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LOSING MY CONNECTION: THE ROLE OF INTERLOCKING DIRECTORATES

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Losing my connection: The role of interlocking directorates

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Abstract. The paper examines the causal impact of bank-firm interlocking directorates on a firm's access to credit. We exploit matched bank-firm panel data containing information on the firms' loans and on the governing bodies of both the banks and the firms. To identify the connection premium, we adopt a difference-in-differences strategy and exploit the exogenous break of connection that occurs when the bank is placed under special administration and its board members are removed. Specifically, we focus on banks that were placed under special administration and compare the loans of firms that lost the connection with those of the unconnected firms, chosen through propensity score matching among borrowers from the same banks. We find that the loss of connection is associated with a significant and large drop in the firms' granted loans, and in particular, in the credit lines that can be unilaterally modified by the lender in the short term. We also show that the advantages of the connection are mainly due to favouritism behaviours, rather than to privileged information flows.

Keywords: interlocking directorates, bank lending, conflict of interest, asymmetric information, difference-in-differences matching estimator.

JEL classification: G14, G32, G34, K20.

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1. Introduction

The allocation of credit has large consequences for the real economy, and information asymmetries lie at the heart of the explanation of why credit allocation may be inefficient. The existence of a connection between the lending bank and the borrowing firm may mitigate this problem, as it allows information to be revealed to the former that is not otherwise available. However, the connections may also generate conflicts of interest, which, in turn, may induce the bank to grant the connected firm credit conditions that are too favourable and that do not have an economic ground. This is particularly true for banks with poor governance. Examining the connections in the form of board linkages between banks and firms is also high on the policy agenda, as they have been at the root of the frequent scandals that have renewed the interest in bank governance and have increased the public scrutiny of board composition. Moreover, poor lending policies stand out among the causes of the recent bank crises, particularly in banks with unsatisfactory corporate governance.

In this paper, we focus on the connections as measured by interlocking directorates, that is, the fact that the same person sits on the governing bodies of both the bank and the firm, in a sample of poorly managed banks. Our aim is twofold. First, we provide causal evidence of the effect of such connections on loan market outcomes. Second, we examine whether the detected effect is indeed a reflection of conflicts of interest.

We address this theme by exploiting Italian matched bank-firm panel data containing information on the firms' bank loans and balance sheets, and on the people who are on the governing bodies of both banks and firms. In order to identify the causal effect of the connection, we take advantage of the exogenous break in the relationship that occurs when the connected bank is placed under special administration. This event is chosen by a third party (the Supervisory Authority) that resets the bank board, thus breaking the connection. The proper control group for the treated lending relationships (those losing the connection) is identified by means of a propensity score matching procedure in which the potential controls are the unconnected firms borrowing from the same banks.

Our difference-in-differences matching estimates indicate that losing the connection entails a reduction of around one fourth in the total credit, concentrated in the short-term component, which the bank can freely and promptly manage. As far as the cost of credit is concerned, we do not find any effect on the interest rate.

The more favourable lending conditions enjoyed by the connected firms can, in principle, be traced to alternative mechanisms. According to the "information view", the presence of bankers on the company's board may have beneficial effects, as they may improve the monitoring of the lending relationship (and thus, partially solve the agency problem) and contribute their financial expertise. On the other hand, interlocking directorates may be associated with conflicts of interest that arise whenever the bank's and the firm's payoffs are not aligned ("conflict of interest view"). This, in turn, may lead to the diversion and misallocation of resources. In the second part of the paper, we perform a number of tests showing that our estimated connection premium must be interpreted within the latter view. This is consistent with the sample under scrutiny, which includes badly managed banks that have been placed under special administration. First, we show that firms that lose connections record an increase in bad loans in the subsequent periods: This may signal that the connected borrowers might have benefited from favourable and inefficient evergreening practices in the pre-treatment period. Second, we find that the negative effect of the loss of connection is not concentrated among the more opaque firms and/or banks relying more on soft information in the lending process (i.e. where the loss of information is more relevant); these findings are in contrast with those predicted by the information view. Third, the negative effect of the loss of connection is concentrated among the riskier firms (whose divergence of interest with the bank is more severe), in local credit markets, where the banks have higher market power (i.e. less pressure towards profit maximisation) and among the connections where the banker has been involved in criminally relevant behaviours (thus suggesting that the favourable conditions were presumably in place for non-market reasons).

Therefore, the extent of credit misallocation due to interlocking directorates is sizeable; in terms of policy implications, our results indicate that the power of early interventions and closer supervision of bank-firm connections might represent key instruments to prevent credit misallocation and the possible subsequent bank crises.[1]

Our paper is related to an extensive body of literature that has studied interlocking directorates between banks and non-financial firms. In a widely cited paper, Kroszner and Strahan (2001) showed that, in the U.S., bankers tend to be on the boards of firms for which conflicts of interest are likely to be relatively unimportant. Similar conclusions were reached by Byrd and Mizruchi (2005). On

[1] Interestingly, this is also in line with the IMF policy recommendations on the resolution of bank crises and on the corporate governance of banks (see Jassaud, 2014).

the contrary, La Porta et al. (2003) found that firms controlled by bankers benefit from better credit conditions, while experiencing a higher probability of default; these results were interpreted as a manifestation of looting. More recent papers (Güner et al., 2008; Dittman et al., 2010; and Ferreira and Matos, 2012) have exploited extensive panel data and within-firm variation in the presence of bankers on the boards, while controlling for unobserved firm heterogeneity through fixed effects.[2] These papers share a common view that bankers help connected non-financial firms in terms of access to credit. However, existing empirical evidence is not completely convincing in finding causal evidence and unbiased estimates. Indeed, the causality may be reversed if the firms' financing needs determine their boards' representation of financial institutions. Moreover, there may be unobserved (time-varying) shocks that may affect both the company's financial needs and the governance of the firm. These empirical challenges are not addressed by simply adding firms' fixed effect in the regression analysis.

This paper adds several aspects to the previous literature. First, our empirical strategy allows us to handle the pervasive endogeneity issue by exploiting the exogenous break in the relationship that results when the banks are placed under special administration.[3] This allows us to have a causal estimate of the connection premium. Second, we provide a rich set of empirical tests, again exploiting the exogenous break in the relationship, to soundly interpret the role of the connection premium. Third, while most of the existing studies focus on the U.S., we examine the Italian case, where the role of bank credit in firm financing and the strength of relationship lending are much more relevant. Therefore, Italy represents an ideal laboratory to analyse the economic value of the connections and the mechanisms behind them.

The remainder of the paper is structured as follows. Section 2 discusses the identification issues and describes our empirical choices to address them. Section 3 presents the data, the variables and the descriptive evidence. Section 4 shows the main results and the empirical tests used to disentangle the information and the conflict of interest views. Section 5 concludes the paper.

[2] Our paper is also related, though to a lesser extent, to the studies focusing on whether "politically" connected firms (usually defined as firms in which a member of the board is also a member of a political body) get preferential access to credit. See Khwaja and Mian (2005), Claessens et al. (2008) and Infante and Piazza (2014).

[3] Engelberg et al. (2012) focus on personal connections, rather than more formal bank-firm links, and show that they lead to more favourable loan contract terms. They address endogeneity issues by exploiting the fact that the personal relationships (e.g. having attended the same college or worked at the same company) are formed several years prior to the banking deals.

2. Empirical strategy

The causal analysis of the role of the connections has proven to be extremely challenging. The connection is the equilibrium output of the firm's and the bank's optimising choices, which is a typical circumstance in which endogeneity is at work. Awareness of this issue is high in the corporate finance literature: Roberts and Whited (2013) introduce their chapter of the Handbook of the Economics of Finance by arguing that endogeneity is "the most important and pervasive issue confronting studies in empirical corporate finance" (p. 494).[4] Indeed, connected and unconnected bank-firm relationships may be different along many dimensions, most of which are difficult to observe and are likely to be correlated with the probability of being connected and with the loan market outcome.

Our answer is to rely on a panel dataset that allows us to handle, in a simple way, the endogeneity that is related to the time-invariant unobserved effects, while exploiting the variation over time of the connectedness. This is a difference-in-differences (DID) estimation strategy.

However, endogeneity is still a concern, since fixed effects do not eliminate reverse causation and omitted variable bias due to an unobserved firm shock affecting both variables at the same time. For example, an increase in granted loans may call for the presence of a banker on the firm's board in order to decrease monitoring-related contract costs and to prevent opportunistic behaviours by the firm's managers. Alternatively, a banker may extend credit lines and lower costs with the aim of being rewarded with a seat on a firm's board. Finally, there may be unobserved (time-varying) shocks, such as the implementation of a new business strategy or an M&A operation that may affect both the company's financial needs and a change in the governance of the firm.

In order to address these concerns, we exploit the exogenous loss of connection due to the bank's placement under special administration. Indeed, under Italian law, the special administration procedure resets the governing bodies (see more on this below), thus breaking the connection. Our identifying

[4] In a similar vein, Adams et al. (2010) state (p. 97): "[U]nlike the situation in some other areas of economics, there are no cure-all instruments that one can use to deal with this endogeneity. Ultimately, much of what one learns about boards is about equilibrium associations. Causality, in the usual sense, is often impossible to determine. […] Because the directors in question were determined through some equilibrium selection process, one does not have a classic experiment in which different director types are randomly assigned to control and treatment pools."

assumption is that this treatment is exogenous with respect to the bank-firm loan market outcomes after controlling for bank-firm and bank-time fixed effects.

Therefore, we focus on banks that were placed under special administration and compare the firm-bank relationships that lost the connection with a comparable group of unconnected firms borrowing from the same banks, as follows:

$$y_{fbt} = \alpha + \beta L_{fbt} + \gamma X_{ft} + \delta_{fb} + \rho_{bt} + \varepsilon_{fbt} \quad (1)$$

where y_{fbt} is the log of loans that firm f borrows from bank b in period t; L_{fbt} is a dummy variable that equals 1 for treated firm f (i.e. those who were connected before t) from period t on (i.e. when they lost the connection) and equals 0 otherwise. β is the parameter of interest and measures the percentage of increase/loss in credit due to the connection loss. The specification also includes a set of firms' time-varying controls X_{ft} (turnover as a proxy for size, Z-score as a proxy of creditworthiness, sector trends and geographical area trends), as well as firm-bank and bank-time fixed effects (δ_{fb} and ρ_{bt} respectively). The periods are the quarters from 2006Q4 to 2014Q4.

The credibility of the DID estimator crucially relies on the assumption that, in absence of the treatment, the average outcomes for the treated and the controls would have followed parallel paths over time. This assumption may be implausible if the pre-treatment characteristics that are associated with the dynamics of the outcome variable are unbalanced between the treated and the control groups. For example, differential trends might arise if the treated and the control units operate in different markets and/or are exposed to distinct macro shocks. In this case, the DID estimator will not consistently estimate the treatment effect.

In order to address this last concern, we adopt a combination of matching with DID, as proposed in Heckman et al. (1997), thus pairing each connected firm with "similar" control units. We adopt the propensity score matching method proposed by Rosenbaum and Rubin (1985), who suggest the use of the probability of receiving the treatment, conditional on observable characteristics. Specifically, we adopt the nearest-neighbour matching procedure, selecting the unconnected firms with the (predicted) probability of being treated that is the closest to that of the connected firm. We implement the matching procedure separately for each bank, thus assuring that each treated firm is paired with a control firm that is borrowing from the same lender. Among the control variables, we include turnover, Z-score and sector and geographical area dummies. Finally, the matching

procedure has been run with data taken one year before the treatment, in order to have pre-determined matching. We match with a replacement, which allows a given unconnected firm to be matched to more than one connected firm, and we use the ten nearest neighbours, with each neighbour receiving equal weight in constructing the counterfactual unit.[5]

3. Data and descriptive analysis

Our data regard the lending relationships of the Italian banks that were placed under special administration between 2007 and 2013. The rules governing special administrations are discussed in subsection 3.1, while the matched bank-firm panel dataset and how it was built are fully described in subsection 3.2. Finally, subsection 3.3 shows some descriptive evidence.

3.1 Special administration

In Italy, the procedures for managing bank crises are governed by Title IV, Chapters I and II of Legislative Decree 385/1993 and its subsequent amendments (the Consolidated Law on Banking). These rules have, as their primary objective, the protection of savings, primarily in view of, amongst other things, the negative social impact of crises on depositors, as well as on the other subjects involved, such as other creditors, employees and shareholders.

The rules envisage different crisis management procedures, depending on how critical the situation is. If there are signs that the crisis can be tackled, the bank can be placed under special administration. This is decided by a decree of the Minister for the Economy and Finance, issued following a proposal made by the Bank of Italy (which is the Supervisory Authority), whose task is to nominate the special bodies. Specifically, the Bank of Italy is responsible for the appointment of one or more special commissioners and a monitoring committee composed of three to five members: The commissioners shall exercise the functions and powers of the directors of the bank; the monitoring committee shall carry out the control functions. If, instead, the crisis appears to be irreversible, the bank is placed under compulsory administrative liquidation, by a decree of the Minister for the Economy and Finance which is issued following a proposal to this effect by the

[5] We have chosen the ten closest observations, as is common in the related empirical literature (Blundell and Costa Dias, 2009). In unreported evidence, we replicate the analysis using the full sample or a subsample selected through exact matching. In both cases, our findings are confirmed.

Bank of Italy. Also in this instance, the Bank of Italy is responsible for appointing the liquidating bodies.

The banking supervision bulletin, published by the Bank of Italy, includes a monthly report of the list of banks placed under special administration. Figure 1 reports the number of banks placed under special administration from 2007 to 2013, which are included in our sample.[6] The procedures involved 40 banks, mainly small banks, although in the more recent sample period, they have also involved some medium-sized banks operating in large geographical areas, and one bank listed on the stock exchange. The following are among the difficulties most frequently encountered in cases of special administration: insufficient capital base, poor corporate governance, irregularities in the organisational and monitoring structure (especially with regard to the credit approval process) and violations of anti-money laundering rules.

As far as the timing of the events is concerned, we assume that the treatment starts from the first quarter following the date on which the bank is placed under special administration. Additional results refine this assumption, showing that leading and lagged effects are also at work.

3.2 Data

For the sample of banks described above, we built matched bank-firm panel data, drawing information from five different sources.

First, the *ORgani SOciali* (ORSO) database, managed by the Bank of Italy, contains exhaustive current and historical information on the members of the governing bodies of banks and financial intermediaries (e.g. president, executive director, members of the boards of directors, members of supervisory boards, etc.). Second, the National Business Register (NBR) database, managed by the consortium of the Italian Chambers of Commerce, contains exhaustive, current and historical vital statistics on Italian firms, including information on the members of their governing bodies. Matching ORSO and NBR archives enabled us to build a binary variable that maps the banks' involvement in the firms' governance before the removal of the governing bodies (which occurs when the special commissioners are appointed). Specifically, from the ORSO and the NBR, we retrieved the fiscal code that unequivocally identifies a person for each past

[6] We excluded a handful of (small) banks because they had no connections with non-financial firms (e.g. foreign banks or financial intermediaries whose main activity was markedly different with respect to that of standard commercial banks).

member of the governing bodies of both the banks and the non-financial firms. Therefore, we were able to define connected bank-firm relationships as those in which at least one person was a member of both of the governing bodies before the special administration, after which there are no connections.

Third, the Credit Register (CR) is a database, housed at the Bank of Italy, which contains extensive information on the loan contracts granted by Italian banks. All banks report information on the credit granted and utilised for all loans exceeding a minimum threshold (75,000 euros until December 2008, 30,000 euros afterwards), plus all nonperforming loans. The types of loans include credit lines, credit receivables and fixed-term loans.[7] Fourth, the Loan Interest Rate Survey (LIRS), also run by the Bank of Italy, provides quarterly information on the interest rates that banks charge to individual borrowers on newly issued term loans and granted credit lines (above 75,000 euros). The LIRS data cover only a subsample of Italian banks, and in our case, include only 8 banks (instead of the 40 included in the special administration procedures). For comparability reasons, interest rates were computed for credit lines only.[8] From the CR and the LIRS, we were able to trace the firms' lending history, including information on the amounts of the granted loans in different types of contracts and the corresponding cost of credit.

Finally, the Company Accounts Data System (CADS), managed by the Cerved Group, includes balance sheet data and indicators covering almost all of the Italian limited companies. Specifically, we selected all non-financial limited companies that had borrowed at least once from one of the banks in the sample, and for these firms, we have data on the following variables: firms' turnover (used as a proxy for size), Z-score (a measure of credit risk), age, sector of activity and geographical area.

The descriptive statistics on the final bank-firm level dataset, covering more than 30 quarters, are reported in the following subsection.

[7] When a loan contract is closed by the bank, the log of loans is set equal to zero.

[8] Interest rates are measured for credit lines only for three main reasons. First, these loans are highly standardised among banks, and therefore, the cost of credit across different firms is not affected by unobservable loan-contract-specific covenants. Second, credit lines are loans granted neither for some specific purpose, as is the case for mortgages, nor on the basis of a specific transaction, as is the case for short-term advances against trade credit receivables; as a consequence, the pricing of these loans is highly associated with the borrower-lender relationship. Third, credit line conditions (both quantities and prices) can be unilaterally changed by the lender in the short term.

3.3 Descriptive evidence

Table 1 reports the mean and the standard deviation for each variable mentioned above. Italian firms strongly rely on bank debt as a source of external finance; unsurprisingly, this dependence is reflected in the close ties between banks and firms, which also take the shape of interlocking directorships. Considering the quarter preceding the start of the special administration for each bank, we obtained information on nearly 30,000 firms; among them, 2.3% (nearly 700 units) were connected to the lender. The credit granted to a connected firm represents, on average, 0.2% of the total loans granted by the same bank to all of its borrowers; the distribution of these figures is highly skewed and is above 2% for only a handful of firms (Figure 2, left panel). If we consider all of the connected firms as a whole, they amount, on average, to 3% of the total loans granted by each bank; for seven banks, the overall exposure to connected firms is more relevant, i.e. above 5% (Figure 2, right panel).

Table 2 provides the summary statistics for the main variables used to represent the characteristics of the firm that we control for, providing the comparison and the mean tests between the connected and the unconnected firms. The connected firms are larger and less risky; these differences are statistically significant at the 1% level. Marked differences also arise in terms of the sector of activity and the geographical area of the residence of the firm. The propensity score matching should balance the pre-treatment variables between the connected firms and the control group. In order to verify that the balancing properties are satisfied in the data, we performed two balancing tests suggested in the related empirical literature. First, we measured the standardised bias as suggested by Rosenbaum and Rubin (1985). For each covariate, it is defined as the difference of the sample means in the treated and the matched control subsamples as a percentage of the square root of the average of the sample variances in both groups. Even though there is not a clear threshold to establish the success of the matching procedure, a standardised bias of around 5% or less is seen as sufficient (Caliendo and Kopeinig, 2008). Second, we performed a two-sample t-test to check if there are significant differences in the covariate means for both groups: Before matching, differences are expected, but after matching, the covariates should be balanced in both groups, and hence, no significant differences should be found. As expected, the firm differences, after the propensity score matching, are substantially narrowed and vanish from a statistical point of view.

4. Results

4.1 Main results: the impact of the loss of connection

In this subsection, we examine whether the loss of connection with the bank has an impact on the firm's access to credit. We focus on granted credit lines (i.e. overdraft facilities) as the main outcome variable, because they are the most attractive vehicle for studying the impact of the lender-borrower relationship (e.g. Berger and Udell, 1995). Moreover, on the lender side, it is a flexible instrument whose contractual terms may be changed unilaterally and with very short notice.

To help illustrate the value of the connections, Figure 3 plots the average credit lines for the two groups of firms. The first group includes the firms losing their bank connection at the start of a special administration (at time 0); the second group includes a selected group (through propensity score matching) of control units. The firm-bank specific averages and common shocks have been preliminarily differenced out of the credit line series, so that values greater (lower) than zero indicate firms having credit that is above (below) average. The two lines suggest that the change in the connection status is associated with a significant and lasting shift in the access to credit, which worsens for firms that have lost their connections.

Table 3 statistically substantiates the visual evidence reported in Figures 3 and 4. Our estimate for the parameter β in equation (1) indicates that the loss of the connection implies a 26% drop in credit availability (column 1). This estimate is highly significant and very stable when we include the firms' time-varying controls in the specification (column 2). In the latter case, estimates are also a bit more precise.

We now corroborate our core result by dealing with the only potential source of endogeneity we detected in our analysis. Suppose that a bank is significantly exposed towards a connected firm (or a group of connected firms) that is going through a difficult economic phase. As a consequence, the supervisory authority might decide in favour of the special administration regime (aimed at cutting the firm's credit lines) to avoid the poor firm trends from impacting the bank's financial equilibria. In this case, the treatment would be endogenous, as the unsafe amount of a firm's credit line would determine the treatment at the bank level. According to the descriptive evidence reported in subsection 3.3, none of these firms had very large relevance; therefore, it is plausible that this endogeneity

concern is not at work in our case. Nevertheless, in Table 4, we present two empirical tests aimed at addressing this potential threat to the identification. In the first column, we exclude the top 5% in the distribution of the share of the firm's credit over its lender's total credit for both the treated and the control groups. In the second column, we exclude the two banks (i.e. 5% of the banks in our sample) that are more exposed to the treated group as a whole. These choices are aimed at minimising the risk that the firms to which the banks are highly exposed may drive the treatment. In both cases, the estimate is identical to the baseline, thus suggesting that this potential source of endogeneity is not an issue in our case.

Thus far, we have assumed that the treatment starts in the first quarter following the special administration date. This assumption might be questioned in both directions. On the one hand, the new board might need time to examine all of the granted credit, and eventually, cut the credit granted to unworthy borrowers: Hence, the effects might be delayed. On the other hand, the special administration is the final step of a bank crisis, which usually occurs after a long investigation during which the old board might review lending policies under the moral suasion of the Supervisory Authority, aimed at resolving the bank crisis in a cooperative manner: In this case, the effects might be anticipated. Table 5 documents the existence of possible leading and lagged effects: The connection premium strongly persists in a 4-quarter window around the special administration date.

The existence of the leads documented above may cast some doubt on our identification strategy, suggesting that the treated and the control units may have divergent pre-treatment trends. Therefore, in Table 6, we provide two tests of the validity of our DID estimation strategy. The first exercise is a placebo regression in which we focus on the period that extends, for each bank, from the beginning of the sample period to one year before the special administration. We know for certain that, in this interval, no treatments took place. We then split this interval in two equal sub-periods and assume that the loss of connection takes place at that fake time threshold. The first column shows that no significant effect emerges. In the second column, we test the parallel trend assumption more directly: We again consider the period preceding the treatment. We augment the baseline specification with an additional variable obtained by interacting a trend variable with the treatment dummy, and we estimate the model on the same sample of column 1. If the evolution of loans was different for the treated and the untreated firms before the loss of connection, this additional variable would turn out to be significant, thus invalidating our strategy. As shown in column 2, this is not the case.

Thus far, we have focused on credit lines, because they can be contractually modified in the very short-term. However, our evidence on the more favourable credit stance towards connected firms would be invalidated if, for example, a drop in the credit lines after the loss of connection was accompanied by an increase in the terms of fixed-term debt. To address this issue, in Table 7, we examine the impact of the loss of connection on various definitions of loan contracts. In the first column, we redefine the dependent variable as including both credit lines and credit receivables to have an overall picture of short-term loans. The parameter estimate is even larger (in absolute value) with respect to the baseline. In the second column, we focus on fixed-term loans (fixed term contracts) as the dependent variable, and we do not find a significant impact; therefore, there are no substitution effects. In the last column, all of the types of loans are pooled together, to provide an overall picture of the granted credit. Again, there is a large connection premium that is driven by its short-term component.

Table 8 contains the analysis of the effects on interest rates. Unfortunately, they are available only for a subset of the banks, and this leads to a significant drop in the number of observations and treated firms. According to our findings, the loss of the connection has no effect (both from an economic and a statistical point of view) on the cost of credit, either without or with firm controls. All in all, the connection premium concerns market quantities, but not prices.[9] This result may be explained by the fact that the new manager, in dealing with troubled banks, decided to focus on the quantities (cutting risky loans and correcting portfolio imbalances), rather than on the re-pricing of existing loans. Moreover, it is worth noting that interest rates are observed only for existing loans (i.e. they are not observed for credit lines that have been closed by the bank), and this may introduce a selection (downward) bias in our parameter of interest.

4.2 Value of connection: conflict of interest vs. information view

Thus far, we have shown that the firms connected to their lenders through interlocking directorates benefit from a sizeable connection premium in terms of granted loans. Since the banks are badly managed – they have been placed under special administration – an obvious guess would be that the connection premium signals credit misallocation arising from a conflict of interest. However, in

[9] The absence of any significant effect seems not to be attributable to the specificities of this subset of banks. Indeed, in unreported evidence, we re-estimated the baseline equation for granted credit lines on this subsample, and the results are qualitatively similar to those reported in Table 3.

principle, the connection premium might also capture different underlying mechanisms. The banker holding a seat on the board of directors of a company may act as she was delegated to monitor the borrower, thereby mitigating asymmetric information problems, since the borrower reveals information to the bank that is not otherwise available (Kroszner and Strahan, 2001; Byrd and Mizruchi, 2005). In addition, the banker might provide valuable financial expertise to the firm (Güner et al., 2008). In this section, we propose a number of empirical tests aimed at disentangling the conflict of interest view (our null hypothesis) and the information view (the alternative one).

First, we examine whether the firms' non-performing loans increase after the loss of connection (Table 9). If the favourable lending conditions were due to conflicts of interest, we may expect an increase in non-performing loans: The poor quality of the borrower would no longer be masked by favourable lending conditions. Indeed, the bankers on the firm's board may have an incentive to apply evergreening practices: They may provide additional credit to the troubled firm in order to avoid or delay bankruptcy. We find that bad loans increase by 7% for formerly connected borrowers with respect to the control group.

Second, we examine whether the impact of the loss of connection is heterogeneous across firms along some crucial firm or bank characteristics (Table 10). We start with firm opaqueness, measured as the first principal component of the following variables: firm size, firm physical assets over total assets, firm age and length of the bank-firm relationship.[10] If the credit drop due to the loss of connection is passed through to the loss of access to privileged information, then the impact should be stronger among more opaque firms. As shown in the first column, we find the opposite, in contrast to the finding predicted by the information view.

The second characteristic is whether the bank is a mutual bank or not. The assumption, widely accepted in the banking literature, is that mutual banks tend to privilege lending relationships based on soft information. Therefore, according to the information view, one may expect that the negative impact of the loss of

[10] Opaqueness is expected to be negatively correlated with size, since smaller firms have less informative financial statements and lower public profiles. Bonaccorsi di Patti and Dell'Ariccia (2004) assumed that firm opaqueness is also negatively correlated to the relative use of fixed and tangible assets in the production process. This assumption is based on the idea that a bank can evaluate more easily the quality of a project (and later monitor the actions of the borrower) when the technology is simple and the relationship between observable inputs and output is predictable. Finally, age and length of the bank-firm relationship are also commonly thought to be negatively correlated with opaqueness.

connection would be concentrated among mutual banks. However, our findings show that the impact is similar between the two categories.

The third characteristic is firm riskiness, exploiting the fact that the divergence of interest between the bank and the borrower is most severe when a firm faces financial distress (Kroszner and Strahan, 2001). Indeed, as a member of the firm's board, one should try to obtain debt conditions that are more favourable than would be economically justified. On the contrary, as a member of the bank's board, one should limit credit extension in order to maximise the expected value of debt repayment. Therefore, if the conflict of interest hypothesis is at work, we should observe a larger (negative) impact of the loss of connection for more troubled firms. The second column supports this statement: The connection premium is larger for more risky firms, defined as those whose Z-scores are above the median.

The fourth variable that may drive the differential effects is the bank's market power. The idea of the test is based on two assumptions: Favouritism in lending is not compatible with profit-maximisation, and pressure for the latter is lower in markets where the bank has some market power. Hence, we test whether the connection premium is higher when the bank's market share is larger in the province where the connected firm is located. In the third column, we show that this is the case: The impact of losing the connection is, by far, larger for connections with banks whose market shares are above the median.

Finally, we consider the differential impact between "bad" and "good" connections. According to Italian law, imposing the special administration on a bank is an administrative measure that does not imply, per se, any crime according to the penal code. On the other hand, in some cases, the administrative measure goes hand in hand with the penal prosecution of some of the members of the board (e.g. fraudulent accounting, criminal conspiracy, etc.). We define "bad" connections as those in which the banker has also been involved in penal crimes that are related to his role on the governing body of the bank. The idea of the test is that a larger connection premium for a bad connection is more consistent with the conflict of interest view. The fourth column shows that the loss of both good and bad connections implies a drop in extended loans, but that, in the latter case, the impact is nearly doubled.

All in all, even if each test, individually considered, is not conclusive, all of the tests together essentially point to the conflict of interest view. The internal consistency of these signals leads us to interpret our results as a tale of bad credit allocation.

5. Conclusions

The paper contributes to the literature on interlocking directorates between banks and firms by showing the causal impact of the connections on the firms' access to credit. To this end, we exploit a matched bank-firm panel dataset containing information on the firms' loans and on the governing bodies of both the banks and the firms. To identify the value of the interlocking directorates, we adopt a difference-in-differences matching estimator and exploit the exogenous loss of connection at the firm-bank-time level that occurs when the bank is placed under special administration.

We find that the loss of connection is associated with a significant drop in the firms' credit, which concerns the components that can be freely changed by the lender in the short term, while we do not find a connection premium for the interest rate. We also provide several empirical tests that are consistent with the fact that the advantages of the connection are mainly due to favouritism behaviours, rather than to privileged information flows.

In terms of the policy implications, these results point out that the minimisation of credit misallocation may be achieved by explicit regulation, early intervention powers and closer supervision of interlocking directorates, and by extension, of any other kind of bank-firm ties.

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Tables

Table 1. Data and variables

Name of the variable:	Description of the variable [data source]:	Mean	St. dev.
Credit lines	Log of credit lines (in thousands of euro) [CR]	2.823	2.173
Short-term loans	Log of short-term loans (i.e. credit lines plus credit receivable, in thousands of euro) [CR]	3.781	2.504
Fixed-term loans	Log of fixed-term loans (in thousands of euro) [CR]	2.000	2.701
Total loans	Log of total loans (i.e. short-term plus fixed-term loans, in thousands of euro) [CR]	4.563	2.417
Interest rate	Interest rate on credit lines [CR]	7.575	2.995
Loss of connection	Dummy equal to 1 for treated firms (i.e. those connected to the bank) after the special administration and 0 otherwise [CR & NBR]	0.008	0.087
Size	Log of turnover [CADS]	6.942	1.932
Z-score	Z-score is a measure of credit risk obtained by linear discriminant analysis; values are in the interval [1,10], with lower values indicating safer firms and higher values risky firms [CADS]	5.624	1.587
Agriculture	Dummy equal to 1 if the firm belongs to the agriculture sector and 0 otherwise [CADS]	0.016	0.124
Construction	Dummy equal to 1 if the firm belongs to the construction sector and 0 otherwise [CADS]	0.180	0.384
Manufacturing	Dummy equal to 1 if the firm belongs to the manufacturing sector and 0 otherwise [CADS]	0.264	0.441
Wholesale and retail trade	Dummy equal to 1 if the firm belongs to the wholesale and retail trade sector and 0 otherwise [CADS]	0.220	0.415
Real estate	Dummy equal to 1 if the firm belongs to the real estate sector and 0 otherwise [CADS]	0.107	0.309
Business services	Dummy equal to 1 if the firm belongs to the business services sector and 0 otherwise [CADS]	0.093	0.290
South	Dummy equal to 1 if the firm is localised in the South of Italy and 0 otherwise [CADS]	0.165	0.371
Firm's opaqueness	First principal component of the following variables: size, physical assets over total assets, age and length of bank-firm relationship lending [CADS and CR]	0.327	1.101
Mutual banks	Dummy equal to 1 for mutual banks and 0 otherwise [CR]	0.237	0.425
Bank's market power	Bank's loan share in the province where the firm is located [CR]	0.089	0.108
"Bad" connection	For connected firms, dummy equal to 1 if the prosecutor is required to proceed with a criminal investigation of the person sitting on the boards of the bank and firm; "good" connections are the complement of "bad" connections [hand-collected data from newspapers].	0.475	0.499

Table 2. Comparison between treated and control group

Variables:	Full sample			Propensity score matching sample			
	Mean		Difference			%	Difference
	Treated	Control	in means	Treated	Control	bias	in means
Size	7.82	6.87	0.95 ***	7.84	7.75	3.9	0.09
Z-score	5.45	5.76	-0.30 ***	5.45	5.40	2.9	0.05
Agriculture	0.03	0.02	0.01 **	0.03	0.02	2.6	0.01
Construction	0.13	0.18	-0.04 ***	0.14	0.13	1.8	0.01
Manufacturing	0.28	0.26	0.02	0.28	0.29	-1.4	-0.01
Wholesale and retail trade	0.16	0.22	-0.07 ***	0.16	0.17	-3.2	-0.01
Real estate	0.13	0.10	0.03 **	0.13	0.13	-0.5	0.00
Business services	0.13	0.09	0.04 ***	0.13	0.13	0.3	0.00
South	0.24	0.17	0.07 ***	0.24	0.24	0.4	0.00
Number of observations	660	26,986		650	4,641		

Firms are observed in the quarter preceding the special administration. Differences in means are accompanied by a t-test to document significant differences between the treated and the control subsamples; the standardised bias is defined as the difference of sample means in the treated and matched control subsamples as a percentage of the square root of the average of sample variances in both groups.

Table 3. Credit lines: baseline results

Dependent variable:	Log of credit lines	
Loss of connection	-0.262	-0.260
	(0.075)***	(0.072)***
	(0.060)***	(0.055)***
Firm-bank FE	YES	YES
Bank-trimester FE	YES	YES
Firms' controls	NO	YES
Observations	110,435	110,435
R-squared	0.715	0.723

Firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Credit lines: robustness

Dependent variable:	Log of credit lines	
	Excluding firms' outliers	Excluding banks' outliers
Loss of connection	-0.230	-0.262
	(0.074)***	(0.074)***
	(0.057)***	(0.059)***
Firm-bank FE	YES	YES
Bank-trimester FE	YES	YES
Firms' controls	YES	YES
Observations	101,885	102,006
R-squared	0.723	0.730

Firms' outliers are firms whose granted loans, relative to overall bank loans, are above the 95th percentile; banks' outliers are the two banks with a larger exposure to treated firms; firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Credit lines: leads and lags

Dependent variable:	Log of credit lines			
Leads and lags	Leads (-4 quarter)	Leads (-2 quarter)	Lags (+2 quarter)	Lags (+4 quarter)
Loss of connection	-0.252	-0.246	-0.261	-0.227
	(0.078)***	(0.084)***	(0.070)***	(0.068)***
	(0.061)***	(0.064)***	(0.059)***	(0.054)***
Firm-bank FE	YES	YES	YES	YES
Bank-trimester FE	YES	YES	YES	YES
Firms' controls	YES	YES	YES	YES
Observations	110,435	110,435	110,435	110,435
R-squared	0.725	0.731	0.734	0.746

Firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Placebo regression and parallel trend

Dependent variable:	Log of credit lines	
	Placebo regression	Parallel trend hypothesis
Loss of connection	-0.052	
	(0.061)	
	(0.039)	
Trend × treated		-0.007
		(0.008)
		(0.006)
Firm-bank FE	YES	YES
Bank-trimester FE	YES	YES
Firms' controls	YES	YES
Observations	67,732	67,732
R-squared	0.830	0.830

In the first column, we consider the temporal window up to one year before the special administration, we split it in two sub-periods, and we simulate a loss of connection in the second sub-period (placebo regression); in the second column, we consider the temporal window up to one year before the special administration, and we test whether treated and control units have a parallel trend; firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Different types of loans

Dependent variable:	Short-term loans	Fixed-term loans	Total loans
Loss of connection	-0.288	0.091	-0.213
	(0.082)***	(0.093)	(0.084)**
	(0.075)***	(0.091)	(0.099)**
Firm-bank FE	YES	YES	YES
Bank-trimester FE	YES	YES	YES
Firms' controls	YES	YES	YES
Observations	110,435	110,435	110,435
R-squared	0.699	0.734	0.611

Firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8. Interest rate

Dependent variable:	Interest rate on credit lines	
Loss of connection	-0.001	-0.006
	(0.115)	(0.115)
	(0.051)	(0.057)
Firm-bank FE	YES	YES
Bank-trimester FE	YES	YES
Firms' controls	NO	YES
Observations	41,082	41,082
R-squared	0.728	0.731

Firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 9. Default rate

Dependent variable:	Log of bad loans	
Loss of connection	0.070	0.069
	(0.035)**	(0.033)**
	(0.047)	(0.043)
Firm-bank FE	YES	YES
Bank-trimester FE	YES	YES
Firms' controls	NO	YES
Observations	110,443	110,443
R-squared	0.301	0.318

Firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

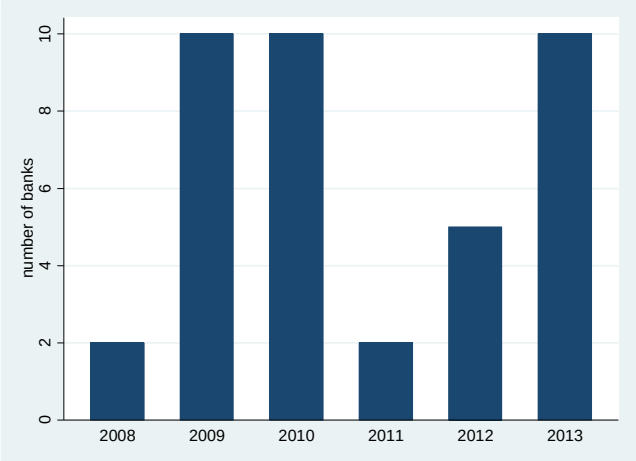
Table 10. Credit lines: heterogeneous effects

Dependent variable:	Log of credit lines				
Loss × low firm opaqueness	-0.340				
	(0.082)***				
	(0.071)***				
Loss × high firm opaqueness	-0.097				
	(0.124)				
	(0.078)				
Loss × mutual banks		-0.267			
		(0.106)**			
		(0.062)***			
Loss × other banks		-0.256			
		(0.095)***			
		(0.080)***			
Loss × low Z-score			0.043		
			(0.115)		
			(0.110)		
Loss × high Z-score			-0.383		
			(0.085)***		
			(0.094)***		
Loss × low bank market power				-0.090	
				(0.123)	
				(0.107)	
Loss × high bank market power				-0.329	
				(0.088)***	
				(0.060)***	
Loss × "good" connection					-0.197
					(0.097)**
					(0.075)**
Loss × "bad" connection					-0.323
					(0.104)***
					(0.080)***
Firm-bank FE	YES	YES	YES	YES	YES
Bank-trimester FE	YES	YES	YES	YES	YES
Firms' controls	YES	YES	YES	YES	YES
Observations	110,435	110,435	110,435	110,435	110,435
R-squared	0.723	0.724	0.724	0.723	0.723

Firms' controls include log of size, Z-score and sector and area trends; standard errors clustered at the bank-firm level (first row) and bank-group level (second row) are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Figures

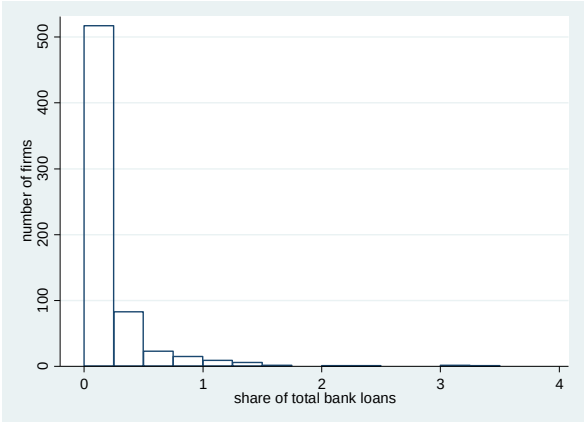
Figure 1. Number of banks under special administration



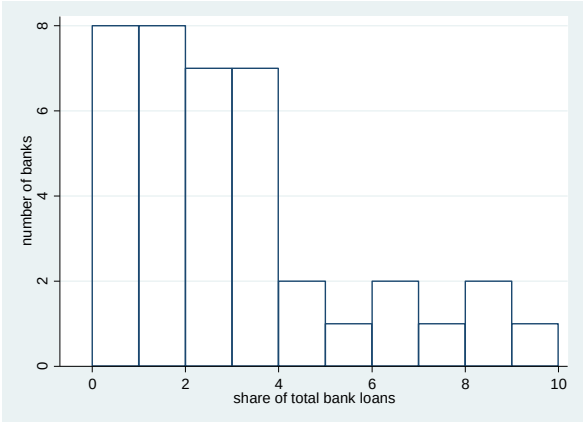
The histograms represent, for each year, the number of banks placed under special administration.

Figure 2. Share of loans to connected firms

Firms by share of total bank loans

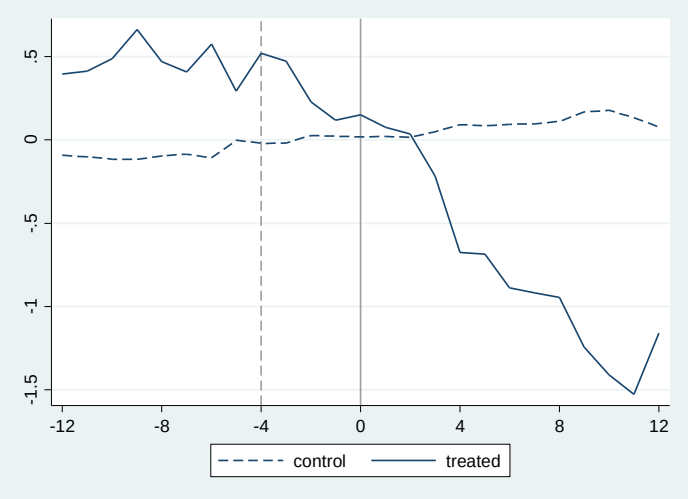


Banks by share of loans granted to connected firms



The left panel reports the number of treated firms by the share of loans granted to them relative to the total loans of the bank from which they borrow. The right panel reports the number of banks by the share of loans granted to the connected firms. Figures refer to the quarter preceding the special administration.

Figure 3. Credit lines before and after special administration



The lines represent the residuals of a regression of credit lines on firm-bank and bank-quarter fixed effects and other firm controls (log of size, Z-score and sector and area trends); quarterly averages of the residuals are distinguished between treated firms (i.e. those losing the connection with the start of the special administration) and the control group; firms in the control group are firms matched through propensity scores.