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"Credit Expansion and Banking Crises: The Role of Guarantees"

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Abstract

This paper aims at analysing whether banking changes that occurred in Italy in the last fifteen years have mined the soundness of its financial system. We look for potential threats to financial stability as a result of the dynamic behaviour of Italian banks that progressively have been favouring consumer households at the expense of firms in the allocation of credit. The theme of financial instability is closely linked to the question of capital regulation, which is a centrepiece of government intervention because it affects banks' soundness and risk taking incentives. After reviewing the literature on capital regulation, we first discuss the role of guarantees as a solution to banks' potential instability in the case of credit default and, secondly, we estimate a bank interest rate model that explicitly includes collateral and personal guarantees as explanatory variables. We show that banks follow different lending policies according to the type of customer. In the case of firms banks seem to efficiently screen and monitor customers and guarantees (real and personal) are both used to reduce moral hazard problems. In the case of consumer households and sole proprietorships banks behave "lazily" by replacing screening and monitoring activities with personal guarantees; instead, collateral is used to separate good from bad customers (i.e., to mitigate adverse selection problems). These results, together with the large proportion of bad loans in case of unsecured loans, may indicate the existence of potential sources of financial instability because (a) personal guarantees are a small share of loans, especially in the case of consumer households, (b) a decline in the value of collateral held by banks in the event of a housing market weakening.

Keywords: Banking Crisis; Household and Firm Credit Growth; Banking Regulation
JEL Classification: E44, G21, G28

Credit Expansion and Banking Crises: The Role of Guarantees

1. Introduction

Over the past several decades costly banking crises have stirred up again interest in understanding how supervisory and regulatory structures affect the stability of banking systems.[1] Banking is one of the most regulated industries in the world due to its central role in financial intermediation. Therefore, given that financial institutions and markets are not perfect substitutes, the configuration of financial systems matters and changes to one of these institutions likely have important consequences on economies' performances. Indeed, banks have always been the most important financial intermediaries in all economies for their role as providers of liquidity insurance, monitoring services and information.[2]

Regulation is just one type of interventions of the State in the economy and, as it is the case for other industries, banking regulation is justified by the existence of market failures. Precisely, this is the point of view held by those who belong to what is known as the "public interest" school. In banking, the public interest would be served if banks allocated resources in a socially efficient manner, facilitated payments, mobilized savings, allocated capital, monitored managers, and provided tools for the management and trading of a variety of risks.[3] In this paper we follow the "public interest" approach for two main reasons. The first reason is that the "public interest" view is the one that dominates international thinking on regulation; the second one is that capital regulation, which is Pillar 1 in Basel Capital Accords, is a centrepiece of government intervention because it can affect banks' soundness and risk taking incentives. Moreover, regulation has often focused on bank capital for its role in the corporate governance and competitiveness of banks (Santos, 2001).

Led by what is now widely known as the New Basel Capital Accord (Basel II), a widespread debate still focuses on the most efficient way to guarantee financial stability. Specifically, a major aim of Basel II has been to revise the rules of the 1988 Basel Capital Accord in such a way as to align banks' regulatory capital more closely with their risks, taking account of the progress in the measurement and management of risk and of the opportunities which these rules provide for strengthened supervision.[4]

This paper aims at shedding light on the role that guarantees and collateral play within the capital requirements argument and, consequently on the interest rate Italian banks charge to three different types of customers: firms, sole proprietorships and consumer households. We will focus on the latter because other Authors observed that household credit growth is a particularly important predictor of banking

[1] Recently, Goodhart (2006) pointed out that there is no generally accepted definition of financial stability. In this paper we interpret financial stability as the absence of banking crises that impairs credit intermediation or capital allocation.
[2] On this topic see Diamond and Rajan (2001).
[3] See Barth *et al*. (2006), chapter 2.
[4] Recently, Demirgüç-Kunt *et al*. (2006) showed that a significant and positive relationship between bank soundness (measured with Moody's financial strength ratings) and compliance with principles related to information provision. Specifically, countries which require banks to report regularly and accurately their financial data to regulators and market participants have sounder banks.

crises in countries with high propensity to consume (Buyukkarabacak and Valev, 2006). Our work is in the same line of research of Pozzolo (2004). However, while the latter is mainly focussed on the relationship between guarantees and the likelihood of obtaining loans, our paper studies the relationship between bank interest rates and guarantees by means of an econometric model and a panel data made up of about 120 banks for the period June 2003-June 2006. We try to infer about the presence in the Italian banking system of potential instability from our empirical results, namely the sign and the statistical significance of the estimated coefficients of bad loans and guarantees. Indeed, the economic literature already highlighted how empirical relationships between interest rates and guarantees may reflect banks' screening and monitoring activity.

Our results show that banks follow different lending policies according to the type of customer. In the case of firms banks seem to efficiently screen and monitor customers, higher interest rates are charged to riskier customers, and guarantees (real and personal) are both used to reduce moral hazard problems. Moreover, collateral seems to be very effective: the average value of loan defaults is the lowest when compared to loans with personal guarantees and without guarantees, for all types of customers. It is likely that the efficacy of collateral as a means of avoiding strategic default depends upon the positive trend registered in collateral prices. Eventually, a decline in house prices would change the situation by making strategic default more likely.

In the case of consumer households and sole proprietorships banks behave "lazily" by replacing screening and monitoring activities with personal guarantees; instead, collateral is used to separate good from bad customers (i.e., to mitigate adverse selection problems). In this role it works very efficiently in the case of consumer households, given that their ratio of bad loans to loans is the lowest. However, as above, collateral pledged by consumer households and sole proprietorships is subjected to the same concern about the event of a bubble burst that causes house prices to fall. Personal guarantees are still used to avoid strategic default. However, the estimated coefficient is not always statistically significant. In other words, banks behave "lazily", i.e., they simply replace screening and monitoring activities with personal guarantees. Therefore, interest rates do not reflect differences in customers' riskiness.

These results, together with the large proportion of bad loans in case of loans without guarantees, may indicate the existence of potential sources of financial instability within the Italian banking industry.

The rest of the paper is organized as follows. Section 2 reviews the economic literature on capital regulation, guarantees and financial stability, while Section 3 discusses how changes occurred in the Italian banking industry since the beginning of Nineties affected the supply and the distribution of credit. Section 4 describes data we used to estimate our empirical interest rate model and discusses econometric results. Finally, Section 5 concludes.

2. Bank Capital Regulation and Bank Soundness: A Review

Several contributions illustrate why capital regulation might be important especially when banks have access to safety net (deposit insurance) and the presence of small, generally uninformed investors hold most of the bank debt (Barth *et al*. 2006, Santos 2001).

Synthetically, deposit insurance gives banks an incentive to increase risk. The increase in risk, together with the potential externalities resulting from bank failures, justify the existence of minimum prudential capital/asset ratios that, therefore, become important in determining the amount bank owners must have at risk. In the intentions of international supervisory authorities, capital regulations may help to align the incentives of bank owners with depositors and other creditors. However, more stringent capital standards could still lead banks to choose riskier portfolios. Indeed, this may be the case if bank owners realise they are incurring in losses larger enough to completely absorb their bank equity. In this case, bank owners will have an incentive to choose a very high risk portfolio returning expected high returns, without bearing any further downside loss.

On the other hand, in the presence of information asymmetries, an increase in capital standards leads banks to keep into account the higher costs they will incur in case of bankruptcy and the higher cost of funding. If these costs are transferred to firms, they will be induced to choose safer investments which, in turn, reduce banks' risk of insolvency (Santos 2001).

Therefore, there are conflicting theoretical predictions on whether capital requirements curtail or promote bank performance and stability. Recently, Barth *et al.* (2006, pp. 218-221) provide empirical evidence on the relationship between bank capital regulation and banking crises. In banking crises regressions, and after controlling for other important variables, they find no support that more stringent capital requirements reduce the destabilizing effects of generous deposit insurance. Indeed, the estimated coefficient of the capital stringency variable is negatively associated with banking crises, but this relationship is not robust to changes in model specification.[5] Instead, they do find that capital regulation is negatively correlated with the level of nonperforming loans.

The preceding discussion on capital requirements shows that, even on a single topic, the bank regulation argument is far from reaching clear-cut conclusions concerning the best way to guarantee financial stability. It is also the case that financial stability trades off with the role financial systems play in favouring economic growth.

Recently, Guiso et al. (2006) showed that, in the case of Italy, restrictions to competition reduced the supply of credit, but also reduced the percentage of bad loans. By contrast, deregulation worked the other way around. Moreover, restrictions on competition had negative effects on aggregate growth.

Both in response to the critiques of Basel I, that made use of risk weights taken from those rating agencies, and in recognition of the changing financial markets, Basel II capital/asset ratios may be determined by means of internal models. This approach, particularly its advanced configuration, allows

[5] Barth *et al*. explain the result may be due to the harmonization of capital regulatory policies introduced by the Basel Capital Accords and the consequent reduction in cross-country variation in capital/asset ratios.

banks to derive default probabilities and loss given default to measure the overall risk of the bank rather than its individual components, the same way the market would measure it.[6]

The economic rationales behind the role formally played by collateral and guarantees in the Basel II analytical set-up of the formula used to measure risk are several. In a context where, for instance, moral hazard is the main problem in financial relationships, the right to repossess collateral gives lenders an essential threat to ensure that borrowers have an incentive to use the money borrowed productively. When this occurs, the banking system is more stable and banking crises are less likely.

Within the New Basel Capital Accord, a collateralised transaction is one in which:

- banks have a credit exposure or potential credit exposure; and
- that credit exposure or potential credit exposure is hedged in whole or in part by collateral posted by a counterparty or by a third party on behalf of the counterparty.

Where banks take eligible financial collateral (e.g. cash or securities), they are allowed to reduce their credit exposure to a counterparty when calculating their capital requirements to take account of the risk mitigating effect of the collateral.

Banks may opt for either the simple approach, which, similar to the 1988 Accord, substitutes the risk weighting of the collateral for the risk weighting of the counterparty for the collateralised portion of the exposure (generally subject to a 20% floor), or for the comprehensive approach, which allows fuller offset of collateral against exposures, by effectively reducing the exposure amount by the value ascribed to the collateral. Partial collateralisation is recognised in both approaches. Banks must have clear and robust procedures for the timely liquidation of collateral to ensure that any legal conditions required for declaring the default of the counterparty and liquidating the collateral are observed, and that collateral can be liquidated promptly.

Where guarantees are direct, explicit, irrevocable and unconditional, and supervisors are satisfied that banks fulfil certain minimum operational conditions relating to risk management processes, they may allow banks to take account of such credit protection in calculating capital requirements.[7]

However, financial stability might be negatively affected by the presence of guarantees and collateral in loans. Indeed, the role of collateral and guarantees in lending relationship has been widely discussed, and different conclusions have been reached. Theoretically, under perfect information, there is no need to ask for collateral since the bank can distinguish between different types of borrowers, and has perfect knowledge about the riskiness of their investment projects.

Under asymmetric information, however, collateral and personal guarantees play a role in solving different problems that may arise (Ono and Uesugi, 2006).

First of all, there are problems linked to the riskiness of the borrower. A hidden information-adverse selection problem arises in situations in which banks cannot discern the riskiness of the entrepreneur. Without collateral, the average loan rate would be higher than the rate optimal for safe

[6] See Barth *et al.* (2006), p. 70.
[7] BIS (2006), pp. 31-35.

borrowers, and only riskier borrowers would apply for banks loans. In these situations collateral acts as a screening device to distinguish the riskiness of the entrepreneur, and the lower risk borrower will choose the contract with collateral in order to take advantage of the lower interest rate (Bester, 1995 and 1998).[8]

A hidden action-moral hazard problem arises when the banks cannot observe the information taken by the borrower after the loan is originated. In these situations collateral is used as an incentive device, and reduces the debtor incentive to default strategically. As Boot *et al.* (1991) show, if there is substitutability between borrower quality and action, the riskier borrower pledges more collateral, while the good borrower gets an unsecured loan.

Moreover, there are studies that analyze the association between the length of the bank-borrower relationship and collateral requirements in both adverse selection and moral hazard settings. Among others, Boot and Thakor (1994) analyze repeated moral hazard in a competitive credit market. They find that a durable banking relationship benefits the borrowers, in the sense that borrowers pay a high interest rate and pledge collateral early in the relationship, but, after they encounter the first project success, they are awarded with a unsecured loan and a lower loan rate.

In a principle agent setting, John *et al.* (2003) find that collateral decreases the riskiness of a given loan, and that collateralized debt has higher yield than general debt, after controlling for credit rationing.

Secondly, collateral influences the screening and monitoring activities of the banks. Given the role of the banks as information providers, in the literature there are different outcomes about the impact of collateral on bank's screening and monitoring activities. According to the lazy bank hypothesis (Manove, Padilla, and Pagano, 2001), the presence of a high level of collateral weakens the bank's incentive to evaluate the profitability of a planned investment project. In this case collateral and screening are substitutes for a bank, but they are not equivalent from a social standpoint. Indeed, the Authors find that collateral limitations are efficient in competitive credit markets. Rajan and Winton (1995), on the other hand, argue that since the bank usually has a greater incentive to ask for collateral when the borrowers prospects are poor, a high level of collateralization might be considered as a sign that the borrower is in difficult. Therefore, the monitoring activity should be higher in the presence of higher debt collateralization. Longhofer and Santos (2000) argue that collateral and monitoring are complements when the bank takes senior positions on its small business loans.

Finally, collateral requirements might be affected by the credit market competition. Besanko and Thakor (1987) analyze the role of credit market structures in the presence of asymmetric information. The Authors find that in a competitive market, the role of collateral is useful, and that low risk borrowers choose a contract with a high level of collateral and a low loan rate, whereas high risk borrowers choose a contract with a low level of collateral and a high loan rate. In the monopolistic setting, instead, collateral plays no role unless it is sufficiently valuable to the bank to make the loan riskless. Inderst and Mueller

[8] However, in the presence of debt renegotiation, renegotiation might undermine the role of collateral as a screening device in the sense that if collateralization becomes attractive also for high risk entrepreneurs, the low risk entrepreneurs can no longer distinguish themselves by posting collateral (Bester, 1994).

(2006) analyze a model with different types of lenders: local lenders, with a soft, non contractable information advantage, and transaction lenders. The Authors show that as long as the information advantage narrows, and the competitive pressure from transaction lenders increases, local lenders should reduce the loan rate and increase the collateral requirements to maintain their competitive advantage.

Empirically, results about the impact of collateral and personal guarantees on the loan rate are not homogeneous either. Indeed, if collateral is used as a signalling device to solve the adverse selection problem, there should be a negative correlation between collateral and risk premium. On the other hand, if collateral is used as an incentive device to reduce moral hazard, and the *ex- ante* risk of the borrower is observed, the correlation should be positive. Berger and Udell (1990) find that collateral is most often associated with riskier borrowers, riskier loans, and riskier banks, supporting the idea that observably riskier borrowers are asked to pledge more collateral to mitigate the moral hazard problem. Ono and Uesugi (2006), who analyze the small business loan market in Japan, reach similar results. The Authors find that collateral is more likely to be pledged by riskier borrowers. Pozzolo (2004) argues that, when testing the relationship between risk and collateralization, it is important to distinguish between inside collateral and outside collateral, and between real and personal guarantees. Inside collateral is physical assets owned by the borrower, and its function is to order creditors priority in case of default. Outside collateral is assets posted by external grantors, and it increases the potential loss of the borrower in case of bankrupts. Therefore, the relationship between risk and guarantees should be higher in case of outside collateral, given that inside collateral does not provide additional losses to the borrower in case of default. However, empirically, real guarantees are used without the distinction between inside and outside collateral. Personal guarantees are contractual obligations of a third party, and they act as external collateral. However, they do not give the lender a specific claim on particular assets, limiting the actions he could take in case of borrower's bankruptcy. On the other hand, real guarantees are easier to dispose, but they might be both inside and outside. Consequently, only empirical analysis may help to distinguish which of the two types of guarantees affects more the loan interest rate. The Author finds that real guarantees are not statistically related to the borrower risk, and interprets this finding as potentially consistent with the hypothesis that inside collateral is used as a signalling device to solve the adverse selection problem. On the contrary, he finds that personal guarantees are more likely to be asked for when the borrower is *ex-ante* riskier. However, once the borrower's riskiness is controlled for, both real and personal guarantees reduce the interest rate charged on loans. Jimènez, Salas-Fumàs and Saurina (2006) find direct evidence of a negative association between collateral and the borrower's risk, thus supporting the theoretical idea of collateral used as a signalling device in an adverse selection setting.

Some Authors investigate the relationship of other variables on the probability of a loan to be secured. Berger and Udell (1995) and Jimènez, Salas-Fumàs and Saurina (2006) find that borrowers with longer banking relationships pay lower interest rates and are less likely to pledge collateral. Particularly, Berger and Udell (1995) find that the older a firm is and the longer its banking relationship, the less often

it will pledge collateral. The result is seen as consistent with the idea that requiring collateral early in a relationship may be useful in solving the moral hazard problem. Berger and Udell (1995) also find a positive relationship between the total assets of the borrowing firms, that is a measure of its size, and the probability to get a secured loan.

Analyzing the impact of relationship on the loan rate, Chakravarty and Yilmazer (2005) argue that the overall granting process is a sequential process given by three stages: application, decision and rate setting stages. The Authors find that the lending relationship matters only in the first and second stages, i.e.: conditional on being approved, relationships are not important in determining the loan rate. On the same direction, Petersen and Rajan (1994) do not find statistical evidence that the strength of the lender-borrower relationship is correlated with cheaper credit. The Authors also find that firms that borrow from multiple banks are charged a significantly higher rate, and they do not find statistical evidence in support of alternative explanations different from the idea that multiple sources weaken relationships.

As for the influence of collateral on screening and monitoring activities of banks, empirical implications of the theoretical models discussed above are different. Indeed, according to the lazy bank hypothesis, a higher screening activity should be observed when the borrowers post low collateral. Further, the average debt default should be higher when the creditors rights are more strictly enforced given that fewer projects will be screened in this case. On the other side, Rajan and Winton (1995) model predicts that collateralized debt should be observed more often in firms that need monitoring, and that changes in collateral should be positively correlated with the onset of financial distress. Jimènez, Salas-Fumàs and Saurina (2006) discuss how the use of collateral as a substitute to the screening activity of the bank depends on lenders characteristics.

Finally, the theoretical models seen on the relationship between collateral and competition predict a positive correlation between bank competition and collateral requirements. In the same line of research is the empirical analysis of Jimènez, Salas-Fumàs and Saurina (2006), who find that the use of collateral is less likely in more concentrated markets. The effect of credit market competition on lending relationship is analyzed in Petersen and Rajan (1995). They find that firms in the most concentrated credit markets are the least credit rationed, and that banks in more concentrated markets charge a lower than competitive rate on young firms, and higher than competitive rate on older firms.

In countries like Italy, whose economy is largely dominated by small companies, the provision of (real and personal) guarantees has always played a major role in facilitating the flow of credit to borrowers.

Beginning in the Nineties, the supply of credit to the economy has been also facilitated in Italy by the financial liberalization. The reduction of the Italian saving rate, the expansion of bank branches, the

elimination of administrative limits (for example lending ceiling) proved to be some of the major explanations for the growth of credit.[9]

Financial intermediaries are generally thought to reduce moral hazard and adverse selection problems that can make raising external funds difficult and expensive for firms. Efficient financial intermediaries thus should benefit firms that are most dependent on external funds to finance their growth. Conversely, crises in the financial sector should have a disproportionately negative impact on firms that rely heavily on external sources of finance. In the economic literature on this topic, it is thought that small firms are likely those to be more sensitive to the availability of external sources of finance. And small firms are widespread and account for a large share of the Italian economy. However, an "excessive" credit expansion can be beneficial for economic development in the long-run, but it may negatively affect macroeconomic stability and lead to poor credit allocation in the short-run. Indeed, there is international empirical evidence that credit expansions are often followed by banking crises (Buyukkarabacak and Valev, 2006; Kaminsky and Reinhart, 1999; Demirgüç-Kunt and Detragiache, 1997). This evidence, however, considers the growth rate of total credit to the private sector (households and firms) as a predictor of crises, but not separately. Indeed, household credit growth and firm credit growth have positive and distinct effects on the likelihood of banking crises. Household credit growth is a particularly important predictor of banking crises in countries with high propensity to consume (Buyukkarabacak and Valev, 2006).

The economic literature has pointed to three channels through which credit expansions lead to financial crises:[10]

- by leading to a current account deficit if the demand for goods cannot be satisfied by domestic supply. Moreover, while household credit growth raises the demand for consumption goods, firm credit growth raises the demand for investment goods. Therefore, borrowing to finance consumption does not add to long-term productive capacity of an economy. The consumption boom that results from rapid credit growth can be particularly strong in countries with traditionally low savings rates.[11] In these economies, the relaxation of credit constraints raises household indebtedness without boosting significantly future income, thus increasing default risks.
- by inflating asset bubbles. During a boom, credit expands and asset prices increase, which in turn increase borrowers' net worth and leads to new lending and even higher asset prices. During a burst, the borrowers are not able to repay their loans and defaults increase. Household and firm channels are likely to be different. A large portion of household credit is mortgage credit and its

[9] In recent years, the growth rate of banking loans does not reflect the overall credit granted by banks to customers due to the development of securitization. Indeed, from an accounting point of view, securitization changes the counterparties of loans (i.e. from firms to financials intermediaries), but reduces partially the credit risk of banks, in particular when securitizations regards bad loans.

[10] The discussion follows Buyukkarabacak and Valev (2006).

[11] According to Kirsanova and Sefton (2006), Table 2, 1997 savings rates in UK, US and Italy are 7.7%, 7.8% and 11.5%, respectively.

rapid growth might result in inflated residential real estate prices. Problems with consumer credit have been noted as well. Growth in firm credit might be associated with growth in commercial real estate and/or equity prices, both of which have been associated with crises.

- by leading to an inefficient use of resources. Here we refer to the difficulties faced by overburdened loan officers to price loans appropriately when the volume of new loans created is increasing rapidly. These problems could arise from both household and firm credit growth. The economic literature has focused mostly on firm credit because much of the household credit involves collateral real estate and, therefore, requires less precise judgments on the part of loan officers (unless there is a large drop in real estate prices). However, the increase in the unsecured household debt should also be a concern since higher levels of debt to income increase the probability of defaults.

Rapid growth in bank credit to the private sector is commonly associated to firm lending.

In this paper, we aim at analysing how the credit market changed in the last decade and the role played by collateral. Specifically, we analyze whether:

- collateral reduces the screening activity of banks and increases the risk of moral hazard. This "lazy" screening activity may affect allocation of funds in favour of projects with lower returns but that provide more collateral;
- the conventional wisdom that secured loans are less risky (and, thus, they carry lower interest rates) is supported by empirical evidence. We will also look at differences in interest rates in the case of real or personal guarantees.

Descriptive statistics use aggregated data drawn from statistical return and report information on loans assisted by real and personal warranties, as well as on unsecured loans, broken down by sector of counterparties and type of banks. Econometric exercises are mainly carried out using data at bank or customer level drawn from statistical return and central credit register for the period 1998-2005; the main variables employed cover the characteristics of customers (such as size of firms, relationship lending, branch of activity), the type of loans, interest rates applied and characteristics of lenders (for example size of banks, cooperative *vs* other banks).

3. Financial Liberalization and Credit Expansion in Italy

Since the beginning of the Nineties, European banking has been undergoing a massive restructuring that promised to create vast new financial market efficiencies and to transform how business is conducted. Notwithstanding, banking industries still show marked differences among the largest European financial markets (France, Germany, Italy and the U.K.). While the number of credit institutions decreased in all four countries, in 2005 the number of banks is still remarkably different. In U.K. only 400 banks are active, compared to the 792 banks in Italy, the 854 banks in France and the 2089

banks in Germany (see Table 1). These differences are only partially explained by the relative importance of markets vs. credit institutions as the preferred way to fund the economy. Indeed, the U.K. is traditionally classified as an economy oriented to financial markets, meaning that companies give more importance to financial sources coming from markets than from credit institutions. Consequently, the low number of banks might be easily explained. However, the situation observed in the other three countries, which are considered bank oriented, clearly reflects differences in domestic bank industry organization and regulation. The picture becomes richer when we compare the number of bank branches per 1000 capita (see Table 2). In the last twenty years, Italian banks more than doubled their physical presence in the economy, while in the other countries the number of branches either remained relatively constant or significantly decreased. Differences are remarkable not only dynamically, but also in absolute levels in 2005: Italy has the highest number of bank branches per 1,000 capita (0.54). The average number of bank branches for the European Union countries is 0.39.[12]

Finally, differences are observed in the banking market concentration. As expected, given the high number of banks, Germany shows the lowest bank concentration with respect to the other three countries. It is followed by Italy, also characterized by banks relatively small-sized, by the U.K. and, lastly, by France. The picture on banking concentration based on the Herfindahl index (calculated on banks' total assets) or on the share of the five largest credit institutions in total assets is the same (see Table 3).

One result from the previous descriptive analysis is that the Italian banking industry undergone a deep transformation the most striking result of which has been the increase and the diffusion of bank branches. Even in the most recent period with the widespread adoption of the information technology (IT), and the consequent possibility to access banking services from distant, bank branches are increasing on average at 2% a year.[13]

We expect to find that the bank branch development had a positive impact on the credit market. Table 4 provides a first answer to our hypothesis, at least with reference to the consumer debt market. In the both periods, 1980-1995 and 2003-2005, Italy shows a small stock of debt (housing mortgages and personal consumer loans). It is unlikely that small debt-consumption ratios for Italy are due to permanent severe liquidity constraints. It is more likely that the comparatively high level of interest rate makes consumers borrow less than in other countries.[14] The increase in the debt-consumption ratios between the two periods has been common to all countries in Table 4, and particularly marked in the case of the Netherlands. Notwithstanding a clear improvement, especially in the housing mortgage loan market, the Italian debt-consumption ratio in 2003-2005 is still below the levels of the other European economies. Further, the personal consumer loans-consumption ratio is about one-third of that of Germany and France

[12] On this topic see also Calcagnini and Hester (2002).
[13] See the on line Statistical Bulletin at www.bancaditalia.it.
[14] See de Bondt (1999), p.7. and also Cosci *et al*. (2005), pp.16-17.

(see Table 4).[15] In other words, financial liberalization resulted in an expansion of the Italian credit market, but still individuals seem to be not able to borrow as conveniently as individuals in other countries. That may be changing given that the Italian high saving rate will decline, as a natural outcome from the age structure of the Italian population as predicted by the life-cycle model of saving.[16] Consumer households' gross saving, as a percentage of gross national disposable income, that was 21.8% in the period 1981-1990, declined to 10.3% in the period 1996-2005.[17] Further, a recent survey shows that between 2005 and 2006 there has been an increase (3%) in the share of households whose consumption was larger than their income. This share was 25% in 2006, almost twice as large as its value in 2001 (13%). Among this 25% of households, 18% financed their consumption by reducing their wealth and 7% by borrowing. Further, of the whole sample, 37% of households answered that their savings were nil.[18]

In summary, the Italian consumer loan market is still thin compared with that of other European economies, but it shows several elements that potentially may transform it in a much larger market. Least, but not last, the capital regulation within the Basel Capital Accords that will become effective next year. Indeed, banks may find it profitable to increasingly provide loans to consumers because of their higher interest rates[19] and risk weights applied to the retail market segment are lower (75%) than those applied to unrated small- and medium-sized firms (100%). A negative consequence of these changes may be banks' portfolio with larger shares of lower quality loans, but with higher returns.[20] Based on our previous review of the economic literature, a larger share of banks' portfolio in low quality consumer loans represents a threat to the banking industry and financial stability.

Between 1999 and 2006 the portfolio loan of Italian banks changed significantly in favour of consumer households. Their share increased by almost 7 percentage points as a result of a growth rate of 120.9% in the whole period. As for firms, the share in the bank loan portfolio decreased from around 67% in 1999 to 62% in 2006. The growth rate of loans to firms increased in the same period of almost 65%. Finally, the growth rate of loans to sole proprietorships increased by 47.5% and, consequently, their share of loan portfolio decreased to 7.5% in 2006 from 9.3% in 1999 (see Table 5).

Table 6 shows a breakdown of loans and bad loans by type of customer (all customers, consumer households, sole proprietorships, firms) and type of guarantee (real, personal, no guarantees).[21] Data shown in Table 6 should be read across years than along time. Indeed, bad loans also decreased because

[15] However, it is also the case that consumers tend to arbitrage between mortgages and personal consumer loans, often obtaining credit more cheaply in the market for mortgages in order to finance current consumption rather than the purchase of a house (see Jappelli and Pagano, 1989).
[16] See Calcagnini and Hester (2002), pp. 152-153.
[17] See Bank of Italy (2006), p. 75.
[18] See ACRI (2006).
[19] In December 2005, the interest rate for loans to companies was 3.56%, that for mortgage loans to households 3.96%, and the interest rate for consumer loans 9.08%. See Bank of Italy (2006), Appendix, pp.175-177.
[20] See Santos (2001), p.30.
[21] All customers refers to a larger set of bank customers than the sum of consumer households, sole proprietorships, and firms.

of extraordinary securization operations and write-offs, especially in 2005.[22] However, several facts are worth noting.

First, loans to consumer households are mainly made of mortgage loans: in 1999, almost 64% of loans are guaranteed by collateral and this share increased in the following years up to almost 73% in 2005. The share of loans with personal guarantees was almost 10% in 1999, but it dropped to around half of it in 2005. Finally, the share of loans with no guarantees averaged around 24% between 1999 and 2005, and it decreased over the years.

Second, as for sole proprietorships, we also note an increase in the share of collateralized loans and a reduction in personal guaranteed loans, while loans with no guarantees remained relatively stable, but at a higher level than in the case of consumer households.

Third, a dynamics similar to that of consumer households and sole proprietorships is observed also for firms. The main difference is represented by the share of loans with no guarantees which is almost twice as large as that of the first two categories of bank customers.

As expected, the larger share of bad loans originates among loans with no guarantees. This share is the largest in the case of consumer households and smallest in the case of firms. Moreover it declined between 1999 and 2005 for all three types of customers. Therefore, guarantees (real and personal) play an important role in establishing a sounder banking system.

In the case of bad loans with guarantees, we note that consumer households show a larger share of bad loans correspondent to collateralized loans (a fact that mirrors their demand of mortgages) than loans with personal guarantees. The situation in the case of firms is the opposite (especially in the most recent years), while sole proprietorships are in an intermediate position (see Table 6).

A clearer picture of the risk associated with the different customers and type of loans emerges from the analysis of the bad loans-loans ratio that traditionally is used as a measure of credit risk (see Table 7). Sole proprietorships emerge as the riskiest type of customer especially when loans are provided without guarantees. There has been an improvement between 1999 and 2005,[23] but in 2005 almost 16% of loans with no guarantees defaulted. In the same year, sole proprietorships showed a higher bad loans-loans ratio than consumer households and firms. With the only exception of firms, the risk of default increases going from collateralized loans to loans with no guarantees. It is likely that the low default risk associated with collateralized loans depends on the type of investment undergone with the mortgage, i.e. the purchase of houses and apartments in a period of time characterized by increasing prices.

Results for consumer households seem to confirm, even though only partially, conclusions reached by Cosci *et al*. (2005). Indeed, the Authors find that Italian households borrow to stabilize their consumption path during time, without giving rise to situations of over-indebtness. However, Cosci *et al*. (2005) conclude their paper by formulating a hypothesis according to which in the future a growing number of families would need to borrow to stabilize their welfare. This expected increase in the loan

[22] See Bank of Italy (2006), pp.232 and 315-316.
[23] See footnote 22.

demand will represent a potential threat to bank stability if not matched by a correspondent increase in guarantees.

4. Data, Model Specification, and Results

This paper uses aggregated and individual statistics drawn from the ESCB (European System of Central Banks) harmonized data, the Statistical Return, and the Central Credit Register. Data are semi-annual and refer to the period June 2003 - June 2006. Information refer to three types of operators (firms, consumer households and sole proprietorships), consistent with the ESA95 definition.

Bank Interest Rates. Time series on interest rates are drawn from harmonized MIR (Monetary Financial Institution Interest Rates) statistics, collected by the Eurosystem since January 2003, primarily as a support to monetary policy. However MIR statistics are also suitable for economic analysis at national level. This information is collected and compiled by the Eurosystem; it is based on a representative sample of banks, made up of about 120 Italian banks.[24] Interest rates on loans to firms is the weighted average of new businesses up to and over € 1 million; interest rates on loans to consumer households and sole proprietorships is the weighted average of new businesses granted for consumer credit, house purchases and other purposes. Overnight interest rates are the arithmetic mean of the weighted average rates daily traded on the Interbank Deposit Market.

Warranties. Real guarantees (inside collateral) are mainly mortgages granted by borrowers to the bank; personal guarantees (outside collateral) are guarantees granted by third parties in favor of borrowers. Data are drawn from Statistical Return.

Loans and Bad Loans. Data are drawn from Statistical Return.

Average Loan Duration. This information is the average length (in years) of customer relationship for each bank in the sample; it is figured out for firms, using individual data and refers to a period of five years prior each reference date. Data are drawn from Central Credit Register. Given that the Central Credit Register records borrowers with loans larger than € 75,000, *Average Loan Duration* has only been calculated for firms. Indeed, a large share of loans to households are smaller than € 75,000 and, therefore, *Average Loan Duration* would be uninformative.

Regional Dummy. Binary dummy variable that has a value of 1 for banks with headquarter in Southern Italy and 0 otherwise.

Bank Size. Binary dummy variable that has a value of 1 for banks which are classified as “major” or “large”, according to Banca d'Italia’s classification by size (see Bank of Italy, 2006), and 0 otherwise.

Market Concentration. Herfindhal index on new loans to firms and households. This variable is calculated for each time period of our sample.

Average Loan Size. This variable is the ratio between loan and number of customers, i.e., the average loan size granted by each bank to customers. It is calculated by using individual data drawn from the

[24] For further details, see Regulation ECB/2001/18, and Battipaglia and Bolognesi (2003).

Central Credit Register. As in the case of *Average Loan Duration*, this variable is calculated on for firms, because of the bias due to the threshold of € 75,000 in the case of households.

Variable descriptive statistics are shown in Appendix 1.

We estimate a panel data model that relates the interest rate spread (average loan rate-overnight rate), the banks charge to different types of borrowers to a set of variables that capture the costumer riskiness, the presence of guarantees, the duration of the lending relationship, the loan size, and the degree of market competition plus additional control dummy variables:

$$Interest\,Rate\,Spread_{i,t} = \beta_0 + \beta_1\left(\frac{Bad\,Loans}{Loans}\right)_{i,t} + \beta_2\left(\frac{Collateral}{Loans}\right)_{i,t} + \beta_3\left(\frac{Personal Guarantees}{Loans}\right)_{i,t}$$
$$+ \beta_4\left(Average\ Loan\ Duration\right)_{i,t} + \beta_5\left(Average\ Loan\ Size\right)_{i,t} + \beta_6\left(Market\ Concentrat\,ion\right)_{i,t}$$
$$+ \beta_7\left(Regional Dummy\right)_{i,t} + \beta_8\left(Bank\,Size\,Dummy\right)_{i,t} + \varepsilon_{i,t} \qquad [1]$$

where the subscript *i* refers to banks, *t* to the time period, and $\varepsilon_{i,t}$ is a composite error term that contains unobserved factors (λ_i, fixed or random), plus a Normally distributed error ($u_{i,t} \sim N(0, \sigma_u^2)$).

We estimate equation [1] for three different types of borrowers: firms, consumer households, and sole proprietorships. We run both fixed effects and random effects specifications, but only report results for the latter on the base of the Hausman Test.

Table 8 shows two specifications of equation [1] for each customer type.

As for firms, in column (1) we control for the business cycle by adding *Time Dummies*. We find that *Bad Loans* have a positive and significant impact on the interest rate spread, i.e., riskier customers are charged with higher interest rates. The coefficient on *Collateral* is positive and significant. As already noted above, inside collateral does not increase the potential loss suffered by the borrower, but it is mainly used to order creditors' priority. Therefore, *ex-ante*, the expected sign of its coefficient is not clear. The fact that the coefficient on C*ollateral* is positive means that collateral is mainly used to reduce the moral hazard problem, i.e., observably riskier borrowers are asked to pledge more collateral. *Personal Guarantees* have also a positive and significant coefficient. This result is in line with the prevailing literature according to which riskier borrowers are asked to pledge personal guarantees (outside collateral) to avoid strategic default. The estimated coefficient of the *Regional Dummy* is not statistically significant, meaning that interest rates charged by banks located in the Southern regions are not different from those charged by banks located in the rest of Italy. Indeed, it is possible that Southern banks provide loans also to firms located in other regions, and/or that other variables (bad loans and guarantees) already capture the differences in customers riskiness in different regional areas. The *Average Loan Duration* coefficient is negative and statistically significant. This variable is a proxy for the duration of the lending relationship; therefore, a decrease in the interest rate is expected with an increase in the duration of the lending relationship. This finding is common to other empirical studies (among others, Berger and Udell, 1995; Jimènez, Salas and Saurina, 2006). As long as the duration increases, the lender's information

about the borrower increases, and the moral hazard problem due to information asymmetries becomes less important (Boot and Thakor, 1994). As for the *Bank Size Dummy*, the estimated negative coefficient means that larger banks charge lower interest rates. According to Manove and Padilla (1999), and Manove, Padilla and Pagano (2001) banks with larger resources devoted to evaluate the economic risk of a loan should have a lower incentive to substitute the screening activity with collateral. On the same direction, Jimènez, Salas and Saurina (2006), argue that larger banks should have a comparative advantage in terms of the borrower's risk evaluation. Therefore, these banks should have fewer moral hazard problems, and charge lower interest rates. The *Average Loan Size* coefficient is negative and statistically significant. Boot *et al.* (1991) argue that a higher loan dimension reduce the collateral requirement. Moreover, larger loans are probably a proxy for larger firms that have stronger contractual power and, therefore, are expected to pay lower interest rates.

Estimates in column (2) refer to equation [1] when *Time Dummies* are replaced by *Market Concentration*.[25] The coefficient of *Market Concentration* is positive and statistically significant, meaning that higher loan rates are associated with a higher market concentration. Petersen and Rajan (1995) find that the impact of market concentration is different according to the age of the firm, negative for young firms, positive for older firms. We cannot disentangle this effect due to the lack of information on firms' age. However, our result also finds theoretical support in the work of Inderst and Mueller (2006) who show that an increase in bank competition increases the demand for collateral and decreases loan rates.

As for consumer households, we have two specifications, one with *Time Dummies* and one with the *Market Concentration* index (columns (3) and (4), respectively). Differently from firms' estimates, the coefficient of *Bad Loans* is negative but not statistically significant, meaning that interest rate is not influenced by households riskiness as measured by the share of *Bad Loans*. The coefficient of *Collateral is* negative and statistically significant. In this case, therefore, collateral is used by safer borrowers to signal their consumer type and take advantage of lower loan rates, as expected in an adverse selection setting (Bester, 1995 and 1998). On the other hand, the estimated coefficient of *Personal Guarantees* is not statistically significant. This finding may be interpreted as a signal of a possible lazy behaviour of banks that replace the screening activity (i.e.: different loan rates to different borrowers type) with personal guarantees. For consumer households, it turns out that banks located in the South of Italy charge higher loan rates than in the rest of Italy. Indeed, the coefficient of the *Regional Dummy* is positive and significant. Given that consumer households markets are local (local banks serve local households) the interpretation is twofold. On one side, Southern consumer households may be recognized riskier. On the other side, Southern credit markets may be less competitive than Central and Northern credit markets. Finally, *Bank Size* is not significant in determining the loan rate.

[25] *Time Dummies* and *Market Concentration* are collinear because the latter is calculated for each market (firms, customer households and sole proprietorships) and each time-period.

As for firms, the *Market Concentration* coefficient is still positive and significant, underlining that banks in more concentrated credit markets charge higher rates (Column (4)). Moreover, differently from the previous specification, the coefficient of *Personal Guarantees* is still positive but significant. As for firms, therefore, *Personal Guarantees* are asked to riskier borrowers to reduce strategic defaults, and some screening activity seem to be performed by banks. However, it is worth noting that loans secured by personal guarantees are a small share of the total amount of loans to consumer households (Table 6), creating a concern about a possible source of financial instability.

Columns (5) and (6) show results for sole proprietorships, with *Time Dummies* and *Market Concentration*, respectively. The positive and statistically significant coefficient of *Bad Loans* signals that also in this case higher interest rates are associated with higher risks. As for consumer households, *Collateral* and *Personal Guarantees* are asked to mitigate two different kind of problems: adverse selection and moral hazard, respectively. Indeed, the estimated coefficients are of opposite signs (negative and positive, respectively), but these findings are robust only when we control for *Market Concentration* (see Column (6)). As explained above, this result may indicate the lazy bank behaviour is more relevant in the case of sole proprietorships than in the cases of firms and consumer households. Banks require secured loans, but not necessarily higher guarantees are associated with riskier customers and higher interest rates. Again, the positive and statistically significant coefficient of the *Regional Dummy*, means that credit markets for sole proprietorships are local, as observed in the case of consumer households: Southern sole proprietorships are either riskier or they are operating in less competitive credit markets. Finally, for more concentrated credit markets, the cost of loan, captured by the loan rate, is higher.

It is worth noting that the distinction between firms, consumer households, and sole proprietorships is empirically important, given the findings are not unique. Our results are threefold:

- first, we find that Italian banks use efficient screening and monitoring procedures to select firms in view of the New Basel Capital Accord (Basel II) that will be in force in 2007. Indeed, banks require more collateral and personal guarantees to riskier firms and charge them with higher interest rates.

However, in the case of consumer households and sole proprietorships, banks seem to devote less resources to screen and monitor customers' behaviour. Indeed,

- as expected in adverse selection situations, collateral is mainly used by consumer households and sole proprietorships to signal themselves as safer borrowers and take advantage of lower interest rates;
- there seems to be no robust relationship between interest rates and personal guarantees. Banks behave "lazily", i.e., they simply replace screening and monitoring activities with personal guarantees. Therefore, interest rates do not reflect differences in customers' riskiness.

Moreover, only a small fraction of loans to consumer households and sole proprietorships are secured by personal guarantees. This result may be cause for concern about banks' financial stability, given that consumer households and sole proprietorships are the borrowers with the highest default rates (Table 6).

5. Conclusion

This paper was motivated by an important question concerning the financial stability of the Italian banking industry. Changes in banks' portfolio have been favouring consumer households; their loan share increased significantly since the late Nineties driven by the demand for mortgages and by a decline in their savings rate. Moreover, the economic literature pointed out that consumer household credit growth is a predictor of banking crises. Here we attempted a first answer to our question concerning the stability of the Italian banking industry by analysing bank interest rate policies with respect to firms, sole proprietorships and consumer households. We described banks' interest rate decisions keeping into account customers' riskiness and their provision of collateral and/or personal guarantees, and by controlling for the presence of other characteristics of banks and/or customers. Our aim was to understand whether banks allocate funds efficiently and assure the stability of the whole financial industry. Our results are mixed. Banks show to dispose of screening and monitoring procedures that allow them to efficiently price loans to firms, while in the case of households and sole proprietorships, they behave "lazily" and make use of personal guarantees to avoid strategic default. However, personal guarantees are only a small fraction of loans, and consumer households and sole proprietorships are the bank customers with the highest default rates. Therefore, to avoid future potential threats to financial stability, we hope that Italian banks will devote increasing resources to the screening and monitoring of consumer households and sole proprietorships.

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Table -1
Number of credit institutions

	1980	1985	1990	1995	2000	2005
FR	n. a.	2,105	2,027	1,469	1099	854
GE	5,356	4,740	4,720	3,785	2742	2089
IT	1,156	1,192	1,156	970	861	792
UK	n. a.	n. a.	n. a.	564	491	400

Source: Ecb, MFI Statistical Report.

Table - 2
Number of branches per 1,000 capita

	1980	1985	1990	1995	2000	2005
FR	0.45	0.47	0.45	0.44	0.43	0.47
GE	n. a.	0.61	0.63	0.59	0.69	0.53
IT	0.22	0.23	0.31	0.41	0.49	0.54
UK	n. a.	0.38	0.35	0.33	0.24	0.23
EU (12)	n. a.	0.52	0.51	0.49	0.59	0.39

Source: ECB, MFI Statistical Report.

Table - 3
Herfindahl index for credit institutions' total assets and share of the 5 largest credit institutions in total assets

	Herfindahl index for credit institutions' total assets (index ranging from 0 to 1)			share of the 5 largest credit institutions in total assets (percent)		
	1997	2000	2005	1997	2000	2005
FR	0.0449	0.0589	0.0758	40	47	54
GE	0.0114	0.0151	0.0174	17	20	22
IT	0.0306	0.0190	0.0230	31	23	27
UK	0.0207	0.0292	0.0399	28	30	36

Source : ECB, EU Banking Structures (various years).

Table - 4
Consumer debt market (as a percentage of consumption)

	Germany	France	Italy	Belgium	Netherlands
			1980-1995		
Housing mortgage loans	55.6	40.5	7.0	31.8	39.5
Personal consumer loans	16.4	5.8	2.8	6.6	3.9
Total consumer debt	72.0	46.3	9.8	38.4	43.4
			2003-2005		
Housing mortgage loans	71.7	44.7	21.0	50.4	133.7
Personal consumer loans	13.7	14.2	4.5	5.6	9.0
Total consumer debt	85.4	58.9	25.5	56.0	142.7

Source: de Bondt (1999) and calculations based on data from ECB and European Commission.

Table - 5
Loans Distribution and Growth Rates

	Firms	Sole Proprietorships	Consumer Households
		Distribution (%)	
2006 (June)	62.1	7.5	30.4
1999 (June)	66.9	9.3	23.7
		Growth Rate (%)	
1999 (June)-2006 (June)	64.8	47.5	120.9

Source: Calculations based on Bank of Italy data.

Table - 6

Composition of Loans and Bad Loans by type of guarantee (percent)

		All customers	Consumer Households	Sole proprietorships	Firms
Loans					
Collateral	1999	28.3	63.7	33.7	24.0
Personal Guarantees		20.8	9.8	39.3	27.1
Unsecured		50.9	26.4	27.0	48.8
		100	100	100	100
Collateral	2002	31.7	67.5	38.2	26.6
Personal Guarantees		18.8	7.0	34.6	25.6
Unsecured		49.4	25.6	27.2	47.8
		100	100	100	100
Collateral	2005	42.7	72.6	45.4	32.2
Personal Guarantees		15.7	5.4	28.0	23.6
Unsecured		41.6	22.0	26.6	44.2
		100	100	100	100
Bad Loans					
Collateral	1999	24.2	24.8	18.7	26.3
Personal Guarantees		21.1	9.9	22.8	25.0
Unsecured		54.7	65.3	58.5	48.7
		100	100	100	100
Collateral	2002	24.4	25.5	19.6	26.1
Personal Guarantees		25.2	10.1	24.2	31.7
Unsecured		50.4	64.4	56.2	42.3
		100	100	100	100
Collateral	2005	24.0	28.5	21.0	23.5
Personal Guarantees		26.7	10.3	26.4	33.0
Unsecured		49.3	61.2	52.6	43.5
		100	100	100	100

Source: Calculations based on Bank of Italy data.

Table - 7

Bad Loans to Loans ratios by type of guarantee (percent)

		All customers	Consumer Households	Sole proprietorships	Firms
Collateral	1999	6.6	3.3	11.1	9.6
Personal Guarantees		7.8	8.6	11.6	8.1
Unsecured		8.3	21.2	43.4	8.7
Collateral	2002	3.7	2.1	6.8	5.1
Personal Guarantees		6.4	8.1	9.3	6.4
Unsecured		4.9	14.0	27.5	4.6
Collateral	2005	2.1	1.4	3.7	3.4
Personal Guarantees		6.2	6.6	7.6	6.4
Unsecured		4.3	9.7	15.9	4.5

Source: Calculations based on Bank of Italy data.

Table - 8

Interest Rate Spread Model – Random Effects Estimates

	Firms		Consumer households		Sole proprietorships	
	(1)	(2)	(3)	(4)	(5)	(6)
Bad Loans/ Loans	2.34***	2.38***	-1.56	-1.40	2.10***	2.82***
	(0.73)	*(0.76)*	*(1.06)*	*(1.04)*	*(0.72)*	*(0.77)*
Collateral/ Loans	0.67***	0.61**	-0.51*	-0.64**	-0.41	-0.88***
	(0.25)	*(0.24)*	*(0.29)*	*(0.30)*	*(0.26)*	*(0.27)*
Personal Guarantees/ Loans	0.82**	0.81**	1.39	1.61*	0.05	0.69**
	(0.25)	*(0.39)*	*(0.87)*	*(0.87)*	*(0.35)*	*(0.34)*
Average Loan Duration	-0.20**	-0.17**				
	(0.08)	*(0.07)*				
Average Loan Size	-0.13**	-0.13**				
	(0.07)	*(0.07)*				
Market Concentration		34.84**		45.16***		-28.61
		(14.17)		*8.96*		*23.17*
Regional Dummy (South=1)	-0.10	-0.10	0.81***	0.79***	0.32**	0.18
	(0.11)	*(0.11)*	*(0.19)*	*(0.19)*	*(0.13)*	*(0.14)*
Bank Size Dummy (Large Banks =1)	-0.19*	-0.18*	-0.01	-0.01	-0.05	-0.06
	(0.10)	*(0.10)*	*(0.17)*	*(0.17)*	*(0.14)*	*(0.14)*
Constant	✓	✓	✓	✓	✓	✓
Time Dummies	✓		✓		✓	
Hausman Test (p-value)	0.83	0.25	1.00	1.00	1.00	0.97
No.of Observations	704	704	663	663	541	541
Banks	108	108	105	105	94	94

Robust Standard Errors are shown in parentheses; ***** p<0.10, ****** p<0.05, ******* p<0.01 significance levels, respectively.

Appendix 1
Summary Statistics

Variable	Mean	Standard deviation	Min	Max
Firms				
Spread (interest rate – overnight interest rate)	1.55385	0.49343	-0.05043	5.81174
Bad Loans/ Loans	0.04693	0.07107	0.00102	0.80954
Collateral/ Loans	0.33885	0.15871	0.00021	1.00278
Personal guarantees/ Loans	0.26367	0.11400	0.00021	1.01054
Average Loan Duration	3.01209	0.55327	1.00000	4.00000
Herfindhal Index	0.03321	0.00115	0.03186	0.03531
Loan Size (log)	14.20851	1.83523	6.51026	17.72952
Average Loan Size (log)	6.439886	0.99403	4.043051	11.33795
Consumer Households				
Spread (interest rate – overnight interest rate)	2.39922	0.86539	0.13627	6.80369
Bad Loans/ Loans	0.03990	0.05267	0.00000	0.42781
Collateral/ Loans	0.68330	0.19187	0.00010	1.00325
Personal guarantees/ Loans	0.07108	0.05652	0.00000	0.37049
Herfindhal Index	0.04187	0.00283	0.03874	0.04811
Loan Size (log)	13.33072	1.80825	2.99573	17.16740
Sole Proprietorships				
Spread (interest rate – overnight interest rate)	2.40445	0.53415	0.93664	4.77367
Bad Loans/ Loans	0.07697	0.07734	0.00000	0.53959
Collateral/ Loans	0.40970	0.16942	0.00001	1.00026
Personal guarantees/ Loans	0.31058	0.13152	0.00012	0.73091
Herfindhal Index	0.03658	0.00054	0.03549	0.03730
Loan Size (log)	12.35439	1.29635	6.87109	15.87353

Source: Calculations based on Bank of Italy data.