1046	2037	1395	1833

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Other controls include 11 sector dummies, 3 geographical dummies, and the square of log(size).

Table 9: Appendix - Comparative statistics for the bank-firm loan observations (euro)

	Mean	Median	Obs.
Before October 2008:			
Bank-firm relations disappeared after Sept. 2008	247,692	11,267	458
Bank-firm relations considered in the analysis	710,715	100,000	19,722
After October 2008:			
New bank-firm relations appeared after Sept. 2008	178,746	6,250	438
Bank-firm relations considered in the analysis	672,147.8	100,000	19,722

Table refers to bank-firm loan averages either for the period 1st October 2007 - 30th September 2008 (Before October 2008) or for the period 1st October 2008 - 30th September 2009 (After October 2008)

Table 10: Appendix - Collateral channel, Interest rates

Dependent variable:	$\Delta_t Collat.ratio_i$		$\Delta_t Netinterestrate_i$	
	(1)	(2)	(3)	(4)
Family	-0.0359	-0.0822	0.0019	-0.0023
	(0.0636)	(0.0727)	(0.0080)	(0.0087)
log(Size)		-0.0124		-0.0098*
		(0.0235)		(0.0056)
Risk		-0.0670		0.0051
		(0.0625)		(0.0108)
Leverage		0.136		-0.00917*
		(0.0827)		(0.00514)
Cashflow/Revenues		0.0148		-0.0013
		(0.0297)		(0.0010)
% Change in sales$_{2008-09}$		-0.0665		-0.0132
		(0.0881)		(0.0119)
Share first		-1.028*		-0.0440
		(0.571)		(0.0764)
Constant	0.154***	-2.700	-0.0291***	-0.4100
	(0.0524)	(1.865)	(0.0067)	(0.4550)
Other controls	No	Yes	No	Yes
Observations	1182	841	998	863

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Leverage is measured at the end of 2007. Share first measured at the end of Sep. 2008. Other variables are measured at Dec. 2008. Other controls include 11 sector dummies, 3 geographical dummies, firm's year of foundation and weighted length of the relations. For columns (1) and (2) we cut the 1th e 99th percentiles of the dependent variable to control for outliers.