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Some New Evidence on the Role of Collateral: Lazy Banks or Diligent Banks?

by

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ABSTRACT

In the banking literature (Manove et al. (2001)) "Lazy Banks" are defined as those banks that substitute project screening with collateral. This paper aims to test for Italy some empirical implications of the theoretical model of "Lazy Banks": the negative relationship between collateral and project screening, whether collateral is posted by safer borrowers and law enforcement is able to increase the degree of collateralization. Empirical evidence presented here suggests that, both for long-term loans and short-term ones, when project screening increases, the amount of real guarantees with respect to the credit granted increases. Moreover, the data show that collateral seems to be posted by high-risk borrowers and law enforcement does not matter in explaining the presence of real guarantees for long-term loans, whereas it represents a further risk component that generates an increase in collateral for short-term loans. Therefore, a model of "Lazy Banks" does not seem to be verified on the data, suggesting the results rather a sort of "diligence" in the banks' behavior. Furthermore, the empirical findings on our data reveal that the presence of real guarantees is not able to lower ex-post default credit risk. These results are consistent with a view of collateral as a credible mechanism for commitment against informative asymmetries and not as a convenient hedge against realized ex-post credit default risk.

Keywords and Phrases: Collateral; Screening; Lazy Banks; Default Risk.

JEL Classification: D82, G21, H42.

NON TECHNICAL SUMMARY

Collateral can be defined both as an incentive device against the consequences arising from the informative asymmetries in the credit market (adverse selection and moral hazard) and a buffer against the realized ex-post credit defaults. The first feature of the definition concerns the signalling value of the borrowers' intrinsic risk and the one of their projects before the execution of the loan contract, whereas the latter regards the actual value able to repay the lender in the case of ex-post credit loss.

The purpose of this paper is to verify the theoretical assumptions of the model of “Lazy Banks” developed by Manove et al. (2001).

"Lazy banks" are banks that substitute project screening with collateral. In such a framework, safer borrowers post more collateral than riskier ones in order to give a positive signal of themselves when they are evaluated by a bank and thus avoiding to pay screening costs for bad borrowers, whenever creditor rights are ensured by a strong law enforcement. The banks, in turn, learning this process, progressively reduce their screening activity substituting it with collateral; consequently riskier projects are not financed, thus lowering social welfare.

This paper aims to test whether in the data is present a negative relationship between collateral and project screening, if collateral is posted by safer borrowers and law enforcement is able to increase the degree of collateralization. These assumptions are all implied by the conclusions of the theoretical model of Manove et al. (2001).

First, we test for Italy, in each province, whether it is present any form of substitution between the degree of collateralization, measured here by the ratio between the amount of real guarantees and the level of loans granted, and a measure of project screening, given by the number of bank employees for each unit of credit granted, and we do not find any evidence in favour of Manove, Padilla and Pagano's theory both for long-term loans and short-term ones: when project screening increases, the degree of collateralization increases. This result is consistent with the empirical findings of Ono and Uesugi (2005), that, with different measures of the screening activity of the banks, show that screening and collateral are complements rather than substitutes.

Then, in the same regression we test whether judicial inefficiency (as a measure of a low law enforcement), measured here by the length of civil trials, is able to reduce the level of collateralization, finding that, for short-term loans, real guarantees increase in an environment where judicial inefficiency is stronger, thus generating a substitution effect between high law enforcement

and collateral and going in the opposite direction with respect to the theoretical conclusions of the model of "Lazy Banks", for which law enforcement strengthens collateral requirements. Furhermore, the data show how ex-ante risk, measured by the degree of opaqueness, i.e. the ratio between gross total assets and gross physical assets of the economic sector analysed, following Bonaccorsi Di Patti and Dell'Ariccia (2004), is always positively related to collateral, so real guarantees seem to be posted by high-risk borrowers. Therefore a model of "Lazy Banks" does not seem to be verified in the data and collateral requirements come from riskier borrowers and whenever judicial efficiency decreases: in this sense the banks show a sort of "diligence" rather than "laziness". The second level of our study is an ex-post analysis, i.e. we aim to test whether collateralization lowers the default risk for a loan, which henceforth we call indifferently *default risk* or *ex-post risk*, defined here as the ratio between the value of defaulted loans in a period and the total amount of the non defaulted loans of the previous period.

We find evidence in favour of the so called commitment view (Liberti and Mian (2005)), which suggests that collateral provides a credible mechanism for commitment against agency risk such as moral hazard and adverse selection, but we find no evidence in favour of the hedging view (Liberti and Mian (2005)), according to which collateral provides a convenient hedge against realized ex-post risk of default. In fact, in the ex-post analysis we find a positive relationship between the ex-ante and ex-post risk, thus showing that, given the level of collateralization, ex-ante riskier borrowers are more likely to have credit defaults, whereas collateral and the default risk do not appear to have a statistically significant relationship. In other words, collateral is not a stem against credit default; real guarantees could rather be an instrument to recover the amount of a loan (or a part of it) after a definitive situation of default. Therefore, collateral does not seem to provide an effective hedge against default risk.

NUOVE EVIDENZE EMPIRICHE SUL RUOLO DELLE GARANZIE REALI NELLE BANCHE: BANCHE PIGRE O BANCHE DILIGENTI?

SINTESI

Nella letteratura bancaria (Manove et al. (2001)) per “banche pigre” si intendono quegli istituti di credito che sostituiscono l’attività di valutazione di un progetto da finanziare (screening) con l’utilizzo di garanzie. Questo lavoro intende testare per l’Italia alcune implicazioni empiriche del modello teorico delle “banche pigre”: la relazione negativa tra le garanzie reali e l’attività di screening, se le garanzie reali sono maggiormente richieste ai prenditori di fondi più sicuri (in termini di restituzione del credito accordato e degli interessi annessi) e se l’efficienza del sistema giudiziario sia in grado di generare un incremento nelle garanzie reali nelle banche.

L’evidenza empirica trovata suggerisce che, sia per i crediti a breve termine che per quelli a lungo termine (rispettivamente entro i diciotto mesi e oltre i diciotto mesi), quando l’attività di screening aumenta, l’ammontare di garanzie reali rispetto al credito accordato cresce. Inoltre, i dati mostrano come le garanzie reali siano maggiormente richieste ai debitori potenziali più rischiosi e che l’efficienza del sistema giudiziario non abbia alcun effetto sulla richiesta di garanzie reali nei finanziamenti a lungo termine, mentre rappresenta un’ulteriore componente di rischio per i finanziamenti a breve termine dove genera un aumento nella richiesta di garanzie reali.

Pertanto, i dati evidenziano una sorta di “diligenza” nel comportamento delle banche più che un atteggiamento di “pigrizia”. Inoltre, i risultati empirici sui nostri dati rivelano che la presenza di garanzie reali non è in grado di ridurre gli ingressi in sofferenza per i finanziamenti accordati.

Questi risultati sono in linea con un ruolo credibile da parte delle garanzie reali per fronteggiare le asimmetrie informative, ma non come un argine al rischio di perdita sui crediti accordati.

Parole chiave: Garanzie reali; screening; banche pigre; rischio di perdita.

Classificazione JEL: D82, G21, H42.

CONTENTS

1 INTRODUCTION[1]

Collateral can be defined both as an incentive device against the consequences arising from the informative asymmetries in the credit market (adverse selection and moral hazard) and a buffer against the realized ex-post credit defaults. The first feature of the definition concerns the signalling value of the borrowers' intrinsic risk and the one of their projects before the execution of the loan contract, whereas the latter regards the actual value able to repay the lender in the case of ex-post credit loss.

The role of collateral has been explored in the banking literature since the pioneering paper of Stiglitz and Weiss (1981)**,** where it is argued that banks may prefer to reject some borrowers, because of negative adverse selection and incentive effects. For a given amount of collateral, an increase in the interest rates causes adverse selection, since only riskier borrowers will apply for a loan at an higher interest rate and, whenever safer-risk-adverse borrowers leave the market, for a given interest rate, an increase in collateral requirements may cause a decrease in bank's profits. Moreover, Stiglitz and Weiss (1986) show that credit rationing may arise even when the choice of the interest rate and collateral were simultaneous and there were an increase in the dimensionality of contracts with regard to different projects available to heterogeneous borrowers.

Coco (2000), in his survey, classifies the models of the use of collateral in three classes: i) models based on asymmetric evaluation of the quality of the projects, ii) models in which collateral is used in conjunction with the interest rate to induce a separation of risk profiles and iii) models in which the return from investment has a probability of being diverted by the entrepreneur to his private uses or can be verified by the bank only at a cost. Concerning these last two cases, the author underlines how in the former rationing may arise, whereas in the latter collateral may be used in order to reduce the amount of inefficient liquidations.

1 I am very grateful to Alberto Franco Pozzolo for his supervisor activity. I thank Andrea Zaghini and an anonymous Referee for their very useful comments. A special thank to Marcello Bofondi and to the Research Office of the Bank of Italy for having provided me selected and useful data for this study. I thank Michele Bagella, Gustavo Piga, Alessandro Girardi, Stefano Costa, Marco Ventura and Maria Cristina Mercuri for many conversations and the participants to the Doctoral seminar and to the XVII International Conference on Banking and Finance both organized by the Department of Economics of University of Rome Tor Vergata for comments on previous versions of the paper. I also thank Silvia Guglielmi and Maria Teresa Iafelice for the precious activity of research assistance. Of course, all errors are mine.

Our paper, according to the classification described above, could be considered as an instrument to verify the empirical implications of a theoretical model belonging to the first class of models: the model of "Lazy Banks".

"Lazy banks" are banks that substitute project screening with collateral. This definition comes from a theoretical paper of Manove et al. (2001), where safer borrowers post more collateral than riskier ones in order to give a positive signal of themselves when they are evaluated by a bank and thus avoiding to pay screening costs for bad borrowers, whenever creditor rights are ensured by a strong law enforcement. The banks, in turn, learning this process, progressively reduce their screening activity substituting it with collateral; consequently riskier projects are not financed, thus lowering social welfare.

This paper aims to test whether in the data is present a negative relationship between collateral and project screening, if collateral is posted by safer borrowers and law enforcement is able to increase the degree of collateralization. These assumptions are all implied by the conclusions of the theoretical model of Manove et al. (2001).

First, we test for Italy, in each province, if there is a form of substitution between the degree of collateralization, measured here by the ratio between the amount of real guarantees and the level of loans granted, and a measure of project screening, given by the number of bank employees for each unit of credit granted, and we do not find any evidence in favour of Manove, Padilla and Pagano's theory both for long-term loans and short-term ones: when project screening increases, the degree of collateralization increases. This result is consistent with the empirical findings of Ono and Uesugi (2005), that, with different measures of the screening activity of the banks, show that screening and collateral are complements rather than substitutes.

Then, in the same regression we test whether judicial inefficiency (as a measure of a low law enforcement), measured here by the length of civil trials, is able to reduce the level of collateralization, finding that, for short-term loans, real guarantees increase in an environment where judicial inefficiency is stronger, thus generating a substitution effect between high law enforcement and collateral and going in the opposite direction with respect to the theoretical conclusions of the model of "Lazy Banks", for which law enforcement strengthens collateral requirements. Furhermore, the data show how ex-ante risk, measured by the degree of opaqueness, i.e. the ratio between gross total assets and gross physical assets of the economic sector analysed, following Bonaccorsi Di Patti and Dell'Ariccia (2004), is always positively related to collateral, so real guarantees seem to be posted by high-risk borrowers. Therefore a model of "Lazy Banks" does not seem to be verified in the data and collateral requirements come from riskier borrowers and whenever judicial

efficiency decreases: in this sense the banks show a sort of "diligence" rather than "laziness". The second level of our study is an ex-post analysis, i.e. we aim to test whether collateralization lowers the default risk for a loan, which henceforth we call indifferently *default risk* or *ex-post risk*, defined here as the ratio between the value of defaulted loans in a period and the total amount of the non defaulted loans of the previous period.

We find evidence in favour of the so called commitment view (Liberti and Mian (2005)), which suggests that collateral provides a credible mechanism for commitment against agency risk such as moral hazard and adverse selection, but we find no evidence in favour of the hedging view (Liberti and Mian (2005)), according to which collateral provides a convenient hedge against realized ex-post risk of default. In fact, in the ex-post analysis we find a positive relationship between the ex-ante and ex-post risk, thus showing that, given the level of collateralization, ex-ante riskier borrowers are more likely to have credit defaults, whereas collateral and the default risk do not appear to have a statistically significant relationship. In other words, collateral is not a stem against credit default; real guarantees could rather be an instrument to recover the amount of a loan (or a part of it) after a definitive situation of default. Therefore, collateral does not seem to provide an effective hedge against default risk.

The paper is organized as follows. In section 2, we briefly revise the theoretical and empirical literature that is relevant for our research; in section 3, we analyse in detail the model of "Lazy Banks" in the spirit of the paper of Manove et al. (2001) and its empirical implications; in section 4, we describe the data, the variables used for the empirical study and the resulting summary statistics; in section 5, we build the ex-ante analysis in which the determinants of collateral are explored and the ex-post analysis in which we investigate the determinants of credit default risk and within them the role of collateral. In section 6, we conclude.

2 LITERATURE REVIEW

Both theoretical and empirical literature has analysed and measured the determinants of collateral, its abilities in preventing credit defaults and its relationships with borrower's risk and project risk. In particular, the theoretical literature has developed models with informative asymmetries between lender

(typically a bank) and borrower, sometimes in the presence of different structures of the credit market (monopoly, competition, monopolistic competition and oligopoly), where collateral plays the role of a signal of the borrower's risk ((Besanko and Takor (1987), Boot et. al (1991), Rajan and Winton (1995), Manove et al. (2001), Inderst and Muller (2007)) and a device to avoid credit rationing (Stiglitz and Weiss (1981), Stiglitz and Weiss (1986), Bester (1985), Chan and Thakor (1987)).

In particular, Boot et al. (1991) find that collateral represents a useful device against the informative asymmetries and is posted by riskier borrowers; this last assumption is really controversial in the theoretical literature. In fact Bester (1985) and Besanko and Takor (1987) argue, basing on a self-selection mechanism, that low-risk borrowers choose contracts with low interest rates and high collateral requirements, whereas high-risk borrowers choose contracts with high interest rates and low collateral requirements.

Several empirical papers aim to test the relationship between collateral pledged and risk profile of the borrower (Berger and Udell (1990), Jimenez et al. (2006), Pozzolo (2004), Ono and Uesugi (2005), Brick and Palia (2007) among others), whether collateral can be considered a credible incentive for solving the consequences deriving from the informative asymmetries, an effective instrument to prevent credit losses (Blazy and Weill (2006), Liberti and Mian (2005), Booth and Booth (2006) among others) and if collateralization is influenced by the length of the relationship-lending (Berger and Udell (1995) among others).

Evidence reported in these works (Berger and Udell (1990), Jimenez et al. (2006), Ono and Uesugi (2005), Blazy and Weill (2006)) strongly suggests that collateral is most often associated with riskier borrowers and riskier loans. This result is quiet common to the empirical works in despite of the controversial conclusions of the theoretical papers. The variable prevalently used to evaluate loan and borrower's ex-ante risk is risk-premium; however, we think that this measure is endogenously related to collateral with a consequent arbitrariness in choosing the most suitable instrumental variable. In fact, if it is empirically verified (Berger and Udell (1990) and Blazy and Weill (2006) among others) that risk premia are positive influenced by the degree of collateralization, it is equally true that ex-ante risk is one of the more important determinants of collateral (Jimenez et al. (2006) among others). Therefore, the use of risk premia as a measurement of ex-ante risk among the variables able to explain the degree of collateralization would lead to an endogeneity problem. In this regard, the banking literature has developed other measures of ex-ante risk, among which we can number the presence of a default in the previous year when the loan is granted (Jimenez et al. (2006)).

A recent result concerning the ability of collateral in solving agency problems (adverse selection and moral hazard) comes from the empirical analysis of Liberti and Mian (2005): they identify two theoretical explanations for the use of collateral. The former is the *commitment view*, according to which collateral provides a credible mechanism for commitment against agency risk such as moral hazard and adverse selection; the latter is the *hedging view*, basing upon a role of collateral as a convenient hedge against realized ex-post default risk. The empirical finding of the authors on a sample of 9,000 small and medium firms in 15 countries with direct measures of ex-ante risk and ex-post realized default is that the commitment motive alone explains collateralization. Hence, collateral would not be able to prevent credit defaults but it is only an instrument to sort the borrowers and loans according to their riskiness.

Ono and Uesugi (2005) first deal with the issue of an empirical measurement of screening and monitoring activity of the banks; basing on survey data of Japan's small business loan market, they build three variables able to understand whether monitoring and screening activity are complements or a substitutes of collateral. These measures are given by a dummy which takes the value of one if the borrower submits documents to its main bank, an index variable that shows the frequency of this submission, with the lowest value 1 indicating the shortest frequency (1: once every 1-2 months, 2: quarterly, 3: semi-annually, 4: annually) and an index variable that indicates the frequency of loan officer contact and takes the value of 1-9 (1: every day, 2: weekly, 3: once every 2 weeks, 4: monthly, 5: bi-monthly, 6: quarterly, 7: semi-annually, 8: annually, 9: no contact). The evidence presented by the authors is against the theoretical model of "Lazy Banks" and reveals that lenders who require borrowers to pledge collateral and personal guarantees are more likely to monitor and screen intensively.

Finally, we are not aware, to the best of our knowledge, of empirical studies that measure the dependence of real guarantees from law enforcement, as theoretically predicted by Manove et al. (2001) and as we plan to do in the present work.

3 THE THEORETICAL MODEL OF "LAZY BANKS" AND ITS EMPIRICAL IMPLICATIONS

The theoretical model of "Lazy Banks" set out by Manove, Padilla and Pagano (2001) shows how the unrestricted availability of collateral may generate inefficiencies in a competitive credit market due to the presence of a trade-off between the provision of cheap credit and project screening, caused by a strong protection of creditor rights.

Three cases are considered by the authors: the benchmark case with market efficiency, the case in the presence of adverse selection and the case of Monopolistic Bank.

In an economic framework without informative asymmetries there are two kinds of investment projects: a good project with positive expected present value and a bad project with negative expected present value; the entrepreneurs are identical, each one selects a project at random, they know the probability of choosing a good project, but they cannot observe directly the actual project quality; the banks finance the projects and discover the quality of a project by project screening at a cost. Project screening is non-observable and non-contractible, so that banks are not able to sell screening to the entrepreneurs as a specific service; the banks, in turn, will screen a project as a part of loan-approval procedure only when the direct benefit to the bank of the information obtained exceeds the screening cost; the entrepreneurs with approved loan application will have to pay not only their own screening costs (as a part of loan-approval procedure), but also a prorated share of the screening costs of denied loans. As a result, the banks would never have an incentive to screen a project when a borrower is fully collateralized, because of a complete protection in case of default with a saving of the screening costs. Nevertheless, if the screening costs were small so that evaluating the entrepreneurs' projects were socially efficient, an entrepreneur would choose a contract with small collateral in order to involve the bank to screen. In this case, the market equilibrium is represented by the following conditions: the banks screen all projects, they fund only the entrepreneurs with good projects, charge an interest rate *i* equal to the cost of funds plus the screening costs for the approved loans plus the prorated screening costs of unapproved loans. This competitive equilibrium is efficient even though the screening activity of the banks is non-contractible.

In the presence of adverse selection there are two types of loan applicants: an high-type with an higher probability of selecting a good project and a low-type with a lower probability of selecting a good project; each

applicant is able to observe his own type, but the banks cannot distinguish the applicant types. The implications of such a framework are straightforward: the high type entrepreneurs will have to pay a prorated share of the screening costs for unapproved loans both for high-type and low-type and, therefore, there is an incentive for the high-types to separate themselves from low-types. The high type entrepreneurs will choose contracts with an amount of collateral able to avoid the project screening activity of the banks: this proceeding is driven by the common knowledge both of the banks and of the high type entrepreneurs that low types would not be attracted to these contracts because of their higher probability of default. The unique competitive equilibrium is a separating equilibrium in which the high-type entrepreneurs post collateral and are not screened, thus renouncing the protection from bad projects provided by the banks' screening activity and avoiding a financing to the low type entrepreneurs via the payment of the screening costs. The amount of collateral posted increases with a stronger protection of creditor rights and the competitive equilibrium achieved leads to a loss of social surplus with respect to the benchmark case with efficiency. The only way to restore this lost surplus and yield an efficient outcome would be the imposition of collateral limitations on the banks. Yet, in one case the authors find interestingly that the inefficient lazy attitude towards screening disappears: that is in the presence of a monopolistic bank. This particular credit market structure allows the bank to extract all the surplus from entrepreneurs and to internalize the problem of choosing the level of screening activity that maximizes total social surplus. In fact, in the case of a monopolistic bank, the demand for capital is completely inelastic and therefore

"high interest rates do not lead to lower lending volumes, but shift rents from entrepreneurs to the bank without causing any allocation distortion" (Manove et. al (2001)), thus yielding to an efficient project screening. From this theoretical model, we can discover at least three empirical implications which may be tested on the data. First, there should be a "substitution effect" between collateral and project screening. Second, collateral should be posted by the low-risk entrepreneurs: a large part of econometric literature (Berger and Udell (1990), Coco (1999), Jimenez et al. (2006), Blazy and Weill (2006), Booth and Booth (2006), Brick and Palia (2007) among others) asserts that collateral is required from high-risk borrowers; nevertheless, the model of "Lazy Banks" could be consistent with this regularity if risk is measured in terms of ex-post performances. In fact, in the theoretical model discussed above the lower-quality entrepreneurs are screened and only those with good projects are funded; the high-quality entrepreneurs are not screened, so all of their projects, *including the bad ones*, are funded, thus generating an increase of ex-post risk together with collateral posted. Therefore, it's necessary to distinguish ex-ante

risk from ex-post risk; only the former is needed to be negative related to collateral in order to give an empirical validation to the theory of "Lazy Banks". Third, if a country has got an efficient judicial system, so that creditor rights are speedily enforced, the amount of collateral posted should increase and, according to the model, generate a credit market in which *"cheap credit is emphasized over project screening"* (Manove et al.(2001)).

In the next sections we test these three implications, by constructing, as in Berger and Udell (1990), an ex-ante and an ex-post measure of risk to better distinguish the performances in the use of collateral both as an instrument to prevent agency risks (adverse selection and moral hazard) and as an effective credible buffer to stem credit defaults.

4 DATA, VARIABLES AND SUMMARY STATISTICS

The empirical analysis uses information on the Italian credit market and the Italian judicial system on a province basis. The data are taken from three sources: the Central Credit Register (Centrale dei Rischi) held by the Bank of Italy, the Italian Bank Association (ABI) and the Italian Ministry of Justice. The first source is used for data concerning the amount of loans granted, the amount of real guarantees posted (collateral) and default risk (i.e. ex-post risk), measured here as the ratio between the value of defaulted loans in a period and the total amount of the non defaulted loans of the previous period; loans are recorded only when they are above a threshold level of €75,000 and are classified according to the province where they are granted, their maturity (short-term and long-term if the maturity is respectively below and above eighteen months), the class of utilization and the economic sector of activity to which the borrowers belong[2]. In particular, to measure the ex-ante risk profile of the borrower, we use the degree of opaqueness, i.e. the ratio between gross total assets and gross physical assets of the economic sector analysed, following Bonaccorsi Di Patti and Dell'Ariccia (2004). This measure identifies riskiness in the share of non physical assets held by the firms, as revealed by

2 Unfortunately, due to privacy reasons, we are not able to access to individual data referring to the loans granted and to the borrowers, that would be more detailed for the information revealed. Thus Central Credit Register makes available to us data aggregated by province of the borrower, economic sector of activity of the borrower, class of utilization and maturity of the loans granted.

the balance sheets; in fact, the higher is the degree of opaqueness, the lower is the share of tangible goods (and so the higher is the share of non physical assets). The decision of not identifying ex-ante risk with risk premium as in large part of the literature (Berger and Udell (1990) among others) has been undertaken to avoid an endogeneity problem between collateral and interest rate with a consequent arbitrariness in choosing the most suitable instrumental variable, as already underlined in the short literature review.

The data on credit market just described are quarterly and cover a period of eight years (1999:01-2006:02).

The second source of data contains information on the number of bank employees working in the branches[3] in the provinces, that are annual data and cover a period of six years (1999-2004).

The third source is used for data on judicial inefficiency measured here by the length of civil trials grouped by district-province[4]; these data are annual and cover a period of five years (2000-2004).

Then we construct a measure of the degree of collateralization given by the ratio between the amount of real guarantees and the level of credit granted and a measure of project screening (henceforth called *screening*) given by the number of bank employees for each unit of credit granted. In particular, this last indicator tries to capture the contribution of labor factor in the decision of financing a project by a bank, even though here is not considered that a contraction in such a measure of screening could be due to improved banking information technologies, that have progressively substituted the labor factor, but not the activity of screening *tout court* that, in turn, could be also increased. Moreover, the increasing number of bank officers may be caused by an inefficient management of the human resources in the branches and so not always a ticker presence of employees means an augmented level of screening activity. Due to the lack of microeconomic data, we are not able to build the same measures of Ono and Uesugi (2005) for Japanese economy, even though by our macroeconomic information[5] we obtain analogous results, as shown in the next section.

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3 We exclude by the bank employees sample the workers employed in the central officies that are concentrated in a group of provinces (very often in the capitals of a region). In this way, we avoid an over-estimation of the contribution of such provinces.

4 Indeed the geographical dimension of a judicial district not always coincides with the province. Whenever the district is wider than the province including also more than one province, we use the data of that district for all the provinces belonging to it. On the contrary, if in a province is present more than one district, we consider only the value of the judicial district of the county town.

5 Also Alessandrini et al. (2009) build two macroeconomic indicators, that are operational distance between banks and borrowers and functional distance between banks and local communities, to measure a typical microeconomic aspect, i.e. borrowers' financing constraints.

Table (1) lists all the variables adopted in this study together with their definitions:

Table 1 **Variable Definitions**

Variables	Definitions
Collateral	Value of real guarantees with respect to the amount of credit granted
Default Risk	Ratio between the value of defaulted loans in a given period and the amount of the non defaulted loans of the previous period
Screening	Number of bank employees with respect to the amount of credit granted
Ex-ante Risk	Ratio between gross total assets and gross physical assets
Judicial Inefficiency	Length of civil trials in terms of year
Time 1-30	Time Dummies, set to 1 in each quarter and 0 otherwise
Utilization Class 1-8	Set to 1 in each utilization class of the loan and 0 otherwise

Next, table (2) defines the monetary range for each of the eight classes of utilization of the loans:

Table 2 **Classes of utilization of the loans**

Classes of utilization	Range
1	from 75,000 to 124,999 €
2	from 125,000 to 249,999 €
3	from 250,000 to 499,999 €
4	from 500,000 to 2,499,999 €
5	from 2,500,000 to 4,999,999 €
6	from 5,000,000 to 24,999,999 €
7	from 25,000,000 to 99,999,999 €
8	Equal or greater of 100,000,000 €

Table (3) describes the classification adopted by Bonaccorsi Di Patti and Dell'Ariccia (2004) about the degree of opaqueness in each economic sector used in our study:

Table 3 **Economic Sectors and Opaqueness**

Industry	Opaqueness
Paper and Allied Products	4.91
Stone, Clay, Glass and Concrete Products	5.1
Rubber and Miscellaneous Plastic Products	5.18
Energy goods	5.66
Basic Metal Industries	5.72
Food and Beverage	5.94
Hotels, Restaurants and Bars	6.36
Metal Products	6.95
Furniture, Toys and Miscellaneous Manufacturing	8.78
Chemicals, Fibers and Allied Products	8.81
Automobiles, Other Vehicles and Parts	8.96
Electrical and Electronic Machinery and Supplies	12.76
Non-eletrical Machinery and Office Equipment	13.24
Retail Trade and Repair Services	14.52
Apparel and Finished Textile Products	14.67
Printing, Publishing and Allied Industries	17.46
Wholesale Trade	34.74
Costruction	53.29

Tables (4)-(9) introduce the summary statistics for the degree of collateralization using the information from the Central Credit Register and grouping the loans by maturity (short-term and long-term, as respectively defined above) and geographical macro-area (North, Centre and South):

The first key result is that collateral matters essentially for long-term loans, with some significant differences among the three geographical macro-areas, that show the increasing utilization of collateral from the North Area to the South Area of Italy (the average degree of collateralization is 59.46 per cent for the North Italy, 66.97 per cent for the Central Italy and 76.84 per cent for the South Italy for long-term loans; 6.13 per cent for the North Italy, 9.88 per cent for the Central Italy and 12 per cent for the South Italy for short-term loans). The value of the degree of collateralization for long-term loans is above 100 per cent at the 99th percentile for long-term loans, whereas is 44.68 per cent for the North Italy, 50.74 per cent for the Central Italy and 86.20 per cent for the South Italy at the 99th percentile for short-term loans. These statistics show clearly that, when present, collateral normally covers the full amount of the loan for long-term loans and only a part of the credit granted for short-term loans.

Table 4 Degree of collateralization short term loans NORTH

NORTH	N	mean	cv	p1	p50	p99
ALESSANDRIA	2180	0.0551584	1230914	0.0002404	0.0341147	0.2717366
AOSTA	958	0.1109908	2059651	0.0011326	0.0514452	1017794
ASTI	1510	0.0534345	1365685	0.0005155	0.0351805	0.3243253
BELLUNO	1378	0.0515017	1319329	0.0001845	0.026898	0.3432484
BERGAMO	3012	0.0558114	1695018	0.00031	0.0297289	0.4275281
BIELLA	1559	0.106349	1410248	0.0006315	0.0535681	0.774872
BOLOGNA	2697	0.0316387	1202438	0.0000624	0.0178411	0.1812225
BOLZANO	2359	0.1173081	1112381	0.0024427	0.0763277	0.6092166
BRESCIA	3098	0.0480092	1310776	0.0008174	0.027733	0.3117832
COMO	2414	0.0535421	1257595	0.0005881	0.0335828	0.3408293
CREMONA	2204	0.06249	1107869	0.0016427	0.0404877	0.3725421
CUNEO	2125	0.044269	145922	0.0002688	0.0270863	0.2788448
FERRARA	1838	0.0595702	1347055	0.000408	0.0312332	0.3507133
FORLI'	2209	0.0604325	1867713	0.0004807	0.0277172	0.7004282
GENOVA	2511	0.0647805	1248676	0.0002582	0.0406672	0.4090784
GORIZIA	1071	0.0697779	1300595	0.0000409	0.0371456	0.4684937
IMPERIA	1104	0.1242858	1523743	0.0008514	0.0682837	1
LA SPEZIA	1499	0.1135888	2394618	0.0014105	0.051169	0.8591136
LECCO	2182	0.051733	1387653	0.0010045	0.0298613	0.3706223
LODI	1656	0.069504	1590854	0.0001448	0.0385622	0.5257537
MANTOVA	2239	0.0536586	1530905	0.0007712	0.029032	0.3493325
MILANO	3730	0.0414757	1411333	0.0001001	0.0256836	0.2511257
MODENA	2543	0.0512352	1911752	0.000535	0.0215531	0.6517241
NOVARA	2072	0.0658021	1386969	0.0005378	0.0422426	0.4280389
PADOVA	2717	0.0516624	1241878	0.0005709	0.030991	0.2866515
PARMA	2105	0.0547924	1372063	0.0001861	0.0257801	0.3230797
PAVIA	2169	0.0620193	1676299	0.0011986	0.03224	0.5707358
PIACENZA	1732	0.0591498	1188842	0.0005901	0.0297463	0.3113078
PORDENONE	1736	0.0573518	1342152	0.0001229	0.0248448	0.3067692
RAVENNA	1888	0.0415147	136949	0.0004753	0.0236267	0.2169709
REGGIO EMILIA	2418	0.0541659	1416146	0.0004545	0.0267606	0.3992569
RIMINI	1929	0.0674404	1405117	0.0009823	0.039038	0.4541166
ROVIGO	1716	0.0647974	1274285	0.0010563	0.0372771	0.4128091
SAVONA	1485	0.0980955	155796	0.0001144	0.0587573	0.686866
SONDRIO	1376	0.0941344	1378102	0.000635	0.0508214	0.6849837
TORINO	3039	0.0527197	1187264	0.0002973	0.0357056	0.2867938
TRENTO	2017	0.0426347	1228193	0.0005692	0.0263998	0.2541524
TREVISO	2655	0.0377888	1432529	0.0005314	0.0198219	0.2649497
TRIESTE	1049	0.1029108	1426936	0.0000546	0.0520246	0.7753885
UDINE	2106	0.0461797	1235303	0.0006937	0.0256351	0.2360994
VARESE	2632	0.0605539	1272668	0.000796	0.0370109	0.436048
VENEZIA	2348	0.0444354	1547112	0.00012	0.0237628	0.3307388
VERBANIA	1407	0.0838023	1466847	0.0005955	0.038303	0.6115775
VERCELLI	1754	0.0917241	1128666	0.0013709	0.0645843	0.4982535
VERONA	2670	0.0561605	15021	0.0002414	0.0271778	0.3959695
VICENZA	2808	0.0624545	1466201	0.0002713	0.0342944	0.4497413
Total	**95904**	**0.0613003**	**1594747**	**0.000424**	**0.0326338**	**0.4467919**

Table 5 Degree of collateralization long term loans NORTH

NORTH	N	mean	cv	p1	p50	p99
ALESSANDRIA	2978	0.5445549	0.5012132	0.0520543	0.5399664	1
AOSTA	1550	0.5918384	0.4647616	4.18E-06	0.6035166	1076898
ASTI	2274	0.4858074	0.4863547	0.0466427	0.4748004	1
BELLUNO	2380	0.618935	0.3587387	0.0954573	0.6162097	1019882
BERGAMO	3488	0.6156185	0.3544238	0.0233973	0.6346556	1012717
BIELLA	1956	0.5661145	0.4354788	0.0481264	0.5646344	1010765
BOLOGNA	3461	0.5531924	0.3664015	0.0361222	0.5735254	1
BOLZANO	2829	0.580058	0.3489823	0.0934824	0.5791926	1
BRESCIA	3415	0.6191317	0.3316894	0.0620809	0.6394227	1
COMO	2979	0.627581	0.3342219	0.0926931	0.6348017	1004163
CREMONA	2781	0.6198732	0.4333409	0.0660324	0.638678	1014195
CUNEO	2868	0.4339473	0.4632739	0.0404186	0.418008	0.9773841
FERRARA	2661	0.6235435	0.3363804	0.1044421	0.6397758	1
FORLI'	2902	0.5791428	0.3853535	0.051123	0.5883133	1
GENOVA	3188	0.5952314	0.3626974	0.0633169	0.6109371	1012018
GORIZIA	2169	0.6508388	0.3886081	0.0449822	0.6799026	1023995
IMPERIA	1852	0.7330087	0.3296813	0.0904791	0.7778811	1112282
LA SPEZIA	2174	0.7297407	0.3317318	0.1047189	0.7666858	1083999
LECCO	2773	0.6552883	0.3013463	0.0905576	0.6802624	1004768
LODI	2378	0.6765354	0.8504252	0.0979903	0.711888	1055109
MANTOVA	2917	0.6058136	0.3735327	0.0510004	0.6361849	1000085
MILANO	4080	0.5657886	0.3695076	0.0210694	0.5882072	0.9970775
MODENA	3161	0.5566623	0.363061	0.0718448	0.5660459	1
NOVARA	2680	0.6240704	0.3760696	0.0101758	0.6601029	1007671
PADOVA	3239	0.5819356	0.3269407	0.1139092	0.5884269	1
PARMA	3083	0.5873824	0.4085426	0.0242861	0.6134427	1000021
PAVIA	2782	0.651938	0.3904403	0.1077421	0.6755338	101879
PIACENZA	2558	0.5529647	0.4538229	0.0799517	0.5487806	1
PORDENONE	2765	0.5416408	0.4302855	0.018555	0.530081	1
RAVENNA	2998	0.5879683	0.3751405	0.0802223	0.5916279	1
REGGIO EMILIA	3028	0.5721611	0.3742875	0.0160554	0.5891491	1
RIMINI	2664	0.6206022	0.3522141	0.0958771	0.6403605	1
ROVIGO	2509	0.6508286	0.3663236	0.0558396	0.6678925	1075525
SAVONA	2338	0.7094234	0.3335084	0.0281443	0.7457629	1248169
SONDRIO	2223	0.5712257	0.41092	0.0539583	0.5698885	1015656
TORINO	3575	0.4886348	0.4218515	0.0285242	0.4817703	1
TRENTO	2991	0.5327681	0.4038689	0.0692495	0.5246565	1
TREVISO	3145	0.5382443	0.3793967	0.0630999	0.5423213	1
TRIESTE	2288	0.7039122	0.3999634	0.0317013	0.7449983	1135223
UDINE	3127	0.5434185	0.4536131	0.051837	0.5432611	1
VARESE	3029	0.6392371	0.4328612	0.0824481	0.6466657	1017342
VENEZIA	3230	0.6031476	0.3437686	0.0340371	0.6292098	1000079
VERBANIA	2253	0.6720582	0.3647412	0.0472906	0.7123211	1085934
VERCELLI	2162	0.5599626	0.4626039	0.0101445	0.5731901	1000048
VERONA	3333	0.6056059	0.3353687	0.0413169	0.6247429	100003
VICENZA	3273	0.5775204	0.3225625	0.0534512	0.5892811	1
Total	**128487**	**0.5946012**	**0.4123436**	**0.0491375**	**0.6070676**	**1005248**

Table 6 Degree of collateralization short term loans CENTRE

CENTRE	N	mean	cv	p1	p50	p99
ANCONA	2277	0.040831	1372288	0.000212	0.022523	0.295837
AREZZO	1776	0.306344	2025084	0.0008	0.032167	0.483953
ASCOLI PICENO	1910	0.058718	1378383	0.000105	0.032731	0.366913
CHIETI	1668	0.061058	1890634	0.000565	0.026996	0.642261
FIRENZE	2492	0.039328	1550447	0.000102	0.023097	0.243497
FROSINONE	1863	0.114066	3815091	1.16E-05	0.044203	1586836
GROSSETO	1154	0.081285	1803627	0.000155	0.034982	0.9
L'AQUILA	1386	0.123045	2269049	0.000106	0.06905	0.729457
LATINA	1864	0.086519	1844783	0.000142	0.049466	0.551125
LIVORNO	1502	0.054747	1399247	0.000205	0.031168	0.396675
LUCCA	1939	0.043529	1681918	0.000154	0.025555	0.335742
MACERATA	2010	0.042354	1726497	9.73E-05	0.022429	0.425714
MASSA	1452	0.105503	1611551	0.000628	0.052546	0.771825
PERUGIA	2354	0.049836	1548165	0.000146	0.029363	0.431709
PESARO	2193	0.043392	1628387	3.96E-05	0.0245	0.30265
PESCARA	1645	0.07333	1477903	0.000524	0.042119	0.510735
PISA	1731	0.055864	1537912	0.00036	0.029937	0.460333
PISTOIA	1757	0.04698	1371535	0.000232	0.030159	0.285954
PRATO	1441	0.0839	1302196	0.00189	0.043019	0.50787
RIETI	703	0.315628	9858798	2.23E-05	0.061196	0.86517
ROMA	3371	0.333031	4648583	3.74E-05	0.046384	0.450566
SIENA	1704	0.060691	1714388	0.0006	0.034336	0.513269
TERAMO	1782	0.074927	2007259	5.79E-05	0.03033	0.736355
TERNI	1314	0.065509	156607	0.000173	0.038838	0.437367
VITERBO	1222	0.084128	1350022	0.000142	0.045006	0.475523
Total	**44510**	**0.098758**	**4512582**	**0.000154**	**0.033672**	**0.507388**

Table 7 Degree of collateralization long term loans CENTRE

CENTRE	N	mean	cv	p1	p50	p99
ANCONA	2845	0.541436	0.396953	0.036291	0.545977	1
AREZZO	2614	0.627341	0.322554	0.10224	0.636871	1
ASCOLI PICENO	2686	0.662432	0.322367	0.102585	0.680499	1025059
CHIETI	2627	0.7166	1695525	0.078966	0.697563	1023656
FIRENZE	3162	0.588047	0.344311	0.037993	0.611122	1
FROSINONE	2471	0.730908	0.48995	0.021682	0.751027	1335915
GROSSETO	2176	0.682713	0.34079	0.096086	0.705529	1043029
L'AQUILA	2299	0.759558	0.364832	0.060834	0.790301	1462427
LATINA	2555	0.759933	0.50233	0.136944	0.766375	1536698
LIVORNO	2561	0.673899	0.356845	0.040293	0.702442	1073169
LUCCA	2727	0.62334	0.335462	0.070743	0.654744	1
MACERATA	2581	0.553112	0.40747	0.051618	0.553589	1
MASSA	2087	0.718148	0.30146	0.11934	0.737147	1071458
PERUGIA	2996	0.685136	0.322822	0.124066	0.69267	104509
PESARO	2714	0.586841	0.376293	0.052138	0.599585	1
PESCARA	2556	0.76388	0.278734	0.167511	0.785973	1132269
PISA	2669	0.637402	0.342305	0.045368	0.669085	1
PISTOIA	2655	0.647278	0.325093	0.060727	0.661188	1000005
PRATO	2088	0.604645	0.437972	0.040892	0.609118	101543
RIETI	1452	0.7854	0.377555	0.139658	0.830039	1291574
ROMA	3726	0.680216	0.393877	0.008068	0.735761	1132569
SIENA	2629	0.62845	0.349187	0.047503	0.65254	1000662
TERAMO	2657	0.744624	0.302721	0.040677	0.789233	1068273
TERNI	2228	0.693151	0.515926	0.065976	0.699112	1062282
VITERBO	1968	0.77011	0.245865	0.267516	0.786375	1141857
Total	**63729**	**0.669688**	**0.526817**	**0.057892**	**0.687398**	**1080082**

Table 8 Degree of collateralization short term loans SOUTH

SOUTH	N	mean	cv	p1	p50	p99
AGRIGENTO	1101	0.118595	1238843	0.000158	0.071267	0.733794
AVELLINO	1491	0.124225	2933102	0.000515	0.065576	1
BARI	2381	0.079827	567822	0.000294	0.036309	0.639314
BENEVENTO	1164	0.119383	1338072	0.000263	0.070498	0.752904
BRINDISI	1092	0.164083	4606884	0.000322	0.077461	0.968941
CAGLIARI	1892	0.119291	1796609	1.99E-05	0.05734	0.875
CALTANISETTA	834	0.13331	1452138	0.000514	0.069221	0.897092
CAMPOBASSO	1031	0.096224	1611166	0.000037	0.048286	0.9
CASERTA	1794	0.153635	8759964	0.001363	0.06897	0.820831
CATANIA	1978	0.091681	1284704	0.000508	0.056311	0.666666
CATANZARO	1303	0.13694	1639096	7.99E-05	0.081759	0.881818
COSENZA	1620	0.114409	1112375	0.000273	0.075838	0.666667
CROTONE	1158	0.168399	2722421	0.000286	0.092391	0.86556
ENNA	688	0.200951	1292866	0.000236	0.098812	107132
FOGGIA	1668	0.12673	1268167	0.001458	0.077833	0.872889
ISERNIA	612	0.122367	1502458	3.21E-05	0.057429	0.833278
LECCE	1576	0.074926	1848092	0.000126	0.048135	0.538173
MATERA	823	0.348422	9755302	0.00022	0.055482	1183628
MESSINA	1439	0.14012	207338	0.000155	0.062562	1253847
NAPOLI	2981	0.076015	1244605	0.000558	0.06004	0.461739
NUORO	850	0.102319	1433307	1.07E-05	0.059024	0.872277
ORISTANO	495	0.113665	1618824	0.000348	0.056666	0.999182
PALERMO	2077	0.081643	1254241	3.36E-05	0.053862	0.560336
POTENZA	1331	0.20599	6839545	0.001077	0.063987	0.970874
RAGUSA	1104	0.086444	1321377	0.001921	0.050415	0.623298
REGGIO CALABRIA	1472	0.161353	2268829	7.53E-05	0.080931	0.880005
SALERNO	2212	0.084394	2231179	0.002424	0.048042	0.902742
SASSARI	1554	0.108291	1540971	0.000436	0.053401	1
SIRACUSA	1194	0.135312	2378118	0.002026	0.066957	1
TARANTO	1452	0.09796	1898948	0.000253	0.049947	0.760228
TRAPANI	1384	0.093475	1118519	0.000398	0.064813	0.526541
VIBO VALENZIA	875	0.167735	1160669	5.01E-05	0.095397	0.96752
Total	**44626**	**0.120743**	**5296079**	**0.000208**	**0.060814**	**0.861979**

Table 9 Degree of collateralization long term loans SOUTH

SOUTH	N	mean	cv	p1	p50	p99
AGRIGENTO	1651	0.766582	0.32538	0.151805	0.779653	1383185
AVELLINO	2280	0.771814	0.369336	0.066268	0.800375	1607163
BARI	3042	0.749186	0.280678	0.103301	0.779571	1090497
BENEVENTO	1874	0.790873	0.661891	0.116154	0.828444	1201315
BRINDISI	1855	0.793965	0.291393	0.087932	0.826148	1216446
CAGLIARI	2948	0.749558	0.600687	0.128126	0.752967	126157
CALTANISETTA	1625	0.755475	0.345742	0.046132	0.797349	1257543
CAMPOBASSO	1867	0.771687	0.557242	0.134326	0.791486	1245124
CASERTA	2504	0.785263	0.372463	0.12193	0.808341	1230552
CATANIA	2635	0.73681	0.325116	0.079215	0.768445	1204916
CATANZARO	1833	0.763643	0.307934	0.12987	0.810112	1174458
COSENZA	2268	0.790923	0.269599	0.168527	0.822362	1206442
CROTONE	1757	0.860912	0.268868	0.228396	0.917016	1385561
ENNA	1116	0.802948	0.820094	0.150386	0.793293	1350934
FOGGIA	2329	0.821986	0.346828	0.127994	0.858645	1100442
ISERNIA	1433	0.860192	0.800629	0.111005	0.878487	166637
LECCE	2364	0.774632	0.29964	0.16036	0.80762	1144306
MATERA	1851	0.811987	0.3497	0.178818	0.843692	1180067
MESSINA	2201	0.740907	0.429001	0.095876	0.762376	1244079
NAPOLI	3350	0.705255	0.509685	0.012789	0.74274	1071597
NUORO	1921	0.768712	0.306643	0.211679	0.78039	1191875
ORISTANO	1478	0.720986	0.378027	0.003248	0.748433	1342997
PALERMO	2676	0.748696	0.434628	0.1295	0.77509	1255373
POTENZA	2141	0.80541	0.276331	0.128825	0.848054	1190831
RAGUSA	1913	0.742873	0.287035	0.178673	0.765216	1164671
REGGIO CALABRIA	1901	0.813214	0.347087	0.148148	0.84384	1322382
SALERNO	2892	0.728401	0.313397	0.071377	0.758638	1129621
SASSARI	2476	0.705079	0.34933	0.14909	0.701743	1329654
SIRACUSA	1950	0.759257	0.313438	0.111507	0.782923	1236794
TARANTO	2212	0.763887	0.346313	0.112122	0.799297	110739
TRAPANI	2121	0.75001	0.418525	0.124047	0.773922	1159315
VIBO VALENZIA	1269	0.845559	0.313668	0.139709	0.901907	1581393
Total	**67733**	**0.768395**	**0.413611**	**0.107274**	**0.794285**	**1248964**

Tables (10)-(12) present summary statistics for the screening activity of the banks, according to the measure defined above, merging the information on bank employees from the Italian Bank Association (ABI) and the data on loans granted from Central Credit Register:

Table 10 **Screening NORTH**

NORTH	N	mean	cv	p1	p50	p99
ALESSANDRIA	5158	0.0000003	0.9521957	0.000000001	0.0000003	0.0000010
AOSTA	2508	0.0000004	0.8532913	0.000000001	0.0000004	0.0000010
ASTI	3784	0.0000003	0.9057472	0.000000002	0.0000003	0.0000010
BELLUNO	3758	0.0000004	0.7987522	0.000000001	0.0000004	0.0000010
BERGAMO	6500	0.0000004	0.9209838	0.000000001	0.0000003	0.0000010
BIELLA	3515	0.0000004	0.8553252	0.000000002	0.0000003	0.0000010
BOLOGNA	6158	0.0000003	0.9272661	0.000000000	0.0000003	0.0000010
BOLZANO	5188	0.0000004	0.7802713	0.000000004	0.0000003	0.0000010
BRESCIA	6513	0.0000003	0.9341489	0.000000002	0.0000003	0.0000010
COMO	5393	0.0000004	0.8859421	0.000000002	0.0000004	0.0000010
CREMONA	4985	0.0000004	0.9237834	0.000000003	0.0000003	0.0000010
CUNEO	4993	0.0000003	0.9296132	0.000000001	0.0000002	0.0000009
FERRARA	4499	0.0000004	0.8262632	0.000000001	0.0000004	0.0000010
FORLI'	5111	0.0000004	0.8901059	0.000000001	0.0000003	0.0000010
GENOVA	5699	0.0000004	0.8673340	0.000000001	0.0000003	0.0000010
GORIZIA	3240	0.0000005	0.7559566	0.000000001	0.0000005	0.0000010
IMPERIA	2956	0.0000005	0.7311806	0.000000003	0.0000006	0.0000011
LA SPEZIA	3673	0.0000005	0.8273733	0.000000004	0.0000005	0.0000011
LECCO	4955	0.0000004	0.8663854	0.000000002	0.0000004	0.0000010
LODI	4034	0.0000004	1.2586490	0.000000001	0.0000004	0.0000010
MANTOVA	5156	0.0000004	0.8928545	0.000000001	0.0000003	0.0000010
MILANO	7810	0.0000003	0.9672851	0.000000001	0.0000002	0.0000009
MODENA	5704	0.0000003	0.9056158	0.000000001	0.0000003	0.0000010
NOVARA	4752	0.0000004	0.8766218	0.000000002	0.0000003	0.0000010
PADOVA	5956	0.0000003	0.8887498	0.000000001	0.0000003	0.0000010
PARMA	5188	0.0000004	0.8723864	0.000000001	0.0000003	0.0000010
PAVIA	4951	0.0000004	0.9050038	0.000000002	0.0000004	0.0000010
PIACENZA	4290	0.0000004	0.8864877	0.000000002	0.0000003	0.0000010
PORDENONE	4501	0.0000004	0.8511699	0.000000000	0.0000003	0.0000010
RAVENNA	4886	0.0000004	0.8471985	0.000000001	0.0000004	0.0000010
REGGIO EMILIA	5446	0.0000003	0.8977223	0.000000001	0.0000003	0.0000010
RIMINI	4593	0.0000004	0.8386359	0.000000002	0.0000004	0.0000010
ROVIGO	4225	0.0000004	0.8369487	0.000000002	0.0000004	0.0000010
SAVONA	3823	0.0000005	0.7700985	0.000000003	0.0000005	0.0000012
SONDRIO	3599	0.0000004	0.7894666	0.000000002	0.0000004	0.0000010
TORINO	6614	0.0000003	0.9303635	0.000000001	0.0000002	0.0000009
TRENTO	5008	0.0000003	0.8772303	0.000000001	0.0000003	0.0000010
TREVISO	5800	0.0000003	0.9492768	0.000000001	0.0000003	0.0000010
TRIESTE	3337	0.0000005	0.7239298	0.000000003	0.0000006	0.0000011
UDINE	5233	0.0000003	0.9075930	0.000000001	0.0000003	0.0000010
VARESE	5661	0.0000004	0.9628382	0.000000002	0.0000003	0.0000010
VENEZIA	5578	0.0000004	0.8721210	0.000000001	0.0000004	0.0000010
VERBANIA	3660	0.0000004	0.7919149	0.000000001	0.0000005	0.0000011
VERCELLI	3916	0.0000004	0.8849739	0.000000003	0.0000002	0.0000010
VERONA	6003	0.0000004	0.8781801	0.000000001	0.0000004	0.0000010
VICENZA	6081	0.0000003	0.8757578	0.000000001	0.0000003	0.0000010
Total	**224391**	**0.0000004**	**0.8967170**	**0.000000001**	**0.0000003**	**0.0000010**

Table 11 **Screening CENTRE**

CENTRE	N	mean	cv	p1	p50	p99
ANCONA	5122	0.0000003	0.9352144	0.000000001	0.0000003	0.0000010
AREZZO	4390	0.0000005	7.9428900	0.000000001	0.0000004	0.0000010
ASCOLI PICENO	4596	0.0000004	0.8343682	0.000000001	0.0000004	0.0000010
CHIETI	4295	0.0000005	2.1753170	0.000000002	0.0000005	0.0000010
FIRENZE	5654	0.0000003	0.9078870	0.000000001	0.0000003	0.0000010
FROSINONE	4334	0.0000005	1.0686970	0.000000000	0.0000005	0.0000014
GROSSETO	3330	0.0000005	0.7446819	0.000000001	0.0000006	0.0000010
L'AQUILA	3685	0.0000005	0.7980179	0.000000002	0.0000006	0.0000013
LATINA	4419	0.0000005	0.9528518	0.000000001	0.0000005	0.0000013
LIVORNO	4063	0.0000004	0.8038406	0.000000001	0.0000005	0.0000010
LUCCA	4666	0.0000004	0.8651350	0.000000001	0.0000004	0.0000010
MACERATA	4591	0.0000003	0.9359988	0.000000001	0.0000003	0.0000010
MASSA	3539	0.0000005	0.7733890	0.000000003	0.0000005	0.0000011
PERUGIA	5350	0.0000004	0.8871426	0.000000001	0.0000005	0.0000010
PESARO	4907	0.0000003	0.9294738	0.000000000	0.0000003	0.0000010
PESCARA	4201	0.0000005	0.7737978	0.000000002	0.0000006	0.0000011
PISA	4400	0.0000004	0.8208295	0.000000001	0.0000005	0.0000010
PISTOIA	4412	0.0000004	0.8295317	0.000000002	0.0000005	0.0000010
PRATO	3529	0.0000004	0.8532978	0.000000003	0.0000004	0.0000010
RIETI	2155	0.0000006	2.8576880	0.000000000	0.0000007	0.0000013
ROMA	7097	0.0000005	20.7098300	0.000000000	0.0000003	0.0000011
SIENA	4333	0.0000004	0.8200691	0.000000001	0.0000004	0.0000010
TERAMO	4439	0.0000005	0.8066077	0.000000000	0.0000006	0.0000010
TERNI	3542	0.0000005	0.9121316	0.000000001	0.0000005	0.0000010
VITERBO	3190	0.0000005	0.7330176	0.000000001	0.0000006	0.0000011
Total	**108239**	**0.0000004**	**6.6319420**	**0.000000001**	**0.0000004**	**0.0000010**

Table 12 **Screening SOUTH**

SOUTH	N	mean	cv	p1	p50	p99
AGRIGENTO	2752	0.0000005	0.7551075	0.000000004	0.0000006	0.0000012
AVELLINO	3771	0.0000005	0.8711340	0.000000003	0.0000006	0.0000015
BARI	5423	0.0000005	1.0426380	0.000000002	0.0000005	0.0000011
BENEVENTO	3038	0.0000005	1.0011400	0.000000002	0.0000006	0.0000012
BRINDISI	2947	0.0000006	1.0369210	0.000000003	0.0000007	0.0000012
CAGLIARI	4840	0.0000005	0.9654804	0.000000000	0.0000006	0.0000012
CALTANISETTA	2459	0.0000005	0.6983509	0.000000004	0.0000006	0.0000012
CAMPOBASSO	2898	0.0000005	0.9069383	0.000000001	0.0000006	0.0000012
CASERTA	4298	0.0000005	1.8214090	0.000000006	0.0000006	0.0000012
CATANIA	4613	0.0000005	0.8150439	0.000000002	0.0000005	0.0000011
CATANZARO	3136	0.0000005	0.7661299	0.000000002	0.0000005	0.0000011
COSENZA	3888	0.0000005	0.7468419	0.000000003	0.0000006	0.0000012
CROTONE	2915	0.0000006	0.8197537	0.000000001	0.0000007	0.0000013
ENNA	1804	0.0000006	1.0743120	0.000000003	0.0000006	0.0000013
FOGGIA	3997	0.0000005	0.7881200	0.000000004	0.0000006	0.0000011
ISERNIA	2045	0.0000006	1.0568410	0.000000001	0.0000007	0.0000016
LECCE	3940	0.0000005	0.8021932	0.000000002	0.0000006	0.0000011
MATERA	2674	0.0000007	2.8561280	0.000000004	0.0000007	0.0000012
MESSINA	3640	0.0000005	0.8445228	0.000000003	0.0000005	0.0000013
NAPOLI	6331	0.0000004	1.0118320	0.000000002	0.0000003	0.0000010
NUORO	2771	0.0000006	0.6620585	0.000000000	0.0000007	0.0000012
ORISTANO	1973	0.0000006	0.6425113	0.000000001	0.0000006	0.0000013
PALERMO	4753	0.0000005	0.9115304	0.000000001	0.0000004	0.0000012
POTENZA	3472	0.0000006	1.6260540	0.000000005	0.0000007	0.0000012
RAGUSA	3017	0.0000005	0.7271677	0.000000004	0.0000006	0.0000011
REGGIO CALABRIA	3373	0.0000005	0.8623503	0.000000002	0.0000005	0.0000013
SALERNO	5104	0.0000004	0.8526199	0.000000004	0.0000005	0.0000011
SASSARI	4030	0.0000005	0.7661147	0.000000003	0.0000005	0.0000012
SIRACUSA	3144	0.0000005	0.7804266	0.000000005	0.0000006	0.0000012
TARANTO	3664	0.0000005	0.8051867	0.000000002	0.0000006	0.0000011
TRAPANI	3505	0.0000005	0.8325713	0.000000003	0.0000005	0.0000011
VIBO	2144	0.0000006	0.7206840	0.000000000	0.0000006	0.0000014
Total	**112359**	**0.0000005**	**1.1130830**	**0.000000002**	**0.0000006**	**0.0000012**

The statistics show that, as for the degree of collateralization, screening is increasing from the North Area to the South Area of Italy with an high volatility in the Central Italy (with values of the coefficient of variation equal to 6.63 and 20.71 respectively for the Area and for the province of Rome). From this picture emerges that screening and the degree of collateralization show a sort of complementarity rather than the substitution effect theoretically predicted by the model of "Lazy Banks".

Tables (16)-(18) show summary statistics concerning judicial inefficiency measured by the length of civil trials in terms of year in Italian judicial districts grouped by geographical macro-area; this variable is used here as a measure of law enforcement, that, in turn, represents an instrument to protect creditor rights. La Porta et al. (1997) use different measures (rule of law, anti director rights, one-share-one-vote, creditor rights) to compare the cross-country quality of law enforcement; however, their variables are not suitable to evaluate the different degree of judicial efficiency in the geographical areas of a single country where civil laws and other legal rules are the same, because those measures are not variable within the territory of a specific country.

The level of law enforcement decreases from the North Area to the South Area of Italy (an average length of civil trials of 2.2 years for the North Area, 2.87 years for the Central Area and 3.65 years for the South Area); these results, together with the ones of real guarantees, show a negative co-movement between the protection of creditor rights and the degree of collateralization, which is in contrast with the theoretical model of "Lazy Banks", that postulates a strong use of real guarantees whenever creditor rights are better protected.

Table 13 **Judicial Inefficiency NORTH**

NORTH	N	mean	cv	p1	p50	p99
Alessandria	20	2.292055	0.2277394	1.726027	1.983562	2.936986
Aosta	20	2.106301	0.2873247	1.49589	2.10137	3.10137
Asti	20	2.255342	0.1506614	1.893151	2.128767	2.742466
Belluno	20	3.507397	0.0724325	3.150685	3.487671	3.928767
Bergamo	20	2.088219	0.2347385	1.750685	1.819178	3.021918
Biella	20	2.074521	0.1731819	1.663014	2.057534	2.646575
Bologna	20	2.972055	0.1000244	2.59726	2.89863	3.457534
Bolzano	20	2.013151	0.1089963	1.690411	1.983562	2.336986
Brescia	20	3.367123	0.1068449	2.715069	3.471233	3.712329
Como	20	1.693699	0.1468945	1.39726	1.679452	2.09863
Cremona	20	1.98137	0.0550062	1.882192	1.936986	2.186301
Cuneo	20	1.139726	0.063033	1.010959	1.167123	1.210959
Ferrara	20	2.999452	0.0518616	2.775342	3.008219	3.169863
Forlì	20	2.136986	0.0594855	1.972603	2.120548	2.353425
Genova	20	2.465205	0.085529	2.153425	2.509589	2.687671
Gorizia	20	2.748493	0.1027957	2.413699	2.676712	3.243836
Imperia	20	2.33589	0.0994427	1.90411	2.375342	2.534247
La Spezia	20	2.591233	0.0921876	2.260274	2.49863	2.912329
Lecco	20	1.507397	0.0823817	1.309589	1.575342	1.635616
Lodi	20	1.808219	0.0925686	1.673973	1.734247	2.120548
Mantova	20	2.231233	0.0999253	1.928767	2.293151	2.50137
Milano	20	2.094247	0.1186056	1.745206	2.139726	2.441096
Modena	20	2.303014	0.1468306	1.745206	2.263014	2.731507
Novara	20	1.602192	0.2834104	1.172603	1.438356	2.383562
Padova	20	2.709589	0.1415632	2.208219	2.564384	3.147945
Parma	20	2.085479	0.0685807	1.90411	2.087671	2.265754
Pavia	20	2.179178	0.0385899	2.10137	2.161644	2.326027
Piacenza	20	2.44548	0.0473061	2.287671	2.479452	2.591781
Pordenone	20	1.883288	0.0349218	1.761644	1.912329	1.942466
Ravenna	20	2.580822	0.1208455	2.213699	2.621918	3.09863
Emilia	20	2.572055	0.1714329	1.753425	2.69589	2.991781
Rimini	20	3.111781	0.0995697	2.580822	3.189041	3.394521
Rovigo	20	2.232877	0.0783822	2.063014	2.158904	2.526027
Savona	20	2.709041	0.3133608	1.928767	2.378082	4.246575
Sondrio	20	1.626849	0.1318197	1.356164	1.567123	1.975343
Torino	20	1.689863	0.1792618	1.309589	1.673973	2.052055
Trento	20	1.65589	0.1238354	1.383562	1.594521	1.956164
Treviso	20	2.588493	0.1318889	2.309589	2.452055	3.227397
Trieste	20	1.955068	0.0890691	1.720548	1.90137	2.167123
Udine	20	2.091507	0.1792271	1.580822	2.208219	2.558904
Varese	20	2.02411	0.1752998	1.449315	2.035616	2.419178
Venezia	20	1.863014	0.1472723	1.578082	1.791781	2.279452
Verbania	20	1.248767	0.2249832	1.016438	1.093151	1.747945
Vercelli	20	1.574247	0.5979586	0.690411	1.180822	3.260274
Verona	20	2.326027	0.0773411	2.158904	2.208219	2.60274
Vicenza	20	3.092603	0.0410417	2.871233	3.10411	3.238356
Total	**920**	**2.229577**	**0.2771116**	**1.010959**	**2.164384**	**3.712329**

Table 14 **Judicial Inefficiency CENTRE**

CENTRE	N	mean	cv	p1	p50	p99
Ancona	20	2.663014	0.214306	2.019178	2.484931	3.594521
Arezzo	20	1.903562	0.144191	1.594521	1.835616	2.40274
Ascoli Piceno	20	3.161096	0.05873	2.945205	3.126027	3.391781
Chieti	20	3.752329	0.235096	2.936986	3.205479	5.068493
Firenze	20	2.250411	0.191213	1.808219	2.230137	2.986301
Frosinone	20	3.076164	0.23635	2.046575	3.024657	4.156164
Grosseto	20	2.79726	0.072874	2.506849	2.756164	3.030137
L'Aquila	20	3.102466	0.099927	2.747945	3.060274	3.556164
Latina	20	4.358356	0.205413	3.20274	3.969863	5.578082
Livorno	20	2.728219	0.283984	1.821918	2.547945	3.649315
Lucca	20	2.66411	0.184259	1.89589	2.90137	3.208219
Macerata	20	3.456438	0.107186	3.038356	3.534247	3.991781
Massa	20	3.320548	0.263164	2.569863	2.843836	4.876712
Perugia	20	3.225753	0.226477	2.079452	3.175343	4.10411
Pesaro	20	2.232329	0.117063	2	2.126027	2.717808
Pescara	20	2.97589	0.104623	2.660274	2.912329	3.547945
Pisa	20	2.80274	0.077158	2.542466	2.726027	3.161644
Pistoia	20	2.595616	0.072246	2.323288	2.567123	2.808219
Prato	20	2.847123	0.175795	2.356164	2.679452	3.775342
Rieti	20	2.20274	0.144664	1.958904	1.967123	2.720548
Roma	20	2.398356	0.144278	2.117808	2.183562	2.972603
Siena	20	3.150137	0.244715	2.358904	2.80548	4.10137
Teramo	20	3.476712	0.306763	2.205479	3.619178	5.246575
Terni	20	2.204931	0.077084	2.00274	2.254795	2.386301
Viterbo	20	2.605479	0.264693	2.054795	2.249315	3.906849
Total	**500**	**2.878071**	**0.270239**	**1.808219**	**2.756164**	**5.246575**

Table 15 **Judicial Inefficiency SOUTH**

SOUTH	N	mean	cv	p1	p50	p99
Agrigento	20	2.887123	0.151418	2.358904	2.772603	3.449315
Avellino	20	4.401096	0.143714	3.79726	4.158904	5.558904
Bari	20	4.218082	0.064533	3.884932	4.128767	4.652055
Benevento	20	3.472329	0.123966	2.939726	3.575342	3.928767
Brindisi	20	3.220274	0.223732	2.178082	3.39726	4.243835
Cagliari	20	4.110685	0.077757	3.657534	4.10411	4.460274
Caltanissetta	20	4.38137	0.116673	3.736986	4.186301	4.991781
Campobasso	20	3.492603	0.037901	3.328767	3.454794	3.70137
Caserta	20	4.049863	0.218262	2.789041	3.80274	5.128767
Catania	20	2.432329	0.064746	2.238356	2.372603	2.676712
Catanzaro	20	6.748493	0.198304	4.843836	6.356164	8.449315
Cosenza	20	3.605479	0.069064	3.254795	3.6	3.989041
Crotone	20	3.740822	0.160962	3.008219	3.824657	4.405479
Enna	20	3.143014	0.308991	1.750685	3.216438	4.410959
Foggia	20	2.854795	0.242257	1.893151	2.756164	3.734246
Isernia	20	2.72	0.113344	2.4	2.569863	3.2
Lecce	20	3.61589	0.245793	2.767123	3.547945	5.131507
Matera	20	4.073973	0.129138	3.117808	4.117808	4.60274
Messina	20	5.385205	0.345406	3.676712	4.032876	7.70411
Napoli	20	2.72	0.062998	2.517808	2.756164	2.956164
Nuoro	20	3.703562	0.089669	3.394521	3.473973	4.156164
Oristano	20	3.506849	0.087516	2.975343	3.515069	3.884932
Palermo	20	3.391233	0.092386	2.832877	3.441096	3.764384
Potenza	20	4.731507	0.265036	3.372603	4.342466	7.027397
Ragusa	20	2.195069	0.194079	1.706849	2.093151	2.956164
Reggio Calabria	20	3.491507	0.317439	2.60274	3.090411	5.526027
Salerno	20	4.251507	0.065463	3.876712	4.186301	4.613698
Sassari	20	2.976986	0.123888	2.60274	2.819178	3.59726
Siracusa	20	4.171507	0.169418	2.958904	4.183562	5.057534
Taranto	20	3.344658	0.179858	2.249315	3.660274	3.808219
Trapani	20	2.135342	0.124003	1.791781	2.175343	2.419178
Vibo Valenzia	20	3.744658	0.260907	2.293151	3.547945	5.213699
Total	**640**	**3.653681**	**0.313146**	**1.750685**	**3.569863**	**7.956164**

In the next two groups of tables ((16)-(21) and (22)-(24)) we present the results of summary statistics for the distribution of ex-ante risk and ex-post risk, according to the measures defined above, over the three Italian macro-areas.

Table 16 **Ex-ante risk short term loans NORTH**

NORTH	N	mean	cv	p1	p50	p99
ALESSANDRIA	1706	14.33713	0.9561181	4.91	8.78	53.29
AOSTA	762	20.87266	0.8626489	5.1	14.52	53.29
ASTI	1141	15.79549	0.9410985	4.91	8.78	53.29
BELLUNO	1037	17.41829	0.8850442	5.1	13.24	53.29
BERGAMO	2397	13.76408	0.9598834	4.91	8.78	53.29
BIELLA	1292	16.72081	0.9210018	4.91	8.96	53.29
BOLOGNA	2071	14.55275	0.9558116	4.91	8.81	53.29
BOLZANO	1807	15.15332	0.9548762	4.91	8.78	53.29
BRESCIA	2530	13.07696	0.9567985	4.91	8.78	53.29
COMO	1938	14.26599	0.9487549	4.91	8.81	53.29
CREMONA	1790	13.73598	0.975394	4.91	8.78	53.29
CUNEO	1621	14.99366	0.978001	4.91	8.78	53.29
FERRARA	1503	15.7172	0.9392028	4.91	8.81	53.29
FORLI'	1726	15.06291	0.9676357	4.91	8.78	53.29
GENOVA	1914	14.46184	0.9570845	4.91	8.81	53.29
GORIZIA	834	18.57701	0.9057163	4.91	8.96	53.29
IMPERIA	857	19.65181	0.8690355	4.91	14.52	53.29
LA SPEZIA	1139	16.4209	0.9525804	4.91	8.96	53.29
LECCO	1815	14.19051	0.9660811	4.91	8.78	53.29
LODI	1298	16.4122	0.9454243	4.91	8.81	53.29
MANTOVA	1789	14.42349	0.9558167	4.91	8.81	53.29
MILANO	2954	13.37742	0.9307267	4.91	8.81	53.29
MODENA	1983	14.69614	0.9534163	4.91	8.81	53.29
NOVARA	1698	14.80643	0.9478793	4.91	8.81	53.29
PADOVA	2165	13.87187	0.9619648	4.91	8.78	53.29
PARMA	1633	15.47042	0.9695259	4.91	8.78	53.29
PAVIA	1739	14.34294	0.9674625	4.91	8.78	53.29
PIACENZA	1387	15.75976	0.9396993	4.91	8.81	53.29
PORDENONE	1297	16.80502	0.9421103	4.91	8.81	53.29
RAVENNA	1419	16.68166	0.9451067	4.91	8.78	53.29
REGGIO EMILIA	1928	14.49982	0.9787893	4.91	8.78	53.29
RIMINI	1530	16.13694	0.9463392	4.91	8.96	53.29
ROVIGO	1332	16.81766	0.9137905	4.91	8.96	53.29
SAVONA	1103	16.99306	0.9728571	4.91	8.81	53.29
SONDRIO	1030	17.80033	0.9263187	4.91	8.78	53.29
TORINO	2454	13.47956	0.9445226	4.91	8.81	53.29
TRENTO	1529	15.7624	0.982016	4.91	8.78	53.29
TREVISO	2089	13.87922	0.9631439	4.91	8.78	53.29
TRIESTE	809	20.34629	0.8557515	5.1	14.52	53.29
UDINE	1620	14.83137	0.9600834	4.91	8.78	53.29
VARESE	2162	13.70383	0.9486452	4.91	8.81	53.29
VENEZIA	1760	14.99111	0.9576035	4.91	8.81	53.29
VERBANIA	1142	17.0123	0.9463734	4.91	8.81	53.29
VERCELLI	1428	15.68373	0.9494656	4.91	8.81	53.29
VERONA	2071	14.19691	0.975687	4.91	8.78	53.29
VICENZA	2238	13.85534	0.9640629	4.91	8.78	53.29
Total	**75467**	**15.07663**	**0.9572694**	**4.91**	**8.81**	**53.29**

Table 17 **Ex-ante risk long term loans NORTH**

NORTH	N	mean	cv	p1	p50	p99
ALESSANDRIA	2371	13.47919	0.980682	4.91	8.78	53.29
AOSTA	1171	16.02058	0.996375	4.91	6.36	53.29
ASTI	1792	14.28053	0.973158	4.91	8.78	53.29
BELLUNO	1898	14.23487	0.936095	4.91	8.81	53.29
BERGAMO	2828	13.04446	0.955542	4.91	8.78	53.29
BIELLA	1611	15.30821	0.937473	4.91	8.81	53.29
BOLOGNA	2831	13.30536	0.949216	4.91	8.81	53.29
BOLZANO	2241	13.97696	0.954871	4.91	8.78	53.29
BRESCIA	2829	12.6618	0.959928	4.91	8.78	53.29
COMO	2423	12.95168	0.964215	4.91	8.78	53.29
CREMONA	2273	12.92337	0.980732	4.91	8.78	53.29
CUNEO	2324	12.98974	0.978809	4.91	8.78	53.29
FERRARA	2125	14.01995	0.991549	4.91	8.78	53.29
FORLI'	2330	13.74397	0.961752	4.91	8.78	53.29
GENOVA	2441	13.2962	0.964144	4.91	8.78	53.29
GORIZIA	1657	14.20232	0.960382	4.91	8.78	53.29
IMPERIA	1375	15.86413	0.9626	4.91	8.81	53.29
LA SPEZIA	1602	15.12978	0.95481	4.91	8.81	53.29
LECCO	2338	13.01891	0.961753	4.91	8.78	53.29
LODI	1897	14.49575	0.96151	4.91	8.81	53.29
MANTOVA	2333	13.25355	0.947707	4.91	8.78	53.29
MILANO	3260	13.10931	0.938103	4.91	8.78	53.29
MODENA	2591	13.14149	0.975414	4.91	8.78	53.29
NOVARA	2234	13.68667	0.952238	4.91	8.81	53.29
PADOVA	2617	12.90756	0.955709	4.91	8.78	53.29
PARMA	2450	13.76345	0.984092	4.91	8.78	53.29
PAVIA	2255	13.17788	0.953566	4.91	8.78	53.29
PIACENZA	1989	13.86824	0.972598	4.91	8.78	53.29
PORDENONE	2214	13.76112	0.967526	4.91	8.795	53.29
RAVENNA	2291	14.11627	0.959438	4.91	8.81	53.29
REGGIO EMILIA	2473	13.48474	0.982474	4.91	8.78	53.29
RIMINI	2115	14.38187	0.956248	4.91	8.81	53.29
ROVIGO	2028	13.56119	0.98577	4.91	8.78	53.29
SAVONA	1734	14.26403	0.979882	4.91	8.795	53.29
SONDRIO	1768	14.98682	0.980555	4.91	8.78	53.29
TORINO	2907	13.15325	0.955685	4.91	8.78	53.29
TRENTO	2412	13.30085	0.973706	4.91	8.78	53.29
TREVISO	2578	13.34094	0.94968	4.91	8.795	53.29
TRIESTE	1654	15.08387	0.955431	4.91	8.81	53.29
UDINE	2514	12.82867	0.971179	4.91	8.78	53.29
VARESE	2501	13.31225	0.962544	4.91	8.78	53.29
VENEZIA	2491	13.39685	0.955543	4.91	8.81	53.29
VERBANIA	1812	14.13206	0.982533	4.91	8.78	53.29
VERCELLI	1779	14.5336	0.949096	4.91	8.81	53.29
VERONA	2686	13.15695	0.959791	4.91	8.78	53.29
VICENZA	2681	13.08144	0.961716	4.91	8.78	53.29
Total	**102724**	**13.64106**	**0.9663425**	**4.91**	**8.78**	**53.29**

Table 18 **Ex-ante risk short term loans CENTRE**

CENTRE	N	mean	cv	p1	p50	p99
ANCONA	1804	14.34715	0.958409	4.91	8.81	53.29
AREZZO	1383	16.51151	0.921465	4.91	12.76	53.29
ASCOLI PICENO	1453	15.48237	0.965191	4.91	8.78	53.29
CHIETI	1341	16.03145	0.986509	4.91	8.78	53.29
FIRENZE	1928	15.26241	0.959649	4.91	8.81	53.29
FROSINONE	1452	15.03121	0.969864	4.91	8.81	53.29
GROSSETO	798	19.58335	0.87536	4.91	14.52	53.29
L'AQUILA	1106	17.9937	0.904578	4.91	12.76	53.29
LATINA	1393	15.44673	0.975656	4.91	8.81	53.29
LIVORNO	1070	17.38793	0.93648	4.91	8.96	53.29
LUCCA	1577	14.75112	0.964716	4.91	8.78	53.29
MACERATA	1552	15.01757	0.967754	4.91	8.78	53.29
MASSA	1197	16.03592	0.950662	4.91	8.78	53.29
PERUGIA	1891	14.55215	0.962985	4.91	8.78	53.29
PESARO	1690	14.78665	0.985785	4.91	8.78	53.29
PESCARA	1295	16.84171	0.915785	4.91	12.76	53.29
PISA	1322	16.34394	0.930194	4.91	8.96	53.29
PISTOIA	1383	15.48641	0.929984	4.91	8.81	53.29
PRATO	1154	18.56088	0.862031	4.91	14.52	53.29
RIETI	579	21.53886	0.836487	4.91	14.52	53.29
ROMA	2580	14.3863	0.932632	4.91	8.81	53.29
SIENA	1317	15.81957	0.983492	4.91	8.78	53.29
TERAMO	1432	15.18149	0.942224	4.91	8.96	53.29
TERNI	1011	17.28438	0.941441	4.91	8.96	53.29
VITERBO	925	17.72026	0.9268	4.91	8.81	53.29
Total	**34633**	**15.88564**	**0.9490851**	**4.91**	**8.81**	**53.29**

Table 19 **Ex-ante risk long term loans CENTRE**

CENTRE	N	mean	cv	p1	p50	p99
ANCONA	2291	13.23407	0.95467	4.91	8.81	53.29
AREZZO	2119	14.05185	0.972221	4.91	8.78	53.29
ASCOLI PICENO	2163	13.60368	0.955317	4.91	8.78	53.29
CHIETI	2117	13.65575	0.998395	4.91	8.78	53.29
FIRENZE	2504	13.80536	0.965696	4.91	8.78	53.29
FROSINONE	1893	13.6816	0.999139	4.91	8.78	53.29
GROSSETO	1669	14.98456	0.96168	4.91	8.78	53.29
L'AQUILA	1809	14.23948	0.971397	4.91	8.81	53.29
LATINA	1912	13.45625	0.985548	4.91	8.78	53.29
LIVORNO	1881	13.95693	0.974878	4.91	8.78	53.29
LUCCA	2263	13.74406	0.980479	4.91	8.81	53.29
MACERATA	2100	13.60488	0.954681	4.91	8.78	53.29
MASSA	1632	14.70772	0.966523	4.91	8.78	53.29
PERUGIA	2432	13.06456	0.959545	4.91	8.78	53.29
PESARO	2250	13.63695	0.979568	4.91	8.78	53.29
PESCARA	2043	13.94359	0.957268	4.91	8.81	53.29
PISA	2187	13.52284	0.959987	4.91	8.81	53.29
PISTOIA	2154	13.41904	0.94703	4.91	8.78	53.29
PRATO	1689	15.60841	0.939149	4.91	8.81	53.29
RIETI	1113	15.98076	0.945225	5.1	8.81	53.29
ROMA	2768	13.77557	0.947883	4.91	8.81	53.29
SIENA	2091	13.58836	0.96396	4.91	8.78	53.29
TERAMO	2153	13.28593	0.976221	4.91	8.78	53.29
TERNI	1744	14.50202	0.975303	4.91	8.78	53.29
VITERBO	1563	14.6837	0.993426	4.91	8.78	53.29
Total	**50540**	**13.89562**	**0.9689646**	**4.91**	**8.78**	**53.29**

Table 20 **Ex-ante risk short term loans SOUTH**

SOUTH	N	mean	cv	p1	p50	p99
AGRIGENTO	849	17.95216	0.960079	4.91	8.78	53.29
AVELLINO	1235	15.99301	0.923948	4.91	8.81	53.29
BARI	1833	14.78896	0.970346	4.91	8.81	53.29
BENEVENTO	907	17.01786	0.957788	4.91	8.96	53.29
BRINDISI	843	17.34531	0.92103	4.91	8.96	53.29
CAGLIARI	1462	15.59847	0.973238	4.91	8.78	53.29
CALTANISETTA	628	19.72554	0.896923	4.91	13.24	53.29
CAMPOBASSO	786	19.58094	0.894325	4.91	12.76	53.29
CASERTA	1467	15.6759	0.948752	4.91	8.81	53.29
CATANIA	1521	15.20799	0.970871	4.91	8.78	53.29
CATANZARO	1023	16.7847	0.951938	4.91	8.81	53.29
COSENZA	1227	16.73018	0.949751	4.91	8.81	53.29
CROTONE	890	17.42794	0.906581	4.91	8.96	53.29
ENNA	521	22.77324	0.809337	4.91	14.52	53.29
FOGGIA	1340	16.52676	0.935123	4.91	8.81	53.29
ISERNIA	526	21.71949	0.813058	4.91	14.52	53.29
LECCE	1304	16.65433	0.926118	4.91	8.96	53.29
MATERA	632	22.76487	0.829875	5.1	14.52	53.29
MESSINA	1099	17.37648	0.951127	4.91	8.96	53.29
NAPOLI	2288	13.62622	0.971513	4.91	8.78	53.29
NUORO	681	18.89383	0.962291	4.91	8.81	53.29
ORISTANO	349	21.59582	0.873468	4.91	14.52	53.29
PALERMO	1493	15.24766	0.955739	4.91	8.81	53.29
POTENZA	1030	16.97529	0.940957	4.91	8.81	53.29
RAGUSA	846	16.79874	0.971135	4.91	8.81	53.29
REGGIO CALABRIA	1097	17.0643	0.934344	4.91	8.81	53.29
SALERNO	1749	14.18818	0.976843	4.91	8.78	53.29
SASSARI	1102	16.72609	0.97277	4.91	8.81	53.29
SIRACUSA	907	18.11659	0.922502	4.91	8.96	53.29
TARANTO	1191	16.74277	0.925351	4.91	8.96	53.29
TRAPANI	1072	16.8482	0.943082	4.91	8.96	53.29
VIBO VALENZIA	650	18.05658	0.946693	5.1	8.96	53.29
Total	**34548**	**16.69834**	**0.9484305**	**4.91**	**8.81**	**53.29**

Table 21 **Ex-ante risk long term loans SOUTH**

SOUTH	N	mean	cv	p1	p50	p99
AGRIGENTO	1187	16.27324	0.983663	4.91	8.78	53.29
AVELLINO	1768	14.14169	0.951026	4.91	8.78	53.29
BARI	2395	13.61997	0.964503	4.91	8.78	53.29
BENEVENTO	1392	14.74317	0.981315	4.91	8.78	53.29
BRINDISI	1428	14.72681	0.980325	4.91	8.78	53.29
CAGLIARI	2245	13.93559	0.967732	4.91	8.81	53.29
CALTANISETTA	1194	15.87059	1.00016	4.91	8.78	53.29
CAMPOBASSO	1384	15.55509	0.973598	4.91	8.81	53.29
CASERTA	1911	13.84071	0.991277	4.91	8.78	53.29
CATANIA	2022	13.58257	0.978989	4.91	8.78	53.29
CATANZARO	1422	15.29072	0.9803	4.91	6.95	53.29
COSENZA	1753	14.7804	0.970487	4.91	8.81	53.29
CROTONE	1274	15.07302	0.939487	4.91	8.81	53.29
ENNA	769	20.08718	0.869111	4.91	14.52	53.29
FOGGIA	1820	14.47505	0.975064	4.91	8.78	53.29
ISERNIA	1120	16.06015	0.975624	4.91	8.78	53.29
LECCE	1893	14.25324	0.953427	4.91	8.81	53.29
MATERA	1419	15.76214	0.973348	4.91	8.81	53.29
MESSINA	1656	15.18115	0.975001	4.91	8.78	53.29
NAPOLI	2503	13.82001	0.960505	4.91	8.81	53.29
NUORO	1409	15.00037	1.007154	4.91	8.78	53.29
ORISTANO	1099	15.66583	0.978203	4.91	8.81	53.29
PALERMO	1864	14.31879	0.968042	4.91	8.78	53.29
POTENZA	1663	14.33381	0.990738	4.91	8.78	53.29
RAGUSA	1443	14.73007	0.99891	4.91	8.78	53.29
REGGIO CALABRIA	1345	15.63653	0.951637	4.91	8.81	53.29
SALERNO	2273	13.29944	0.961175	4.91	8.78	53.29
SASSARI	1780	14.67678	0.974701	4.91	8.81	53.29
SIRACUSA	1364	15.78133	0.95619	4.91	8.81	53.29
TARANTO	1744	14.96696	0.947276	4.91	8.81	53.29
TRAPANI	1566	14.42509	0.977999	4.91	8.81	53.29
VIBO VALENZIA	909	16.61691	0.968436	4.91	6.95	53.29
Total	**51014**	**14.75528**	**0.974237**	**4.91**	**8.78**	**53.29**

Ex-ante risk is almost equally distributed in Italy, both for long-term loans and short-term loans: the 1st percentile is always the one corresponding to the least opaque sector, whereas the 99th percentile is represented by the riskiest sector, i.e. constructions. There is only a little increase in the average ex-ante risk from the North Area to the South Area of Italy (from an average degree of opaqueness of 14.24 for the North Area to 15.53 for the South Area for long-term loans and from 15.07 to 16.69 for short-term loans).

Table 22 **Ex-post risk NORTH**

NORTH	N	mean	p1	p50	p99
ALESSANDRIA	4066	0.006991	0	0	0.119694
AOSTA	2914	0.005644	0	0	0.153096
ASTI	3352	0.003572	0	0	0.088432
BELLUNO	3409	0.004398	0	0	0.075598
BERGAMO	4583	0.003509	0	0	0.061835
BIELLA	3151	0.005326	0	0	0.116032
BOLOGNA	4672	0.003661	0	0	0.056355
BOLZANO	4070	0.003398	0	0	0.057104
BRESCIA	4506	0.00356	0	0	0.055201
COMO	3998	0.003873	0	0	0.072289
CREMONA	3809	0.004165	0	0	0.085022
CUNEO	4049	0.003723	0	0	0.080385
FERRARA	3841	0.005117	0	0	0.115212
FORLI'	4087	0.00437	0	0	0.07852
GENOVA	4344	0.00476	0	0	0.089252
GORIZIA	3367	0.00464	0	0	0.132998
IMPERIA	2817	0.005103	0	0	0.12214
LA SPEZIA	3247	0.007875	0	0	0.163785
LECCO	3737	0.004092	0	0	0.081741
LODI	3420	0.003801	0	0	0.110835
MANTOVA	4023	0.004077	0	0	0.078878
MILANO	5299	0.004792	0	0	0.055122
MODENA	4354	0.003747	0	0	0.053407
NOVARA	3883	0.005441	0	0	0.114719
PADOVA	4382	0.004159	0	0	0.062303
PARMA	4284	0.005608	0	0	0.089453
PAVIA	3819	0.005803	0	0	0.105585
PIACENZA	3752	0.003379	0	0	0.073798
PORDENONE	3818	0.003735	0	0	0.080242
RAVENNA	4161	0.00304	0	0	0.055503
EMILIA	4190	0.002716	0	0	0.046061
RIMINI	3829	0.003745	0	0	0.07457
ROVIGO	3511	0.006153	0	0	0.145313
SAVONA	3370	0.005152	0	0	0.11284
SONDRIO	3392	0.003797	0	0	0.113303
TORINO	4875	0.004779	0	0	0.056364
TRENTO	4120	0.002854	0	0	0.068186
TREVISO	4291	0.003805	0	0	0.074114
TRIESTE	3492	0.004557	0	0	0.103136
UDINE	4197	0.003538	0	0	0.084542
VARESE	4203	0.004987	0	0	0.074212
VENEZIA	4422	0.004136	0	0	0.073427
VERBANIA	3309	0.006666	0	0	0.165734
VERCELLI	3267	0.003644	0	0	0.086871
VERONA	4366	0.004358	0	0	0.084779
VICENZA	4478	0.00379	0	0	0.051092
Total	**180526**	**0.004389**	**0**	**0**	**0.082714**

Table 23 **Ex-post risk CENTRE**

CENTRE	N	mean	p1	p50	p99
ANCONA	3933	0.004783	0	0	0.08954
AREZZO	3724	0.004376	0	0	0.097845
ASCOLI PICENO	3672	0.005154	0	0	0.099013
CHIETI	3779	0.006469	0	0	0.141392
FIRENZE	4456	0.00441	0	0	0.077703
FROSINONE	3554	0.014652	0	0	0.314806
GROSSETO	3106	0.004201	0	0	0.104084
L'AQUILA	3366	0.010175	0	0	0.291306
LATINA	3670	0.014258	0	0	0.298267
LIVORNO	3614	0.006383	0	0	0.126893
LUCCA	3810	0.005512	0	0	0.10218
MACERATA	3554	0.004008	0	0	0.071307
MASSA	3096	0.006901	0	0	0.150708
PERUGIA	4048	0.005906	0	0	0.104679
PESARO	3778	0.00398	0	0	0.076061
PESCARA	3556	0.00738	0	0	0.179049
PISA	3812	0.005893	0	0	0.118943
PISTOIA	3589	0.005341	0	0	0.104693
PRATO	3294	0.005484	0	0	0.12415
RIETI	2292	0.007403	0	0	0.189749
ROMA	5013	0.01092	0	0	0.146919
SIENA	3625	0.003884	0	0	0.080989
TERAMO	3619	0.00669	0	0	0.11273
TERNI	3295	0.007535	0	0	0.174728
VITERBO	2687	0.011445	0	0	0.291165
Total	**89942**	**0.006893**	**0**	**0**	**0.13885**

Finally, ex-post risk is, instead, increasing from the North Area to the South Area of Italy (from an average default risk of 0.004 for the North Area to 0.009 for the South Area); moreover the data underline a strong volatility both between the three geographical macro-areas and within them. Unfortunately, the information on default risk is not present at a level of detail referred to the maturity of the loans.

In conclusion, summary statistics show that from the North Area to the South Area of Italy there is an increase in the degree of collateralization, in project screening, in ex-ante risk, in ex-post risk and in the judicial inefficiency and that collateral requirements are higher for long-term loans than for short-term ones, whereas ex-ante risk is slightly higher for short-term loans than for long-term ones.

Table 24 **Ex-post risk SOUTH**

SOUTH	N	mean	p1	p50	p99
AGRIGENTO	2537	0.008774	0	0	0.204785
AVELLINO	3365	0.00882	0	0	0.190152
BARI	4070	0.007781	0	0	0.123135
BENEVENTO	2922	0.011459	0	0	0.260015
BRINDISI	2880	0.008401	0	0	0.170896
CAGLIARI	4034	0.009187	0	0	0.199469
CALTANISSETTA	2560	0.010698	0	0	0.341234
CAMPOBASSO	2856	0.008911	0	0	0.250962
CASERTA	3578	0.008411	0	0	0.159037
CATANIA	3634	0.007095	0	0	0.154062
CATANZARO	2934	0.010294	0	0	0.246464
COSENZA	3196	0.010625	0	0	0.226455
CROTONE	2732	0.010653	0	0	0.309015
ENNA	2038	0.009546	0	0	0.340995
FOGGIA	3339	0.009623	0	0	0.19494
ISERNIA	2354	0.015699	0	0	0.578843
LECCE	3222	0.009345	0	0	0.165292
MATERA	2794	0.007023	0	0	0.205972
MESSINA	3375	0.01027	0	0	0.232504
NAPOLI	4481	0.007242	0	0	0.096776
NUORO	2692	0.006347	0	0	0.153247
ORISTANO	2260	0.007641	0	0	0.209712
PALERMO	3849	0.011059	0	0	0.190749
POTENZA	3250	0.010195	0	0	0.235833
RAGUSA	2832	0.004453	0	0	0.097109
REGGIO CALABRIA	2952	0.012808	0	0	0.297874
SALERNO	3896	0.010105	0	0	0.169149
SASSARI	3486	0.00783	0	0	0.168922
SIRACUSA	3031	0.009846	0	0	0.232311
TARANTO	3292	0.008686	0	0	0.171749
TRAPANI	3184	0.007764	0	0	0.197824
VIBO VALENZIA	2214	0.013468	0	0	0.46208
Total	**99839**	**0.009273**	**0**	**0**	**0.204291**

5 THE MODEL STRUCTURE AND EMPIRICAL RESULTS

5.1 The Ex-Ante Analysis

In the first part of our study, i.e. the ex-ante analysis, we focus the attention on the determinants of collateral and in particular way we aim to evaluate the role of project screening and whether its decrease could generate an increase in collateral requirements as theoretically predicted by Manove et

al. (2001). The empirical strategy adopted here is based upon an unbalanced random effect panel for the Italian credit market; to reduce the possible influence of outlier data, we trim the observations on each dataset, discussed in the previous section, above the 99th percentile and below the 1st percentile.

Formally, in each Italian province we estimate the following equation for two subgroups, each of one identifying a different maturity of the loans granted (short-term and long-term):

$$\begin{aligned} Collateral_{it} &= a + b*(Judicial\ Inefficiency)_{it} + c*(Screening)_{it} \quad (1) \\ &+ d*(Ex-ante\ risk)_i + e*Dummy(Time) + \\ &+ f*Dummy(Utilization\ Class) + \epsilon_{it} \end{aligned}$$

where index *i(1….103)* indicates the cross-section dimension, that are the Italian provinces and index *t(1….30)* indicates time.

Tables (25)-(26) report the results of the estimates of the determinants of collateral, distinguishing between short-term loans and long-term loans:

Table 25 Ex-ante analysis: estimation results short term loans

VARIABLES	Collateral
Ex_ante_Risk	0.000627***
	(6.73e-05)
Screening	2.96e-05***
	(2.20e-06)
Judicial_Inefficiency	0.00264**
	(0.00132)
Constant	0.0980***
	(0.0116)
Observations	121329
Number of Provinces	103
R-squared	0.1404

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 26: Ex-ante analysis: estimation results long term loans

VARIABLES	Collateral
Ex_ante_Risk	0.00182***
	(0.000184)
Screening	1.11e-05***
	(9.08e-07)
Judicial_Inefficiency	-0.00172
	(0.00286)
Constant	0.387***
	(0.0248)
Observations	172442
Number of Provinces	103
R-squared	0.0613

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Estimates are performed on a sample of 121,329 short-term loans and 172,442 long-term loans; time dummies and dummies for the utilization class of the borrower, included in the regression, are not reported in order to save space. The Hausman test performed on the equation (1) for the possibility of

use a random-effect model rejects the null hypothesis that the difference in coefficients between a fixed-effects model (with fixed effects referred to the provinces) and a random-effects model is not systematic; thus, we choose a fixed-effects model, referring fixed-effects to the provinces.

The overall R-squared of the regressions on the two subsamples are respectively 0.14 and 0.06.

In the case of ex-ante risk, the coefficient is positive and significant at a level of 1% for both the subsamples: this result shows how the increase in collateral posted does not come from ex-ante safer borrowers, as the model of "Lazy Banks" hypothesizes, but the increase in the ex-ante risk generates a growing demand in collateral requirements by the banks. This result, in line with the existing empirical literature cited above, is also consistent with the use of collateral as an instrument to solve adverse selection problems (Liberti and Mian (2005)): the riskier (or opaquer) is the economic sector of activity of the borrower the higher will be his degree of collateralization.

Also screening activity of the banks is positively related to the degree of collateralization, showing that there exists a complementary relationship between collateral and project screening, as already shown at a geographical level by the summary statistics and consistently with the literature (Ono and Uesugi (2005). In fact, whenever the screening activity of a bank on an investment project is more intense (in this case in terms of labor force), this means for the bank an increase of costs in activities whose aim is to produce additional information, such as screening. The presence of collateral, in turn, makes a loan senior with respect to one without guarantees (real or personal). Hence, an increase in collateral requirements would represent a sort of pay-off asked by the banks in order to have the right incentive in the screening activity, that is a costly information production activity.

Judicial inefficiency is positively related to collateral requirements for short-term loans, whereas is not statistically significant for long-term loans. Indeed, judicial inefficiency as a measure of scanty law enforcement represents a sort of ex-ante systemic risk, that, together with specific ex-ante risk, here described by the degree of opaqueness of the borrower, makes the lending activity of a bank riskier due to the actual difficulty to recover a loan in the case of a default. Hence, the increase in the demand of collateral appears to be a valid instrument to protect the banks from any form of ex-ante risk, both coming from the economic sector of activity of the borrower (and so specific) and from the different level of judicial efficiency (systemic risk), so an increase in law enforcement, represented here by a decrease in judicial inefficiency, does not generate larger amounts of collateral posted, as the theoretical model of "Lazy Banks" predicts, but real guarantees are rather generated by judicial

inefficiency. The different result between short-term loans and long-term loans could be really explained by the different maturity of the two kinds of loan with respect to the average length of civil trials. In fact, civil trials last on average 3.65 years, which is a longer period with respect to the maximum length of short-term loans (eighteen months); thus, this kind of loans need to be assisted by higher collateral requirements in order to give to the banks an instrument to protect themselves by credit losses. For long-term loans, instead, the average duration, that is very often much longer than the one of civil trials, makes judicial inefficiency not relevant in the determinacy of the degree of collateralization.

All this evidence is in line with a sort of "diligence" in the lending behavior of the banks rather than "laziness", on the basis of which the borrowers would use collateral in order to signal their safety and to avoid financing screening activity for bad borrowers, who would not be financed. In fact, the data show how collateral is required more from ex-ante riskier borrowers, whenever screening activity increases and judicial inefficiency is high.

Finally, to test the robustness of these results we make a series of robustness checks. In detail, we run the regression (1) excluding by both the subsamples the borrowers with the highest degree of opaqueness, that are the firms belonging to the sector of construction, to test whether risk associated with them were able to influence the results, but we find the same results exposed in tables (25)-(26). Then, we ulteriorly split our sample for the three geographical macro-areas (North, Centre and South) within each maturity subsample: in this case we find a confirmation of the original regressions apart from the judicial inefficiency for short-term loans; we find that only in the Central Area of Italy the ex-ante systemic risk represented here by a low law enforcement is able to influence the increase in collateral requirements and so the results of the regression (1) for the short-term subsample are driven by the weight of Central Italy provinces. The next robustness check regards a further sample split for each loan utilization class within each maturity subsample: the results are in line with those of tables (25)-(26) apart from judicial inefficiency, that exhibits a positive relationship with the degree of collateralization only for some utilization classes for short-term loans and for some classes has a positive sign for long-term loans too. These further tests prove that our results are robust for project screening and ex-ante risk and quite robust for judicial inefficiency.

Therefore, on the basis of the ex-ante analysis results, we can assert that collateral seems to provide a credible mechanism for commitment against ex-ante agency risk such as adverse selection and moral hazard (Liberti and Mian (2005)), and so our empirical findings are consistent both with theoretical models that consider collateral a credible incentive for solving the consequences deriving from the informative asymmetries arising in the credit

market (Boot et al. (1991)) and empirical works that find an increase in collateral requirements in the presence of an higher ex-ante risk (Berger and Udell (1990), Ono and Uesugi (2005), (Blazy and Weill (2006), Jimenez et al. (2006), among others).

5.2 The Ex-Post Analysis

In the second part of our analysis, i.e. the ex-post analysis, we aim to test whether collateral represents an effective buffer against credit default risk. The study is now focusing on the determinants of credit default risk measured here by the ratio between the value of defaulted loans in a period and the total amount of the non defaulted loans of the previous period; this measure represents a flow of loans in a specific period that enters a default status with respect to the full amount of loans granted not in default one period before. We base our empirical model upon an unbalanced fixed effect panel for the Italian credit market; formally, in each Italian province we estimate the following equation, without the sample split for loan maturity due to the lack of this piece of information:

$$\begin{aligned} Default\ Risk_{it} \quad = \quad & k + l * (Ex - ante\ risk)_{it} + m * (Collateral)_{it} + \\ & + n * Dummy(Time) + \\ & + o * Dummy(Utilization\ Class) + \epsilon_{it} \end{aligned} \tag{2}$$

where index *i(1….103)* indicates the cross-section dimension, that are the Italian provinces and index *t(1….30)* indicates time**.**

Table (27) reports the results of the estimates for the determinants of credit default risk:

Tab. 27 Ex-post analysis: estimation results

VARIABLES	Default_Risk
Ex_ante_Risk	1.03e-05**
	(4.72e-06)
Collateral	-0.000222
	(0.000167)
Constant	0.00561***
	(0.000649)
Observations	433798
Number Of Provinces	103
R-squared	0.0009

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Estimates are performed on a sample of 433,798 loans; time dummies and dummies for the utilization class of the borrower, included in the regression, are not reported in order to save space. The Hausman test performed on the equation (2) for the possibility of use a random-effect model rejects the null hypothesis that the difference in coefficients between a fixed-effects model (with fixed effects referred to the provinces) and a random-effects model is not systematic; therefore also in this

case, we have to choose a fixed-effects model, referring fixed-effects to the provinces.

The overall R-squared of the regression, despite the statistical significance of several variables, is 0.0009; this low value is a consequence of an high cross-section volatility, typical of these models.

In the case of ex-ante risk, the coefficient is positive and significant at a level of 5%: this result shows how an ex-ante riskier borrower has an higher probability of default given the amount of collateral posted, that, in turn, has not a statistically significant relationship with default risk.

The presence of real guarantees, even though they are increasing in ex-ante risk to build up a credible weapon against asymmetric information, is not able to lower ex-post credit risk default: given the borrower's ex-ante risk attitude, the presence of real guarantees does not stem the probability of default but could be rather an instrument to recover the amount of a loan (or a part of it) after a permanent situation of default.

Also in this case, to test the robustness of these results we make a series of robustness checks. The regression (2) excluding the borrowers with the highest degree of opaqueness and the sample split for the three geographical macro-areas (North, Centre and South) gives the same qualitative results exposed in table (27), apart from the Central Area of Italy, where neither the degree of collateralization nor the ex-ante risk are statistically significant, may be due to a presence of risk not correctly specified in our independent variables. Finally, the sample split for each loan utilization class shows that ex-ante risk and collateral requirements are statistically significant only for the second and the fifth class; in particular, for this last one the presence of real guarantees appears to be a valid instrument in lowering credit risk default.

The last robustness check we perform is to test whether the positive relationship between the degree of collateralization and ex-ante risk obtained in the ex-ante analysis is able to generate a strong collinearity between these variables in the ex-post regression, so to produce distortions in the results. Thus, we run again the regression (2) twice: first we drop ex-ante risk and we obtain also in this case the absence of any statistically significant linkage between collateral requirements and ex-post risk and secondly we drop collateral and leave ex-ante risk and the result is also in this case a positive dependence of ex-post risk from ex-ante risk. Also in this case, the empirical findings are quite robust.

In conclusion, the evidence presented here is consistent with the findings of Liberti and Mian (2005) according to which collateral seems to provide a credible mechanism for commitment against agency risk such as informative

asymmetries, but does not provide a convenient hedge against the realized ex-post credit default risk.

6 CONCLUSIONS

The empirical evidence presented in this paper sheds some new light on the determinants of collateral and of credit default risk; in particular way, we have tested the existence of a model of "Lazy Banks" for the Italian credit market, according to the theoretical paper of Manove et al. (2001).

We don't find any evidence in favour of "the substitution effect" between project screening and collateral, neither for long-term loans, where the presence of collateral requirements is higher, nor for short-term ones. This result is in line with the empirical evidence found by Ono and Uesugi (2005) with different measures of screening activity of the banks.

Moreover, ex-ante risk of the borrower is always positively related with collateral, so collateral seems to be posted by the riskier borrowers and not by the safer ones: thus, collateral appears to be an instrument able to solve ex-ante agency risk problems, because by this way the banks are able to sort the borrowers according to their riskiness. In this sense, from this empirical framework emerges a picture of "Diligent Banks" rather than "Lazy Banks".

Judicial inefficiency (as measure of low law-enforcement) does not matter for long-term loans, whereas it has a positive relationship with collateral for short-term loans; therefore, the increase in law enforcement does not generate larger amounts of collateral posted, as the theoretical model of "Lazy Banks" predicts, but collateralization is rather generated by judicial inefficiency. Therefore, the increase in the demand of collateral appears to be a valid instrument to protect the banks both from the ex-ante risk coming from the borrower (specific) and from a sort of systemic risk caused by different degree of law enforcement.

These results are robust enough if we do different sample splits within each maturity group of loans (short-term and long-term): the exclusion of the opaquest economic sector, the sample split for the three Italian geographical macro areas (North, Centre and South) and the one for loan utilization class.

This evidence is consistent both with theoretical models that consider collateral a credible incentive for solving the consequences deriving from the informative asymmetries arising in the credit market and empirical works that

find an increase in collateral requirements in the presence of higher ex-ante risk.

In the second part of our work, we turn to the relationship between credit default risk and collateral and we discover a positive co-movement between ex-ante and ex-post risk, whereas collateral and default risk do not appear to be related in a statistically significant way.

Consequently, collateral does not provide an effective hedge against credit defaults, but it represents only an effective incentive device against adverse selection and moral hazard.

The empirical structure described here calls for extensions on at least two points: the former deals with a further empirical analysis of the theoretical model of "Lazy Banks", i.e. is a monopolistic bank, or at least a bank with a strong market power, able to confirm the empirical findings of a "complementary effect" between collateral and project screening? The latter concerns the research of a more refined measure of project screening which would take into account the presence of information technologies for credit scoring able to reduce the number of employees in the screening activity.

We plan to investigate these points in a future work.

APPENDIX

EX-ANTE ANALYSIS: ROBUSTNESS CHECKS

Tab. 28 All economic sectors without Constructions, short term loans

VARIABLES	Collateral
Ex_ante_Risk	0.000627***
	(6.73e-05)
Screening	2.96e-05***
	(2.20e-06)
Judicial_Inefficiency	0.00264**
	(0.00132)
Constant	0.0902***
	(0.00872)
Observations	121329
Number of Provinces	103
R-squared	0.1403

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 29 All economic sectors without Constructions, long term loans

VARIABLES	Collateral
Ex_ante_Risk	0.00182***
	(0.000184)
Screening	1.11e-05***
	(9.08e-07)
Judicial_Inefficiency	-0.00172
	(0.00286)
Constant	0.387***
	(0.0248)
Observations	172442
Number of Provinces	103
R-squared	0.0647

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 30 North Italy, short term loans

VARIABLES	Collateral
Ex_ante_Risk	0.000959***
	(8.62e-05)
Screening	2.58e-05***
	(2.99e-06)
Judicial_Inefficiency	-0.000190
	(0.00132)
Constant	0.0740***
	(0.00820)
Observations	63049
Number of Provinces	46
R-squared	0.1294

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 31 North Italy, long term loans

VARIABLES	Collateral
Ex_ante_Risk	0.000659***
	(9.58e-05)
Screening	2.79e-05***
	(5.65e-06)
Judicial_Inefficiency	0.00959**
	(0.00375)
Constant	0.0358**
	(0.0170)
Observations	28923
Number of Provinces	25
R-squared	0.1344

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 32 Central Italy, short term loans

VARIABLES	Collateral
Ex_ante_Risk	6.10e-05
	(0.000117)
Screening	3.38e-05***
	(3.50e-06)
Judicial_Inefficiency	0.00128
	(0.00225)
Constant	0.183***
	(0.0232)
Observations	29357
Number of Provinces	32
R-squared	0.1528

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 33 Central Italy, long term loans

VARIABLES	Collateral
Ex_ante_Risk	0.00290***
	(0.000208)
Screening	1.17e-05***
	(1.40e-06)
Judicial_Inefficiency	0.000687
	(0.00540)
Constant	0.324***
	(0.0264)
Observations	86302
Number of Provinces	46
R-squared	0.0778

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 34 South Italy, short term loans

VARIABLES	Collateral
Ex_ante_Risk	0.00169***
	(0.000338)
Screening	1.14e-05***
	(1.95e-06)
Judicial_Inefficiency	0.0158
	(0.0137)
Constant	0.239***
	(0.0640)
Observations	42593
Number of Provinces	25
R-squared	0.0629

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 35 South Italy, long term loans

VARIABLES	Collateral
Ex_ante_Risk	0.000210
	(0.000263)
Screening	9.21e-06***
	(1.55e-06)
Judicial_Inefficiency	-0.00305
	(0.00360)
Constant	0.497***
	(0.0648)
Observations	43547
Number of Provinces	32
R-squared	0.0308

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tabb. 36-43 Sample Splits for the Utilization Class of the loans, short term loans

VARIABLES	Collateral
Ex_ante_Risk	-0.000147**
	(7.51e-05)
Screening	2.47e-05***
	(2.29e-06)
Judicial_Inefficiency	0.00200
	(0.00247)
Constant	0.0411***
	(0.00932)
Observations	18952
Number of Provinces	103
R-squared	0.2975

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	7.77e-05
	(6.32e-05)
Screening	2.65e-05***
	(2.81e-06)
Judicial_Inefficiency	0.00330*
	(0.00189)
Constant	0.0399***
	(0.00652)
Observations	21268
Number of Provinces	103
R-squared	0.2085

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.000372***
	(8.64e-05)
Screening	3.65e-05***
	(4.08e-06)
Judicial_Inefficiency	0.00481*
	(0.00253)
Constant	0
	(0)
Observations	22121
Number of Provinces	103
R-squared	0.1763

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.000979***
	(9.98e-05)
Screening	5.38e-05***
	(9.23e-06)
Judicial_Inefficiency	0.00314
	(0.00216)
Constant	0
	(0)
Observations	25170
Number of Provinces	103
R-squared	0.1487

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00143***
	(0.000155)
Screening	7.05e-05***
	(1.37e-05)
Judicial_Inefficiency	0.00756**
	(0.00309)
Constant	0
	(0)
Observations	15310
Number of Provinces	103
R-squared	0.1103

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00120***
	(0.000163)
Screening	3.84e-05**
	(1.87e-05)
Judicial_Inefficiency	0.00436
	(0.00345)
Constant	0
	(0)
Observations	13991
Number of Provinces	103
R-squared	0.0617

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00159***
	(0.000441)
Screening	4.22e-05
	(3.09e-05)
Judicial_Inefficiency	-0.00655
	(0.00914)
Constant	0.110***
	(0.0345)
Observations	3600
Number of Provinces	93
R-squared	0.0383

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00252***
	(0.000744)
Screening	0.000513***
	(0.000110)
Judicial_Inefficiency	0.00976
	(0.0120)
Constant	0.0111
	(0.0398)
Observations	917
Number of Provinces	55
R-squared	0.0756

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tabb. 44-51 Sample Splits for the Utilization Class of the loans, long term loans

VARIABLES	Collateral
Ex_ante_Risk	0.00213***
	(0.000202)
Screening	9.83e-06***
	(9.86e-07)
Judicial_Inefficiency	0.00352
	(0.00474)
Constant	0
	(0)
Observations	30237
Number of Provinces	103
R-squared	0.0681

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00156***
	(0.000215)
Screening	1.10e-05***
	(1.20e-06)
Judicial_Inefficiency	0.00475
	(0.00410)
Constant	0
	(0)
Observations	30504
Number of Provinces	103
R-squared	0.0570

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00157***
	(0.000244)
Screening	7.62e-06***
	(1.21e-06)
Judicial_Inefficiency	0.00536
	(0.00382)
Constant	0
	(0)
Observations	28911
Number of Provinces	103
R-squared	0.0372

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00221***
	(0.000246)
Screening	1.07e-05***
	(2.73e-06)
Judicial_Inefficiency	-0.00218
	(0.00444)
Constant	0
	(0)
Observations	30303
Number of Provinces	103
R-squared	0.0234

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00164***
	(0.000270)
Screening	1.65e-05***
	(3.21e-06)
Judicial_Inefficiency	0.00440
	(0.00545)
Constant	0
	(0)
Observations	21982
Number of Provinces	103
R-squared	0.0260

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00169***
	(0.000326)
Screening	3.34e-05***
	(8.00e-06)
Judicial_Inefficiency	-0.000790
	(0.00515)
Constant	0
	(0)
Observations	20832
Number of Provinces	103
R-squared	0.0178

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00228***
	(0.000643)
Screening	5.89e-05***
	(1.91e-05)
Judicial_Inefficiency	0.0285***
	(0.0103)
Constant	0.423***
	(0.0388)
Observations	7496
Number of Provinces	99
R-squared	0.0536

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Collateral
Ex_ante_Risk	0.00409***
	(0.00150)
Screening	0.000103***
	(2.80e-05)
Judicial_Inefficiency	0.0207
	(0.0257)
Constant	0
	(0)
Observations	2177
Number of Provinces	67
R-squared	0.0610

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

EX-POST ANALYSIS: ROBUSTNESS CHECKS

Tab. 52 All economic sectors without Constructions

VARIABLES	Default_Risk
Ex_ante_Risk	1.01e-05**
	(4.74e-06)
Collateral	-0.000115
	(0.000155)
Constant	0.00561***
	(0.000555)
Observations	268853
Number of Provinces	103
R-squared	0.0008

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 53 North Italy

VARIABLES	Default_Risk
Ex_ante_Risk	1.03e-05*
	(5.98e-06)
Collateral	-2.65e-05
	(0.000201)
Constant	0.00159**
	(0.000709)
Observations	221467
Number of Provinces	46
R-squared	0.0011

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 54 Central Italy

VARIABLES	Default_Risk
Ex_ante_Risk	-1.05e-05
	(7.80e-06)
Collateral	-0.000210
	(0.000353)
Constant	0.00728***
	(0.00159)
Observations	105824
Number of Provinces	25
R-squared	0.0010

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tab. 53 South Italy

VARIABLES	Default_Risk
Ex_ante_Risk	2.86e-05**
	(1.10e-05)
Collateral	-0.000503
	(0.000372)
Constant	0.00847***
	(0.00251)
Observations	106507
Number of Provinces	32
R-squared	0.0018

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tabb. 56-63 Sample Splits for the Utilization Class of the loans

VARIABLES	Default_Risk
Ex_ante_Risk	7.59e-06*
	(4.45e-06)
Collateral	-9.90e-05
	(0.000244)
Constant	0.00594***
	(0.000626)
Observations	73614
Number of Provinces	103
R-squared	0.0014

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Default_Risk
Ex_ante_Risk	1.24e-05*
	(6.31e-06)
Collateral	8.19e-05
	(0.000323)
Constant	0.00682***
	(0.000874)
Observations	77414
Number of Provinces	103
R-squared	0.0009

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Default_Risk
Ex_ante_Risk	-4.66e-06
	(7.90e-06)
Collateral	-0.000420*
	(0.000253)
Constant	0.00592***
	(0.000604)
Observations	82606
Number of Provinces	103
R-squared	0.0006

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Default_Risk
Ex_ante_Risk	3.01e-05**
	(1.49e-05)
Collateral	-0.00118**
	(0.000465)
Constant	0.00714***
	(0.00103)
Observations	54117
Number of Provinces	103
R-squared	0.0013

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Default_Risk
Ex_ante_Risk	2.56e-05
	(1.60e-05)
Collateral	-3.70e-05
	(0.000593)
Constant	0.00249***
	(0.000906)
Observations	50457
Number of Provinces	103
R-squared	0.0013

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Default_Risk
Ex_ante_Risk	-8.44e-06
	(3.45e-05)
Collateral	0.000880
	(0.00133)
Constant	0.00458*
	(0.00268)
Observations	15553
Number of Provinces	99
R-squared	0.0025

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Default_Risk
Ex_ante_Risk	2.10e-05
	(4.55e-05)
Collateral	0.00117
	(0.00175)
Constant	-0.00150
	(0.00128)
Observations	4175
Number of Provinces	71
R-squared	0.0071

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Tabb. 64-65 Robustness Checks for the presence of collinearity

VARIABLES	Default_Risk
Ex_ante_Risk	1.04e-05**
	(4.72e-06)
Constant	0.00551***
	(0.000646)
Observations	433798
Number of Provinces	103
R-squared	0.001

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Default_Risk
Collateral	-0.000
	(0.0001671)
Constant	0.006**
	(0.0006451)
	433798
Observations	103
Number of Provinces	0.0009
R-squared	-0.000

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

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