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DEBT RESTRUCTURING WITH MULTIPLE BANK RELATIONSHIPS

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Abstract

When the debt of distressed firms is dispersed, free riding makes it difficult to reach a restructuring agreement. We develop a multistage game in which banks come across each other frequently, allowing them to threaten punishment in case of free riding. As the number of banks grows, the chance of re-encountering a bank and of being punished for free riding increases, improving the likelihood of cooperation. Looking at Italian firms in distress, we find that the restructuring probability increases with the number of banks up to a threshold - around three banks - beyond which coordination problems prevail.

JEL Classification: G21, G33.
Keywords: banks, debt restructuring, number of creditors.

Contents

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1 Introduction[1]

Bank lending is an important source of external finance, frequently the only one available to small- and medium-sized enterprises to fund their activity and investments. Tight bank-firm relationships are assumed to ease financial constraints of firms without access to capital markets (Boot, 2000). This is true especially in difficult times, when the firm cannot meet its obligations and it has to renegotiate its debt contracts to avoid bankruptcy (Rajan, 1992; Bolton and Freixas, 2000).

Despite the relevance of relationship lending, one common feature in many countries is multiple borrowing from many banks. According to Ongena and Smith (2000), focusing on a sample including 20 countries, firms have an average of 5.6 banking relationships. In Qian and Strahan (2007), who compare 43 countries, the number of banks ranges between 4 and 7 according to the country legal origin (English or German). In Italy, the average number of banks for non-financial firms is 3 when bank lending is between 500 thousands and 2.5 millions, and 4 for loans up to 5 millions; considering higher values of total loans, the number of banks becomes very large (up to 8 banks, see Figure 1) and the first lender covers less than 40 per cent of the total bank debt.[2]

The theoretical literature explains this behavior as aimed at reducing the information monopoly held by the main bank, which may translate into some form of rent extraction (Sharpe, 1990; Rajan, 1992) and induce misbehavior phenomena during the restructuring phase (Guiso and Minetti, 2010). Firms want to reduce the bank's monopoly power by diversifying the sources of external finance and by increasing the number of lending banks. Yet, the diversification in bank financing comes at the cost of increasing coordination risk in case of distress, since the conflicts among many creditors

[1]The opinions expressed are those of the authors and do not necessarily reflect those of the Bank of Italy. We wish to thank Raffaello Bronzini, Vittoria Cerasi, Ettore Croci, Domenico Delli Gatti, Silvia Del Prete, Marcello Pagnini, Carlotta Rossi, Paolo Sestito, L. Federico Signorini, the participants at the Workshop on Credit and Financial Institutions Agglomeration (Bank of Italy, Rome, 30 January 2015), and two anonymous referees for suggestions and comments to a previous version of the paper. Remaining errors are our own.

[2]Bank of Italy's statistics referred to firms reported in the Credit Register (Centrale dei rischi) with total loans larger than 75,000 Euros and one or more credit relationships.

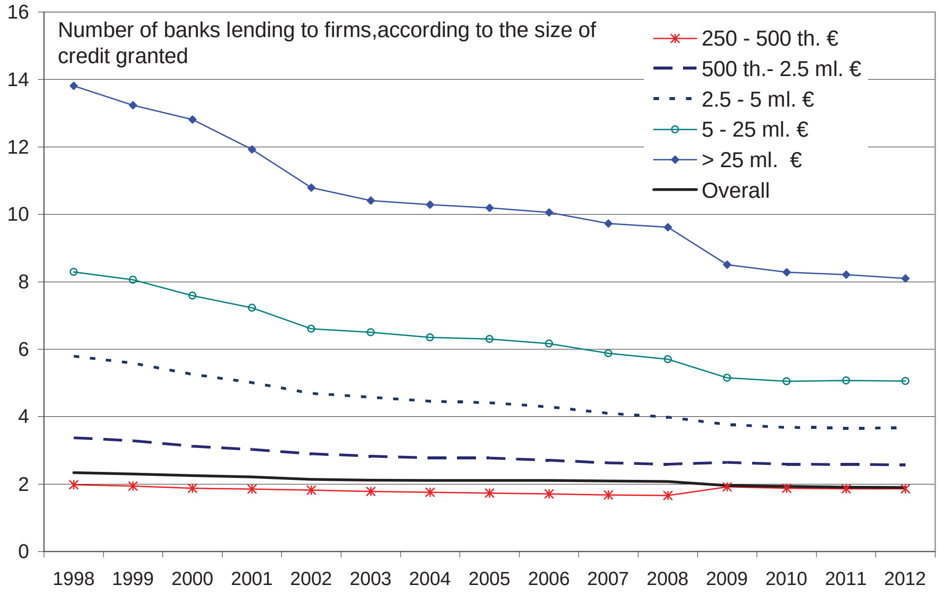

Figure 1: Multiple bank borrowing by firms. Source: Bank of Italy, Statistics on line.

may convey liquidation even when this is not economically efficient (Bolton and Scharfstein, 1990, 1996; Bulow and Shoven, 1978; Gertner and Scharfstein, 1991; White, 1989). Considering this theoretical background, it is even more puzzling that especially risky firms – those with a higher probability of default – tend to have a higher number of lending banks (Ongena, Tümer-Alkan and von Westernhagen, 2012; Godlewski, Lobez, Statnik and Ziane, 2010).

As a matter of fact, while multiple bank relationships are widespread across countries, the actual effect of this choice on debt restructuring in case of financial distress is still an open question and very few papers address the coordination problem in a multiple bank framework.

In this paper, we provide a novel rationale for the diffusion of multiple banking. We consider the case when the debt of a firm in distress is dispersed among many banks. In this situation, a restructuring agreement is difficult to reach because of free rider problems among lenders. We show this result through a very simple "restructuring game" modeled as a one-shot game with complete information among lending banks. When more than one bank is lending to the distressed firm, the liquidation solution is prevalent since the non-cooperative strategy strictly dominates.

However, there are some features in bank lending that may help reducing this coordination risk. Differently from dispersed bond-holders, banks are non-atomistic creditors that can act strategically. Recent theoretical contributions have assumed that banks interact strategically (Hertzberg, Liberti and Paravisini, 2011; Ogura, 2006; Fluet and Garella, 2007). Therefore, even having in mind that multiple banking is a restraint in the renegotiation process, still banks may behave very differently from dispersed public creditors, or large pools of uniform lenders. They can meet and discuss over the best solution for the firm. More important to our analysis, they can threat a punishment in case of free riding behavior in other credit relationships.

We add these features to our model by considering a game repeated through time. Every stage of the game corresponds to a decision on a different firm in distress, whose outstanding debt should be restructured by the lending banks. Repetition gives the possibility to introduce a punishment in case of free-riding behavior. By following a classical trigger strategy (each bank cooperates until the other defects and afterwards it defects forever, thus forcing the liquidation of distressed firms), free riding becomes unprofitable whereas cooperation is rewarded. A central result of our model is that the threat of punishment becomes more relevant as the number of banks lending to the firm (and participating in the restructuring negotiation) grows larger, since the chance of re-encountering another bank on another negotiation table grows as well. Thus, the likelihood of debt restructuring, avoiding an inefficient liquidation of a distressed firm, increases with the number of lending banks. This result contrasts with the traditional view that a large number of creditors reduces the chances of an agreement leading to debt forgiveness, due to coordination problems.

The argument we use resembles that of multimarket contact proposed by Bernheim and Whinston (1990), according to whom multimarket contacts between two rival firms improve collusive outcomes since any deviation is punished not only in the market where it occurs but also in all other markets where the two firms compete. In our setting, the repetition of the game trough time and over different firms in distress improves the incentive to cooperate. Of course, this is true only if creditors are likely to meet again in the future and if they do not discount the value of the next encounter too much. In Axelrod's (1984) words "the future must have a sufficiently large shadow". This is a reasonable assumption as long as bank lending is concerned, while it is difficult to reconcile with publicly held debt restructuring.

Our key contribution is to test empirically the theoretical predictions of our simple model by estimating the probability of bank-debt restructuring. A restructuring choice is problematic, as firms' prospects are difficult to evaluate in a distress situation when hard information is likely to be less reliable. Of course, banks have many advantages compared to outside financiers. They have proprietary information about the firm characteristics, gathered through repeated interaction with the entrepreneur along the credit relationship, and they are better equipped to monitor borrowers than other creditors, especially when small and medium-sized enterprises are involved.

We focus on the role of relationships with the banking system. We are especially interested on how the number of banks affects the capability of firms in financial distress to renegotiate outstanding debt and to successfully overcome the crisis, after controlling for the different aspects that may affect this decision. In particular, we want to test whether an increase in the number of banks has a positive impact on the probability of restructuring (at least up until coordination problems arise), as predicted by our theoretical model, or has a negative impact, as predicted by standard theory. In other words, we want to highlight the trade-off between the incentive to cooperate stemming from the strategic interaction among banks and coordination problems that arise when the number of banks increases. To this aim, the Italian case – on which we focus – is an especially interesting one: on the one hand, bank-debt is the main source of external finance; on the other hand, multiple borrowing from many banks is widespread also among small- and medium-sized enterprises (Detragiache, Garella and Guiso, 2000). We control for the economic and financial situation of the firm, by introducing balance-sheet ratios before the reorganization; we introduce also dummies for the sector of activity of the firm and its location. We use also firm fixed or random effects in various robustness checks. Finally, we verify the impact of these variables on the workout success and the firm's overall survival probability.

We consider explicitly only financial restructuring, in order to highlight the role of banks in this process, controlling for anticipated profit opportunities.

Our empirical analysis has been performed on the population of about 2,400 Italian firms facing distress in 2007. To build our dataset we start from banks' reports of borrowers facing distress. For regulatory reasons, banks have to report firms that encounter difficulties in repaying their debts, as long as the amount extended to the firm exceeds 75,000 Euros. We focus on doubtful loans ("incagli"), a condition in which the borrower is insolvent, but – unlike with bad loans ("sofferenze") – this situation is assumed to be only temporary by the bank. We classify these firms as financially distressed. In order to include in our data those firms that are at an early stage of distress, we consider all firms that were reported as doubtful for the first time in 2007. Therefore we consider all Italian firms, with outstanding bank debt above the censoring threshold, that were unable to repay their debts in 2007, but that still had the possibility to recover according to their lending banks. These data have been combined with information concerning relationships with the banking system, balance-sheet data, and records from firms' official registers to assess whether the considered firms have gone bankrupt or have been liquidated in the following years.

We find that the probability of restructuring increases with the number of lending banks, although the impact is not linear and it becomes negative above a threshold of three banks. Consistently with our theoretical predictions, this finding suggests that the presence of a larger number of creditors can have a positive impact on the likelihood of cooperation among them, even though – after a threshold – this impact is more than offset by coordination problems. Our empirical analysis provides other interesting findings, although not directly implied by the theoretical model. Banks help firms with a better economic and financial situation – in terms of returns on industrial production and leverage ratio – before the distress event. Firm size is positively correlated with the probability of restructuring and improves the likelihood of survival. Banks tend to restructure the outstanding debt of those firms for which bank financing is prevailing and coordination problems with other type of creditors are therefore lower. We control also for the concentration of debt among banks lending to the firm, finding that dispersed debt increases the probability of restructuring. One possible explanation is that symmetric lending shares represent a mutual control mechanism, which improve the restructuring process by reducing the free riding incentive; this explanation is consistent with the insurance motive put forward by Carletti, Cerasi and Daltung (2007), according to which multiple lending permits to banks to diversify their loans portfolio and share monitoring efforts. These results are robust to various specifications of the dependent variable and to different econometric techniques.

Overall, we show that banks maintain their special role in firm financing also in difficult situations and when the firm's debt is dispersed among many banks, essentially because they may act strategically. However, this result fades away rapidly and multiple banking relationships become detrimental to the restructuring process when more than three banks are involved.

The paper is organized as follows. Section 2 presents a stylized model highlighting our basic intuition, while Section 3 tests its empirical relevance. Section 4 deals with the outcome of the restructuring process, either liquidation or survival. Section 5 concludes.

2 A simple model of the restructuring decision

2.1 The basic decision problem with a single bank

We consider a firm that has an investment project to be completed in a two-period time span (t_1 and t_2). The investment is financed by issuing only bank debt (D), which encompasses both the principal and interest payments and which will come to maturity at the end of the second period. We assume that the project cannot be partially liquidated.

As in Rajan (1992), at the end of the first period the investment starts generating cash flows and it becomes clear whether it will be successful or problematic. In good times, the returns are high, covering current expenses in t_1 and ensuring both debt repayments and extra profits for the entrepreneur in t_2. In contrast, in bad times, returns are not large enough to pay back current expenses in t_1 – such as wages or the costs of intermediate inputs. The low level of returns also signals that the firm will not be able to repay its debt due in t_2. Hence, the firm enters in financial distress and it must ask the bank for help. The bank can decide to rescue the firm by providing the additional funds needed to keep the firm going and to carry out the investment project. The bank either grants a new loan to assure survival, or it liquidates the firm: we focus our attention on this choice. At the end of the second period, if the workout is successful, the firm obtains a return (at most) equal to the value of the initial outstanding debt.[3] In turn, if the workout is unsuccessful, the investment brings zero return and the firm is liquidated.[4]

There are two possible cases. First, the bank does not refinance the firm and goes for liquidation. The liquidation value, $L > 0$, is lower than the outstanding bank debt: $L < D$. Hence, the bank suffers a loss in case of liquidation and it recovers only a known and previously identifiable portion

[3] We do not consider higher returns, essentially because of the financial distress situation in which the firm is operating. This is a common framework in previous research on debt restructuring (see, among others, Detragiache and Garella 1996).

[4] We assume that the entrepreneur prefers to avoid default, both because of its stigma and to retain the ability to invest and profit in the future.

of its initial loan.

Second, the bank refinances the firm, allowing it to continue its activity. It is reasonable to assume that the outcome from carrying out the workout plan presents further uncertainties, stemming from the distressed situation in which the firm is operating. Thus, the workout brings a positive return x in date t_2, with a probability of success equal to θ. This return is (at most) equal to the outstanding debt D, whereas the residual profits to equity-holders are zero, i.e. $x \leq D$. The bank can recover its initial loan, but it loses the new financing granted in the workout, i.e. the new loan is assumed to be junior with respect to the outstanding debt. For the sake of simplicity, and without loss of generality, we can assume that the relation between x and D holds with equality: $x = D$. If the workout fails, liquidation is the only option left, and the liquidation value L is lower than x (and D), essentially because of distressed selling.[5] Hence, the value of the firm under the restructuring hypothesis (V_r) is

$$V_r = \theta D + (1 - \theta)L,$$

with $L < D$.

As mentioned above, in order to obtain this restructuring value, new funds must be invested in the firm, representing the cost (C) of the restructuring option. Hence, the actual expected profit for the bank from restructuring is $V_r - C$.

Figure 2 reports the extensive form representation of the payoffs obtained by the bank under different scenarios.

In the debt restructuring case, the bank has the possibility to receive a higher percentage of its credit than in the case of liquidation ($D - C > L$), although with some degree of uncertainty.[6]

[5] For the sake of simplicity, we assume that the liquidation value L is the same either if the firm is liquidated in t_1 – as a consequence of financial distress, or in t_2 – following an unsuccessful restructuring.

[6] This framework is in line with actual evidence about workout losses. For Italy, Generale and Gobbi (1996) estimate that banks lose about 20 per cent of their claims in private reorganizations, as against up to 80 percent in court-supervised bankruptcy procedures.

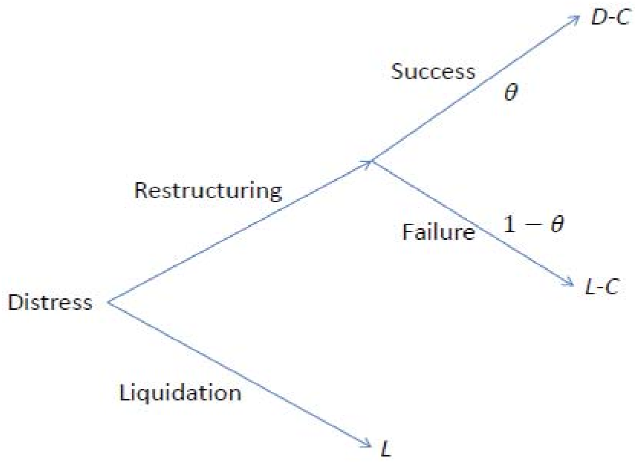

Figure 2: The decision tree of the restructuring choice

In case of unsuccessful restructuring, the liquidation value is reduced by the deadweight loss of the new credit extended to finance the workout.

In order to analyze the restructuring versus liquidation decision, we assume that the bank is risk-neutral. Risk neutrality is usually considered a reasonable assumption to describe a well diversified bank (Rajan, 1992; Bannier, 2007; Detragiache, 1995). Hence, the bank participates to the restructuring process only if the expected profit from restructuring is higher than the liquidation value that could be obtained by liquidating the firm in t_1:

$$V_r - C \geq L. \tag{1}$$

This condition allows us to derive a probability threshold for which the bank is indifferent between restructuring or liquidating the firm in t_1 that is equal to

$$\theta^* = \frac{C}{D - L}. \tag{2}$$

As long as the probability of success of the workout is greater or equal than this threshold, i.e.

$\theta \geq \theta^*$, the bank refinances the firm with the new loan, while if $\theta < \theta^*$ the firm is liquidated.

2.2 The coordination problem with several banks

Assume now that Condition (1) holds, so that it is efficient ex-ante for the single bank to restructure the debt and bail out the firm. It is then interesting to ask what are the consequences if more than one bank is financing the firm. A coordination problem arises among the lending banks, who should decide whether to restructure or not. The problem occurs because each bank is better off if it gains from restructuring without carrying the associated costs. Hence, each bank has an incentive to hold out from any possible agreement, leaving the other banks to carry the whole burden of the procedure. This is a classical prisoner's dilemma situation. The consequence might be the liquidation of the firm, even though it is not the Pareto optimal solution.

To better highlight this coordination problem, we focus here on the simple two-bank case. The reasoning can be easily extended to the more general case in which the number of banks is $N > 2$, a case we study in the next sub-section, dealing with a multistage game. Let us consider two banks, each lending $\frac{D}{2}$ to a distressed firm, so that each bank has one half of the total outstanding debt. Each of them has to decide in t_1 whether to provide the new funds needed to bail out the firm: we label these two different strategies as Cooperate (Co) and Not Cooperate ($NotCo$) respectively. The outcomes of their decisions can be described as follows.

1. Both banks cooperate, sharing the cost of bailing out the firm ($\frac{C}{2}$ each), in exchange of one-half of the restructured firm's value ($\frac{V_r}{2}$).

2. Both banks do not cooperate: the firm is liquidated, and each bank gets $\frac{L}{2}$.

3. One bank cooperates and the other does not: the first bank bears the full cost of restructuring (C), while it gets only one-half of the restructured firm's value ($\frac{V_r}{2}$); the second bank gets one-half of the restructured firm's value ($\frac{V_r}{2}$) without bearing any restructuring cost. In other

words, the latter bank adopts a typical free-riding behavior.

Figure 3 represents the payoffs of the different strategies. We assume that the outcomes are common knowledge and that the two banks act simultaneously. To keep things simple, we focus on pure strategies only.

	Bank 1		
		$NotCo$	Co
Bank 2	$NotCo$	$\frac{L}{2}, \frac{L}{2}$	$\frac{V_r}{2} - C, \frac{V_r}{2}$
	Co	$\frac{V_r}{2}, \frac{V_r}{2} - C$	$\frac{V_r - C}{2}, \frac{V_r - C}{2}$

Figure 3: The payoff of the two-bank game

(The first payoff in each cell is that of bank 1)

It is immediate to see that (Co, Co) cannot be a Nash equilibrium, since $\frac{V_r}{2} > \frac{V_r - C}{2}$: if one bank cooperates, the other one has a clear incentive to free ride. To see whether either $(NotCo, Co)$, or $(Co, NotCo)$ can be an equilibrium, we need to check the inequality

$$\frac{V_r}{2} - C \geq \frac{L}{2}, \tag{3}$$

which enables us to define the following threshold for the success probability of the workout:

$$\widehat{\theta} = \frac{2C}{D - L}. \tag{4}$$

If $\theta \geq \widehat{\theta}$, then each bank has an incentive to bear the full cost of bailing out the firm, given that the other bank holds out. If $\theta < \widehat{\theta}$, to the contrary, the dominant strategy for each bank is $NotCo$, so the Nash equilibrium is $(NotCo, NotCo)$. This discussion allows us to state the following Proposition 1.

Proposition 1 *There exists a threshold level* $(\widehat{\theta})$ *for the success probability of the workout, such that:*

(a) if $\theta \geq \widehat{\theta}$*, the two-bank game has two Nash equilibria in pure strategies:* $(NotCo, Co)$ *and* $(Co, NotCo)$*;*

(b) if $\theta < \widehat{\theta}$*, the two-bank game has a unique Nash equilibrium in pure strategies:* $(NotCo, NotCo)$*.*

Notice also that $\widehat{\theta} = 2\theta^*$. This implies that there is a range of values for the probability of success, namely $\widehat{\theta} > \theta \geq \theta^*$, such that Condition (1) is met but Condition (3) is not. This observation immediately leads to the following Proposition 2.

Proposition 2 *There exists a range of values of the success probability of the workout, such that a single bank lender allows for restructuring, while two banks fail to coordinate and liquidate the firm.*

Therefore, there are circumstances in which, even if restructuring is economically efficient – i.e. the expected continuation value of the firm net of the restructuring cost is larger than the liquidation value (Condition (1) holds), the firm is restructured if only one bank is lending and it is liquidated if multiple banks are lending, due to a coordination failure among them. Because of free riding, the liquidation outcome is more likely with several lending banks than with a single bank. [7]

[7] When $\theta \geq \widehat{\theta}$, we have multiple equilibria. We could introduce a rule to select the equilibrium such as, for istance, banks move sequentially. Alternatively, since each bank has an incentive to hold in, they can also find a different agreement. A common solution to improve cooperation is to introduce a majority rule. The restructuring procedures, both court supervised and out-to-court, usually require that the majority of debt-holders participate in the agreement. Therefore, the decision of each debt-holder is pivotal to the agreement and a free-riding behavior will jeopardize the restructuring outcome. As a result, they will cooperate more easily. We will show in the next section that repetition can lead to a similar outcome.

2.3 A multistage game with many distressed firms

We now study the general case in which $N \geq 2$ banks have to decide whether to allow for debt restructuring in a sequential game. We assume that there are many distressed firms in the market, and we extend the previous model to allow for an infinite time horizon, with periods denoted by $t_{0,}t_{1,\ldots}$. When a bank decides whether to cooperate or not in t_0, it considers the likelihood of re-encountering any of the other $N-1$ banks in the future, when the decision about restructuring will have to be made for some other distressed firms. In other words, it has to consider the chance of repeating the game on other "bargaining tables" in some future periods with any of the banks with which they are currently playing the restructuring game. We investigate whether this sequential game can lead to some improvements over the one shot game introduced above, by increasing the chance of an efficient restructuring being undertaken. Therefore, we focus here on the case in which $\theta < \widehat{\theta}$, so that the Nash equilibrium of the one-shot game is $(NotCo, NotCo)$.

We also assume that the probability that any of the N banks playing the game in t_0 will not meet any of the other $N-1$ banks in any future period (denoted by $p(N)$) is a decreasing function of N: $p'(N) < 0$. In other words, we assume that the larger is the number of banks currently playing the restructuring game, the higher is the likelihood of playing again the same game with some of them, when other firms will enter financial distress.This assumption can be justified by considering that the total number of banks in the population (say P) is assumed to be fixed (i.e. the size of the market for bank loans is given). If N banks currently play the restructuring game (where of course $N \leq P$), for each of them the probability of playing again the game with any of the other $N-1$ banks in a single future period is equal to $\frac{N}{P}$. More in detail, given that bank a has currently played the restructuring game, the probability of potential future interactions of bank a with the other (N-1)-banks corresponds to the combinations of (N-1)-elements that can be drawn without repetition from the population of P-banks, out of all the possible encounters of N-elements that can be drawn from the P-banks, i.e.: $\frac{\binom{P-1}{N-1}}{\binom{P}{N}} = \frac{\frac{(P-1)!}{(P-1-(N-1))!(N-1)!}}{\frac{P!}{(P-N)!N!}} = \frac{\frac{(P-1)!}{(P-N)!(N-1)!}}{\frac{P!}{(P-N)!N!}} = \frac{N}{P}$.

This problem can be considered equivalent to the following simple example. Consider an urn with P balls, from which N balls are extracted and then replaced into the urn. Now consider another extraction: the probability of extracting one of the balls that was previously extracted is $\frac{N}{P}$, which is trivially increasing in N. Equivalently, the probability of not extracting any of them is decreasing in N. This reasoning can be easily extended to a sequence of extractions, where the probability of extracting a ball already extracted in a previous trial follows a Binomial distribution.

As is standard in sequential games of this kind, we let each participating bank play a "grim trigger strategy", namely: play Co in t_0 and in all future periods as long as all other banks do the same, and switch to $NotCo$ in period t_k and in all following periods if any of the other banks plays $NotCo$ in period t_{k-1}. Notice that the threat of punishing a deviation from the cooperative behavior with a non-cooperative behavior forever is credible, since $(NotCo, NotCo)$ is the equilibrium (in dominant strategies) of the stage game. Importantly (we will be back on the point later on in this Section), we assume that if a bank in a renegotiation pool encounters again a bank that has been deviating in a previous pool, the information about the deviator becomes available to all banks participating in the current renegotiation table – and only to them, so that knowledge is local.

We first determine the payoff of each bank along the equilibrium path, where all banks cooperate in all stages of the restructuring game. In each stage, the payoff is $\frac{V_r - C}{N}$, since each bank receives a share $\frac{1}{N}$ of the expected continuation value of the firm and it pays the same share of the restructuring cost, namely the new funds to be injected in the distressed firm. For all future periods t_k (with $k = 1, 2...$), this payoff is multiplied by a factor $\frac{(1-p)}{(1+r)^k}$, where $(1-p)$ is the probability of playing again the game and $\frac{1}{1+r}$ is the discount factor, computed with the market interest rate r. Easy calculations show that the term $\left[1 + \frac{(1-p)}{(1+r)} + \frac{(1-p)}{(1+r)^2} + ...\right]$ can be written as $\left[1 + \frac{(1-p)(1-r)}{r}\right]$. By letting $\frac{(1-p)(1-r)}{r} = \gamma$, we can then write the bank payoff from cooperation as: $(1+\gamma)\frac{(V_r - C)}{N}$.

The payoff from deviation can be computed as follows. A bank playing $NotCo$ in some periods receives $\frac{V_r}{N}$ in that period, since it does not pay for the restructuring costs, and it gets $\frac{L}{N}$ in all future periods, since the grim punishment will be triggered by all other banks. By considering again that all future payoffs must be multiplied by the factor $\frac{(1-p)}{(1+r)^k}$ (with $k = 1, 2...$), the overall payoff from deviation can be written as $\frac{V_r}{N} + \gamma\frac{L}{N}$.

By comparing the payoffs from cooperating and from deviating, it is immediate to see that the following inequality must hold for the equilibrium path to be sustained

$$(1+\gamma)\frac{(V_r - C)}{N} \geq \frac{V_r}{N} + \gamma\frac{L}{N}.$$

It is worth noting that in the above equation we should add the payoff that a bank would get if it does not meet again (for a given number of periods, or forever) any of the banks it is currently playing with, weighted by the appropriate discounted probability. However, as this term would appear on both sides – being obtained both if a bank currently either cooperates or deviates – it can be neglected.

It is then possible to derive a new threshold for the success probability of the workouts, i.e.

$$\widetilde{\theta} = \frac{(1+\gamma)C}{\gamma(D-L)}, \tag{5}$$

such that banks cooperate if $\theta \geq \widetilde{\theta}$ and deviate otherwise.

Easy calculations show that $\frac{\partial\widetilde{\theta}}{\partial\gamma} < 0$ and $\frac{\partial\gamma}{\partial N} > 0$, so that $\frac{\partial\widetilde{\theta}}{\partial N} = \frac{\partial\widetilde{\theta}}{\partial\gamma}\frac{\partial\gamma}{\partial N} < 0$. The above discussion is summarized in the following Proposition 3.

Proposition 3 *In the sequential restructuring game, there exists a threshold level* $\widetilde{\theta}$ *for the success* *probability of the workout, such that the equilibrium path with cooperation is sustained iff $\theta \geq \widetilde{\theta}$, and it is decreasing in the number of banks participating in the game.*

This is the central result of our model. As the number of banks negotiating for restructuring the debt of a distressed firm grows larger, the likelihood to reach a cooperative outcome, and thus to avoid an inefficient liquidation, increases. The rationale behind this result relies on the threat of being punished by some other banks in case of free-riding, which becomes more severe as the number of banks grows larger. It is important to note that the result in Proposition 3 contrasts with the traditional view of the literature on debt restructuring, arguing that an agreement allowing for restructuring is more difficult to reach with a large number of creditors due to the emergence of coordination problems among them. This literature generally considers the case of a large number of dispersed bondholders, who have a clear incentive to hold out in a one-shot game. Our contribution is to show that creditors (having a chance to meet again in other restructuring games) take into account the threat of being punished for free-riding, which can offset the immediate gains from free riding. Furthermore, this threat turns out to be more powerful the larger the number of creditors that are likely to meet in the future.

It is crucial to stress the importance of the assumption that all banks involved in a renegotiation pool know about the presence of a bank among them that behaved as a free rider in a previous renegotiation. In general, one may question that a bank re-encountering a deviator has an incentive to report her information to the other (unaware) banks involved in the renegotiation, hence triggering the punishment. Indeed, a bank might decide to hide her information so that a cooperative arrangement could be implemented. In abstract terms, this is an instance of the well known debate on the applicability of the Folk Theorem when agents are involved in infrequent trades. The key feature of our analysis is the presence of imperfect observability – an agent (i.e. bank) possessing information about previous trades that are not known by others – which establishes a fundamental difference with respect to standard multistage games where all relevant information is common knowledge across agents (and for which cheating immediately triggers retaliation by the victim). Kandori (1992) has shown that the Folk Theorem holds under these circumstances – independent of the matching rule and of the population size – provided that each player observes the 'label' attached (based on the player's behavior in previous trades) to each agent in the local community she is currently dealing with; i.e. there is local monitoring.[8] In our setup, we can immediately appeal to Kandori's result exactly thanks to the assumption that all banks in a renegotiation pool at any given point in time are informed – by a bank that met the deviator in the past – about a former deviation by any other banks in the pool.[9]

Finally, we check whether the sequential game improves upon the one-shot game when banks follow a trigger strategy as punishment in case of free riding behaviour, by lowering the threshold level for the success probability of the workout above which banks are induced to cooperate. To do so, we compare the new threshold $\widetilde{\theta}$ with the value $\widehat{\theta}$ previously obtained. Using Equations (5) and (4), where of course 2 must be substituted with N, we have that $\widetilde{\theta} < \widehat{\theta}$ if and only if

$$\frac{(1+\gamma)C}{\gamma(D-L)} < \frac{NC}{(D-L)},$$

which is equivalent to

$$\frac{r}{(1-p)(1-r)} < N-1. \tag{6}$$

[8]As stated by Kandori (1992, p.65), the informal enforcement mechanism supporting cooperation in this case relies on the threat of punishment strategies triggering a 'contagious' defection process. Ellison (1994) has shown that contagious punishments may support cooperation even in setups with anonymous random matching, in which players are unable to recognize their opponents.

[9]A subsequent literature (see e.g. Ali and Miller, 2016) investigated the conditions under which cooperation can be supported if information disclosure within a community is only voluntarily shared, showing that ostracism (i.e. excluding deviating agents and cooperating with the others) may be self-defeating and it should be tempered by forgiveness to facilitate cooperation. This approach can not be immediately applied to our setup, as ostracism would not be possible in our framework. Indeed, cooperation by all banks (but for the deviating one) would result in a firm's debt being renegotiated, hence eliminating the possibility of punishing the deviating bank, whose loans would be repaid in full.

It is easy to see that Condition (6) is more likely to be met (i) the lower is r – i.e. the longer is the time horizon of the banks participating in the restructuring game, (ii) the smaller is the termination probability p, and (iii) the larger is the number of banks N (as N grows large, the l.h.s in (6) decreases since $p'(N) < 0$, and of course the r.h.s. increases). While the first finding is consistent with the standard result that in a sequential game the cooperative path can be sustained provided players' time horizon is sufficiently long, the last one – summarized by the following proposition – is a specific feature of our model and reinforces the key message of Proposition 3.

Proposition 4 *The larger is the number of creditors, the more likely is that the sequential game allows for a cooperative outcome under scenarios in which a one-shot game would lead to the inefficient liquidation of a firm in financial distress.*

Proposition 4 implies that, since the probability of debt restructuring is increasing in the number of lending banks, all banks that are active in the economy should be involved in all lending relationships. This is obviously too extreme and follows directly from the absence of coordination costs in the model. It is straightforward that in the presence of such costs there will be a maximum number of banks above which coordination problems would prevail over cooperation incentives.[10]

3 Debt restructuring: An empirical analysis

The empirical analysis presented in this Section aims first of all at assessing the validity of the main prediction of the model in Section 2, namely that an increase in the number of lending banks makes it more likely that the bank debt of a distressed firm will be restructured, thus allowing the firm to survive and possibly to recover. Of course, the advantage of the multiple

[10] Adding coordination costs to our theoretical model is a straightforward extension. We dispose of this additional complication to neatly isolate the benefits of cooperation among lenders in debt restructuring decisions, which are the novel addition to a literature that has extensively investigated the role of coordination issues.

bank relationship enlightened by our model must be balanced with the coordination problems that we have not explicitly modeled, but that have obvious implications. Therefore, we expect a non-linear relationship between the number of lending banks and the debt restructuring probability. Moreover, our dataset enables us to test the impact of additional variables, among which the ratio of bank debt over total debt, the degree of concentration in bank lending shares, as well as the economic and financial conditions of the borrowing firms. As we shall see below, these variables add interesting information about the likelihood of debt restructuring and the role of multiple banking relationships.

3.1 Data description

Italian banks are required to report to the Bank of Italy detailed information on non-performing loans (classified in the two sub-categories of bad and doubtful loans) for regulatory purposes. Bad loans are extended to insolvent borrowers against whom the procedures of debt collection and collateral repossession are initiated. Conversely, 'doubtful' (or 'sub-standard') loans refer to borrowers who are not timely paying back their debt but whose economic prospects suggest that they might recover their solvency within a reasonable time period. Hence, they are natural candidates to enter our dataset of financially distressed firms. The doubtful loans of such firms might eventually develop into bad loans, or recover their financial stability.

We build our dataset starting from lending banks' reports on the firms classified as doubtful loans in the Credit Register data base (CR hereafter), which reports firms' individual relationships with the lending banks.[11] Only loans larger than 75,000 Euros are recorded in the CR. Since banks have to report doubtful loans as long as the amount extended to a firm exceeds 75,000 Euros,

[11] This strategy is similar to the one followed by Brunner and Krahnen (2008), Franks and Sussman (2005), Couwenberg and De Jong (2006), who start from a sample of financially distressed firms as directly defined by their lending banks.

above this censoring threshold we have information on the population of Italian firms that are not repaying their debts in a given moment.

To avoid selection biases, our dataset includes those firms that are reported as distressed within a particular year, unconditional of the firm type or the outcome of distress. We choose 2007 as our reference year in order to allow for enough time following the crises (we have data up until 2012). Furthermore, by choosing 2007, we are able to select those firms that were already in distress before the burst of the financial crisis, hence avoiding the effects of the so-called "moratorium".[12] In 2007, 3,073 firms operating in the industrial and service sectors have been reported for the first time as distressed by at least one bank. We consider only firms that have been classified by their lending banks as financially distressed for the first time in that year in order to make sure that firms enter our data at the onset of the crisis or, at least, when it has been initially accounted for.[13] In this way, we define our sample of Italian firms that did not pay back the principal or the interests on their debts towards the banking system for the first time in 2007, but that might reasonably recover their financial stability in a limited period of time. Our data follow these firms for the three following years.

In order to gather information about firms' economic and financial conditions, we use annual balance sheet data and the records of firms' legal situation available through the Italian Chambers of Commerce (Cerved dataset). As a consequence of the matching, the number of firms in our sample decreases to 2,489.

Table 1 shows the composition of the sample by sector of activity, while Table 2 reports descriptive statistics about balance-sheet indices. On average, distressed firms in the sample record

[12] In 2009, the Ministry for the Economy and Finance, the Italian Banking Association and the Italian Business Associations signed an agreement allowing for the suspension of principal repayments on some forms of debt held by small and medium-sized enterprises (renewed in February 2012). However, these measures were not applied to firms already in distress before the crisis. Therefore, by choosing 2007 as a benchmark, we are able to select firms in distress to which the traditional restructuring instruments apply.

[13] To our purposes, the onset of the crisis corresponds to the first year the firm has been reported as financially distressed by at least one bank.

4 million Euros of sales and around 6 million of total assets; the medians are lower, around 1 and 1.6 million, respectively. The year before the distress event, returns on productive activities are already deteriorated, but still positive: earnings before interest payments, depreciation taxes and amortization (Ebitda) were 0.6 percent of total assets. On average they are lower than the interest payments, which are around 3.6 percent of total assets; however, the median firm still manages to cover the interest expenses, since the latter are around 3.1 percent of total assets against an Ebitda on assets of 4.7 percent. The situation worsens the following year (the year of the distress), when operating profits on average become negative. They do not cover debt-service obligations also for the median firm. Total returns on assets become strongly negative (-13,2 percent). Total liabilities are nearly equal to total assets for the median firm, and even higher for the average. About one fourth of the firms in the sample has a negative net worth, thus confirming the severity of their crisis. Banks cover more than 80 percent of financial liabilities (more than 96 percent for the median), and more than 40 percent of total debts.[14]

Table 3 describes the type of relationship between the firms in the sample and the banking system. The year before the distress, credit extended is around 2.3 million Euros on average, while credit granted is 2.8 million (650 and 700 thousand for the median, respectively). Firms in the sample maintain relationships with approximately 3.7 banks (3 for the median). This is consistent with the evidence reported in Detragiache, Garella and Guiso (2000), whose paper focuses on large firms and reports that the median firm has 5 lending relationships and the mode is 3 banks. It is also consistent with the Bank of Italy's statistics on the number of banks, according to which non financial firms whose credit granted is between 2.5 and 5 million of Euros have on average 4.3 lending banks (2.7 when the credit granted is between 500 thousand and 2.5 million Euros – see Figure 1 in Section 1).

[14] The other major source of borrowing is trade credit.

Lending shares are fairly concentrated, with an Herfindahl-Hirschman concentration index of 0.55. Real collateral is around 26 per cent of total credit extended, a percentage that does not include personal guarantees. One year after the distress event, the number of banks tends to decrease and the concentration index rises.

3.2 Variables definition

The first question we address concerns the determinants of debt restructuring. Banks are the main source of external finance for Italian firms.

We study how lending banks contribute to the workout of financially distressed firms, adopting credit decisions such as a maturity rescheduling or the granting of new loans. Following the taxonomy introduced by Brunner and Krahnen (2008), used also in Micucci and Rossi (2017), we consider a firm to have restructured outstanding loans if one of the following two conditions has occurred in the three years following the distress event: (i) total loans granted have increased, (ii) the long term credit granted by lending banks has increased.[15] With these interventions, banks make borrowers' financing constraints less stringent, thus improving their survival probability. We do not consider other types of restructuring, such as debt equity-swaps, lender syndicates or others, which are very uncommon for SMEs in distress.

The dependent variable is defined by looking at the three years following the distress event, whereas all the regressors are calculated in the year of distress or the year before.[16] Therefore all the regressors are predifined with respect to the restructuring decision.

Our interest is mainly focused on the impact of those variables that describe the type of relationship between a firm and its lending banks on the probability of debt restructuring. To pin

[15] These interventions correspond to what Brunner and Krahnen (2008, page 431) define as "loosening of the borrower's financial constraints".

[16] Using different time lags does not change the results reported in the paper.

down this multifaceted relationship between borrowing firms and their lenders and to control for firm characteristics, we focus on the covariates listed below.

Bank debt. We consider a variable (*bank ratio*) defined as the ratio between bank debt and total outstanding debt of the firm (including trade credit). We expect that better coordination is achieved if a large part of outstanding debt is held by banks.

Number of lending banks. We introduce the number of banks (*#banks*) with which a firm has credit relationships. We allow for possible non-linearities in this relation, by also considering the number of banks squared. It is sensible to assume that there is a threshold beyond which free riding prevails over the retaliation threat. Both variables are defined either at the moment of distress or the year before, to limit possible endogeneity problems.

Credit concentration. We measure debt dispersion among lending banks by means of an index of skewness in lending shares across the banks lending to the firm. Since we are interested in the degree of skewness, regardless of whether it is positive or negative, we use the index squared. We also focus on the Herfindahl-Hirschman concentration Index (HHI), as modified by Hannan (1997) (and used in Ongena, Tümer-Alkan and von Westernhagen, 2012) to reduce the correlation of the index with the number of banks. More precisely, the HHI is defined as $HHI_{jt} = \sum_{i=1}^{n} s_{ijt}^2$, where s_{ijt} is the share of credit granted by bank i to firm j at time t on overall credit granted by the n-lending banks to firm j. Hannan (1997) decomposes the HHI as follows:

$$HHI_{jt} = \frac{V_{jt}^2}{N_{jt}} + \frac{1}{N_{jt}}, \tag{7}$$

where V_{jt} denotes the coefficient of variation of the credit granted to the firm and N_{jt} denotes the number of banks. Furthermore, observing that the first term on the right hand side of (7) provides a measure of share inequality, by subtracting the inverse of the number of banks ($1/N_{jt}$) from the expression of HHI_{jt}, we obtain a third index – the Share Inequality Index – that we also use in our estimates .

Main bank. We control for the type of bank that has the largest share in lending to the distressed firm. The idea is that local banks tend to intervene more easily in favour of firms in financial distress. This may reflect either the fact that they are deeply rooted in the economy they belong to and have strong linkages with their customers or that they are subject to the risk of being "captured" by the local community, thus delaying liquidation of the distressed firm even when this is the most efficient solution (Berger and Udell, 2002).

Collateral. We account for the value of collateral posted by the firm (normalized on total loans), since the degree of collateralization may account for different banks' behavior.

Firm characteristics. We control for the anticipated going-concern value of the firm, introducing several balance-sheet indices to pin down the economic situation and financial position of each firm, as well as the existence of intangible assets. In particular, we use the ratios of *total liabilities*, *intangible assets*, *Ebitda* and *interest payments* over *total assets*. To limit potential endogeneity problems, all these ratios are calculated in the year before the crisis. As a robustness check we use also different time lags, such as two year lags or the average in the three years before the distress event, without significant differences in the results. In some specifications, we also use Altman's Z-score (as calculated by Cerved Group) to catch the ex-ante probability of default of the distressed firm (Altman, 1968), using the score with one year lag with respect to the distress event.

Finally, we control for firm size (*log of total assets*), and add sectoral and regional dummies.

Table 4 reports descriptive statistics for the variables used in the estimates and Table 5 the correlations among variables.

3.3 Restructuring probability

3.3.1 The baseline model

The primary goal of our empirical analysis is to assess the probability of restructuring at the firm level. Accordingly, our dependent variable ($RESTR$) is a dummy taking value one if the firm obtains (a) an increase in total credit granted, or (b) a maturity extension at least once in the three years following the distress event (i.e. between 2007 and 2010); and value zero otherwise. Around 28 percent of the firms in our sample obtain one of these interventions (see Table 4).

At this stage, data are organized as a cross-section with a limited dependent variable and we estimate a probit model of the type

$$prob\,(y=1)_{i(between\ t\ \ and\ \ t+3)} = \Phi\left(a_i + \beta X_i + \gamma B_i + L_i + e_i\right), \tag{8}$$

where Φ denotes the standard cumulative normal distribution, and X_i a set of controls describing a firm's overall economic and financial situation (firm size, debt/assets, intangibles/assets, Ebitda/assets, interest payments/assets, Altman's Z-score). These controls are evaluated the year before the distress event, since these are the balance-sheet information that each bank has at its disposal at the moment of distress. B_i are the characteristics of the relationship of the firm with the banking system defined at the moment of distress (bank debt, number of lending banks, credit concentration, collateral, type of main bank); L_i are dummies to control for the localization (macro-regions) and the sector of activity of the firm; e_i denotes the model error term. The dependent variable is defined by looking at the three years after the distress event; as a consequence, all the regressors are predefined with respect to the restructuring decision. We define the dependent variable at firm-level, which allows us to consider the overall decision by the lending banks.[17]

[17] Micucci and Rossi (2017) use a similar definition of the dependent variable, but consider loan-level data. We

Table 6 shows the results of Model (8) and reports the marginal effects on restructuring probability of unit changes in the relevant explanatory variables, as well as of discrete changes from the baseline levels in case of dummy variables. Because of the possible presence of collinearity, we introduce the number of lending banks, its squared value and the index of asymmetry (or concentration index) one by one in Columns 1-5 of Table 6. Our preferred specification is reported in Column [5], where all the covariates are introduced and the dispersion in lending shares is measured by the share inequality index. In Column [6] we use the Z-score variable instead of balance-sheet indices to capture the economic situation of the firm and its perspective.

Overall, the estimates show that all the variables describing the type of relationship with the banking system have a significant impact on the restructuring probability. The main results are confirmed across different specifications, with few differences in the size of marginal effects. The likelihood of restructuring is higher for larger firms. It is improved for those firms with healthier economic and financial conditions before the distress event, thus suggesting that economic efficiency is preserved.

More in detail, the ratio of bank loans over total borrowing is highly significant and positive. Banks tend to help those firms they are more involved in. Moving from the first to the third quartile of the distribution of this variable (approximately from 28 to 60 percent in the ratio of bank debt to total debt), the restructuring probability is increased by 5 percentage points out of an overall estimated probability of around 30 percent.

Consistently with the prediction of our theoretical model, the number of banks has a direct and positive impact on the restructuring probability. Yet, this impact is non-linear, as the coefficient of

believe that loan-level data would emphasize the heterogeneous behavior in the restructuring decision, detecting situations where a single bank decides to restructure the debt whereas the overall debt of the firm is not. Since coordination is the core point of the analysis, we opted for firm-level definition of the dependent variable, which allows us to consider the overall decision by the lending banks. In the robustness checks, we investigate also different defintions of the dependent variable and different sub-samples of firms, thereby restricting our analysis to those cases where there is a certain consensus on the difficulties of the firm.

the squared term is statistically significant and negative (Columns [2]-[5]). Considering the average marginal effects of Column [5], the maximum restructuring probability is reached when the firm has relationshipswith four banks and the estimated restructuring probability rises to 38 percent (against an estimated average of 30 percent). Therefore, the probability tends to rise with the number of banks up to a certain threshold, beyond which it starts declining, which suggests that problems of coordination among banks tend to dominate beyond this threshold.

The skewness index has a negative sign but it is not statistically significant. However, when we introduce the share inequality index, this has a negative and statistically significant impact: given the number of banks, dispersed held debt increases the probability of debt restructuring, while concentrated debt tends to reduce it.[18] This result can be explained by the possible mutual control mechanism among banks having similar lending shares, which reduces free riding incentives in the restructuring process. This explanation is consistent with the insurance motive put forward by Carletti, Cerasi and Daltung (2007), according to which banks diversify their loans portfolio and share monitoring efforts by means of multiple lending. Conversely, this effect might be compensated by an opposite incentive: a main bank, holding a large share of firm debt, might be induced to behave as a single lender, since it bears most of the consequences of the liquidation/continuation decision, so it might be induced to allow for restructuring. Our empirical findings show that this second effect is weaker than the former.

Collateral – defined as the value of real guarantees (mainly real estate) pledged to the bank over the value of outstanding loans – is never significant in our specifications. However, we do not have information on the personal guarantees pledged by the entrepreneur, which might be even more relevant and can partially account for the lack of evidence on our collateral variable.[19]

[18] An interaction term between the number of banks and the concentration index is never significant.

[19] This is in line with the evidence reported in Davydenko and Franks (2008), who show that in France personal guarantees are used more often than real estate as collateral, since banks can size them directly against cumbersome procedures required in court supervised collateral sales. The opposite is true for Germany and the UK, where the

Considering the characteristics of the main bank lending to each firm in the sample (i.e. the bank with the highest share in total lending), cooperative banks have a higher probability of restructuring (8 percentage points higher than the benchmark, represented by large banks corporations). Conversely, when the main bank is specialized in long-term financing, the restructuring probability is reduced (by about 9 percentage points).[20]

As far as balance-sheet variables are concerned, the restructuring probability is higher when the firm has better economic performances before the distress. Profitability is strongly significant with the expected signs: a higher Ebitda before the distress increases the likelihood of debt restructuring. On the contrary, highly leveraged firms have a lower restructuring probability (significant at the 10 percent level). When introducing the Z-score variables instead of balance-sheet indices (in Column 6), the likelihood of restructuring is lower for risky firms, but the corresponding variables are not statistically significant.

The size of the firm has a strong positive effect: the bigger the firm, the higher the probability to restructure. Moving from the first to the third quartile of the distribution of this variable (i.e., increasing total assets from 700 thousand to 4 million Euros), the overall restructuring probability increases by 7 percentage points. Large firms might have a stronger bargaining power, or the bank might decide to restructure a doubtful loan to postpone the emergence of a loss, which is higher the larger is the distressed firm. Intangible assets are never significant, as well as the cost of debt.

As far as the sector of activity is concerned (the corresponding coefficients are not reported in the Tables), our benchmark is the 'food and beverages' industry. With respect to this benchmark, the probability to restructure is significantly lower for firms operating in the 'textile' and 'other manufacturing' sectors, the latter encompassing the wood and furniture industry. These traditional

bank's ability to realize assets upon default is much higher.

[20] These banks are generally specialized in granting long-term loans to firms to finance investments or firms operating in particular fields, such as construction or agriculture. They have only deposits with 18-months-maturity or more, with the esclusion of sight deposits.

manufacturing industries have endured a long standing structural crisis, following the fierce competition from low-price producers in emerging countries, which may account for our results. The other significant difference (yet at the 10 percent level) is detected for firms operating in the 'Commerce' sector. These are usually very small firms, characterized by a significant market turnover, and negatively affected by the diffusion of large-scale distribution.

We check our results also by computing the restructuring variable for each of the three years following the distress event. This specification accounts for the individual unobserved characteristics of the firms in the sample and for the potential reversibility of the restructuring decision. For instance, one firm may receive help one year, but the following year this decision is changed because of bad news about the long-term perspective of the firm, or because there is a further deterioration of its economic situation, or again because the firm exits the market. These changes are overlooked by the analysis of the three-year window. To take into account that error terms might be correlated within firms, we use a probit model with individual random effects to catch firms' heterogeneity. We also introduce time dummies since both the dependent variable and the regressors vary each year. We also introduce all the regressors with a one-year lag, to limit possible endogeneity problems.

Table 7 reports our results. Overall, our main findings are confirmed; the marginal effects concerning the relation with the banking system are lower, and the estimated overall probability of restructuring is around 16 percent per year. The maximum restructuring probability is now reached with around three banks, when the overall probability rises to 19.9 percent from 16.2 percent on average.

3.3.2 Robustness: debt restructuring for various sub-samples of firms

In the previous analysis we consider the whole sample of distressed firms, which gives us an overall picture of the restructuring probability at firm level. We now correlate more precisely our estimates to the theoretical model put forward in the previous Section by considering different sub-samples of firms (Table 8). First, we select only those firms that are reported as doubtful by at least one-third of the lending banks, thereby restricting our analysis to those cases where there is consensus on the difficulties of the firm (column [1]). Then, from this sample we drop all the firms that have just one lending relationship, as our main goal is to investigate the impact of the interactions among different banks (columns [2], [3] and [4]). Finally, we consider only those firms that are still in distress after three years from the beginning of the crisis. To select those firms, we consider a Z-score at t+3 corresponding to fragile or risky firms (i.e. equal or higher than 6; see column [5]).

While the number of firms considered in the estimates decreases progressively across the various specifications, yet our results are fairly stable and similar to those discussed above. The overall probability of restructuring is now slightly lower than in the whole sample. It increases with the number of banks, but now the maximum is reached around three banks and then it decreases. This result is consistent across all the various sub-samples used in the robustness exercise. The regressor capturing the level of collateral is now significant and positive, pointing to an improved probability to obtain help from the pool of lending banks when pledging more collateral.

3.3.3 Robustness: New financing following financial distress

To further check the robustness of the results obtained with our baseline specification, we investigate a different dependent variable defined as the quantity of new loans granted to the firm in each of the three years following the distress event, which are 2008, 2009 and 2010. In doing so, we exploit the time series dimension of our dataset by means of a panel specification. We need to take into account that error terms might be correlated within firms and therefore the quantity of new credit granted will depend upon the current level of the credit granted to the firm. Furthermore, the changes in some of the variables of interest in the three years following the distress event (such as the number of banks) may be affected by the volume of credit the firm wants to obtain, therefore being possibly endogenous. To properly face these issues, we consider a dynamic panel data specification, following Arellano-Bond (1991) and Blundell and Bond (1998).[21] More precisely, we focus on a system GMM estimator, according to the following specification

$$y_{i,t} = \alpha y_{i,t-1} + X_{it}\beta_1 + W_{it}\beta_2 + u_i + d_t + e_{it}, \tag{9}$$

where the dependent variable is the logarithm of the quantity of credit granted to each firm, $i = 1, \dots n$; X_{it} is the vector of strictly exogenous covariates; W_{it} is a vector of endogenous covariates (detailed below); u_i are the firm-level fixed effects (that may be correlated with the covariates); d_t is a set of time dummies, and e_{it} is the model error term.

The estimation of the system GMM requires to set the variables to be instrumented and the number of lags to be included in the instruments' matrix. We use lags between $t3$ and $t5$ for the GMM instruments (we have data on the firms in the sample since 2003). These lags are introduced for all the covariates that pin down the relation with the banking system, which might be affected by the changes in the dependent variable (i.e. number of banks, concentration, share of bank debt over total debt, collateral, type of the main bank). Standard errors are made robust to heteroskedasticity and to serial correlation. Finally, having firm-level fixed effects, we do not include time-invariant firm variables – such as those on the sector of activity, the area of location and, in one specification, the type of the main bank (although these characteristics could in principle change, they are in fact essentially time-invariant). We keep all the firms in our sample, considering also defaulted firms

[21] The Arellano-Bond's estimator uses first-differences to remove the firm's specific fixed effect and uses internal instruments (i.e. past levels of the variables included in the empirical model) to deal with the endogeneity of the lagged dependent variable and other covariates. The Blundell and Bond system estimator (System GMM) improves the efficiency of the Arellano-Bond's model by estimating jointly a regression in first differences and a regression in levels, using lagged levels as instruments for the regression in differences and lagged differences as instruments for the regression in levels.

as long as we have data on their situation, even though the number of firms actually considered is reduced automatically because of the lags used in the estimates.

We consider the standard Arellano-Bond test for autocorrelation of the first and second order on the idiosyncratic errors. We check the validity of our specification by computing the Hansen test of over-identification, which tests whether the set of instruments is orthogonal to the error process (i.e. the exogeneity of the instrument).

Table 9 shows our results, which are reported both for the whole sample (columns [1]-[3]), and for the sub-sample of those firms that have multiple credit relationships and are considered as doubtful by at least one third of their lending banks (columns [4]-[6]), i.e. those firms we considered in the previous robustness exercise (Sub-section 3.3.2). The various specifications fulfill the standard tests: the Hansen test of over-identification restrictions supports the validity of the instruments; the test of the second order AR(2) is verified (whereas, as expected, the AR(1) is not), which satisfy the requirement that the second lag is not correlated with the error term to assure that GMM estimates are consistent.

The results confirm the qualitative findings discussed previously. The new credit granted (in logs) presents a clear persistency, given that the lagged dependent variable is significantly different from zero. The bank debt ratio loses its relevance. The type of the main bank is significant only for the sub-sample of firms (column [4]). Our results confirm that the credit granted is higher as the number of banks increases and credit concentration decreases. As already noted, the relation appears to be non-linear and it starts to decrease after a threshold, which is again around three banks. This threshold is slightly lower in specification [5], when it is about 2,5 banks. The quantity of the new loan granted to firms in distress is greater the larger the borrowing firm and the higher the Ebitda; Intangibles increase the new loan granted, but only in the whole sample. Z scores are never significant.

4 Survival and restructuring

Finally, having investigated the determinants of the restructuring decision, we focus on its effect on workout success versus liquidation (either through formal bankruptcy procedures, or private asset selling), controlling for the firms that eventually obtain to restructure their outstanding debt.

Table 10 reports the outcome of the crisis for the financially distressed firms in the sample. The final year we consider is 2010. Around 54 percent of the firms in the sample survives (1,345 firms), while 46 percent either goes bankrupt or it is liquidated. The share of successful firms rises to 85 percent among those who have restructured, while it is 42 percent for the others. In this Section we address the relation beetween the restructuring decision and the survival outcome.

Theoretically, restructuring and survival may be jointly determined. Banks should be able to select ex-ante, by means of their screening activity, the firms most likely to survive. If the lending bank can reasonably predict which firm will survive, it will restructure only oustanding debt of those firms with a higher probability of survival. Yet, this decision will affect the survival outcome itself, for two possible motives: i) the firm will not have enought funds to finance its activity and, ii) because if a bank decides not to restructure outstanding debt, at the same time, it may file for bankruptcy. As a consequence, the two decisions may be simultaneously determined.

The endogeneity of the default outcome with respect to the restructuring decision is a possible source of bias. In order to deal with this issue, we consider a system of two equations using a binary response model that jointly considers the two outcomes, the first defining the probability of firm's survival and the second the restructuring decision, i.e.

$$\begin{aligned} probability\ of\ survival \qquad y_1 &= 1\left(x_1\beta_1 + \varepsilon_1 > 0\right) \\ probability\ of\ restructuring \qquad y_2 &= 1\left(x_2\beta_2 + \varepsilon_2 > 0\right), \end{aligned}$$

with $(\varepsilon_1, \varepsilon_2) \approx N(0, 1)$ and $corr(\varepsilon_1, \varepsilon_2) = \rho_{12}$, and where the indicator function 1(.) takes value 1 if the inequality inside the brackets holds true.

To estimate this two-equations model, we consider a bivariate probit model of the type

$$prob\,(y_1 = 1, y_2 = 1) \approx \Phi_2\,(x_{1i}\beta_1, x_{2i}\beta_2, \rho_{12})\,, \tag{10}$$

where Φ_2 is the bivariate normal cumulative distribution function, and ρ_{12} is the correlation between the two events. Consistent and asymptotically efficient parameter estimates can be obtained by maximum likelihood estimation of the bivariate probit model, using the same set of covariates as in Equation (8). Table 11 reports our estimates. The correlation between the survival equation and the restructuring equation (ρ_{12}) is positive and significant: as expected, restructuring improves the likelihood of survival and we have to take into account the correlation among these two phenomena when studying the survival probability. However, ex-post survival probability may affect also the restructuring decision if banks are capable to detect successful firms ex-ante. As a consequence, in the bivariate probit model also the restructuring equation might be affected with respect to our previous specifications because we are estimating it jointly with the survival equation. Nonetheless, the results for the restructuring equation remain essentially unchanged, confirming our previous analysis.

Focusing on the survival equation, the balance-sheet ratios go in the expected direction: higher profits before the distress event improve the likelihood of survival. Analogously, the size of the firm increases the likelihood to survive. The relation with the banking system maintains some explanatory power: when banks are the main creditors, the survival probability is improved. As before, survival increases with the number of banks, but only up to a threshold.

When considering jointly the probabilities of restructuring and survival – i.e. the event of a successful restructuring (Column 3) – the relation with the banking system proves crucial. A high number of lending banks is very important in affecting positively the overall outcome, although the relationship is again non linear. The joint probability of successful restructuring increases up to 3.5 banks, beyond which it begins to reduce. This notwithstanding, it is important to stress that the joint probability of success is given by the product of two components: (i) the probability to survive, conditional on having restructured, and (ii) the probability of restructuring; i.e.

$$prob\,(y_1 = 1, y_2 = 1) = prob\,(y_1 = 1 \mid y_2 = 1) \times prob\,(y_2 = 1)$$

In Table 12 we report the marginal effects of our covariates on these two different probabilities. Column [1] highlights the impact of our main variables on the probability to survive conditional on having restructured, and Column [2] the impact on the probability to restructure. The impact of the relation with the banking system on the joint probability of a successful restructuring process is driven essentially by the restructuring equation. In the second stage, the residual impact on the survival probability conditional on restructuring is negligible (and negative as far as the number of banks is concerned). Overall, the estimated conditional probability to survive for firms that have restructured is 89 percent, against 48.1 percent for those firms that have not restructured their debt.

5 Concluding Remarks and policy implications

In this paper, we investigate the role of strategic interaction among banks in the decision of restructuring their loans towards firms in financial distress. On the one hand, the existence of free rider problems increases the difficulties in finding a restructuring agreement. On the other hand, banks are very different lenders than bond-holders and this difference should be accounted for.

Bond-holders are dispersed and cannot coordinate their actions, while banks are non-atomistic debt-holders: each bank has a bargaining power against the firm, as obvious, but also against the other lending banks. The starting point of our analysis is the observation that usually the pool of lending banks consists of a finite number of lenders, who have more than one distressed firm to face and to restructure. Therefore, they come across each other frequently over time. As a consequence, coordination might be improved by the threat of future punishment in case of free riding behavior. As the number of lending banks increases, the chance of re-encountering another bank in some other restructuring negotiations and of being punished for free riding increases, thus pointing to improved likelihood of the cooperative solution. Quite obviously, also coordination problems become larger as the number of banks grows larger. Hence, we expect to see a critical number of banks above which the probability of restructuring starts decreasing.

We test empirically the key prediction of our model focusing on the impact of the number of lending banks on the restructuring probability by means of a unique data set, which has information on the population of Italian firms at the beginning of their distress spell. Our findings confirm our theoretical prediction and convey a number of interesting insights into the restructuring process. Increasing the number of banks improves initially the restructuring outcome and the access to new loans and, through these effects, the probability of survival, at least up to a threshold. However, reaching an agreement on the restructuring plan becomes more difficult when more than three banks are involved. Interestingly, banks tend to restructure the outstanding debt of those firms for which bank financing is prevailing. The ratio of bank debt over total outstanding debt is very strong in influencing both the decision of debt rescheduling and the probability of successfully overcoming the crisis and surviving, even after controlling for the financial and economic situation of the firm before the distress event. Given the number of banks, dispersed debt improves the probability of restructuring. One possible explanation is that symmetric lending shares represent a mutual control mechanism, which reduces the free riding incentive in the restructuring process, in line with the insurance motive put forward by Carletti, Cerasi and Daltung (2007). Overall, our theoretical and empirical results on the number of banks and credit concentration give a new rationale to the commonly observed feature of multiple banking relations.

The policy implications of the paper are multifaceted. Banks maintain their special role in firm financing also when the firm is in financial distress and its debt is dispersed among many banks, a situation in which the debt is more difficult to restructure because of free riding problem. This is because banks may act strategically, thus improving the restructuring probability of the firm in financial distress even when more than one lender is involved in the process. However, this result fades away rapidly and multiple banking relationships become detrimental to the restructuring process when more than three banks are involved. Being this the case, a limited number of lending banks should be sufficient to avoid information monopoly by the main bank as well as to assure a fair valutation in case of distress.

On the other hand, however, this strategic interaction among (a limited number of) banks raises the issue of a potential bias in favour of the restructuring process: banks may be induced to agree to a restructuring plan to avoid the 'stigma' of a non-cooperative behaviour, even though each bank would have preferred to liquidate the firm. This possibility could add a new rationale to the sometime observed zombie lending behaviour (Caballero et al., 2008; Schivardi et al., 2017). We do not explore this issue. However, while strategic interaction among banks is a force that might improve cooperation in favour of a restructuring agreement, it may be harmful if the decision is taken not only considering the single firm but also the situation of other firms in distress.

Lender coordination through privately negotiated arrangements may be improved also by the institutional framework: in Italy, the insolvency regime has been repeatedly reformed and recently (October 2017) new measures to facilitate the early emergence of the crisis as well as out-to-court restructuring procedures have been introduced. On this point, our model emphasized the relevance of a common ground among lending banks to reach a balanced agreement, where both the firm's situation and its evaluation by the lending banks are common knowledge.

6 References

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Table 1 - Sector of activity and area of location of firms in the sample

Sector:	n. firms	%
Food and beverages	158	6.35
Textile and shoes	143	5.75
Chemicals	113	4.54
Metal and Machinery	343	13.78
Other manufacturing firms	166	6.67
Construction	491	19.73
Commerce sector	559	22.46
Other Services	516	20.73
Area:		
North West (1/0)	822	33.03
North East (1/0)	293	11.77
Centre (1/0)	690	27.72
South (1/0)	684	27.48
Total	2,489	100.00

Table 2 - Balance-sheet ratios (at the distress event and one year earlier)
(Thousand of Euros or ratios)

	2006			2007		
	n. obs	Mean	median	n. obs	Mean	Median
Total assets	2186	7020	1895	2489	6278	1668
Total sales	2186	5029	1200	2489	4248	919
Ebitda / tot. Assets	2186	0.006	0.047	2489	-0.074	0.024
Interest payments / tot. Assets	2186	0.036	0.031	2489	0.056	0.038
Roa	2186	-0.028	0.029	2489	-0.132	0.012
Total debt / tot. assets	2186	0.916	0.902	2489	1.132	0.928
Bank debt / total debt	2186	0.446	0.437	2488	0.429	0.419
Bank debt / financial debt	2173	0.849	0.974	2470	0.836	0.961

Table 3 - Relationship with the banking system (at the moment of distress)
(Thousand of Euros or ratios)

	2006			2007			2008		
	n. obs	mean	median	n. obs	mean	median	n. obs	mean	median
Total credit extended	2489	2345	648	2489	2307	599	2264	2155	565
Total credit granted	2489	2812	708	2489	2347	551	2264	1663	300
Number of lending banks	2489	3.728	3	2489	3.689	3	2264	3.274	2
Herfindahl-Hirschman index in lending shares	2489	0.549	0.500	2489	0.602	0.527	2263	0.658	0.603
Real collateral (as % of total credit extended)	2483	0.257	0.070	2485	0.268	0.064	2259	0.290	0.072
Share of bad loans over total credit extended	2483	0	0	2485	0.039	0	2259	0.239	0

Table 4 - Sample statistics

Variables	N	mean	p50	Sd
Bank-ratio	2186	0.445862	0.43728	0.222232
# banks (in logs)	2489	1.006983	1.098612	0.767408
(# banks)^2 (in logs squared)	2489	1.602694	1.206949	1.781976
Skewness [2]	2489	0.529946	0.08482	1.046253
Herfindahl-Hirschman	2489	0.601739	0.526627	0.31895
Share Inequality Index	2489	0.124121	0.053728	0.19167
Collateral	2483	0.256765	0.070378	0.326285
Size (log of firm's assets, t-1)	2489	7.449304	7.419381	1.367602
Debt over assets (t-1)	2186	0.915676	0.90168	0.463049
Intangibles / total assets (t-1)	2186	0.054693	0.010052	0.111613
Ebitda / assets (t-1)	2186	0.60697	4.678276	28.65828
Interest payments / assets (t-1)	2186	0.035628	0.031127	0.03329
Z-score	2488	2.772508	3	0.492501
Restructuring (1/0)	2489	0.278425	0	0.448314

Table 5 – Correlations

	Restructuring	Bank -ratio	# banks (in logs)	# banks (in logs squared)	Herfindahl-Hirschman	Share Inequality Index	Collateral
Restructuring	1						
Bank-ratio	0.1115	1					
# banks (in logs)	0.1362	0.1683	1				
(# banks)2 (in logs squared)	0.1008	0.1712	0.9364	1			
Herfindahl-Hirschman	-0.1805	-0.1132	-0.8368	-0.7426	1		
Share Inequality Index	-0.0381	0.0639	0.2429	0.1058	0.2362	1	
Collateral	0.0473	0.2723	-0.1678	-0.1505	0.2105	0.0677	1
Type of main bank	0.0286	0.0371	-0.0583	-0.0571	0.0471	-0.0101	0.0584
Size (log of firm's assets, t-1)	0.1661	-0.001	0.6375	0.6368	-0.4834	0.1756	0.0614
Debt over assets (t-1)	-0.0817	-0.0935	-0.1089	-0.0942	0.124	0.0158	-0.0184
Intangibles / total assets (t-1)	-0.0284	0.012	-0.0359	-0.0301	0.0313	-0.0149	-0.0887
Ebitda / assets (t-1)	0.0813	0.0578	0.0735	0.0638	-0.1095	-0.0561	-0.0218
Interest payments / assets (t-1)	-0.0349	0.1674	-0.0484	-0.0543	0.0371	-0.0031	-0.0565
Z-score	-0.1383	-0.0322	0.0572	0.0506	-0.0355	0.0402	-0.1369

	Type of main bank	Size (log of firm's assets, t-1	Debt over assets (t-1)	Intangibles / total assets (t-1)	Ebitda / assets (t-1)	Interest payments / assets (t-1)	Z-score
Type of main bank	1						
Size (log of firm's assets, t-1)	-0.0654	1					
Debt over assets (t-1)	0.0302	-0.2049	1				
Intangibles / total assets (t-1)	-0.0221	-0.026	-0.0108	1			
Ebitda / assets (t-1)	-0.0044	0.1589	-0.3959	-0.0164	1		
Interest payments / assets (t-1)	0.0244	-0.286	0.4882	-0.0413	-0.2698	1	
Z-score	0.0392	-0.0813	0.1663	0.054	-0.0932	0.1824	1

Table 6 - Probit model for debt restructuring at firm level. Baseline specifications.
Average marginal effects and standard errors of the marginal effects.
Discrete changes from the base levels are reported for dummy variables

The dependent variable is a dummy, equal to 1 if the firm has obtained either an increase in the maturity of its loans or the grant of a new loan in the three years following the distress event (between t and t+3).

	[1]	[2]	[3]	[4]	[5]	[6]
Bank-ratio (t0)	0.14487***	0.16191***	0.16438***	0.17628***	0.17532***	0.18754***
	(0.04896)	(0.04894)	(0.04896)	(0.04870)	(0.04868)	(0.04672)
# banks (t0)	0.04387**	0.19354***	0.19209***	0.02264	0.27955***	0.29180***
	(0.01825)	(0.03670)	(0.03670)	(0.04796)	(0.03893)	(0.03893)
(# banks)^2 (t0)		-0.07100***	-0.06633***	-0.05030***	-0.10558***	-0.11073***
		(0.01514)	(0.01569)	(0.01553)	(0.01610)	(0.01612)
Skewness ^{2} (t0)			-0.01231			
			(0.01102)			
Herfindahl-Hirschman (t0)				-0.33705***		
				(0.05964)		
Share Inequality Index (t0)					-0.32627***	-0.34817***
					(0.05861)	(0.05738)
Collateral (t0)	0.04302	0.03776	0.04000	0.05189	0.05181	0.05101
	(0.03383)	(0.03389)	(0.03394)	(0.03374)	(0.03373)	(0.03354)
Long-term banks (1/0)	-0.09700**	-0.09053**	-0.08846**	-0.07464*	-0.07474*	-0.07541*
	(0.03598)	(0.03658)	(0.03681)	(0.03785)	(0.03784)	(0.03798)
Popular banks (1/0)	-0.00383	-0.00638	-0.00655	-0.00415	-0.00397	-0.00538
	(0.02405)	(0.02389)	(0.02387)	(0.02374)	(0.02374)	(0.02374)
Cooperative banks (1/0)	0.08345**	0.08398**	0.08468**	0.07713**	0.07782**	0.07477**
	(0.03462)	(0.03455)	(0.03456)	(0.03409)	(0.03410)	(0.03457)
Foreign banks (1/0)	0.06204	0.08140	0.08321	0.07468	0.07333	0.06689
	(0.14214)	(0.14491)	(0.14437)	(0.13925)	(0.13937)	(0.13836)
Size (log of firm's assets, t-1)	0.03287***	0.04043***	0.04070***	0.04712***	0.04695***	0.05199***
	(0.01035)	(0.01042)	(0.01042)	(0.01043)	(0.01043)	(0.00978)
Debt over assets (t-1)	-0.11063*	-0.10582*	-0.10401*	-0.08270	-0.08339	
	(0.05716)	(0.05721)	(0.05713)	(0.05668)	(0.05670)	
Intangibles / total assets (t-1)	-0.11571	-0.10934	-0.11104	-0.10825	-0.11082	
	(0.09081)	(0.08980)	(0.08980)	(0.08912)	(0.08918)	
Ebitda / assets (t-1)	0.00253***	0.00246***	0.00243***	0.00197**	0.00198**	
	(0.00082)	(0.00081)	(0.00081)	(0.00080)	(0.00080)	
Interest payments / assets (t-1)	0.03605	0.02217	0.02838	-0.02880	-0.02696	
	(0.40514)	(0.41170)	(0.41133)	(0.39559)	(0.39549)	
Zscore - fragile firms (t-1)						0.01856
						(0.04923)
Zscore - risky firms (t-1)						-0.02345
						(0.04663)
Constant	yes	Yes	Yes	Yes	yes	Yes
Industrial dummies	yes	Yes	Yes	Yes	yes	Yes
Regional dummies	yes	Yes	Yes	Yes	yes	Yes
N. of firms	2,182	2,182	2,182	2,182	2,182	2,166
Estimated overall probability	0.2917	0.2868	0.2895	0.2895	0.2904	0.2767
Count R2	0.718	0.721	0.723	0.720	0.720	0.723
BIC	2619.9	2605.8	2612.2	2581.0	2582.0	2563.0
AIC	2489.1	2469.2	2469.9	2438.8	2439.8	2432.3

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7 -Yearly debt restructuring decisions at firm level. Panel data probit model.
Average marginal effects and standard errors of the marginal effects.

The dependent variable is a dummy, equal to 1 if the firm has obtained either an increase in the maturity of its loans or the grant of a new loan in each of the three years following the distress event. All the estimated equations include regional, sector and year dummies.
Average marginal effects and standard errors of the marginal effects are reported in the table. Discrete changes from the base levels are reported for dummy variables.

	[1]	[2]	[3]	[4]	[5]	[6]
Bank-ratio (t-1)	0.05409*	0.06008**	0.06182**	0.06307**	0.06305**	0.07651***
	(0.02777)	(0.02781)	(0.02780)	(0.02771)	(0.02771)	(0.02796)
# banks (t-1)	-0.00422	0.06327***	0.06009***	-0.00804	0.11738***	0.13031***
	(0.01073)	(0.02235)	(0.02241)	(0.02651)	(0.02459)	(0.02492)
(# banks)^2 (t-1)		-0.03360***	-0.02788***	-0.02624***	-0.05398***	-0.06121***
		(0.00977)	(0.01021)	(0.00983)	(0.01054)	(0.01066)
Skewness ^{2} (t-1)			-0.01262*			
			(0.00683)			
Herfindahl-Hirschman (t0)				-0.16084***		
				(0.03216)		
Share Inequality Index (t0)					-0.15958***	-0.18451***
					(0.03171)	(0.03150)
Collateral (t-1)	-0.03536*	-0.03788*	-0.03637*	-0.02838	-0.02831	-0.03125
	(0.01932)	(0.01934)	(0.01934)	(0.01932)	(0.01932)	(0.01956)
Long-term banks (1/0)	-0.05161**	-0.04872**	-0.04771**	-0.04527*	-0.04505*	-0.04889**
	(0.01994)	(0.02036)	(0.02048)	(0.02086)	(0.02088)	(0.02079)
Popular banks (1/0)	0.01748	0.01710	0.01704	0.01730	0.01745	0.01155
	(0.01534)	(0.01527)	(0.01524)	(0.01520)	(0.01520)	(0.01516)
Cooperative banks (1/0)	0.08374***	0.08474***	0.08451***	0.07798***	0.07794***	0.08222***
	(0.02264)	(0.02256)	(0.02251)	(0.02201)	(0.02201)	(0.02278)
Foreign banks (1/0)	-0.07920	-0.07703	-0.07519	-0.07578	-0.07583	-0.07018
	(0.04954)	(0.05117)	(0.05212)	(0.05275)	(0.05264)	(0.05711)
Size (log of firm's assets, t-1)	0.03476***	0.03815***	0.03833***	0.03991***	0.03991***	0.04786***
	(0.00578)	(0.00586)	(0.00585)	(0.00585)	(0.00585)	(0.00569)
Debt over assets (t-1)	-0.11159***	-0.10713***	-0.10502***	-0.09965***	-0.09931***	
	(0.02554)	(0.02556)	(0.02557)	(0.02518)	(0.02518)	
Intangibles / total assets (t-1)	-0.06161	-0.06130	-0.06269	-0.06392	-0.06447	
	(0.05391)	(0.05381)	(0.05373)	(0.05349)	(0.05348)	
Ebitda / assets (t-1)	0.00204***	0.00204***	0.00200***	0.00185***	0.00184***	
	(0.00046)	(0.00045)	(0.00045)	(0.00045)	(0.00045)	
Interest payments /assets(t-1)	0.10827***	0.10440***	0.10225***	0.09287**	0.09245**	
	(0.03822)	(0.03841)	(0.03834)	(0.03841)	(0.03843)	
Zscore – fragile firms						-0.00988
						(0.03197)
Zscore - risky firms						-0.05356*
						(0.03041)
Constant	yes	yes	yes	yes	yes	Yes
Industrial dummies	yes	yes	yes	yes	yes	Yes
Regional dummies	yes	yes	yes	yes	yes	Yes
Year dummies	yes	yes	yes	yes	yes	Yes
N. of firms	2478	2478	2478	2478	2478	2464
N. observations	5218	5218	5218	5218	5218	5129
Estimated overall probability	0.1559	0.1628	0.1637	0.1616	0.1623	0.1682
BIC	4886.9	4883.4	4888.5	4866.4	4866.1	4874.6
AIC	4716.3	4706.3	4704.8	4682.7	4682.4	4704.5

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8 – Robustness. Probit models for of debt restructuring for subsamples of firms.
Average marginal effects and standard errors of the marginal effects;
discrete changes from the base levels for dummy variables

The dependent variable is a dummy, equal to 1 if the firm has obtained either an increase in the maturity of its loans or the grant of a new loan in the three years following the distress event (between t and t+3).

	[1]	[2]	[3]	[4]	[5]
	Considered doubtful by at least one third of the lending banks	Only with multiple-banks and doubtful by at least one third of the lending banks	Multiple- banks and doubtful by at least one third of the lending banks; with z-score	Multiple- banks; doubtful by at least one third of the lending banks; more lags in balance-sheet variables	Still in distress in *t+3* (z-score>=6); doubtful by at least one third of the lending banks in *t*
Bank-ratio (t-1)	0.18010***	0.14093**	0.16223***	0.16038*	0.18173**
	(0.04944)	(0.06584)	(0.06162)	(0.08266)	(0.09162)
# banks (t-1)	0.28472***	0.26679**	0.28541**	0.28781*	0.26031***
	(0.04372)	(0.12936)	(0.13019)	(0.15297)	(0.08029)
(# banks)^2 (t-1)	-0.13595***	-0.13282***	-0.13991***	-0.11794**	-0.11585***
	(0.02095)	(0.04606)	(0.04641)	(0.05290)	(0.03746)
Share Inequality Index (t0)	-0.26211***	-0.33129***	-0.35468***	-0.28560***	-0.22734**
	(0.05795)	(0.06774)	(0.06617)	(0.08275)	(0.10740)
Collateral (t-1)	0.06039*	0.12131***	0.10355**	0.10384*	0.01100
	(0.03321)	(0.04525)	(0.04447)	(0.05694)	(0.06285)
Long-term banks (1/0)	-0.10459**	-0.09128*	-0.09402*	-0.09778	-0.16178**
	(0.03785)	(0.04846)	(0.04816)	(0.05484)	(0.07180)
Popular banks (1/0)	-0.01640	-0.02117	-0.02398	-0.03419	0.00839
	(0.02561)	(0.03164)	(0.03125)	(0.03888)	(0.05040)
Cooperative banks (1/0)	0.04274	0.02758	0.03808	0.01662	0.02873
	(0.03511)	(0.04482)	(0.04543)	(0.05696)	(0.05814)
Foreign banks (1/0)	-0.05936	-0.02180	0.00403		
	(0.16844)	(0.21010)	(0.22139)		
Size (log of firm's assets at t-1) (a)	0.04016***	0.05193***	0.05299***	-0.00415	0.02892
	(0.01096)	(0.01402)	(0.01307)	(0.01923)	(0.02124)
Debt over assets (t-1) (a)	-0.05777	-0.04286		-0.14416	-0.06569
	(0.05334)	(0.07672)		(0.10982)	(0.10026)
Intangibles / total assets at t-1 (a)	-0.12009	-0.20239		-0.03179	-0.24260
	(0.09078)	(0.12277)		(0.17075)	(0.17042)
Ebitda / assets at t-1 (a)	0.00219***	0.00303***		0.00361**	0.00381**
	(0.00080)	(0.00108)		(0.00154)	(0.00165)
Interest payments /assets at t-1 (a)	-0.05215	0.26538		-0.20749	-1.01597
	(0.38641)	(0.67015)		(1.01015)	(1.03512)
Zscore – fragile firms			0.08430		
			(0.16278)		
Zscore - risky firms			-0.01146		
			(0.16015)		
Constant	yes	yes	yes	yes	Yes
Industrial dummies	yes	yes	yes	yes	Yes
Regional dummies	yes	yes	yes	yes	Yes
N. of firms	1,714	1,179	1,178	801	687
Estimated overall probability	0.2506	0.2857	0.2643	0.3092	0.4861
Count R2	0.763	0.727	0.729	0.722	0.643
BIC	1909.6	1418.8	1413.6	1023.5	1015.7
AIC	1.773.4	1291.9	1296.9	911.1	906.9

* significant at 10%; ** significant at 5%; *** significant at 1%. (a) In column [4] it is the average between t-3 and t-1.

Table 9 – Robustness: new credit granted to distressed firms.
System GMM panel data estimation

The dependent variable is the *log of the new credit granted* to firms in distress in each of the three years following the distress event. System GMM estimates of the coefficients and standard errors are reported in the table. Standard errors are robust to heteroskedasticity and serial correlation.

	Whole sample			Only with multiple-banks and doubtful by at least one third of the lending banks		
	[1]	[2]	[3]	[4]	[5]	[6]
L1. credit granted (in logs)	0.82376***	0.83755***	0.81195***	0.77049***	0.78602***	0.74490***
	(0.02442)	(0.02239)	(0.02986)	(0.04232)	(0.04087)	(0.05394)
Bank-ratio	1.46932	2.24133	3.03648**	-0.02015	1.40661	0.60149
	(1.30561)	(1.40246)	(1.45321)	(1.45980)	(1.71065)	(1.56164)
# banks	5.94194***	5.45191***	4.88609***	4.15713**	4.79661**	5.20011***
	(1.48843)	(1.48935)	(1.47993)	(1.75958)	(1.90890)	(1.85872)
(# banks)^2	-2.67804***	-2.56363***	-2.04144***	-1.90989**	-2.72502***	-2.76967***
	(0.71688)	(0.73783)	(0.69988)	(0.84329)	(0.96670)	(0.92300)
Share Inequality Index	-5.42486***	-5.38165***	-5.91016***	-4.29136***	-5.12861***	-5.43535***
	(0.95062)	(0.98561)	(1.26861)	(1.06043)	(1.12303)	(1.45742)
Collateral	-0.03937	-0.37410	-0.36871	-0.40255	-0.90439	-0.63671
	(0.76830)	(0.77425)	(0.87891)	(1.04586)	(1.07553)	(1.23119)
Long-term banks (1/0)	-1.41435			-2.73025*		
	(1.44461)			(1.40230)		
Popular banks (1/0)	-0.37171			1.25198		
	(0.71112)			(1.06618)		
Cooperative banks (1/0)	0.11185			2.14880*		
	(0.75816)			(1.12961)		
Foreign banks (1/0)	2.49820			14.73336		
	(2.46275)			(15.60607)		
Size (log of firm's assets)	0.40784***	0.42447***	0.34131**	0.48573***	0.53395***	0.53019***
	(0.14562)	(0.14170)	(0.16808)	(0.17281)	(0.17996)	(0.16809)
Debt over assets	0.03472	0.03565		0.06093*	0.09577***	
	(0.02404)	(0.02469)		(0.03576)	(0.03517)	
Intangibles over total assets	1.15536**	1.04203*		-0.07218	-0.88342	
	(0.56635)	(0.55100)		(0.92025)	(0.89178)	
Ebitda over assets	0.01189***	0.01227***		0.01426***	0.01428***	
	(0.00236)	(0.00244)		(0.00499)	(0.00483)	
Interest payments over assets	-0.04308	-0.08621		-3.73068*	-4.07261*	
	(0.11421)	(0.15210)		(2.22988)	(2.35933)	
Zscore – fragile firms			5.43354			-1.42881
			(4.08756)			(4.58331)
Zscore - risky firms			3.25283			-2.90139
			(3.69681)			(4.38167)
Year = 2008	-0.82366***	-0.89463***	-0.50740**	-0.81140***	-0.85010***	-0.38205
	(0.18785)	(0.19398)	(0.19957)	(0.30824)	(0.30429)	(0.30202)
Year =2009	-0.13642	-0.13180	0.01942	0.04860	0.24463	0.35775
	(0.14680)	(0.15077)	(0.16196)	(0.23130)	(0.23099)	(0.22972)
Year =2010	-0.20200	-0.18548	-0.04600	-0.20254	-0.07057	0.14137
	(0.12947)	(0.13023)	(0.14345)	(0.17820)	(0.17805)	(0.19075)
Constant	-3.48523***	-3.79340***	-6.99782*	-2.76940*	-2.89748**	-0.01182
	(1.07298)	(1.02191)	(4.08064)	(1.50012)	(1.42321)	(4.62737)
Firm fixed effects	yes	yes	yes	yes	yes	yes
N. obs.	3,416	3,418	2,886	1,676	1,678	1,424
N. firms	1,545	1,546	1,340	817	818	719
Arellano-Bond test for AR(1) (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(2) (p-value)	0.797	0.614	0.200	0.873	0.793	0.750
Hansen test of overid. restrictions (p-value)	0.328	0.523	0.671	0.346	0.117	0.385

Table 10 - Default and liquidation
(Number of firms and frequencies)

Firms which	have restructured		have not restructured		total sample	
	n. obs.	%	n. obs.	%	n. obs.	%
Survive	591	85.28	754	41.98	1,345	54.04
Exit from the market	101	14.72	1,042	58.02	1,144	45.96
Total	693	100.00	1,796	100,00	2,489	100.00
% of the sample	27.84		72.16		100.00	

Table 11 -Survival and restructuring. Biprobit model

The dependent variable for the survival equation is a dummy equal to 1 if, in 2012, the firm is still in activity, equal to 0 if the firm has left the market or a default / liquidation procedure has stared.
The dependent variable for the restructuring equation is a dummy, equal to 1 if the firm has obtained either an increase in the maturity of its loans or the grant of a new loan in the three years following the distress event. Average marginal effects and standard error of the marginal effects are reported in the table

	Marginal effects and standard errors of the marginal effects		Marginal effects for joint probability Survival=1 & restructuring=1
	Survival eq.	Restructuring eq.	
	[1]	[2]	[3]
Bank-ratio (t0)	0.14096**	0.17112**	0.15375**
	(0.05469)	(0.04847)	(0.04098)
# banks (t0)	0.08068*	0.27292*	0.21665*
	(0.04439)	(0.03883)	(0.03299)
(# banks)^2 (t0)	-0.06718***	-0.10479***	-0.09036***
	(0.01853)	(0.01612)	(0.01377)
Share Inequality Index (t0)	-0.24710***	-0.33821***	-0.29764***
	(0.06105)	(0.05884)	(0.04911)
Collateral (t0)	0.06149	0.05632	0.05360
	(0.03758)	(0.03330)	(0.02810)
Long-term banks (1/0)	-0.04700	-0.07030	-0.05980
	(0.04967)	(0.03844)	(0.03208)
Popular banks (1/0)	0.02317	-0.00978	-0.00289
	(0.02674)	(0.02361)	(0.02013)
Cooperative banks (1/0)	0.05669	0.06886	0.06303
	(0.03640)	(0.03393)	(0.02939)
Foreign banks (1/0)	-0.19559	0.07840	-0.01583
	(0.14427)	(0.13405)	(0.10186)
Size (log of firm's assets, t-1)	0.03384***	0.04848***	0.04235***
	(0.01135)	(0.01023)	(0.00864)
Debt over assets (t-1)	-0.00618	-0.03207	-0.02480
	(0.02936)	(0.03989)	(0.03098)
Intangibles / total assets (t-1)	-0.08504	-0.09254	-0.08490
	(0.09923)	(0.08885)	(0.07467)
Ebitda / assets (t-1)	0.00093*	0.00219*	0.00179*
	(0.00049)	(0.00074)	(0.00057)
Interest payments /assets(t-1)	0.36452	-0.05710	0.03025
	(0.41872)	(0.38046)	(0.31494)
Constant	Yes		
Industrial dummies	Yes		
Regional dummies	Yes		
Year dummies	No		
N. of firms	2489		
Rho $_{12}$	0.647286***		
	(0.026722)		
chi2	252		
BIC	5351.2		
AIC	5061.1		

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 12 - Marginal effects on Restructuring and Survival probabilities

	[1]	[2]
	Marginal effects for probability of survival=1, conditional on restructuring=1	Marginal effects for probability of restructuring=1
Bank-ratio (t0)	0.02184**	0.17112**
# banks (t0)	-0.06136 *	0.27292*
(# banks)^2 (t0)	-0.00060 ***	-0.10479***
Share Inequality Index (t0)	-0.02215***	-0.33821***
Collateral (t0)	0.01726	0.05632
Long-term banks (1/0)	0.00138	-0.07030
Popular banks (1/0)	0.01913	-0.00978
Cooperative banks (1/0)	0.01081	0.06886
Foreign banks (1/0)	-0.22590	0.07840

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