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Losing my connection:

the dark side of bank-firm 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 detailed information on individual loans and on the governing bodies of both the bank and the firm. Identification hinges on the exogenous break up of connections occurring when the Supervisory Authority places a bank under special administration, resetting its board. For these banks, we compare the dynamics of loans to 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

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show that the advantages of the connection are mainly due to favouritism, 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.

1. Introduction

The allocation of credit has large consequences for the real economy and the existence of lender-borrower connections may well shape the efficiency of the credit market. Connections may reduce information asymmetries but, at the same time, they may also generate conflicts of interest, which would induce the lender to grant the connected borrower conditions that are too favourable and that do not have an economic ground. Shedding light on this dark side of connections is crucial to better understand the mechanisms that underlie market outcomes and to design sound policies. Examining the connections in the form of board linkages is also high on the policy agenda, especially in the aftermath of the financial crisis: during those years, the difficulties experienced by several banks in Italy (the country we analyse in this paper), as well as in other countries, mainly depended on the economic recession, but were also exacerbated by imprudent or irregular management and by bank scandals (IMF, 2016; Angelini et al., 2017). This brought to a large increase in non-performing loans and, in some cases, triggered irreversible bank crises. As a result, the banking sector's governance, and the role of the supervisory authorities, have drawn the attention of analysts, politicians and the media, as well as that of savers.

In this paper, we focus on bank-firm connections established by interlocking directorates, occurring when the same person sits on the governing bodies of both the bank and the firm. We address two research questions: first, we quantify the

effect of such connections on loan market outcomes (volumes and prices); second, we examine whether the effect is mainly a symptom of better information flows or rather reflects above all a conflict of interest.

The empirical analysis exploits Italian matched bank-firm panel data over the 2007-2013 period containing information on the firms' bank loans and balance sheets, and on the people on the governing bodies of both banks and firms. Our novel identification strategy hinges on the exogenous break up of connections occurring when a third party (the Supervisory Authority) places a bank under special administration, resetting its board. The treated units are firms that were connected to their lending bank and lose the connection after the special administration while the control units are chosen through the propensity score matching procedure among unconnected firms borrowing from the same banks.

According to our findings, firms losing their bank connection experience a fall in the amount of credit granted of about 25%. The drop is concentrated in the short-term component which is what the bank can freely and promptly manage. We do not find any significant effect, in contrast, on the interest rate, even if this result may, at least in part, depends on the fact that interest rates for closed credit relationships are not observed. Finally, we find that firms that lose connections record an increase in bad loans in the subsequent periods.

In principle, our core result on the connection premium can be rationalised by two, very different, explanations, which do not necessarily exclude each other: more favourable lending conditions might reflect lower information asymmetries

and better monitoring of the lending relationship (the "information view") and/or rather the diversion and misallocation of resources ("conflict of interest view"). We then perform a number of exercises aimed at testing whether one of the two potential explanations prevails. Our evidence, based on a number of heterogeneity tests, points to the latter. In fact, losing a connection is *not* more harmful for more opaque firms, for banks relying more on soft information in the lending process and/or for stronger bank-firm relationships, in contrast with what is predicted by the information view. Moreover, the negative effect of the loss of connection is concentrated among riskier firms (whose divergence of interest with the bank is more severe), in local credit markets where banks have higher market power (i.e. less pressure towards profit maximisation) and among connections whose banker has been involved in criminally relevant behaviours (thus suggesting that the favourable conditions were presumably in place for non-market reasons). This set of findings strongly suggests that interlocking directorates induce significant amounts of credit misallocation. This is (unsurprisingly) consistent with the sample under scrutiny, which includes badly managed banks, for which the quasi-experimental setting is available.

Our paper is related to the literature analysing how bank-firm connections affect market outcomes. La Porta et al. (2003) find that Mexican 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. Ferreira and Matos (2012) study a sample of large publicly listed firms in the US

that are controlled by banks through representation on the boards of directors or the holding of shares. Their results, obtained after controlling for firm fixed effects, indicate that the connection shapes interest rates and mitigates credit rationing effects during the crisis. Engelberg et al. (2012) focus on *informal* connections between large public companies and commercial banks in the US and address endogeneity issues by exploiting the fact that the personal relationships (e.g. having attended the same college or worked for the same company) are formed several years prior to the banking deals. Their results indicate that connections lower interest rates and that firm performance after the connected deal improves. Karolyi (2018) examines the effects of personal relationships on lender choice and loan contracting outcomes. Haselmann et al. (2018) study *informal* firm-bank connection arising when both firm's CEO and the banker belong to the same elitist service club in Germany. They exploit plausibly exogenous variation in the connection network and find that connected bankers engage in crony lending.[1]

More in general, this paper speaks to the literature on the effects of board connections on firm outcomes. Connections with politicians take the lion's share. Most of these papers detects abnormal financial returns of connected firms just after elections or news about politicians' health (Knight, 2006; Fisman, 2001; Faccio, 2006). Other works find that political connections favour preferential

[1] Our contribution is also related to a lesser extent to an extensive body of literature that has studied how financial expertise in the board of non-financial firms affects corporate decisions (Kroszner and Strahan, 2001; Byrd and Mizruchi, 2005; Güner et al., 2008; and Dittman et al., 2010). These papers share a common view that bankers help connected firms in terms of access to credit. In our sample, after losing the connection, the most part of people underlying the connections (86%) remain in the firm's board, so we can exclude that estimated effect depends on the firms' financial expertise.

access to credit (Khwaja and Mian, 2005; Claessens et al., 2008; and Infante and Piazza, 2014), and domestic sales (Cingano and Pinotti, 2013).

This paper adds several new insights to the previous literature. First, we propose a new empirical strategy to handle the pervasive endogeneity issue by exploiting the exogenous break in the relationship that results when the banks are placed under special administration and the board members are removed. This quasi-experimental evidence allows us addressing the endogeneity concerns in a clean way. Indeed, accounting for firm fixed effects does not address simultaneity bias arising from unobserved time-varying factors.

As a second novelty element, we provide a rich set of empirical tests allowing to better interpreting the connection premium. Third, our sample is not limited to large public companies and shows that the distortions in credit allocation are more pervasive when focusing on the much larger pool of small and medium size firms. Indeed, the trade-off between monitoring and conflict of interests is magnified for small firms: on one side, information asymmetries between the borrower and the lender are larger for small firms as they are usually opaquer; on the other side, there is more room to offer sweetheart credit conditions to small firms as they are more compatible with the bank's financial equilibrium. Fourth, while most of the recent 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. In this respect, Italy represents an ideal laboratory to analyse the economic value of the connections and the mechanisms behind them.

Our sample includes credit lines with poorly managed banks, which differ from the rest of the banking system in some baseline characteristics, and which are put under special administration by the Supervisory Authority. Moreover, our sample covers a period that includes both the financial crisis and the subsequent sovereign debt crisis. Hence, strictly speaking, our estimate of the connection premium can be referred to badly managed banks in bad times while generalizability to the universe of banks and to normal times cannot be taken for granted. In the well-known trade-off between internal and external validity, this potential limitation is the necessary cost associated with the gain of exploiting a transparent and powerful identification strategy. On the other hand, limits to the external validity should not be overemphasized: our point estimate for the connection premium and its interpretation are in line with Haselmann et al. (2018)'s results for German firms, observed in the 1993-2105 period, which borrow from banks that are not in distress. Moreover, the relevance of the issue and the implied policy implications are more general. Indeed, credit misallocation induced by poor bank governance or improper relational lending is likely to be a widespread phenomenon across countries and economic junctures. Finally, from a policy perspective, our findings call for a close monitoring of all borrower-lender interlocking directorates and for enhanced power of early interventions to the supervisory authority in order to prevent credit misallocation and unseemly lending relationships. Interestingly, this is also in line with the IMF policy recommendations on the resolution of bank crises and on the corporate

governance of banks (Jassaud, 2014).

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. 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. 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.

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 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 all non-financial firms borrowing from banks that were placed under special administration and compare the loan dynamics of firms that were connected to those banks and lose the connection after the special administration with that of a comparable group of unconnected firms borrowing from the same banks. The estimating equation reads as:

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

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 measures the loss of connection and is equal to 1 for treated firm f (i.e. those who were connected before t) from period t on (i.e. when they lose the connection, that occurs in the first quarter after the special administration date), and 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 large set of firms' time-varying controls X_{ft} (log of revenues as a proxy for credit demand and firm size, returns on assets to control for firm profitability, Z-score as a proxy of creditworthiness, and sector and geographical area trends in order to capture differential patterns of credit demand for firms located in specific areas or belonging to a particular economic sector), 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 our difference-in-differences identification strategy 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 observable characteristics that are associated with 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 order to address this last concern, before estimating equation (1) we pair each connected firm with "similar" control units (Heckman et al., 1997) by means

of 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 log of revenues, 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 use pre-determined matching variables. 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.[2]

Our identification strategy differs from the most credible ones scholars have proposed thus far. Engelberg et al. (2012) exploit information on past school connections, or third-party past professional connections. Hanselmann et al. (2018) rely on the exogeneity of the rules that govern the entry into the elitist club or the formation of one of its new branches. In both cases, they focus on the effect of *establishing a new connection* while we study the (potentially non-symmetric) impact of the *connection loss*. Karolyi (2018) uses the executive deaths and

[2] We have chosen the ten closest observations, as is common in the related empirical literature (Blundell and Costa Dias, 2009).

retirements at other firms as a plausible source of exogenous variation in executive turnover. His focus is slightly different, as he is primarily interested in examining how endogenous personal connections between executives and lenders explain lending relationships both on the extensive and on the intensive margin. Overall, our empirical approach has strong and weak points with respect to other approaches. As to the former ones, we analyse *formal* connections, in the form of interlocking directorates, and therefore we can derive neater and more relevant normative implications. On the other hand, we are forced to use a sample of loans extended by distressed banks, which is not necessarily representative of the universe of bank-firm relationships.

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 (i.e. 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. Commissioners are chosen among experts in the banking sector who also meet the "fit and proper" rules for banking managers, and have no conflict of interest with the bank.[3] Their appointment usually lasts less than one year. Under extraordinary circumstances, the special administration may be extended for a further six months. Commissioners shall exercise the functions and powers of the directors of the bank; the monitoring committee shall carry out the control functions. The commissioners' objective is to get the bank through the crisis so that at the end of the special administration a new board is appointed. In principle, the previous directors meeting the "fit and proper" requirements could

[3] For further details see: https://www.bancaditalia.it/compiti/vigilanza/normativa/archivio-norme/comunicazioni/linee-guida-incarichi-professionali-conferiti/Linee-guida-incarichi-professionali-conferiti.pdf (in Italian).

be re-appointed but, as a matter of fact, this never happens because of a stigma effect. Needless to say, if the crisis is irreversible, the bank is placed under compulsory administrative liquidation. Also in this instance, the Bank of Italy is responsible for appointing the liquidating bodies. Of course, the special administration has no legal consequence on the possibility that the removed administrators continue to sit in the firms' board. In our data, this is mostly the case so that our results are not capturing changes in companies' financial skills.

The banking supervision bulletin, published by the Bank of Italy, includes a monthly report of the list of banks placed under special administration. In the period under scrutiny (2007-2013), 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.[4] 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. Figure 1 reports the number of banks placed under special administration over time, while Figure 2 shows the spatial distribution of their loans in the estimation sample across provinces.

In Table 1 we compare the banks included in our sample with the rest of the banking system (733 banks). Data refer to the end of 2006, before the sample

[4] 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).

period (see below). On average, banks in our sample differ in some respect from other banks. In particular, they are smaller (the total amount of loans to non-financial firms is about one-half of comparison group's one), more likely to adopt a cooperative governance and less likely to belong to banking groups. Moreover, their profitability is lower and the incidence of bad loans is slightly higher. Finally, the amount of extended loans exhibits a much faster growth rate in the previous years. We also compare firms included in our sample with respect to the universe of other firms (again at the beginning of the period). It turns out that our sample includes larger units and this might be due, at least in part, to two factors: first, we consider by definition firms with bank debt (that are on average larger with respect to the others) and, second, the fraction of firms in the manufacturing sector is larger in our sample. Moreover, the Southern part of the country in less represented.[5]

As far as the timing of the events is concerned, we assume that the treatment (that is the loss of the connection) starts from the first quarter following the date on which the bank is placed under special administration.

3.2 Data

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

[5] Throughout the paper, Southern firms are those located in the following regions: Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, and Sardinia.

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 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 for which at least one person was a member of both of the governing bodies before the special administration, after which connections are dissolved.

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.[6] 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 involved in the special administration procedures). For comparability reasons, interest rates were computed for credit lines only.[7] 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 observe: firms' turnover (used as a proxy for size), Z-score (a measure of credit risk), age, sector of activity and geographical area.

In the end we have an unbalanced panel data for nearly 30,000 non-financial firms, borrowing from 40 banks that experienced a special administration, observed over the 2007-2013 period. It is worth noting that during this period the Italian economy faced both the financial crisis and the subsequent sovereign debt

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

[7] 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 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.

crisis, which negatively shaped loan supply (e.g. because of loss of equity and drop in liquidity); thanks to bank-time fixed, included as controls in the equation (1), this does not affect the estimation of our parameter of interest. Nevertheless, our core estimate has to be properly thought of as the causal effect of connection in bad times, which does not necessarily apply to normal times. The descriptive analysis is reported below.

3.3 Descriptive evidence

Table 2 reports the mean and the standard deviation for each variable mentioned above. Nearly 700 firms were connected to the lender, 2.3% of the overall sample. 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 3a). 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 3b).

Table 3 provides the summary statistics for the main firm characteristics, providing the comparison and the mean tests between the connected and the unconnected firms. In the whole sample, the connected firms are more indebted, 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. As expected, these differences disappear in the propensity score matching sample. In details, we performed two balancing tests. 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). All firms' observable characteristics are below the 5% threshold, except for firm profitability. Second, we performed a two-sample t-test to check if there are significant differences in the covariate means for both groups: after the propensity score matching, differences are substantially narrowed and vanish from a statistical point of view.

4. Results

4.1 Main results: the impact of the loss of connection

Now 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.

Table 4 shows our main results. 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. The magnitude of the estimated effect is in line with that in Haselmann et al. (2018), who use a different identification strategy to estimate a connection premium equal to 33% in a sample of German firms observed from 1993 to 2015.

We now turn to a number of robustness checks. As starting point, we test the sensitivity to different matching approaches. In the first two columns of Table 5, we enrich the set of the propensity score's predictors by including further variables: firm age, firm leverage and firm profitability (proxied by return on assets); in columns 3, 4 we switch from the nearest-neighbour matching to the kernel (Epanechnikov) matching, in order to assign weights to the controls that are inversely proportional to the distance between the propensity scores of treated and controls; in columns 5, 6 we use exact matching: for each connected firms we identify those belonging to the same cell, where a cell is given by the intersection of the following variables: bank-geographical area (4 areas), sector of economic activity (around 20), firm size (5 classes), *z*-score (3 classes). Results are qualitatively confirmed and there are only minor changes in the magnitude of the

estimated effect.

We detected only one potential source of endogeneity 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 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. Nevertheless, in Table 6, we present four empirical tests aimed at addressing this potential threat to the identification. The underlying idea is to exclude loans that may induce reverse causality and see whether results are stable.

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 the treated firms (and their corresponding units in the control group). This choice is aimed at avoiding that the relevance of the connected firms in the banks' portfolio affects the supervisory authority's decision. In the second column, we exclude the top 5% of firms according to their ex-ante (one year before the special administration) probability of default. This has been estimated by means of a linear probability model whose dependent variable is a dichotomous variable equal to 1 if the firm has bad loans

and the firm-level predictors are: log of revenues, returns on assets, score, leverage and sector- and geographical area-fixed effects. The underlying idea, in this case, is to drop firms whose observables could have suggested future higher economic and financial distress and that, therefore, might have had a higher probability of creating some trouble to their lenders. In the third column, observations referred to the two banks (i.e. 5% of the banks in our sample) that are more exposed to the treated group as a whole are dropped. This choice is aimed at avoiding that our results are driven by the banks where connection play a larger role and this, in turn, might affect again the decision of the supervisory authority. Finally, in the fourth column, we exclude loans referred to the seven banks (mostly small banks) whose motivation for being placed under special administration was (among the other things and according to the official legal deed) "autonomous initiatives of the directors in granting the loans", i.e. banks in which potential misallocation of credit attributable to the board of directors is arguably larger. All these choices share the common goal of minimising the risk that the firms to which the banks are highly exposed may drive the treatment. In all cases, the estimate is fairly close to the baseline, thus suggesting that this potential source of endogeneity is not an issue in our case.

In the fifth column, the sample is restricted to six quarters after the beginning of the special administration to see whether the effect is stable when we distinguish between the special administration and the subsequent period when

the bank goes back to normal times. It turns out that this is the case.[8]

The last two columns in Table 6 are devoted to test the sensitivity of our results to the timing of the treatment. Thus far, we have assumed that the treatment starts in the quarter following the special administration date. This assumption might be questioned in both directions. On the one hand, the special administration is the final step of a bank crisis, which usually occurs after a deep investigation during which the old board might review lending policies under the supervision of the Bank of Italy, aimed at resolving the bank crisis in a cooperative manner: in this case, the effects might be anticipated.[9] On the other 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. We then re-estimated the baseline model in equation (1) assuming that the treatment starts two quarters before special administration (column 5) or two quarters after (column 6): in both cases we document that the existence of a connection premium is robust to the starting point of the treatment.

In Table 7 we provide two further tests of the validity of our identification 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 (i.e. before any anticipation effect). 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

[8] Six quarters is the average duration of special administrations (see subsection 3.1). Results are very similar when we restrict to four or eight quarters.
[9] Informal conversations with banks' supervisors active in the on-site inspections support this view.

emerges. In the second column, we test the parallel trend assumption more directly: we again consider the period preceding the treatment and we augment the baseline specification with an additional variable obtained by interacting a trend variable with the treatment dummy; 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.

In Figure 4 we push forward the common trend analysis and show an event study analysis in the spirit of Autor (2003). We estimate a version of the equation (1) in which L_{fbt} is substituted by the interactions of a dummy for connected firms with time fixed effects (with the period just before special administration taken as reference category). The coefficients before the treatment are not significantly different from zero, suggesting the absence of any anticipation effect or divergent patterns between the two groups before the treatment. From the special administration on, the credit lines decrease significantly for the connected firms. The estimates become somehow less precise over time because attrition reduces progressively the number of treated units.

In the next four tables we offer a more complete picture of the impact of the connection loss by looking at different outcomes.

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 8, 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 (e.g. mortgages) 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.

Another key question is what happens at the firm level. Connected firms might be able to compensate for the lost loans by borrowing more from other banks. In Table 9, first two columns, we show that this is not the case: replicating our analysis with log of loans from outside banks (those that do not go under special administration) as dependent variable brings to a coefficient of interest that is statistically not different from zero. The next two columns summarize the effect at the firm level: overall, losing the connection implies a 16% drop in credit availability, which can be interpreted as an average between a 26% drop with respect to the bank under special administration and a zero effect with outside banks.

Table 10 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.[10] This result may be explained by the fact that it is easier for the new management, in dealing with troubled banks, to cut risky loans and to correct portfolio imbalances, rather than to re-price 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 (i.e. if those credit lines had not been closed the bank would likely increase the cost of credit). The null interest rate result is also consistent with Petersen and Rajan (1994), who find that the primary benefit of lending relationships is greater availability of credit rather than lower prices.

In Table 11 we complete our analysis of additional outcomes by examining whether the firms' non-performing loans increase after the loss of connection. We find that bad loans increase by 7% for formerly connected borrowers with respect to the control group. On the other hand, the increase in bad loans is not mechanically driven by liquidity problems: after the treatment, the bank debt-to-turnover ratio for treated firms remain much higher than that referred to control

[10] 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 4.

units.[11]

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

In the previous section 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 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. In addition, the banker might provide valuable financial expertise to the firm. In this section, we propose a number of empirical tests aimed at testing whether the conflict of interest view (our null hypothesis) can be usefully integrated by the information view (the alternative one).

As a preliminary evidence, results in Table 9 (treated firms are not able to substitute lost loans with credit from outside banks) suggest that the connection premium might more probably be related to some conflict of interest. On the other

[11] Results are available upon request.

hand, the increase in non-performing loans after losing the connection (Table 11) is not conclusive because it is consistent both with the dark and with the bright side of connections: connected borrowers might have benefited from favourable and inefficient evergreening practices in the pre-treatment period or, under a different perspective, the rise in bad loans might stem from the collapse of privileged information (and, therefore, the worsening of monitoring activity). Another potential criticism to the test in Table 11 as a screening device between the two competing views is that, even if one assumes favouritism, this may lead to a negative effect on loan quality because of a selection mechanism: new commissioners retain only the highest quality borrowers among those with previous connections. A further potential bias might also be at work if credit conditions for treated firms were friendlier so easing debt repayment.

In what follows, we examine whether the impact of the loss of connection is heterogeneous across firms along some crucial firm or connection characteristics (Table 12). 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.[12] 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

[12] Opaqueness is expected to be negatively correlated with size, as smaller firms have less informative financial statements and lower public profiles. Bonaccorsi di Patti and Dell'Ariccia (2004) assumed that opaqueness is also negatively correlated to the relative use of fixed and tangible assets in the production process; the idea is that a bank can evaluate more easily the quality of a project (and monitor the borrower) when the technology is simple and the relation 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.

(Petersen and Rajan, 1994; Berger et al., 2005). As shown in the first column, we find the opposite – i.e. the impact is larger for firms with an index of opaqueness below the median – in contrast to the finding predicted by the information view. A simple t-test shows that the difference between the two coefficients is also significant from a statistical point of view.

The second 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 riskier firms (i.e. those with Z-score above the median) and the difference between the two coefficients is statistically significant.[13]

We also 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

[13] This exercise is not conclusive because the fact that the credit reduction is larger for riskier firms might also be consistent with the competing interpretation because information asymmetries are larger under uncertainty.

(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 third 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 (although in this case the difference is not statistically significant at the conventional levels).

Finally, we distinguish between losing the connection for single-bank firms vs multiple-bank ones. According to a consolidated view in the banking literature, lender's informational advantages dissipate with multiple lending relationships (Schenone, 2010). Hence, finding that the connection premium is lower in the latter case would support the information view hypothesis. Column 4 shows that this is not the case.

In Table 13, we show the heterogeneity analysis according to bank characteristics, starting from whether the bank is mutual or not. The underlying idea, widely accepted in the banking literature, is that mutual and smaller banks tend to privilege lending relationships based on soft information (Stein, 2002). Therefore, according to the information view, one may expect that the negative impact of the loss of connection would be concentrated among mutual banks. However, our findings show that the impact is similar between the two categories

(column 1).[14]

On a similar vein, one might assume that creating a connection can be a technology to acquire information. Under this assumption, if asymmetric information is the main explanation then the connection premium should be larger for connections with banks that ex ante had more connected loans. We fail to find a differentiated connection premium (column 2).

Finally, another 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. We find 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; the difference is statistically significant (column 3).

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, thus leading us to interpret the results as a tale of bad credit allocation.

5. Conclusions

[14] One could also argue that mutual banks, because of their strong bank-firm relationship and their small geographical reach, may be more prone to conflicts of interest. If this is the case, the interpretation of our empirical test would be different. In this respect, and taking into account that the connection premium is not different for mutual banks, the test can be seen as not fully conclusive.

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, even if the latter result may, at least in part, depends on the selection (downward) bias stemming from the fact that we do not observe interest rates for credit lines that have been closed. We also provide several empirical tests that, taken together, 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 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.

Our findings have some implications for future research. First, it would be

interesting analysing whether the funding cut translates into lower investments and/or lower employment. Second, some advances on the external validity might be achieved by leveraging different exogenous sources of connection break (e.g. merger and acquisitions) and focusing on normal times. Third, connections in terms of interlocking directorates can, in principle, be either complements or substitutes for common ownership links or for informal connection. Enlarging the focus to different forms of connections and to their relationships and their potentially different implications would be valuable.

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