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THE ROLE OF SOFT INFORMATION DURING A CRISIS

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Family firms and the agency cost of debt: The role of soft information during a crisis [☆]

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Abstract

In this paper we study how access to bank lending during the recent financial crisis differed between family and non-family firms. Our theoretical prediction is that the presence of a family block-holder in the company attenuated the agency conflict in the borrower-lender relation, because of the higher non-monetary cost of default entailed in this type of corporate ownership structure. Because this information is to a large extent soft, we further investigate the interaction between the family firm status and the screening technology adopted by banks. Using highly detailed data referred to Italy, we exploit the change in the credit allocation following Lehman Brothers' bankruptcy. We find that family firms experienced a contraction in granted credit lower than non-family firms. Results are robust to ex-ante differences between the two types of firms and to bank-specific shocks. In line with our prior, banks that increased the role of soft information in their lending practices reallocated credit towards family firms.

Keywords:
Family Firms, Financial crisis, Relationship lending, Soft information, Credit supply
JEL: C81, D22, E44, G21, G32

1. Introduction

It is well established in the economic literature that financial frictions play an important role in determining business cycle fluctuations (see Quadrini (2011), for an overview). In particular, information asymmetry characterizing the borrower-lender relation can amplify initial shocks by disproportionately affecting some types of firms with respect to others, with significant real effects for the economy. In fact, as shown by Bernanke *et al.* (1996), during a recession, firms facing high agency costs tend to receive a relatively lower amount of credit, thus suffering a proportionally larger decline in their activity.

The question that naturally follows is then to identify which firms are more likely to be adversely affected by the existence of such agency costs. To a large extent, this issue, despite the substantial amount of existing research, is still open. Indeed, the standard flight to quality mechanism, describing the reallocation of credit towards more creditworthy borrowers, is typically centered around the dichotomy small-large firms. Gertler and Gilchrist (1994) showed empirically that small firms suffered more than large ones the consequences of negative monetary shocks hitting the U.S. economy in the early 1990s. More recently, Khwaja and Mian (2008) found similar results by exploiting the consequences of negative financial shocks in Pakistan.

However, we argue that other dimensions of firms heterogeneity, in addition to size, are likely to play a substantial role in explaining the propagation of financial shocks. In particular, we focus on the heterogeneity coming from the corporate ownership structure, namely the existence of a family-block-holder within the firm, to study how this interacts with the bank borrowing channel. By exploiting the Lehman Brothers' failure in September 2008 as a natural experiment, it is possible to estimate how family and non-family firms were asymmetrically affected by a common shock in their access to bank lending.

Our interest in the role played by family firms during a financial crisis is justified both theoretically and empirically. Burkart *et al.* (2003), and more recently Bandiera *et al.* (2012), highlighted that family block-holders attach a value to firm control which is not only represented by the monetary return of their investment but includes also an an amenity component, that is utility gained by control *per se*. This amenity component can be thought as the personal status acquired thanks to the identification of the family name with the firm success, or as the desire to transfer the firm to descendants. Therefore it translates into higher non monetary costs of default, that reduce the incentive for the borrower to stall resources at the expense of the lender (thus avoiding the so-called the risk-shifting problem, as highlighted by Jensen and Meckling (1976). The above idea can be summarized by the following quote by the family owner of an Italian firm:

"If the firm fails, also the family fails"[1]

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[1]Translation from Italian. The original text can be found in the on-line version of "Il fatto quotidiano" newspaper, the 10th of January 2012.

Our argument is that the non-monetary cost of default attached to family firms, by reducing the ex-post losses suffered by lenders, plays a significant role in explaining bank lending behavior. This is especially true during a period of economic downturn in which firm profitability shrinks; in fact, this may induce managers to undertake risky projects in order to restore the shareholder value. In a classical borrower-lender agency problem (**?**) this implies an higher reliability of the family firms that translates into less tight borrowing constraints.

On the other hand, as pointed out by Villalonga and Amit (2005) and Ellul *et al.* (2009), family block-holders may have a higher incentive to extract private benefits at the expenses of minority shareholders and creditors, because, differently from non-family block-holders, this benefit is concentrated in the hands of a family. Moreover, because the crisis reduces the expected returns of investments, it could also exacerbate the incentive to divert resources out of the company (Linz *et al.* (2012)). As a result, banks may be induced to dry up resources towards this type of firm and reallocate them to non-family firms. However, as the risk of failure is amplified during an economic crisis and could be exacerbated if resources are voluntarily diverted out of the firm, we can expect that strategies not aligned with the objective of preserving the business are less valuable for family firms.

Family firms have been extensively investigated in recent years. The reasons is that they represent a widespread phenomenon all around the world, characterizing not only small and medium sized enterprizes (SMEs) but also listed companies (see for instance Bertrand and Schoar (2006)[2]. As a consequence, their ability to access financial markets has significant consequences for the real economy. We devote our attention to the bank lending channel because it is well known that banks play a crucial role in providing credit to firms, especially when firms have no direct access to the capital market (in our sample, bank lending represents 85% of total debts).

We investigate our research question by using highly detailed data which cover 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. These data enable us to include firms of different sizes in our analysis, and in particular smaller ones (with number of employees between 20 and 49), for which detailed information is typically unavailable.

We cover the time period spanning from September 2007 to September 2009, enabling a comparison before and after the Lehman Brothers' bankruptcy and the contagion of the US financial crisis to European countries. The choice of October 2008 as the identifying date of the financial crisis is driven by the nature of the shock represented by Lehman Brothers' failure. As pointed out by Albertazzi and Marchetti (2010), this event was exogenous to the Italian financial sector and largely unexpected. Moreover, this event dramatically increased banks' uncertainty on potential losses, and reduced their propensity to lend (captured

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

by the tightening of credit access criteria, periodically measured by the ECB Bank Lending Survey).

Our empirical analysis reveals that family firms, one year after the Lehman Brothers' failure, experienced a decline in the aggregate growth rate of loans which is both lower and statistically significant with respect to comparable non-family firms, of around 5%. Results are robust to the inclusion of a rich set of observable characteristics aimed at excluding correlations of the family firm status with confounding factors and to control for possible differences in demand for credit. Results hold true also when looking at single bank-firm relations, that allow to control for idiosyncratic bank shocks. We also show that this differential effect is not driven by the nationality of the controlling shareholder, nor by a different degree of share concentration of family and non-family block-holder, but on the contrary to firm control by the family *per se*.

Results are coherent with the interpretation that concerns about the reputation of the family have been recognized as valuable by the Italian banks.[3] In line with our theoretical prediction, they also reject the alternative hypothesis that family firms could have been perceived as riskier by banks because of their higher willingness to extract private benefits from the company.

Since our analysis focuses on bank-firm relations, we can also investigate the role of relationship banking during the crisis. In particular, we study how the asymmetric access to credit depends on the heterogeneity in banks screening technologies. To the best of our knowledge this represents a novel in the literature of corporate finance, as previous studies on the relation between bondholders-shareholders are centered around the heterogeneity from the firms side only. As shown by Fama (1985), banks have a special relation with borrowers due to their access to "inside" information, whereas public debtholders must rely mostly (if not exclusively) on publicly available information (balance-sheets, ratings, etc.) to make investment decisions. This inside information is typically soft. Opposite to hard, it comprises qualitative information collected by the loan officer about the creditworthiness of the borrowers which cannot be transmitted to other lenders and thus is not verifiable by third parties[4]. Because the information regarding the non-monetary cost of default is to a large extent soft, we can expect the differential effect for family and non-family firms in the dynamics of credit to depend on banks' ability to process this type of information. In other words, we can expect the two dimensions of heterogeneity (the family firm status and the adoption of soft-intensive screening technologies) to positively interact in determining an easier access to bank lending. Coherently with this theoretical prior, we find that banks that increased the role of soft information in the lending technology, after October 2008, reallocated significantly their credit towards family firms. We also checked and found that for these banks the share of loans granted to family firms is not statistically different with respect to

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[3]Our results are in line with previous evidence from a sample of US listed companies by Anderson *et al.* (2003), despite the significant differences in the two samples analyzed (only 1% of the companies are listed in our sample), the time period covered, and the type of debt contracts considered (bonds rather than bank debt).

[4]For a detailed discussion of the definition and relevance of soft information, see Petersen (2004).

more hard-information based banks, in order to exclude the possibility of ever-greening practices (Peek and Rosengren (2005)).

The rest of the paper is organized as follow: section 2 presents the data used for the analysis and provides some descriptive statistics on 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 single bank-firm relations, focusing on the interaction between bank lending technologies and family firm status; section 5 concludes.

2. Data sources and descriptive statistics

For the purpose of our analysis, we exploit the information about bank-firm relations, firm corporate governance, firm balance-sheet data and bank organization. Accordingly, our dataset results from four main databases: Invind, Cerved, Centrale dei Rischi (CR) and a special survey on the Italian banks, run by the Bank of Italy in 2009. Each observation is then represented by a triplet of firm-quarter-bank dimensions over the period 2007-2009.

Invind is a survey conducted yearly by the Bank of Italy (Bank of Italy (2011)), on a representative sample of Italian non-financial companies. It collected information on the variables concerning the family status of the firms for three consecutive waves. We can observe the family firm status up to the beginning of 2009 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?"[5]

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 of the company's websites. Amadeus is a European database that provides qualitatively and quantitatively information on firm ownership structure. This approach to the definition of family firms, which relies on self-reported information, can overcome the typical identification problem of measuring the stake of the ultimate owner in order to define firm control (see Ellul *et al.* (2009)). Additionally, for a sub-sample of observations (industrial firms with at least 50 employees) we are also able to quantitatively assess the specific distribution of the firm stakes between controlling and minority shareholders, in order to measure how the degree of concentration of the controlling shareholder affects firm behaviors.

In order to recover balance-sheet data (total assets, leverage, ROE among others), we used the the local Italian Chambers of Commerce's official information collected in the CERVED archives.

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[5]Translated from Italian.

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 the firms, with quarterly frequency. This information enables us to construct unique bank-firm relations for each quarter. We focus on revocable credit lines only, due to the homogeneity underlying this type of contracts and because they can be easily renegotiated unilaterally by banks.[6] 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.[7]

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. Crucially, this survey contains a variable referred to the change in the use of soft information during the screening process, as a result of the financial crisis. In particular, banks were asked, in relation to the lending practices towards firms:

"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"[8]

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 1808 family firms and 1101 non-family firms (family firms represent around 60% of the sample).

Table 1, panel A, provides a summary description of the characteristics of our sample of firms, where family and non-family firms are presented separately. From there, we notice that family firms were much smaller on average at the end of 2008 (a result well known in the literature), slightly older and with a lower penetration in the North of Italy (and conversely a higher penetration in the South) compared to non-family firms. Moreover, family firms are more indebted on average prior to the crisis, suffered slightly more the contraction in sales relative to non-family firms and generated less cashflow 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.

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[6]CR distinguishes between call loans and term loans. When call loans is granted, banks can call them unilaterally at any moment in time, while granting term loans implies that banks typically have to wait 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 specificity of the financial instrument considered, we also re-estimated all the empirical models summing together call and term loans. Results are qualitatively the same, even if the inclusion of term loans naturally alters the value of the parameters of interest, due to the existing differences between these two types of loans.

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

[8]Translated from Italian.

Table 1, panel B, instead, provides summary statistics regarding firm-bank relations. From there, it appears that family and non-family firms had similar risk profiles, as measured by the Altman Zscore[9] (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 relevant phenomenon within our sample, with more than 87% of firms having relations with at least 3 different banks. Family firms have a higher average number of relations compared to non-family firms, and this result is in line with recent findings by Guiso and Minetti (2010)[10]. This finding explains a different degree of loan concentration for family firms, as measured by the Herfindal index and also as captured by the relative shares of single banks financing the firm activity (particularly the first bank).

Insert Table 1 here

3. Bank lending and corporate ownership

3.1. Graphical inspection

In this section we establish whether or not firms suffered asymmetrically a contraction in the bank lending, depending on their corporate ownership structure. In order to do so, we first look at the overall exposure of the firms with respect to the banking sector, in terms of amount of granted credit lines. In particular, we aggregate the multiple observations of different banks for each firm.

Figure 1 examines non-parametrically the bank lending channel by plotting separately the dynamics of average granted loans for family and non-family firms. 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[11], and, to ease comparability, we normalize to zero the observations relative to the end of the third quarter of 2008. The y-axis can then be interpreted as the growth rate of the outstanding loans relative to that quarter.

Insert Figure 1 here

The figure provides some very useful information. First of all, it confirms that the choice of Lehman Brothers' bankruptcy as the identifying date of the credit shock in Italy was reasonable, as the average growth rates in outstanding loans started to decline during the third quarter 2008. Interestingly, the figure

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[9]This index, built on balance-sheet figures, can take values between 1 and 9. Higher values imply increasing probability of default.

[10]They use concentrated ownership as a proxy for the degree of informational transparency 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.

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

shows that after the sudden drop occurred in September 2008, the dynamics of granted loans for both family and non-family firms remained stable up to the beginning of 2009, after which we observe a further and steadily decline that continued for the rest of the period we consider.

Moreover, the difference in the growth rates of granted loans between family and non-family firms appears to be insignificant both during the period that preceded the negative shock and immediately after it, while the divergence between the two groups can be observed starting from 2009:I and it amplifies in subsequent quarters. It seems that at the beginning the sudden and unexpected shock occurred with the Lehman Brothers' default did not affect differently the lending capacity of family and non-family firms. The divergence occurs with some delay one quarter after September 2008.

3.2. Econometric analysis

In this section we test whether the different trends observed graphically can be simply explained by relevant ex-ante characteristics that differed between family and non-family firms, instead of by a lower agency cost of debt attached to family firms. Given the nature of the exogenous shock we are analyzing in this paper, we refer to the theoretical prediction given by equation (1), and 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 are meant to capture possible channels which have been recognized as relevant by the literature in determining asymmetric bank lending behaviors, which may be correlated with the family-firm status. Given that family firms are much smaller on average compared to non-family ones, we include the log of size (expressed as number of employees) at the end of 2008, as this may be relevant in explaining different accesses to the credit market *per se* (the standard flight-to-quality).

We control for the geographical area of the firm's headquarters by using three geographical dummies, corresponding to North, Center and South of Italy. This is justified by the uneven geographical diffusion of family and non-family firms: this factor may cause different demand shocks and different credit access conditions due to the different distance between firms' headquarters and their financing banks.

We also include the concentration of bank loans, measured by the Herfindal index and by the share of the first bank, at September 2008, as these factors may also affect the capability of the company to substitute across banks and consequently to hedge bank-specific shocks. For each firm, we construct the weighted average length of the relation with its financing banks, with weights represented by the share of the single bank relative to total borrowing (the length is relative to September 2008); in such a way, we control for the average intensity of the bank-firm relations, which may not be fully captured by the Herfindal index. Year of foundation, sector of activity, level of total leverage, cashflow over sales, borrower's risk (captured by the Zscore being greater than 5) are also included as natural controls. Finally, we include the change in sales

occurred between 2008 and 2009 to control for any different change in the demand for loans that results from a different impact of the economic crisis for family and non-family firms.

In order to estimate our reduced-form equation, our dependent variable is the difference in logarithm of average granted loans in the two time windows 1st October 2007 - 30th September 2008 and 1 October 2008 - 30 September 2009. Within each of the two time windows, we collapsed all the loans referred to each firm (recorded at each end of quarter) into a pre-crisis and post-crisis period. The two time windows have the same length 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 to avoid to choose the time windows to compare arbitrarily. The choice of 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, to control for outliers and to increase the accuracy of the estimations. Summary statistics of the change in log 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 Herfindal index of the loans concentration and the share of the first bank. Results are shown in table 3.

Insert Table 3 here

Table 3 shows that family firms experienced a decline in the growth rate of loans which is lower and statistically significantly as compared to non-family firms. The coefficient is robust to different specifications of the model, as well as highly 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 granted loans for family and non-family firms cannot be fully explained by standard theories and require further investigation.

A higher risk (as measured by the Zscore) is associated with lower granted loans, as theory predicts. Moreover, a higher concentration of loans, as measured by the Herfindal index, is positively correlated with the growth rate of loans (even if not significant). However, besides this finding, higher *ex-ante* concentrations of loans with respect to the first bank (with highest share of granted credit) negatively affects the change in loans; the two results together suggest that is the higher concentration with the first bank and not the overall level of loans concentration to affect firms ability to hedge bank specific shocks. Size has a negative effect on the change in granted loans, seemingly contradicting standard fly-to-quality arguments which

predict the opposite sign. However, we cannot conclude from these findings that big firms are perceived as riskier by banks. Firm size may capture other firm differences: for instance, big firms may find alternative sources of financing more easily or be simply *ex-ante* matched with larger banks, that suffered the negative effects of the financial crisis (see Albertazzi and Marchetti (2010)) more than smaller ones.

We argue that the estimated difference between family and non-family firms is mostly driven by a supply-side effect. 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 diff-in-diff captures any additional difference on top of that observed for non-family firms. Therefore, the difference between family and non-family firms can be interpreted as a supply-driven effect. This is possible, provided that the two groups have similar trends in the demand for credit, after controlling for the set of observable characteristics introduced in the analysis.

3.3. Robustness checks

So far, we have shown the existence of aggregate divergent patterns in the dynamics of credit between family and non-family firms, after controlling for a set of observable characteristics potentially correlated with the existence of a family block-holder and 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, at the same time, they may follow patterns of credit different from those observed for Italian companies. Foreign firms may in principle substitute domestic with foreign credit, by exploiting their multinational group affiliation, or may be systematically discriminated by local banks. In order to be sure that our results are not driven by a difference in the nationality of the companies, column (1) of table 4 adds a dummy for the firm's foreign status to the full specification of column (3) in table 3. Reassuringly, our family dummy is still statistically significant, even if the magnitude of the coefficient is slightly lower that 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 for firms to substitute bank credit with intra-group financing transactions. If group affiliation is negatively correlated with the 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 includes 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 ownership concentration of the controlling shareholder, which has been recognized to play an adverse effect on the risk of default (see Aslan and Kumar (2012)) and may vary between family and non-family firms. Unfortunately, the information regarding the fraction of shares of the first shareholder is not available for the entire sample, but only for relatively large firms (with 50 employees or more). This reduces significantly the number of observations to less than half the initial size. Column (3) of table 4 adds the ownership concentration of the first shareholder to the full specification of column (3) in table 3. In line with theory, higher degrees of ownership concentration of the dominant shareholder reduce the amount of granted loans (even if the coefficient is only weakly significant), but the existence of a family block-holder (*ceteris paribus*) reduces significantly this negative effect (the coefficient associated to the family firm status is positive and around 6%).

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 an *ex-ante* matching with different types of financial institutions. In other words, because it is costly to switch banks, non-family firms might have been "locked-in" with banks less willing to lend money during the crisis, differently from family firms. If this were the case, our aggregate results could be explained by a different exposure of family and non-family firms to the financial crisis, and our interest would then shift to understanding the optimal *ex-ante* decision of choosing some types of banks with respect to others. In order to address this issue, we need to check whether family and non-family were treated differently by the same bank. By using the level of single bank-firm relations, we can compare the change in log loans for family and non-family firms, controlling for bank fixed-effects (this variable will control for banks' exposure to the financial crisis)[12]. Therefore, 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 change in the average granted loans (the averaging procedure is identical to the one used at the aggregate level) for firm i, with respect to bank j; X_{ij} includes not only the firm-specific characteristics used in the aggregate 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 relation, both measured at the end of September 2008. The addition of these two variables is important, as they control for very large percentage variations in the

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

dependent variable, induced by loans of 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 at the single bank-firm loan level of the aggregate results presented in column (3) of table 3. Column (5) adds bank fixed effects.

The estimates of β_0 in the two 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 granted loans 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

As explained in the theoretical section, family and non-family firms differ for the different value attributed to the non-monetary cost of default, that can be valuable for banks, especially in a period of economic turmoil. If banks are able to process this "soft" information, they may find family firms to be less risky (*ceteris paribus*) and we should observe that credit is reallocated towards them.

However, the adoption of soft information in lending decisions tend to vary across banks. Berger *et al.* (2005) show that larger banks prefer to reduce the delegation power of the loan officers, due to the complexity of their internal structure and the cost of monitoring. This makes them opt for the so-called "transactions-based" lending, that relies on the use of verifiable and transmittable information (the so-called "hard" information). On the contrary, smaller banks may find it optimal to specialize in the so-called "relationship lending", which is primarily based on the use of "soft" information. Besides that, regulatory interventions play a role in shaping the optimal mix of soft-hard information adopted by banks; for instance, the Basel II reform in 2004 recommended to increase the adoption of standardized criteria for the risk evaluation of company default (thus reducing the value attached to other criteria based on soft information). The recommendation aimed to increase the transparency and comparability of national banking sectors. For Italy, Albareto *et al.* (2008) show that models based on "hard" information were adopted by almost all larger banks, as well as by the majority of smaller institutions.

The relative importance of soft information changes also as a consequence of the economic environment. In fact, if there is a sudden shock to the economy, as the one caused by the recent financial crisis, the informative content of transaction-based lending may be weakened: it relies on past information which turns less powerful for predicting future outcomes. In this case, soft knowledge acquired at branch level can partially alleviate this information gap, as it is based on frequent contacts with borrowers. This pattern is confirmed by our sample of Italian banks: after September 2008 the relative importance of soft information increased for more than 30% of them, while it decreased in less than 5% of the cases. Again, the degree of such a change in the screening technology could depend on bank organization structure as well as on the previous screening technologies adopted (in the extreme case, a bank that never processed soft information before the crisis will probably find too costly to suddenly change its screening technology to incorporate it).

Therefore, by exploiting the exogenous shock represented by the Lehman Brothers' failure, we observe how bank lending shifted towards family firms, as the importance of soft information increased. This overcomes the problem potentially faced when using the *ex-ante* importance of soft information to estimate the *ex-post* effects for different types of firms. In fact, as long as soft information was relevant also before the crisis, so that family firms had already ex-ante an easier access to bank lending from "soft-types" banks, then one may not observe any significant reallocation of credit towards family firms simply because the equilibrium condition did not change substantially as a result of the Lehman Brothers event.

On the other hand, by relying on a variable which is contemporaneous to the shock, we are potentially facing an endogeneity problem, as the change in the relative importance of soft information may be driven by different idiosyncratic shocks faced at bank level. In other words, if a positive correlation between the change in granted loans and the change in the use of soft information were observed, we could not conclude that the increase in the importance of soft information also increased credit availability for firms. This fact could simply depend on the correlation between the evolution of the screening technology and the severity of the shock hitting the banks. However, assuming that the effect of the shock is constant with respect to firms characteristics, then we can consistently estimate the effect of the change in the adoption of soft information for different classes of firms. This identifying assumption is similar in spirit to Rajan and Zingales (1998), even if applied to a different context.

Therefore, we match the information contained in the special survey conducted in 2009 by the Bank of Italy on banks' lending behaviors at the firm-bank loan level, in order to assign each loan a measure of the change in the relevance of soft information in the screening process. Our theoretical prior suggests that it is the interaction of the family firm status and the increased importance attached to soft information that determines a differential treatment with respect to non-family firms.

Figure 2 shows the trends in granted loans for family and non-family firms, separately for banks that increased the use of soft information starting from October 2008 and for those that did not. In particular, for each firm we aggregate the amount of credit lines granted by the two types of banks, and then we compute the average log difference in each quarter with respect to 2008:III, for family and non-family firms. "Soft"-type banks represent a non-negligible phenomenon[13], accounting for around 37% of total loans granted to the average Italian firm before the Lehman Brothers' failure.

Insert Figure 2 here

By looking at figure 2 some interesting facts emerge. Firstly, as previously explained, the decision to change the screening technology is likely correlated with the severity of the shock suffered by banks, as the

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[13]We label banks as "soft" and "non-soft" banks for the sake of simplicity, but it should be kept in mind that we are only measuring the change in the use of soft information, not its level.

overall trends for "soft"and "non-soft" banks appear very different. This implies that we cannot draw any conclusion on the effects of a more intense use of soft information on the lending decision *per se*. Secondly, by comparing the relative adjustments for family and non-family firms in figures 2 and 1, we notice that the importance of "soft" banks emerges in all its magnitude during 2009, when the aggregate trends in granted loans are very close to the lending dynamics of "soft" banks.

We then move to the econometric analysis, in order to have a more accurate estimation of the effects of the interaction between the family firm status and the banks adoption of soft-information intensive screening technologies. In fact, because of the existence of multiple lending within our sample (more than 6 banks for each firm, on average), we can directly account for differences between family and non-family firms which are demand-driven, by using firm fixed-effects.

As a further robustness check, in order to be sure that our comparisons are not capturing *ex-ante* differences between "soft" and "non-soft" banks with respect to family and non-family firms, we also control for the *ex-ante* intensity of the single bank-firm relation, captured by the relative importance of the loans of a specific bank over the total firm's borrowing and by the length of their relation. By doing so, we control for loan-specific demand effects that may vary between banks for family and non-family firms, because of the ex-ante differences just specified. Specifically, we estimate the following equation:

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

where $\triangle_t logLoans_{ij}$ is the change in log loans for firm i with respect to 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 relation, both measured at the end of September 2008; f_i is the firm fixed-effect.

The coefficient of interest is now represented by β_1 that is relative to the interaction term between the change in the use of the soft information, after October 2008, and the family firm dummy. This parameter captures whether the difference in the change in granted loans between family and non-family firms varies across banks that changed the screening technology by increasing the value of soft information, after controlling for any unobservable characteristic at the firm level, and for the set of controls specified above. Results are shown in table 5.

Insert Table 5 here

By looking at results from columns (1) and (2), we see that family firms got a preferential access to bank lending from banks that increased the importance of soft information (in addition to the average increase in granted loans accorded by these banks). The effect is both statistically significant and relevant in magnitude (around 8%). This is a direct test for the initial hypothesis that a credit reallocation towards family firms

occurred during the period under scrutiny and that the change towards soft information-sensitive screening technologies played a role in this respect.

We finally check in table 6 whether the preferential access to family firms, accorded by banks that increased the importance of soft information, cannot be simply justified by ever-greening practices, due to a higher ex-ante exposure of "soft"-type banks towards family firms. This concern is dispelled, since the share of *ex-ante* credit granted to family and non-family firms is not different for the two groups (both considering revocable loans only and the overall financial exposure). Family firms have a relatively high share of total granted credit primarily because they represent about 60% of our sample.

Insert Table 6 here

5. Conclusions

In this paper we have studied the credit allocation decision of Italian banks following the Lehman Brothers' failure. We have found that a relevant source of firm heterogeneity is represented by the corporate ownership structure. In particular, the presence of a family block-holder has a positive effect in mitigating the contraction in loans experienced by Italian companies after 2008. The 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 capability of firms to hedge banks specific shocks, thanks to the highly detailed data available on bank-firm relations.

Our findings relate to a growing body of literature suggesting the existence of an amenity value attached to firm control by family block-holders. This idea suggests that the loss suffered in case of default is represented both by money invested within the firm and also by the utility gained through control *per se*. In the context of borrower-lender relations this translates into family block-holders perceived as more creditworthy and reliable, because of the higher non-monetary cost they suffer in case of default. Given that this type of information is to a large extent soft, we have also looked at how this reliability channel varied depending on the type of screening technology adopted by banks. In particular, we have investigated the interaction between the family firm status and the increased importance attached to soft information in the lending procedure, following October 2008. We have controlled for firm fixed-effects by exploiting the existence of lending from multiple banks and found that the family status positively interacted with the adoption of soft-intensive screening technologies in granting access to bank loans, in line with our theoretical priors.

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6. Appendix

6.1. Data construction

Centrale dei Rischi (CR) database records all the loans granted by Italian banks exceeding a minimum threshold. The threshold is determined by summing up all the types of loans granted to an individual firm by a bank, grouped 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 amount 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 and assign the corresponding value to the observation.

The inclusion of zeros poses a problem when we estimate the log difference in granted loans at the single bank-firm level. We therefore exclude these observations from the sample, instead of arbitrarily changing their values with a positive integer. However, the occurrence of these observations is limited both in terms of number and economic relevance, as table 7 clearly shows.

Insert Table 7 here

6.2. Collateral channel

The observed differences in the change of granted credit between family and non-family firms could also be the result of the different ability for these two types of firms in providing 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 validated our findings by re-estimating the empirical models of the paper, using as dependent variable the sum of call and term loans. As already outlined, the estimates are qualitatively similar and statistical 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 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, we address this concern by estimating a model where the dependent variable is the time difference in the collateral-ratio before and after October 2008. The collateral-ratio is defined as the fraction between the value of the collateral pledged by the firm and the total value of granted credit (call plus term loans). Results from Table 8 clearly show that the family firm dummy has no explanatory power on the change in collateral-ratio. This reassures us that the findings of the paper are not driven by systematic differences between family and non-family firms in the change of collateral provision.

Insert Table 8 here

6.3. Interest rate

In Table 9 we look at the cost of borrowing, to check whether differences in the change in (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. Results show that interest rates went down in the period under consideration (most likely as a result of ECB interventions in the interbank market), but no differences emerge between family and non-family firms.

Insert Table 9 here

6.4. 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 sake of completeness we estimate the main model by 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 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 external capital financing structure; in particular the percentage of family firms is 14.5% while the non-family firms represent the 20%. By re-estimating the main model of section 3, by excluding those firms that directly recurred to the capital market, 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 reinsures us that the size of the firms is not the main driving force behind our findings.
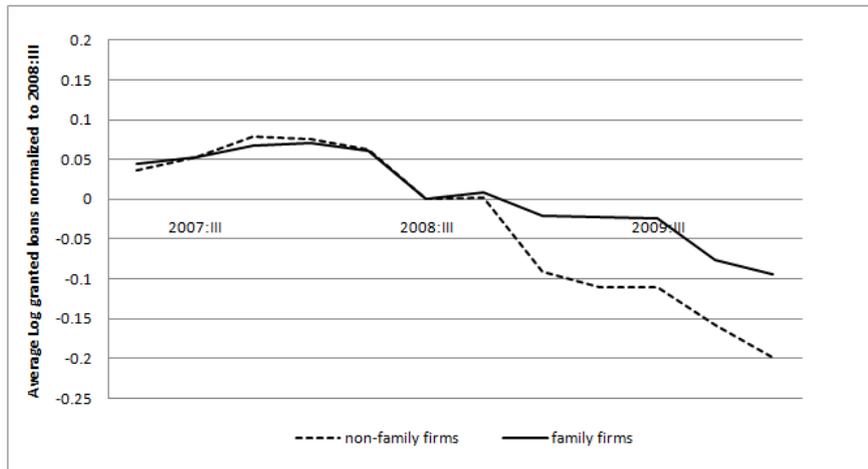
6.5. Figures and Tables

Figure 1: Bank lending before and after the Lehman Brothers' bankruptcy: overall adjustments

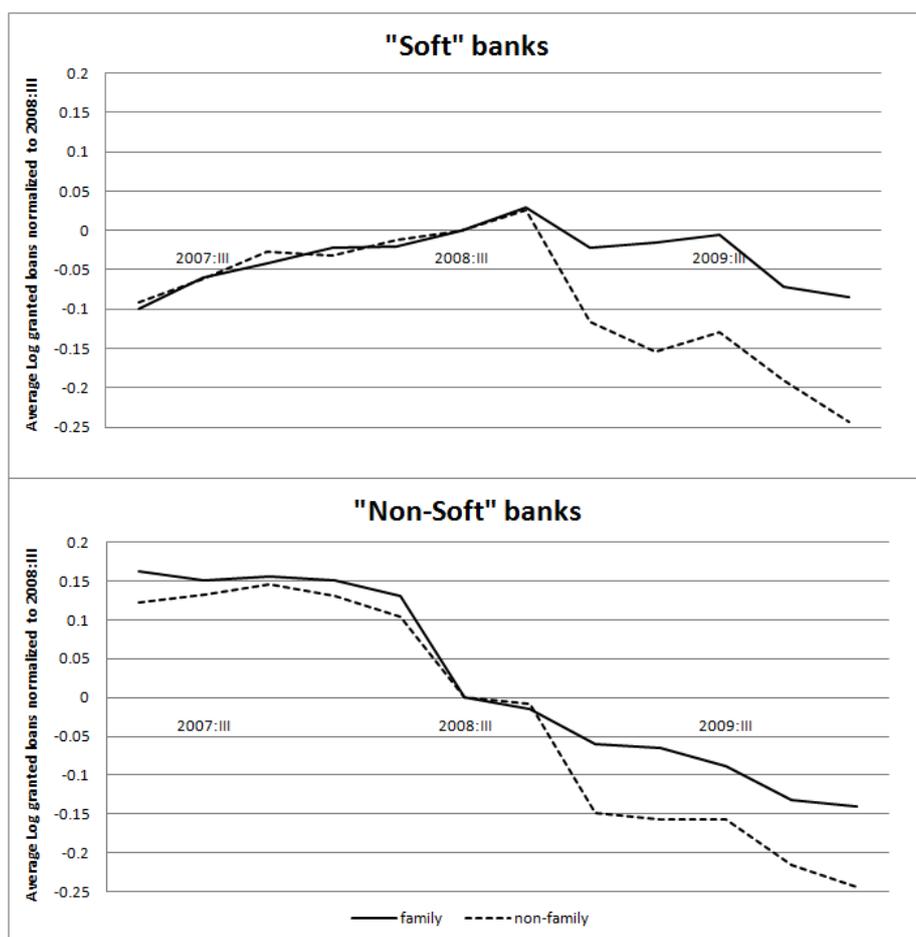**Figure 2:** Bank lending and heterogeneity in screening technologies

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

	Non-Family			Family			Mean Diff.	Obs.
	Mean	St. Dev.	Median	Mean	St. Dev.	Median		
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) (%)	6.25	6.97	4.9	6.40	6.13	5.26	-0.15	2741
Leverage (2007) (%)	.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
Share other banks (%)	.20	.14	.19	.21	.13	.21	.01***	9571
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. extreme values were recoded at the 1th e 99th percentiles because of outliers in these variables. 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 difference in logarithm 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 corporate structure

	Dependent variable: $\Delta_t logLoans_i$		
	(1)	(2)	(3)
Family	0.0577***	0.0625***	0.0503**
	(0.0168)	(0.0204)	(0.0205)
log(Size)		-0.0206**	-0.0194**
		(0.0093)	(0.0092)
Risk		-0.0416**	-0.0508***
		(0.0190)	(0.0189)
Leverage		0.0110	0.0154
		(0.0185)	(0.0186)
% Change in sales$_{2008-09}$		0.0584	0.0647
		(0.0449)	(0.0451)
Cashflow/Revenues		0.0121	0.0160
		(0.0169)	(0.0166)
Herfindal			0.2760
			(0.1800)
Share first			-0.5280***
			(0.1770)
Constant	-0.1180***	-0.2190	-0.1300
	(0.0139)	(0.8890)	(0.8800)
Other controls	No	Yes	Yes
Observations	2851	2026	2026

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Leverage is measured at the end of 2007. Herfindal and Share first are 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 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	0.0464**	0.0474**	0.0608*	0.0430**	0.0464***
	(0.0209)	(0.0207)	(0.0344)	(0.0197)	(0.0170)
Foreign	-0.0404				
	(0.0569)				
Group affiliation		-0.0452**			
		(0.0210)			
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 3. We cut the 1 and 99 percentile of the dependant variable to control for outliers. For columns (4) and (5): controls are those included in column (3) in table table 3, 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: 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 6: Summary Statistics for Non-Soft and Soft banks

	Non-Soft		Soft		Difference
	Mean	Obs.	Mean	Obs.	
Ex-ante Share to family firms (1)	.613	213	.649	119	.036
	[.352]		[.326]		
Ex-ante Share to family firms (2)	.615	221	.648	122	.033
	[.333]		[.308]		

*: p-value¡0.10, **: p-value¡0.05, ***: p-value¡0.01. *Ex-ante* means before Sept. 2008. The first (1) row refers only to revocable loans. The second row (2) refers to revocable loans plus term loans plus advances. Standard deviations in square brackets.

Table 7: Comparative statistics for the bank-firm loan observations (euro)

	Mean	Median	Observations
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

Figures refer 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 8: Collateral channel

	Dependent variable: $\Delta_t Collateral - ratio_i$		
	(1)	(2)	(3)
Family	-0.0359	-0.102	-0.0822
	(0.0636)	(0.0716)	(0.0727)
log(size)		-0.0158	-0.0124
		(0.0238)	(0.0235)
Risk		-0.0899	-0.0670
		(0.0635)	(0.0625)
Leverage		0.125	0.136
		(0.0830)	(0.0827)
Cashflow/Revenues		0.0175	0.0148
		(0.0312)	(0.0297)
% Change in sales$_{2008-09}$		-0.0673	-0.0665
		(0.0878)	(0.0881)
Herfindal			1.246**
			(0.612)
Share first			-1.028*
			(0.571)
Constant	0.154***	-2.695	-2.700
	(0.0524)	(1.870)	(1.865)
Other controls	No	Yes	Yes
Observations	2851	2026	2026

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Leverage is measured at the end of 2007. Herfindal and Share first are 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 all the specifications we cut the 1th e 99th percentiles of the dependent variable to control for outliers.

Table 9: Interest rates

	Dependent variable: $\Delta_t Netinterestrate_i$	
	(1)	(2)
Family	0.0019	-0.0023
	(0.0080)	(0.0087)
log(size)		-0.0098*
		(0.0056)
Risk		0.0051
		(0.0108)
Leverage		-0.00917*
		(0.00514)
Cashflow/Revenues		-0.0013
		(0.0010)
% Change in sales$_{2008-09}$		-0.0132
		(0.0119)
Herfindal		0.0327
		(0.0773)
Share first		-0.0440
		(0.0764)
Constant	-0.0291***	-0.4100
	(0.0067)	(0.4550)
Other controls	No	Yes
Observations	998	863

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Leverage is measured at the end of 2007. Herfindal and Share first are 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.

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