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Corruption in bank lending to firms : do competition and information sharing matter?

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Corruption in Bank Lending to Firms: Do Competition and Information Sharing Matter?

James R. Barth^a, Chen Lin^b, Ping Lin^b and Frank M. Song^{c*}

Abstract

Building on the important study by Beck, Demircug-Kunt and Levine (2006), we examine the effects of borrower and lender competition and information sharing via credit registries/bureaus on corruption in bank lending. Using the unique World Bank dataset of the World Business Environment Survey (WBES) covering 58 countries and information on credit registries/bureaus and bank regulation assembled by other scholars, we find (1) strong evidence that banking competition reduces lending corruption and (2) the first and robust evidence that information sharing among banks (especially via private bureaus) contributes to reducing corruption in bank lending. We also find that government- and foreign-owned firms as well as exporting firms tend to be subject to less lending corruption, objective courts and better law enforcement tend to reduce lending corruption, and private and foreign ownership of the banking industry are associated with more integrity in lending. These findings pass a number of robustness tests and they are consistent with the predictions of a Nash bargaining model.

1. Introduction

Banks matter for countries at all stages of development and in all parts of the world. Banking systems that operate efficiently facilitate the channeling and monitoring of savings to the most productive investment projects and thereby enhance the performance of economies. Since bank lending is a major source of external finance for business firms, especially in developing and emerging market

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economies, a well-functioning banking system can also help reduce income inequality and poverty. Indeed, recent research suggests that banks exert a first-order impact on economic development (e.g., Levine, 1997 and 2005).

Unfortunately, banking systems do not always operate efficiently in countries. In particular, they are susceptible to corruption, which undermines their primary function of allocating scarce capital efficiently. This is a particularly serious problem in developing and transition countries to the extent that they lack adequate laws, objective courts, prudential regulations, and other appropriate institutions to sufficiently contain corruption. In this regard, China, among other countries, has been moving aggressively to address the corruption problem. For example, 461 cases of bank fraud involving more than one million yuan (US\$125,000) each were uncovered in China in 2005. These cases alone amounted to 7.7 billion yuan in fraudulent activity.¹ As another example, in 2000, Turkey's banking sector suffered losses of some \$12 billion (about 6% of GDP). Some of the worst performing banks had been run by some of Turkey's top business and political figures. The banking crisis prompted an anti-corruption drive.² These and other examples of bank corruption in countries everywhere are quite costly because when bank managers take deposits and then pass them along to businesses not solely based on efficiency considerations, fewer funds are available to support more worthy business initiatives. The poor and unconnected individuals with innovative ideas are also denied funds to realize their dreams and improve their economic condition (Barth, Caprio, and Levine, 2006).

Despite its importance, there are surprisingly few studies, either theoretical or empirical, of the determinants of corruption in obtaining bank loans by firms. Indeed, the only one of which we are aware of is by Beck, Demirguc-Kunt and Levine (2006, BDL hereafter). In an empirical study, they rely on the answer to a survey question in the World Business Environment Survey (WBES) - "Is the corruption of bank officials an obstacle for the operation and growth of your business?" - to measure the degree of corruption in bank lending. BDL then examine the relationship between bank supervisory power and lending corruption and find that strengthening traditional official supervision does not have a positive impact on the integrity of bank lending. Instead, a supervisory strategy that focuses on empowering the private monitoring of banks through the disclosure of accurate and timely information reduces lending corruption.

¹ *Yahoo! News Asia*, Nov. 1, 2006.

² HighBeam Research, www.highbeam.com/doc.

The BDL study is important because it overcomes the difficulty of measuring the degree of bank corruption by resorting to a firm-based survey question on the obstacles for operating and growing a firm due to bank-lending corruption. It also has significant policy implications insofar as it finds that the conventional official regulatory framework that relies on empowering official supervisory agencies to directly monitor, control, and discipline banks does not improve the integrity of bank lending. Rather, BDL find that empowering private monitoring of banks works best to promote integrity in bank lending.

Our paper is motivated by the pioneering work of BDL. We follow their lead and measure lending corruption by using the same survey responses of firms regarding the obstacles in obtaining bank loans due to corrupt bankers.³ Importantly, however, we extend their study to examine whether bank competition and information sharing help to curtail corruption in bank lending. To set the stage for our empirical work, we develop a bargaining model of a firm and banker to highlight the determinants of lending corruption. More specifically, a Nash bargaining model is developed in which the firm and the banker negotiate the terms of a bank loan. Bribery is then introduced to allow a firm to obtain a bank loan at a lower rate than otherwise. Factors that strengthen the bargaining power of the firm manager vs. the banker, however, are shown to help reduce the likelihood and the amount of bank bribery. We now briefly describe the predictions provided by our model.

First, our model predicts that greater competition among banks, by enhancing the bargaining power of the firm over that of the banker, reduces lending corruption. In contrast, increased competition among firms could increase lending corruption since greater competitive pressure in their market could force a firm manager to be more aggressive in seeking a bank loan. In our model, this particular situation implies lower bargaining power of the firm manager and thus a greater resort to bribery in bank lending. A possible additional effect of increased firm competition, however, is a higher default risk, which in our model implies a higher “fair interest rate”. Since the firm manager bribes the banker in exchange for a lower interest rate than the risk-adjusted or “fair interest rate”, the higher the latter rate, the larger the gap between it and the discretionary loan rate, and hence the more room for bargaining. This wider spread generally facilitates more bribery.

³ According to BDL, although the measure of lending corruption is based on the managers’ subjective view of financing obstacles when dealing with banks, any potential resulting biases do not affect the results in any particular direction. In fact, to the extent that those measurement error problems are not systematically related to country characteristics, this may be less of a concern when studying variations in corruption across countries. See section 3 of our paper for greater detail on this point.

Second, it is well known that banks are exposed to problems of information asymmetry, in which lenders and borrowers possess different information about the risk of default. Pagano and Jappelli (1993) in this regard point out that information sharing among lenders, through institutions such as credit bureaus, augments the due diligence process, by providing information about borrowers' characteristics and credit histories. This helps to mitigate the problem of adverse selection, in which borrowers whose credit worthiness is not easily discernable by lenders may accept less attractive loan terms because they are also the ones most likely to default. It can also be beneficial in addressing the moral hazard problem in which a borrower may not take sufficient precautions to avoid default after obtaining a loan, through its positive incentive effects on borrowers who desire access to credit in the future (Padilla and Pagano, 1997 and 1999). In our model, we study the effect of information sharing on lending corruption and find that it helps decrease bank-lending corruption, by reducing the degree of discretion that can be exercised in evaluating loan applicants due to imperfect information.

Additional predictions from our model suggest that state or foreign ownership of a firm lowers lending corruption, by lowering the default risk and enhancing the bargaining power of the firm. In the case of banks, foreign or private ownership helps reduce lending corruption because of greater concern about an adverse reputational effect, better managerial incentives and /or negative externalities on their operations in other countries.

In the empirical part of the paper, we test the predictions of our bargaining model by combining information from three databases. First, as mentioned above, we follow BDL in measuring lending corruption by using the same survey question noted above from the WBES. Second, we rely on Barth, Capiro, and Levine (2006, BCL hereafter) to measure various dimensions of bank regulation across different countries. BCL present and discuss a new database on bank regulation in 152 countries during 2001-2003. In particular, it includes detailed measures of bank entry regulations, capital requirements, supervisory powers, explicit deposit insurance schemes, private monitoring, type of bank ownership, among other regulatory variables. Third, we obtain measures of information sharing among lenders from Djankov, McLiesh, and Shleifer (2007, DMS hereafter). DMS collect data on the existence of public credit registries (i.e., government-owned) and private credit bureaus in 129 countries during 1978-2003. These registries/bureaus collect information on the credit histories and current indebtedness of various borrowers and share it with lenders. As predicted by our

theory, both banking competition and information sharing are important determinants of bank lending corruption.

We obtain two main empirical results. First, as predicted by our theory, greater competition in banking helps to curtail corruption in lending. However, as in BDL (2006), increased competition among firms does not significantly reduce lending corruption. Second, information sharing, by making information more timely and accurate through credit registries, helps reduce corruption in bank lending. However, we find that only private bureaus have a significant effect in reducing lending corruption, whereas public registries do not appear to have a significant effect. We believe that this has to do with the fact that private bureaus generally contain finer information about borrowers than do public registries. In particular, the information available from public credit registries consists mainly of credit data above a certain threshold (minimum loan size) and is disseminated in consolidated form (no details on individual loans). The private credit bureaus, in contrast, offer details on individual loans and merge the credit information with data from other sources (e.g., courts, tax authorities, and financial statements).⁴

Beyond the above two major findings, we obtain several additional results: (1) government- and foreign-owned firms tend to be subject to less lending corruption. Our explanation for this finding is that these government-/foreign-owned firms tend to have more bargaining power in negotiations for loans with banks and they could also be subject to lower default risk. (2) Exporting firms tend to be subject to less lending corruption. This is because they may also have greater access to external finance and hence more bargaining power in negotiations for loans with banks. (3) Objective courts and better law enforcement tend to reduce lending corruption. This is expected since lending corruption is generally related to other illegal activities and the expropriation of creditors' rights so that a well-functioning legal environment helps to reduce these practices. (4) Private and foreign ownership of the banking industry are associated with more integrity in lending.

We perform a number of robustness tests on our results. Specifically, we expand our control variables by including major macro-economic and institutional measures. We also examine the potential endogeneity issue in our analysis by performing IV regressions.

Our paper contributes to the existing literature relating to corruption, bank competition, and information sharing. In the corruption literature, researchers

⁴ See section 3.4 for more discussion on the differences between private bureaus and public registries.

typically study cross-country, macro measures of public corruption.⁵ For example, Knack and Keefer (1995) and Mauro (1995) use indicators of corruption assembled by private risk-assessment firms (e.g., the *International Country Risk Guide*).⁶ Others rely on perception-based measures like the *Corruption Perception Index* by Transparency International. Few studies rely on micro- and firm-based measures of corruption. Some exceptions are Svensson (2003), Fisman and Svensson (2001), and Clark and Xu (2004). The first two studies use firm-survey data from Uganda to study the magnitude of corruption and its impact on firm performance. More specifically, Svensson (2003) provides evidence that the amount of a bribe a firm needs to pay is negatively correlated with the degree of reversibility of a capital stock investment. Fisman and Svensson (2001) find that bribery is negatively correlated with firm growth. Clarke and Xu (2004) use enterprise-level data in 21 transition economies to examine how characteristics of the public utilities taking bribes and the firms paying bribes affect corruption in the sector. In this paper, we follow these more recent studies insofar as relying on micro-based measures of corruption in the form of firm survey data to study bank-lending corruption.

A controversial issue in the corruption literature is whether increased competition can reduce corruption. Some argue that greater firm competition could lead to less corruption because firms' profits are driven down by the heightened competitive pressure to the point at which there are no excess profits from which to pay bribes (Ades and Di Tella, 1999). Others, such as a study by Bliss and Di Tella (1997), argue that the level of graft demanded per firm depends on the likelihood that firms in the market are more or less likely to exit due to a marginal increase in graft demand, not on the number of firms in the market or the degree of "natural" competition. As regards competition among briber takers, Rose-Ackerman (1978) argues that increased competition (among the officials receiving the potential bribes) reduces corruption. Similarly, Shleifer and Vishny (1993) argue that when officials dispense government-produced goods, such as passports, the existence of a competing official in which to reapply to when asked for a bribe

⁵ A common definition of public corruption is the misuse of public office for private gain, such as the sale of government property by government officials, kickbacks in public procurement, or bribery and embezzlement of government funds (Svensson, 2005). However, corruption can also take the form of collusion between firms or misuse of corporate assets that imposes costs on customers and investors (private sector corruption).

⁶ The *International Country Risk Guide* corruption indicator captures the likelihood that high government officials will demand special payments and the extent to which illegal payments are expected through government tiers.

will bid down the equilibrium amount of corruption. However, there is lack of convincing empirical evidence supporting this argument about the benefit of greater competition (Svensson, 2005). In this paper, we provide such evidence in the case of bank lending. Finally, in the corruption literature, there is no discussion about the role of information sharing in reducing corruption. We provide the first evidence indicating that information sharing helps to alleviate the impacts of asymmetric information on bribery in the bargaining process for loans between firms and banks.

We also contribute to the bank competition literature. Berger et al. (2004) survey an extant literature on the effect of bank competition on the performance of banks (e.g., bank efficiency, bank net interest margins (profits), and bank risk-taking), firms' access to external financing, and financial stability. However, the surveyed literature seems to provide no clear answer to the question as to whether bank competition is "good" or "bad" from a social perspective (e.g., Allen et al. 2001). Our paper indicates that one positive and important aspect of bank competition is in reducing corruption, apart from any impacts on bank efficiency and stability.

In the information-sharing literature, it is well known that in banking there are substantial information-asymmetry problems. The information wedge between lenders and borrowers may prevent the efficient allocation of lending, leading to credit rationing (e.g., Jaffee and Russell, 1976; Stiglitz and Weiss, 1981) or to a wedge between lending and borrowing rates (e.g., King 1986). Information sharing among lenders, by augmenting the due diligence process, helps to mitigate the problem of adverse selection (Pagano and Jappelli, 1993). It can also be valuable in addressing moral hazard problems through its incentive effects on curtailing imprudent borrower behavior (Padilla and Pagano, 1997 and 2000). In this way, information sharing contributes positively to the functioning of credit markets (Jappelli and Pagano, 2002).

However, few empirical studies have examined the effect of information sharing on bank lending and default risk. One study by Jappelli and Pagano (2002) finds that bank lending is higher and credit risk is lower in countries where lenders share information, regardless of the private or public nature of the information-sharing mechanism. Another study by Djankov, McLeish, and Shleifer (2007) finds that both creditor protections through the legal system and information-sharing institutions are associated with higher ratios of private credit to gross domestic product. A micro-based firm study by Kallberg and Udell (2003) finds that exchange-generated information provides significant explanatory power in

failure prediction models after controlling for other credit information that is easily available to lenders. Our paper suggests that more timely and accurate information about a borrowing firm is likely to be conducive in reducing corruption in bank lending, with empirical support provided based on firm-level survey data.

The remainder of the paper is organized as follows. Section 2 presents a Nash bargaining model for negotiating a loan between a firm manager and a bank loan officer. The model generates several important predictions concerning the relationship between competition, information sharing and corruption in bank lending. Section 3 describes our data and provides variable definitions used in the empirical work. Section 4 presents and discusses our empirical results. Section 5 presents some robustness tests of our major results. Section 6 concludes the paper with a discussion of some policy implications of the results.

2. Model

2.1 *A Nash Bargaining Model of Bank Lending Corruption*

In this section, we construct a simple Nash bargaining model between a firm and a bank to highlight the process and determinants of bank-lending corruption. The firm desires to secure one unit of a loan for an investment project. The bank has to decide whether to provide the loan to the firm and, if it does, what interest rate to charge. Once the loan application of the firm is submitted, the banker (a loan officer) will examine the creditworthiness of the borrower and decide upon an interest rate to charge the loan applicant.

Let R denote the "fair interest rate" the firm should pay. It reflects the firm's default risk, given the level of competition among banks in supplying loans. The greater the firm's default risk, the higher will be R . The fair interest rate also depends on the market power the bank possesses in supplying loans. The more competition in the banking sector, the lower will be R . Similarly, R also depends on the degree of competition the firm faces in its product market. The more competition among firms, the lower a firm's return from an investment project, and hence the lower its ability will be to pay back a loan.⁷

Let I denote the amount (or the set) of information available to a bank when examining the loan application. I contains all the relevant information a bank can assess regarding a firm's proposed investment project, corporate governance, financial strength, and credit history. An important source of this type of

⁷ The outcome of the firm's project to be financed by the bank loan may be uncertain. Our focus here is on the possibility of bribery between the firm and the loan officer, so we simply use R to capture all the underlying uncertainty that may be associated with the firm's investment project.

information about the borrower that may be available is credit registries or credit bureaus. When information-sharing facilities like these are available, a bank is able to obtain more information about a firm so as to determine the level of default risk and thereby whether to lend money and, if so, the interest rate to charge. We can express this relationship as follows:

$$R = R(I, \text{Comp}_f, \text{Comp}_b),$$

where Comp_f stands for the degree of competition the firm faces in its product market and Comp_b the degree of competition in the banking sector. (Of course, other factors also affect the level of default risk of the firm as will be discussed below.)

Given the level of banking competition and the information set I , and hence R , the bank may offer a lower rate, $R - \Delta$, or r , to the firm, in exchange for a bribe, B , $B \leq \Delta$. If the two parties can strike a deal, then the firm receives the loan at a lower interest rate than otherwise, and the loan officer takes the bribe. If they fail to strike a deal, then the firm receives the loan at the rate R , and the loan officer gets nothing extra personally from the transaction. Therefore, the disagreement point of the firm is $d_f = \pi - R$ and the disagreement point of the loan officer is $d_b = 0$, where π is the net profit of the firm from its investment project.

One can think of $R - \Delta$ as an acceptable rate of interest to the bank, given that information about a borrower is in general imperfect (or asymmetric). The idea is that absent perfect information about the loan applicant, there is always some level of discretion that must be used in setting the loan rate, even by an uncorrupted loan officer. It is useful here to not consider Δ as a decision variable in the bribery deal. Rather, $R - \Delta$, or r can be regarded as the lowest interest rate that would be acceptable to the bank, given the information set I and the fair rate R .⁸

Of course, the extent of such discretion (or ambiguity as to whether the interest rate reflects bribery or not) that exists or may be exercised depends on the amount of information available to the bank prior to granting the loan, among other things. Thus, Δ is a function of I . But it may also depend on the degree of competition on both the lender and the borrower sides, thus

$$\Delta = \Delta(I, \text{Comp}_f, \text{Comp}_b).$$

Bribery, of course, may be detected and thus punished by the bank manager and/or regulator, in which case the loan officer will be penalized (e.g., demoted, fined and/or even face more stringent legal sanctions). Let p denote the probability

⁸ In fact, even when Δ is a decision variable it will then be in the best interest of the bargaining parties to choose $R - \Delta$, or r , to be the lowest acceptable level, so as to maximize the amount that can be shared between them in the bribery bargaining game.

of detecting bribery and c_h the amount of penalty imposed on a loan officer. In addition to c_h , the bribe will be confiscated by the bank. Thus, the expected payoff to a loan officer is $(1-p)B - pc_h$. We also assume that if the bribery is discovered, then the rate of interest owed on the loan amount will be adjusted upwards to the fair rate R for the firm (gross of the bribe amount). Hence, the expected payoff of the firm is

$$(1-p)(\pi - R + \Delta - B) + p(\pi - R).$$

The generalized Nash bargaining problem is thus given by:⁹

$$\text{Maximize } \left[(1-p)(\pi - R + \Delta - B) + p(\pi - R) - d_f \right]^{1-\alpha} \times \left[(1-p)B - pc_h - d_h \right]^\alpha,$$

with respect to B , and where α measures the bargaining power of the bank loan officer, and $1-\alpha$ that of the firm.

Taking the logarithm of the objective function and solving the first-order condition provides the equilibrium amount of bribery to the bank loan officer under the Nash bargaining solution:

$$B^* = \alpha \times \Delta + \frac{p}{1-p} (1-\alpha) c_h.$$

The solution has an intuitive interpretation: in the bribery bargaining situation, the loan officer receives a share of the net gain Δ of the deal in proportion to his/her bargaining power, plus the risk-premium of getting caught for bribery.¹⁰

2.2 Predictions of the Bargaining Model

Competition in the banking sector lowers the bargaining power of the bank (loan officer), α , leading to a decline in B^* . (While increased competition also lowers the rate on a loan, R , it is not clear how it may affect the extent of directional change in granting the loan, Δ). Increased competition on the firm side increases default risk and hence lowers the bargaining power of the firm (so α will increase), resulting in greater bank lending corruption, B^* .

Hypothesis 1:

- Competition in the banking sector reduces bank lending corruption by lowering the loan officer's bargaining power (α).

⁹ The existing theoretical literature on corruption has focused on bribery between a government official, (e.g., a regulator) and a firm applying for a license. Bargaining models in the literature thus postulate that the government official has full bargaining power (Bliss and Di Tella, 1997 and Ades and Di Tella, 1999). In our model, because there is competition on both the bribery taker and bribery giver sides, we use a generalized Nash bargaining framework.

¹⁰ We assume that $c_h \leq \frac{1-p}{p} \Delta$ so that B^* is within the feasible range, i.e., $B^* \leq \Delta$.

- Competition on the firm side increases corruption by raising the default risk of the loan and lowering the firm's bargaining power ($1-\alpha$).

Now consider the effects of information sharing on bank-lending corruption. More information sharing among lenders about loan applicants increases information accuracy and timeliness, thus leading to less discretion or ambiguity in interest rate setting (i.e., Δ becomes smaller as the amount of information increases). Thus, B^* declines with information sharing.

Hypothesis 2:

- Information sharing among lenders (via credit registries or credit bureaus) helps reduce bank-lending corruption, by limiting the discretion/ambiguity that exists in evaluating loan applicants due to imperfect information.

The type of ownership on both the borrower and lender sides can also affect the level of bank-lending corruption. State ownership of the firm (borrower), for example, may increase the bargaining power of the firm in dealing with banks, thereby lowering B^* . Also, due to the presence of a "soft-budget constraint" and hence a higher probability of repaying a bank loan, state-owned enterprises (SOEs) may be safer borrowers relative to other firms. Furthermore, SOEs sometimes can obtain bank loans due to government policy so there is less of a need to bribe bank officers. In the case of foreign-owned firms, they may have alternative channels for obtaining funding for their investments (e.g., from their parent companies). Alternatives to bank loans in turn implies greater bargaining power and hence a lower B^* in our model.

On the lenders' side, it is not that clear what form of ownership facilitates combating bank-lending corruption. It can be argued that foreign banks or private banks may care more about their corporate reputation and thus exert greater effort in preventing bribe taking by their loan officers, relative to state-owned banks. Furthermore, private and foreign ownership may strengthen managerial incentives to monitor potential corruptive behavior of employees, thus reducing bribes. Moreover, bank corruption once detected has wider negative externalities among branches of multinational banks operating in different countries, which gives foreign banks an extra incentive to fight lending corruption.

Hypothesis 3:

- State ownership of borrowing firms tends to reduce bank-lending corruption (not necessarily because of a better quality of investment, but because of a “soft- budget constraint”).
- Foreign ownership of borrowing firms may help decrease bank-lending corruption because it may give the borrower greater bargaining power.
- Foreign or private ownership of banks helps reduce lending corruption because of the reputational effect, better managerial incentives and negative externalities on their operations in other countries.

The above hypothesis leads to the following observation. In the bargaining solution, the equilibrium level of bribery B^* increases with the probability of getting caught, p . This can be understood as follows. As p increases, the loan officer demands greater compensation from the firm due to the heightened risk of detection. Yet, the overall expected utility of the corrupted loan officer decreases with p . In fact, the expected value of corruption,

$$(1-p)B^* - pc_b = (1-p)\alpha\Delta - pc_b$$

decreases with increases in both p and c_b . Thus, improved bank management or government regulation, by making detection of bribery a priority and raising the penalty on corrupted bank officials when being caught, reduces corruption on the whole, but increases the amount of bribes taken by those bank officers who continue such behavior.

3. Data and Variables

3.1 The Sample

The dataset used in this study is compiled from three main sources: (1) the World Business Environment Survey (WBES) on corruption in 80 countries, (2) the BCL (2006) dataset on bank supervision and regulation in 152 countries, (3) and the DMS (2007) dataset on information sharing in 129 countries. Most firm-level data used in the study come from the WBES, which was conducted in 2000 by a team from the World Bank. Managers from over 9,000 firms in more than 80 countries were surveyed with a standard questionnaire. The main purpose was to identify the driving factors behind and obstacles to enterprise performance and growth in countries around the world. The questionnaire covered many aspects of a firm's operations, including questions on corruption, regulation, and institutional environment. BDL (2006) note three advantages in using the WBES data in studying bank corruption. First, it provides direct information on the degree to

which corruption in lending represents an obstacle to firms. Second, the firms surveyed vary in size, ownership (both public and private), industrial sector, and organizational structure. In particular, the dataset covers a large proportion of small- and medium-size enterprises, whereas most other cross-country studies focus exclusively on large, listed firms. Third, the firm-level survey data allow us to control for firm-specific characteristics and hence to draw appropriate inferences about the relationships between competition, information sharing and bank corruption.

The banking competition and ownership data come from BCL (2006), which were compiled based on a World Bank survey on bank regulation and supervision in 152 countries during 2001-2003. The information-sharing variables come from DMS (2007), who collect data on private and public credit institutions in 129 countries during 1978-2003. Because of the incomplete overlap among the three datasets and missing firm-level and banking-sector variables, the final sample used in our study includes 4,395 enterprises in 58 countries all over the world.¹¹

In addition to the three datasets mentioned above, we rely on three other data sources, the World Development Indicator (WDI, 2004), the World Governance Indicator compiled by Kaufmann et al. (2006), and Triesman (2000), to control for macro- institutional factors that might affect the overall level of bank corruption in a country. Tables 1 and 2 identify the data sources and provide brief descriptions and summary statistics of the key variables.

[Tables 1 and 2 here]

3.2. Bank Corruption

The bank corruption measure is the dependent variable in our analysis. Following BDL (2006), we construct the measure of corruption (*Corruption*) using data from WBES. Specifically, it is based on the key question concerning bank corruption in the survey. The question takes the following form: "Is corruption of bank officials an obstacle for the operation and growth of your business"? Answers vary between 1 (no obstacle), 2 (a minor obstacle), 3 (a moderate obstacle), and 4 (a major obstacle). Thus, a higher value indicates more severe and pervasive corruption in lending. Thus, the WBES data provide direct information for firms about the degree of specific, perceived obstacles.

¹¹ The countries include Albania, Argentina, Armenia, Azerbaijan, Belarus, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Cote d' Ivoire, Croatia, Czech Rep. Ecuador, Egypt, El Salvador, Estonia, Germany, Ghana, Guatemala, Honduras, Hungary, India, Italy, Kazakhstan, Kenya, Kyrgyzstan, Lithuania, Malaysia, Mexico, Moldova, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Romania, Russia, Senegal, Slovakia, Slovenia, South Africa, Spain, Thailand, Trinidad&Tobago, Tunisia, Turkey, UK, US, Ukraine, Uruguay, Venezuela, Zimbabwe

As pointed out by BDL (2006), there are good reasons for believing that these self-reported data are not biasing the results in favor of their or our findings. BDL (2006) provide a detailed explanation and justification of this point (pp., 2136-2137). As argued in BDL, if a firm facing the same obstacles responds to questions differently in different institutional environments, then, to the extent that this represents pure measurement error, it would bias the results against finding a significant relationship between competition, information sharing and firm financing obstacles. Also, as in BDL, we obtain the same results when controlling for many country-specific traits. Finally, additional work done or cited in BDL show that firms' responses to the survey on financing obstacles are capturing more than idiosyncratic differences in how firms rank obstacles; the survey data are associated with measurable outcomes in terms of efficiency of investment flows, firm growth, institutions, corruption and property rights., in several recent and influential studies (e.g., Hellman et al., 2000; Djankov et al., 2003; Beck, Demirguc-Kunt and Maskimovic, 2005; Acemoglu and Johnson, 2005; Ayyagari et al., 2007). Beck, Demirguc-Kunt and Peria (2007) show an objective measure of access to and use of banking services across countries is closely related to the WBES measure of firm financing obstacles.

3.3. Competition

A key independent variable in our study is a measure of banking competition. A widely used measure in this regard is the concentration ratio (e.g., Demirguc-Kunt, Laeven and Levine, 2004). We therefore use the share of the five largest banks in total bank deposits (*Banking Concentration (Deposit)*) from BCL (2006) to measure banking concentration. Higher concentration indicates less competitiveness within the banking industry. As a check on the robustness of the results, we use the share of total assets held by the five largest banks in the industry (*Banking Concentration (Asset)*) as an alternative concentration measure in our analysis. As will be seen, both measures yield very similar and consistent results.

In their survey paper of banking concentration and competition, Berger et al. (2004) point out that bank competition is multifaceted insofar as it encompasses not only bank concentration but also regulatory restrictions, such as entry restrictions and other legal impediments that limit actual and potential bank competition. Thus, we include two additional measures of competition to address this issue. The first variable measures the stringency of entry requirements into the banking industry (*Entry Barrier*). It is a variable constructed on the basis of eight questions regarding whether various types of legal submissions (i.e., draft by-laws,

intended organization chart, financial projections for the first three years, financial information on the main potential shareholders, the background of future directors and managers, sources of funds to be disbursed in the capitalization of the new bank and market differentiation intended for the new bank) are required to obtain a banking license. The index ranges from 0 (low entry requirement) to 8 (high entry requirement), with higher values indicating greater stringency. The second variable is the fraction of entry applications denied (*Application Denied*), which is the percentage of applications to enter banking that have been denied in the past five years. This variable varies significantly across countries. At one extreme, the ratio is above 85% in countries like Egypt, Kenya and Pakistan. At the other extreme, the ratio is below 5% in countries like France, Sweden and the United States. All these data are from BCL (2006).

3.4. Information-Sharing

Another key independent variable in our analysis is information sharing. It is argued that information sharing among lenders, by augmenting the due diligence process, helps to reduce the information gap and thereby mitigates the problems of adverse selection and moral hazard (Pagano and Jappelli, 1993). In our model, information sharing among lenders (via credit registries or credit bureaus) helps in lowering bank- lending corruption, by reducing the discretion that may be exercised in evaluating loan applicants due to imperfect information. Following DMS (2007), we include two dummy variables to measure information sharing among lenders. The first indicates whether a public credit registry (*Public Credit Registry*) exists, which equals one if a public credit registry is operating in the country by the end of 1999, and zero otherwise. A public registry is defined as a database owned by a public authority, usually the central bank or banking supervisory authority, which collects information on the credit worthiness of borrowers and makes it available to financial institutions (DMS, 2007). In 2000, public registries operated in 35 countries in our sample. The second measure indicates whether a private credit bureau (*Private Credit Bureau*) exists, which equals one if a private credit bureau is operating in the country by the end of 1999, and zero otherwise. A private bureau is defined as a private commercial firm that maintains a database on the credit worthiness of borrowers, and its primary role is to facilitate the exchange of information among banks and other financial institutions (DMS, 2007). In 2000, public registries operated in 29 countries in our sample.

The major difference between public and private credit registries is that participation in a public credit registry is compulsory, and its rules are not

contractual, but imposed by regulation. For this reason, public credit registries usually have larger coverage than that of private bureaus (Jappelli and Pagano, 2002). However, a public credit registry also has some limitations. It is quite common for public credit registries to set a minimum loan size and therefore to collect information only on loans in excess of this amount (Miller, 2003). Furthermore, the information from public credit registries consists mainly of credit data and is disseminated in consolidated form (so that details about individual loans are not available).¹² In contrast, private credit bureaus offer details on individual loans and merge credit data with data from other data sources (e.g., courts, tax authorities and financial statements), though they are less comprehensive in coverage (Jappelli and Pagano, 2002). Due to these differences, it is quite interesting to explore whether public credit registries and private bureaus have different impacts on corruption in bank lending.

We also include a dummy variable (*Firm Auditing*) to measure the completeness and accuracy of the financial statements disclosed by firms. This variable equals one if a firm provides its shareholders with annual financial statements that have been reviewed by an external auditor, and zero otherwise. A higher value indicates more complete and accurate information disclosure of a firm. Better firm financial disclosure should improve the quality of information sharing and hence reduce the information gap between banks and firms. This, in turn, should reduce corruption.

Furthermore, we include the number of years since the establishment of public credit registries and private bureaus to measure the amount of information sharing. *Public Registry Age* is the number of years since the starting or establishment date of the public registry. *Private Bureau Age* is the number of years since the starting or establishment date of the oldest private credit bureau in the country. Public credit registries/ private bureaus that have been around longer should contain longer credit histories of firms and thus contain more information for sharing. However, as Miller (2003) points out, the public registry data function as a kind of enforcement device in many countries; with the data on defaults or late payments erased once loans have been paid. In addition, many countries only distribute current data (e.g., data from last month). Therefore, the public credit registry does not provide a good historical record of a borrower's credit behavior (Miller, 2003). For this reason, the age of the public credit registry may not capture any additional

¹² Due to confidentiality concerns, the total credit exposure for a borrower is often aggregated, and the names of the lending institutions are omitted, before the information is distributed (Miller 2003).

information. Nevertheless, this is an empirical issue that we will explore in the next section.

3.5. Bank Ownership

As discussed in the theory section, private and foreign ownership in the banking sector may reduce corruption in lending due to a greater motivation in shaping appropriate managerial incentives, introducing more competition and maintaining a good reputation. We therefore include two variables to measure the ownership structure of the banking industry. *Foreign Bank Ownership* is the fraction of the banking system's assets in banks that are 50% or more owned by foreign investors. *Private Bank Ownership* is the fraction of the banking system's assets in banks that are 50% or more owned by private investors. In the regression analysis, the omitted group is state-owned banks.

3.6. Additional Bank Controls

We also control for *Deposit Insurance*, *Bank Accounting* and *Creditor Rights*. The first two variables are from BCL (2006) and the third one is from DMS (2007). *Deposit Insurance* indicates whether there is an explicit deposit insurance scheme (Yes=1, No=0) and, if not, whether depositors were fully compensated the last time a bank failed (Yes=1, No=0). The index ranges from 0 to 2. BCL (2006) point out that deposit insurance intensifies the moral hazard problem in banking because depositors no longer face the risk of losing their savings, which diminishes their incentives to and efforts at monitoring bank activities. Hence, higher values of this index indicate less private monitoring. *Bank Accounting* measures whether the income statement includes accrued or unpaid interest or principal on performing and nonperforming loans and whether banks are required to produce consolidated financial statements. A higher value indicates more informative bank financial statements. The *Creditor Rights* index measures the powers possessed by secured lenders in a bankruptcy in four respects (DMS, 2007). First, it measures whether there are restrictions, such as creditor consent, for a debtor to file in reorganization. Second, whether secured creditors are able to seize their collateral after the reorganization petition is approved. Third, whether secured creditors are paid first out of the proceeds from liquidating a bankrupt firm. Last, whether the management retains administration of its property pending the resolution of reorganization. The index ranges from 0 to 4, with higher values indicating stronger creditor rights. We expect that the "*Credit Rights*" index is negatively related to lending corruption.

3.7. Firm Characteristics and Controls

We include two dummy variables that identify a firm's ownership type. Dummy variable *Government* equals 1 if any government agency or state body has a financial stake in the ownership of a firm, and 0 otherwise. State ownership of a firm may reduce bribery payments due to stronger bargaining power and better political connections than is the case for private firms (Svensson, 2003). In addition, the government may direct banks to provide policy loans to SOEs due to soft budget constraints. If so, state-owned companies have less incentive to bribe bank officials. Dummy variable *Foreign* equals 1 if any foreign investor has a financial stake in the ownership of a firm, and 0 otherwise. Foreign ownership of the firm is expected to be associated with fewer bribery payments because local governments are typically willing to provide better treatment to attract foreign direct investment. In addition, companies with foreign ownership may have various alternative channels in obtaining funds (e.g., foreign capital markets or simply by borrowing from foreign partners or the parent firm).

Previous literature (La Porta, Silanes, Shleifer, and Vishny, 1999, 2000, 2002) emphasizes the importance of the legal environment and contract enforcement to corporate governance, firm valuation, and reinvestment decisions. Similarly, the legal environment and contract enforcement may have potential impacts on corruption in lending. A good legal environment would increase the cost and reduce the ability of a government official to extract rents from enterprises. Similarly, we expect a good legal environment would increase the cost of corruption in bank lending. In our study, the empirical analysis includes two variables related to the legal environment and contract enforcement. The first variable is based on a question that asks about the fairness and impartiality of the court system in resolving business disputes (*Court Fairness*). The second variable is based on a question that asks about the enforceability of a court's decision (*Law Enforcement*). The survey offers respondents six choices: 1 (never), 2 (seldom), 3 (sometimes), 4 (frequently), 5 (usually), and 6 (always). A larger number represents a better system in terms of fairness and enforceability.

In addition to the variables discussed above, we include several other enterprise-level controls. *Firm Size* is measured by the natural logarithm of total sales. *Competitor* is the number of competitors in the firm's main business line. *Exporter* is a dummy variable which takes on a value of one if the firm exports, and 0 otherwise. As argued in section 2, we expect the firm competition measure, *Competitor*, to be positively associated with lending corruption and the firm type measure, *Exporter*, to be negatively related to lending corruption. Lastly, industry

classification variables are included in the analysis. For the sake of brevity, the coefficients of the industry classification variables are not reported in the tables, but are available upon request.

3.8. Country Controls

The empirical analysis also includes several country-level variables to control for differences in economic development and institutions across countries. Since Svensson (2005) finds evidence that higher GDP per capita is related to less corruption, we include this variable in our analysis. Economic and political institutions, to the degree they restrict market and political competition, could influence the extent of corruption in a country. We use the variables *Openness* (imports as a share of GDP) and *Democracy* (long-term democracy from 1950 to 2000) from Triesman (2000) to capture these institutional factors. Furthermore, we include a series of other political and institutional quality indexes as a check on the robustness of the results. The World Governance Indexes (Kaufmann et al., 1999) are constructed based on 276 individual variables taken from 31 different sources produced by 25 different organizations. The indexes measure different dimensions of governance, which can be summarized as follows:

- (1) *Voice and accountability (Voice)* – the extent to which a country’s citizens are able to participate in selecting their government, as well as the extent to which they enjoy freedom of expression, freedom of association, and a free media.
- (2) *Government effectiveness (Government Effective)* – the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies.
- (3) *Rule of law (LAW)* – the extent to which agents have confidence in and abide by the rules of society, and in particular, the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.
- (4) *Control of Corruption (Control of Corruption)* - the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests. Higher values indicate better control of corruption.

The indices are used alternatively in our different models. The empirical results are robust to the inclusion of these additional variables.

The correlations among the banking variables and firm-characteristic variables are presented in Table 3.

[Table 3 here]

As can be seen from the table, multicollinearity is not a serious problem for the banking variables and firm-level variables. Most of the correlation coefficients are below 0.3, which makes us comfortable to include these variables in the models simultaneously.

4. Empirical Results

4.1. Banking Competition and Corruption in Lending

To explore the impact of bank competition on corruption in lending, we assume a firm's latent response can be represented as follows:

$$\begin{aligned} \text{Bank Corruption}_{i,j} = & \alpha + \beta' \text{Bank Competition Measures}_j + \alpha_1 \text{State}_{i,j} + \alpha_2 \text{Foreign}_{i,j} \\ & + \alpha_3 \text{Exporter}_{i,j} + \alpha_4 \text{Firm Size}_{i,j} + \alpha_5 \text{Industry Dummies}_{i,j} \quad (1) \\ & + \theta' \text{Macro Controls}_j + \varepsilon_{i,j} \end{aligned}$$

where the i and j subscripts indicate firm and country, respectively. The bank-competition measures and country-control variables are as defined in the previous section. Unlike the latent variable, the observed dependent variable, *Bank Corruption* _{i,j} is a polychotomous variable with a natural order. Specifically, a firm classifies corruption in lending into 4 categories, with 3 threshold parameters, λ_s . We therefore use the ordered probit model to estimate the λ -parameters together with the regression coefficients simultaneously. We use the standard maximum likelihood estimation with heteroskedasticity robust standard errors. The basic results are reported in columns (1)-(4) of Table 4.

[Table 4 here]

As BCL (2006, p.238) point out, questions arise as to whether this type of equation should be estimated using clustering or not. When clustering the standard errors by country, observations are not restricted to be independent within countries; rather, observations are required to be independent across countries. The assumption of clustering seems more reasonable in our context. We therefore follow BDL (2006) with clustering the standard errors by country and repeat the analysis with the results reported in columns (5)-(8) of Table 4. As can be seen, the coefficients are the same but less significant when we allow for clustering by country. The magnitude of the ordered probit coefficients cannot be simply interpreted as the marginal effects of a one-unit increase in the independent variables on the dependent variable, although the sign and statistical significance of the coefficients are similar to the linear regression interpretations. We quantify the magnitude of the impact on an average firm when we discuss the results in Table 6 below.

In Table 4, the most important finding is that banking competition reduces corruption in lending. As can be seen in the table, the coefficients of *Bank Concentration (Deposit)* and *Bank Concentration (Asset)* are positive and statistically significant at the 1% level in most model specifications, suggesting that increased concentration (i.e., less competitiveness) results in a more severe problem of corruption in lending. The coefficients of *Entry Barrier* are positive and statistically significant at the 5% level or less in all model specifications. The coefficients of *Application Denied* are positive and marginally significant after clustering the standard errors by country. All these results strongly support our theoretical hypothesis that lower entry barriers and less stringent entry restrictions reduce corruption in lending.

Also consistent with our hypothesis, the coefficients of *Foreign Bank Ownership* are negative and statistically significant in all model specifications. The coefficients of *Private Bank Ownership* are negative but only statistically significant in the models without clustering by country. These results show some support of our hypothesis that greater private and foreign ownership in a country's banking industry reduce corruption in lending.

Furthermore, as we expected, the coefficients of *Court Fairness* and *Law Enforcement* are negative and statistically significant at the 1% level, indicating that a better legal environment and contract enforcement help reduce corruption in lending. Firm characteristics also have some impact on corruption in lending. Specifically, in all specifications, state-owned firms and foreign-owned firms are less likely to rate bank corruption as an obstacle to growth. This finding is consistent with the prior expectation that firms that have more government connections, soft budget constraints and stronger bargaining power suffer less from corruption. *Firm Size* is negatively related to corruption in lending, but only statistically significant in the models without clustering by country. *Exporting* firms are associated with less corruption in lending, as indicated by the negative and statistically significant coefficients in all model specifications. Regarding the other macro controls, creditor rights is negatively associated with corruption in lending, but only statistically significant in the models without clustering. The existence of deposit insurance is associated with more corruption in lending, which echoes the finding by BCL (2006) that private monitoring improves the integrity of bank lending. However, the results are not significant after clustering by country. Furthermore, we find that the corruption in lending is less pervasive and severe in countries with higher GDP per capita, which is consistent with the existing literature (e.g., Svensson, 2005).

4.2. Information Sharing, Competition and Corruption in Lending

In Table 5, we add to the regressions in Table 4 the five measures of information sharing: the existence of a public credit registry, the existence of a private bureau, the external auditing and disclosure of a firm's financial statements, the age of the public credit registry and the age of the private bureau. The model can be expressed as follows:

$$\begin{aligned} \text{Bank Corruption}_{i,j} = & \alpha + \beta' \text{Bank Competition Measures}_j + \delta' \text{Information Sharing Measures}_j \\ & + \alpha_1 \text{State}_{i,j} + \alpha_2 \text{Foreign}_{i,j} + \alpha_3 \text{Exporter}_{i,j} + \alpha_4 \text{Firm Size}_{i,j} \\ & + \alpha_5 \text{Industry Dummies}_{i,j} + \theta' \text{Macro Controls}_j + \varepsilon_{i,j} \end{aligned} \quad (2)$$

The empirical results are presented in Table 5. The robust standard errors are clustered by country.

[Table 5 here]

As can be seen from Table 5, the existence of a private bureau significantly reduces corruption in lending, as indicated by the negative and statistically significant coefficients of *Private Bureau* in all model specifications. In contrast, the coefficients of *Public Credit Registry* are not statistically significant. This is probably due to the nature of public credit registries in contrast to private bureaus. As we discussed earlier, the information available from public credit registries consists mainly of credit data above a certain threshold (minimum loan size) and is disseminated in consolidated form (no details on individual loans). The private credit bureaus, in contrast, offer details on individual loans and merge the credit data with other data from other sources (e.g., courts, tax authorities, and financial statements), though they are less comprehensive in coverage. The empirical evidence shows that private bureaus play a more effective role in reducing the information gap between lenders and borrowers, and consequently corruption in lending. The coefficients of *Firm Auditing* are negative and statistically significant at the 1% level in all model specifications, indicating that more accurate information disclosure lowers corruption in lending. Overall, the results strongly support our hypothesis that information sharing reduces corruption in lending.

We also include the age of public credit registries and the age of private bureaus in the models and find that the age of private bureaus is negatively and statistically associated with corruption in lending, which bolsters our earlier finding by showing that the information-sharing amount is negatively related to bank corruption. In contrast, the coefficient of public registry age is not statistically significant. As we discussed earlier, this is probably due to the nature of public credit registries being used mainly as a kind of enforcement device in

many countries. Only current data are distributed and the data on defaults or late payments are erased once they have been paid. Therefore, the public credit registries do not offer a historical record of a borrower's credit behavior (Miller, 2003). It is therefore not surprising to find that the age of the public credit registry is not associated with corruption in lending.

In columns (5)-(6), we include the key variables of banking competition and information sharing into the models simultaneously. As can be seen, the empirical results are very similar to our previous findings that information sharing and banking competition are associated with less corruption in lending.

The other variables that are included also yield similar results. *Foreign Bank Ownership* and *Private Bank Ownership* are negatively and statistically significantly associated with corruption in lending. The coefficients of both *Fair Court* and *Law Enforcement* are negative and statistically significant at the 1% level in all models, indicating that a better legal environment and contract enforcement reduce corruption in lending. State-owned firms and foreign-owned firms suffer less from corruption in lending in all model specifications. Exporting firms are associated with less corruption in lending, as indicated by the negative and statistically significant coefficients in all model specifications.

The effect of competition and information sharing on corruption in lending is not only statistically significant, but also economically significant. In order to demonstrate the magnitude of the impacts of information sharing and competition on bank corruption, we use model (5) in Table 5 to quantify the effect that information sharing and competition have on the probability that corruption in lending is rated as an obstacle to firm growth. Specifically, we compute the change in the probability that a firm rates corruption of bank officials as no obstacle (a minor obstacle, a moderate obstacle, or a major obstacle) due to a change in the bank competition and information sharing variables for an average firm. The empirical results of this illustrative exercise are presented in Table 6.

[Table 6 here]

As can be seen, the magnitude of the economic impacts is quite large. For instance, the estimates imply that an one standard deviation increase in banking concentration would lead to a 4.3 percentage point increase in the probability that a firm rates bank corruption as a major obstacle (i.e., the probability that a firm rates bank corruption as a major obstacle) and a 6.7 percentage point decrease in the probability that a firm rates bank corruption as not an obstacle to firm growth. If banking concentration increases from the minimum to maximum in the sample, the probability that a firm rates bank corruption as a major obstacle to a firm

growth increases by 19.6 percentage points and the probability that a firm rates bank corruption as not an obstacle to firm growth decreases by about 30 percentage points. The effects are quite substantial given that about 12% of the firms in the sample report that corruption in lending is a major obstacle to their growth and about 58% of the firms say that bank corruption is not an obstacle for growth.

Similarly, the estimates imply that a one standard deviation increase in *Application Denied* would lead to a 3 percentage point increase in the probability that a firm rates bank corruption as a major obstacle and a 4.8 percentage point decrease in the probability that a firm rates bank corruption as not an obstacle to firm growth. A one standard deviation increase in *Entry Barrier* would lead to a 5.1 percentage point increase in the probability that a firm rates bank corruption as a major obstacle and a 8 percentage point decrease in the probability that a firm rates bank corruption as not an obstacle to firm growth. Again, all these effects are quite substantial given that only about 12% of the firms in the sample report that corruption in lending is a major obstacle to their growth and about 58% of the firms report that bank corruption is not an obstacle for growth.

Regarding the dummy variables, we calculate the discrete change in the probability that that a firm rates bank corruption as an obstacle to growth due to a change in the dummy variable from 0 to 1. The existence of a private bureau would lead to a 4.1 percentage point decrease in the probability that that a firm rates bank corruption as a major obstacle. The disclosure of audited financial statements would lead to a 3.3 percentage point decrease in the probability that that a firm rates bank corruption as a major obstacle. The existence of a deposit insurance scheme would result in a 2.8 percentage point increase in the probability that that a firm rates bank corruption as a major obstacle. The presence of foreign and government ownership would result in 3.4 and 1.6 percentage point decreases in the probability that that a firm rates bank corruption as a major obstacle, respectively.

5. Robustness Tests

5.1. Probit Analysis and Instrument Variable Analysis

The fact that we do not have a balanced distribution of responses across the four categories of answers regarding corruption of bank lending might invalidate the ordered probit estimates or a few outliers in one of the categories with a small number of responses could exert an undue influence on the results (see BDL, 2006). In order to allow us to use a comparatively balanced distribution of

responses and lower the likelihood that idiosyncratic firm responses are biasing the results, we follow BDL (2006) in constructing a bank corruption dummy (*Corruption Dummy*) that takes on the value of zero if “no obstacle” and one if the firm’s response is “minor”, “moderate” or “major”.¹³ We use this lending corruption dummy as the dependent variable and repeat the entire analysis with the probit regressions. The results are reported in columns (1) – (3), Table 7.

[Table 7 here]

As can be seen in Table 7, the results are very similar to our previous findings. The coefficients of *Banking Concentration*, *Entry Barrier* and *Application Denied* are positive and statistically significant in all model specifications, indicating that banking competition reduces the likelihood that a firm rates bank corruption as an obstacle. We also evaluate the marginal effect on an average firm at the median values of the independent variables. For instance, a 10 percentage point increase in *Bank Concentration* will increase the probability that a firm rates bank corruption as an obstacle by 4 percentage points. A 10 percentage point increase in *Application Denied* will increase the probability that a firm rates bank corruption as an obstacle by 1.2 percentage points. A one standard deviation increase in *Entry Barrier* would result in a 2.7 percentage point increase in the probability that a firm rates bank corruption as an obstacle. All these results confirm our finding that greater banking competition, in terms of lowering concentration, lowering entry barriers and imposing less stringent entry restrictions, reduces corruption in lending.

With respect to the information-sharing variable, the existence of a private bureau is negatively associated with the corruption in lending. The existence of a public registry, however, does not have a significant impact on the probability that a firm rates bank corruption as an obstacle. Firm information disclosure reduces the probability that a firm rates bank corruption as an obstacle. Regarding the marginal effect evaluated at the median value of the independent variables, the existence of a private bureau and firm information disclosure reduces the probability that a firm rates bank corruption as an obstacle by 13 and 12 percentage points, respectively. In addition, both private and foreign ownership of bank are negatively associated with the probability of corruption in lending, which is consistent with our previous findings.

¹³ In our sample, 58% of firms responded that corruption in bank lending is not a significant barrier to firm growth, while 42% indicated that bank corruption is an obstacle, with some indicating it is a minor, moderate, or major obstacle.

Similarly, both the presence of government and foreign ownership reduce the probability that a firm rates bank corruption as an obstacle. The existence of a *Deposit Insurance Scheme* increases the probability that an average firm rates bank corruption as an obstacle by about 10 percentage points, which echoes the finding by BDL (2006). Overall, the results provide illustrative evidence of the potential magnitude of the importance of our findings on competition and information.

In our study, the potential for endogeneity being a problem is less of a concern than in pure cross-country analysis because we are examining the impact of banking-market competition and the existence of information-sharing agencies on individual firms. It seems unlikely that an individual firm's view about corruption in lending will influence nation-wide banking competition and information-sharing schemes ((BCL, 2006). Even though there may be feedback from the corporate sector to policy making: if high levels of corruption in lending do generate calls for more banking competition and information sharing, the empirical relationship between banking competition/information sharing should be positive. However, we find a negative relationship between banking competition/information sharing and corruption in lending. Furthermore, among the countries with information-sharing schemes, more than 85% of them set up the schemes 3 or more years prior to our sample period.

Nevertheless, we conduct some robustness tests using instrumental variable probit analysis.¹⁴ The empirical results are presented in column (4) – (6), Table 7. We base the selection of instrumental variables on the theoretical and empirical work in the law, institution and finance literature (Acemoglu and Johnson, 2005, BDL, 2003, Easterly and Levine, 1997, LLSV, 1998, 1999). From the law and finance perspective, LLSV (1999) and BDL (2003) show that the historically determined differences in legal traditions help explain international differences in financial systems today. Moreover, legal origin can be thought of as “exogenous” because it was imposed by colonial power in many emerging countries (Acemoglu and Johnson, 2005; LLSV, 1999). We therefore include legal origin (English, French) as instrumental variables for the banking competition measures using data from DMS (2007). The English legal origin includes the common law of England and its former colonies. The French legal origin includes the civil law of France, of countries Napoleon conquered, and of their former colonies. The endowment theory, on the other hand, focuses on the roles of geography and the disease

¹⁴ To our knowledge, the instrumental variable estimators have not been developed for the ordered probit analysis used in the earlier section.

environment in shaping the political and financial institutional development (Acemoglu et al., 2001, Beck et al., 2003). Beck et al. (2003) find strong evidence that geographical endowment has substantial impacts on the formation of long-lasting institutions that shape financial development. We therefore follow BDL (2005, 2006) in using latitude¹⁵ as an instrumental variable for the competition and information-sharing measures.¹⁶ We also include the ethnic fractionalization¹⁷ as an instrumental variable because it has been found that economies with greater ethnic diversity tend to choose institutions that allow those in power to expropriate resources from others (BDL 2003, 2006). Lastly, it is also reported that a country's culture heritage, as proxied by religion composition, has a significant impact on shaping its political and financial institutions (LLSV, 1999, Stulz and Williamson, 2003). In model 6 (column 6, table 7), we therefore include religion composition as additional IVs.

As can be seen from the table, the empirical results are rather robust. The coefficients of *Banking Concentration* remain positive and statistically significant in all model specifications, indicating that banking competition reduces the likelihood that a firm rates bank corruption as an obstacle. The coefficients of *Entry Barrier* and *Application Denied* are also positive and statistically significant across the model specifications. All these results bolster our finding that banking competition, in terms of lowering concentration, lowering entry barriers and imposing less stringent entry restrictions, is associated with less corruption in lending. As regarding the information variable, the empirical result is also consistent with our previous findings. The existence of a private bureau reduces the probability that a firm rates bank corruption as an obstacle. Again, we do not find a significant relation between the existence of a public registry and corruption in lending. In addition, the coefficient of firm information disclosure remains negative though it is not statistically significant.

Regarding the control variables, the private and foreign ownership of the banking industry are negatively associated with corruption in lending. The presence of government and foreign ownership is negatively associated with the probability that a firm rates bank corruption as an obstacle. Moreover, the coefficients of firm competition are positive and statistically significant in the IV

¹⁵ The absolute value of the latitude of the country, scaled to take a value between 0 and 1, is from LLSV (1999).

¹⁶ We did not use the mortality ratio proposed by Acemoglu and Johnson (2001) because it has a small overlap in countries compared with the sample we are using.

¹⁷ We use the average value of five different indices of ethnical fractionalization. The data are from Easterly and Levine (1997).

regressions, which is consistent with our theoretical hypothesis. Overall, the results are very consistent with our previous findings and predictions.

5.2. More Country Controls

Next, we address the issue of potential omitted variables. Since the overall quality of the institutional environment might influence corruption in lending, we include a series of macro-institutional indexes in our model to test the robustness of the results.

We control for *Democracy* (long-term democracy from 1950 to 2000) and *Openness* (imports as a share of GDP), using data from Triesman (2000). Furthermore, we include a series of political and institutional quality indexes to check the robustness of the results. The World Governance Indexes compiled by Kaufmann et al. (2006) are used to capture different aspects of the institutional environment (voice and accountability, government effectiveness, rule of law, and control of corruption). The detailed definitions of the indexes are presented in section 3.¹⁸ Because some indexes are highly correlated with each other, we include the indexes individually in the models. The results are presented in Table 8. [Table 8 here]

As can be seen from the table, the empirical results are highly consistent with our previous findings. The competition and information-sharing variables are significantly and negatively associated with corruption in lending. Most of the macro-control variables are not statistically significant, indicating that the legal environment and institution quality are well controlled for by the firm-level, legal-environment variables and other macro-control variables like GDP per capita.

6. Conclusion

Our paper examines whether bank competition and information sharing help curtail corruption in bank lending. We use three unique datasets: (1) the World Bank Business Environment Survey (2000) which contains direct firm-level information on the degree to which corruption in bank lending represents an obstacle to firms; (2) the data compiled by Barth et al. (2006) which provides detailed information about various dimensions of bank competition and regulation across different countries during 2001-2003; and (3) the data from Djankov et al. (2007) on public credit registries and private credit bureaus in 129 countries during 1978-2003. We obtain two main empirical results. First, greater competition in banking helps to curtail corruption in bank lending. Second,

¹⁸ Kaufmann et al. (2006) compile the world governance indicators from 1996 to 2005. We use the value of the index for 1999 in our analysis.

information sharing via credit registries/bureaus helps reduce corruption in bank lending.

Beyond these two important results, we find that government- and foreign-owned firms as well as exporting firms tend to be subject to less lending corruption; objective courts and better law enforcement tend to reduce lending corruption; greater private and foreign ownership of the banking industry are associated with more integrity in lending; and that more private monitoring of banks helps to curtail lending corruption. Both our major findings and other results, moreover, pass a number of robustness tests.

Our findings complement the recent, pioneering work of Beck, Demirgüç-Kunt and Levine (2006) which is to our best knowledge the only existing study of the determinants of corruption in obtaining bank loans by firms. Using datasets (1) and (2) mentioned above, they examine the role of bank supervision in combating lending corruption. They find that strengthening traditional official supervision does not have a positive impact on the integrity of bank lending, but instead, a supervisory strategy that focuses on empowering private monitoring of banks through the disclosure of accurate and timely information reduces lending corruption. We focus on the role of market institutions, in particular on market competition and information-sharing mechanisms in the form of credit bureaus (and public credit registries) in reducing bank-lending corruption. Controlling for firm characteristics and including bank and macro controls, we find that competition among banks and information sharing among lenders (especially via private credit bureaus) are both important in reducing bank corruption.

Our findings have important policy implications. First, our results show that one positive and important aspect of bank competition is in reducing corruption, apart from any impacts on banking efficiency and stability. The finding regarding information sharing also sheds light on the positive role that market institutions like private credit bureaus can play in reducing corruption in bank lending.

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Table 1: Definitions and Sources of Variables

Variable	Definition	Original Sources
Bank Corruption	Corruption of bank officials as an obstacle for the operation and growth of your business. (1-no obstacle, 2- minor obstacle, 3- a moderate obstacle, 4-major obstacle)	World Business Environment Survey (WBES, 2000)
Bank Concentration (Deposit)	The fraction of total deposits held by the five largest banks in the industry. The data are compiled based on a survey of banking regulators in 150 countries in 2001.	Barth et al. (2006)
Bank Concentration (Asset)	The fraction of total assets held by the five largest banks in the industry. The data are compiled based on a survey of banking regulators in 150 countries in 2001.	Barth et al. (2006)
Entry Barrier	Entry into Banking Requirement, which is a variable developed based on eight questions regarding whether various types of legal submission are required to obtain a banking license. Which of the following are legally required to be submitted before issuance of the banking license? (1) Draft by-laws? (2) Intended organization chart? (3) Financial projections for first three years? (4) Financial information on main potential shareholders? (5) Background/experience of future directors? (6) Background/experience of future managers? (7) Sources of funds to be disbursed in the capitalization of new bank? (8) Market differentiation intended for the new bank? The index ranges from 0 (low entry requirement) to 8 (high entry requirement). Higher values indicate greater stringency	Barth et al. (2006)
Application Denied	The percentage to which applications to enter banking are denied in the past five years. The data are compiled based on a survey of banking regulators in 150 countries in 2001.	Barth et al. (2006)
Foreign Bank Ownership	The fraction of the banking system's assets in the banks that are 50 percent or more owned by foreign investors. The data are compiled based on a survey of banking regulators in 150 countries in 2001.	Barth et al. (2006)
Private Bank Ownership	The fraction of the banking system's assets in the banks that are 50 percent or more owned by private investors. The data are compiled based on a survey to banking regulators in 150 countries in 2001.	Barth et al. (2006)
Public Credit Registry	The variable equals one if a public credit registry operates in the country by the end of 1999, zero otherwise. A public registry is defined as a database owned by public authorities (usually the central bank or banking supervisor authority) that collects information on the standing of borrowers in the financial system and makes it available to financial institutions.	Djankov et al. (2007)
Public Registry Age	Years of establishment since the starting date of the public registry.	Djankov et al. (2007)

Variable	Definition	Original Sources
Private Bureau	The variable equals one if a private credit bureau operates in the country by the end of 1999, zero otherwise. A private bureau is defined as a private commercial firm that maintains a database on the standing of borrowers in the financial system, and its primary role is to facilitate exchange of information amongst banks and financial institutions.	Djankov et al. (2007)
Private Bureau Age	Years of establishment since the starting date of oldest private credit bureau in the country.	Djankov et al. (2007)
Firm Auditing	Does the firm provide its shareholders with annual financial statements that have been reviewed by an external auditor (Yes=1, No=0)? Higher value indicates more information disclosure of the firm.	World Business Environment Survey (WBES, 2000)
Deposit Insurance	This variable indicates whether there is an explicit deposit insurance scheme (Yes=1, No=0) and, if not, whether depositors were fully compensated the last time a bank failed (Yes=1, No=0). The index ranges from 0 to 2. Higher values indicate less private monitoring.	Barth et al. (2006)
Bank Accounting	Whether the income statement includes accrued or unpaid interest or principal on performing and nonperforming loans and whether banks are required to produce consolidated financial statements. Higher value indicates more informative bank account.	Barth et al. (2006)
Creditor Rights	The index measures the power of secured lenders in bankruptcy. A score of one is assigned when each of the following rights of secured lenders are defined in laws and regulations: First, there are restrictions, such as creditor consent, for a debtor to file reorganization. Second, secured creditors are able to seize their collateral after the reorganization petition is approved. Third, secured creditors are paid first out of the proceeds of liquidating a bankrupt firm. Last, management does not retain administration of its property pending the resolution of the reorganization. The index ranges from 0 to 4. Higher value indicates stronger creditor rights.	Djankov et al. (2007)
Government	Dummy variable equals to 1 if any government agency or state body has a financial stake in the ownership of the firm, 0 otherwise.	World Business Environment Survey (WBES, 2000)
Foreign	Dummy variable equals to 1 if any foreign company and individual has a financial stake in the ownership of the firm	World Business Environment Survey (WBES, 2000)
Law Enforcement	"In resolving business dispute, do you believe your country's court system to be decision enforced," categorical variable, 0-never, 1-seldom, 2-sometimes, 3-frequently, 4-usually, 5-always. Higher value indicates better law enforcement.	World Business Environment Survey (WBES, 2000)

Variable	Definition	Original Sources
Fair Court	"In resolving business dispute, do you believe your country's court system to be fair and impartial," categorical variable, 0-never, 1-seldom, 2-sometimes, 3-frequently, 4-usually, 6-always. Higher value indicates better court quality.	World Business Environment Survey (WBES, 2000)
Competition	Regarding your firm's major product line, how many competitors do you face in your market?	World Business Environment Survey (WBES, 2000)
Exporter	This dummy variable takes on the value 1 if firm exports, 0 otherwise.	World Business Environment Survey (WBES, 2000)
Firm Size	Nature logarithm of firm sales.	World Business Environment Survey (WBES, 2000)
Inflation	3 year average percentage inflation, GDP deflator.	World Development Indicators (WDI)
GDP per Capita	Logarithm of gross national product per capita in 1999.	World Development Indicators (WDI)
Voice and Accountability	The indicator which measures the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media. The value of year 1999 is used in this study. Higher values mean greater political rights.	Kaufmann et al. (2006)
Government Effectiveness	The indicator which measure the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The value of year 1999 is used in this study. Higher values mean higher quality of public and civil service.	Kaufmann et al. (2006)
Rule of Law	The indicator which measure the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence. The value of year 1999 is used in this study. Higher values mean stronger law and order.	Kaufmann et al. (2006)
Control of Corruption	The indicator which measure the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The value of year 1999 is used in this study. Higher values indicate better control of corruption.	Kaufmann et al. (2006)
Democracy	Democratic in all years since 1950 as of 2000	Treisman (2000)
Openness	Imports of goods and services as % of GDP, 2000.	World Development Indicators (WDI)

Table 2: Summary Statistics of Key Variables

Variable	Observations	Mean	Standard Dev.	Minimum	Maximum
Bank Corruption	8032	1.776	1.050	1	4
Government	7726	0.117	0.322	0	1
Foreign	7752	0.192	0.394	0	1
Competitor	7771	2.342	0.731	0	9
Fair Court	7385	3.429	1.435	1	6
Law Enforcement	7325	3.424	1.456	1	6
Firm Size	7294	10.174	7.556	0.11	25.33
Exporter	7609	0.365	0.481	0	1
Bank Concentration (Deposit)	62	0.656	0.191	0.21	1
Bank Concentration (Asset)	64	0.629	0.188	0.14	1
Application Denied	52	0.229	0.287	0	1
Entry Barrier	69	7.464	0.964	3	8
Public Registry	77	0.455	0.501	0	1
Public Registry Age	66	9.015	15.323	0	65
Private Bureau	77	0.377	0.488	0	1
Private Bureau Age	66	8.803	19.118	0	98
Deposit Insurance	69	0.696	0.464	0	1
Bank Accounting	66	3.576	0.583	2	4
Private Bank Ownership	61	42.713	30.405	0	95.2
Foreign Bank Ownership	62	38.567	30.398	1.9	100
Creditor Rights	77	1.935	1.104	0	4
GDP per Capita (log)	81	7.438	1.375	4.58	10.38
Voice and Accountability	81	0.013	0.823	-1.72	1.38
Government Effectiveness	81	0.018	0.897	-1.42	2.57
Rule of Law	81	-0.064	0.864	-1.34	2.04
Control of Corruption	81	-0.086	0.935	-1.34	2.48
Democracy	78	0.141	0.350	0	1

Table 3: Correlation Matrix of Key Banking Variables (Panel A)

	Concentration (Deposit)	Concentration (Asset)	Entry Barrier	Entry Denied	Public Registry	Private Registry	Firm Auditing	Private Bank	Foreign Bank	Deposit Insurance	Bank Accounting	Creditor Right
Bank Concentration (Deposit)	1											
Bank Concentration (Asset)	0.9335*	1										
Entry Barrier	-0.0850*	-0.0799*	1									
Application Denied	-0.0940*	-0.0031	-0.1427*	1								
Public Registry	0.0482*	0.1918*	-0.0945*	0.1731*	1							
Private Bureau	-0.1685*	-0.1226*	-0.0237*	0.0584*	0.1568*	1						
Firm Auditing	-0.0665*	-0.0058	-0.0404*	0.0925*	0.0777*	0.2206*	1					
Private Bank Ownership	-0.2132*	-0.2050*	-0.0596*	-0.1029*	0.0439*	0.2421*	0.0855*	1				
Foreign Bank Ownership	0.3163*	0.3528*	0.2911*	-0.0751*	-0.0366*	0.0049	-0.0507*	-0.7106*	1			
Deposit Insurance	-0.0388*	-0.0402*	-0.0666*	-0.1431*	-0.0618*	0.1671*	0.0252*	0.0829*	-0.0151	1		
Bank Accounting Disclosure	-0.1869*	-0.1712*	0.0019	-0.0785*	0.0077	0.1646*	0.0609*	0.0826*	0.1447*	-0.1929*	1	
Creditor Right	0.0001	-0.0061	0.0377*	0.0126	-0.1380*	-0.1000*	-0.0174	0.0645*	0.001	0.1608*	-0.0807*	1

Table 3: Correlation Matrix of Firm Level Variables (Panel B)

	Corruption	Government	Foreign	Audit	Competitor	Fair Court	Law Enforcement	Firm Size	Exporter
Corruption	1								
Government	-0.0499*	1							
Foreign	-0.0808*	-0.0562*	1						
Audit	-0.1510*	0.0482*	0.2567*	1					
Competitor	0.0982*	-0.0460*	-0.0964*	-0.1026*	1				
Fair Court	-0.1519*	0.0627*	0.0574*	0.1568*	0.0076	1			
Law Enforcement	-0.1440*	0.0636*	0.0310*	0.0887*	0.0052	0.4701*	1		
Firm Size	-0.0948*	-0.2153*	0.2453*	0.3480*	-0.3412*	0.1254*	0.0512*	1	
Exporter	-0.1028*	0.0508*	0.2422*	0.2368*	-0.0386*	0.1310*	0.0566*	0.1362*	1

Table 4: Bank Competition and Corruption

	Without Country Cluster Effect				With Country Cluster Effect			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Banking Sector Variables</i>								
Bank Concentration (Deposit)	0.846 [0.000]***		1.257 [0.000]***		0.846 [0.029]**		1.257 [0.003]***	
Bank Concentration (Asset)		0.654 [0.000]***		0.903 [0.000]***		0.654 [0.054]*		0.903 [0.020]**
Entry Barrier	0.176 [0.000]***	0.166 [0.000]***	0.277 [0.000]***	0.25 [0.000]***	0.176 [0.022]**	0.166 [0.029]**	0.277 [0.005]***	0.25 [0.008]***
Application Denied		0.506 [0.000]***		0.425 [0.000]***		0.506 [0.064]*		0.425 [0.133]
Private Bank Ownership	-0.006 [0.000]***	-0.006 [0.000]***	-0.003 [0.002]***	-0.004 [0.000]***	-0.006 [0.070]*	-0.006 [0.064]*	-0.003 [0.322]	-0.004 [0.265]
Foreign Bank Ownership	-0.01 [0.000]***	-0.01 [0.000]***	-0.011 [0.000]***	-0.011 [0.000]***	-0.01 [0.017]**	-0.01 [0.016]**	-0.011 [0.011]**	-0.011 [0.018]**
<i>Firm-level Variables</i>								
Government	-0.233 [0.000]***	-0.231 [0.000]***	-0.284 [0.000]***	-0.283 [0.000]***	-0.233 [0.016]**	-0.231 [0.017]**	-0.284 [0.003]***	-0.283 [0.003]***
Foreign	-0.174 [0.001]***	-0.181 [0.000]***	-0.166 [0.004]***	-0.169 [0.003]***	-0.174 [0.001]***	-0.181 [0.000]***	-0.166 [0.004]***	-0.169 [0.004]***
Competitor	0.019 [0.525]	0.023 [0.426]	0.038 [0.252]	0.041 [0.212]	0.019 [0.715]	0.023 [0.651]	0.038 [0.531]	0.041 [0.496]
Fair Court	-0.047 [0.002]***	-0.044 [0.004]***	-0.047 [0.007]***	-0.046 [0.008]***	-0.047 [0.020]**	-0.044 [0.028]**	-0.047 [0.018]**	-0.046 [0.021]**
Law Enforcement	-0.096 [0.000]***	-0.099 [0.000]***	-0.089 [0.000]***	-0.092 [0.000]***	-0.096 [0.000]***	-0.099 [0.000]***	-0.089 [0.001]***	-0.092 [0.000]***
Firm Size	-0.01 [0.002]***	-0.01 [0.001]***	-0.019 [0.000]***	-0.018 [0.000]***	-0.01 [0.302]	-0.01 [0.242]	-0.019 [0.070]*	-0.018 [0.095]*
Exporter	-0.137 [0.001]***	-0.138 [0.001]***	-0.154 [0.001]***	-0.162 [0.001]***	-0.137 [0.020]**	-0.138 [0.021]**	-0.154 [0.011]**	-0.162 [0.008]**
<i>Other Controls</i>								
Creditor Right	-0.038 [0.050]**	-0.038 [0.044]**	-0.041 [0.086]*	-0.036 [0.132]	-0.038 [0.494]	-0.038 [0.483]	-0.041 [0.525]	-0.036 [0.597]
Deposit Insurance	0.192 [0.000]***	0.166 [0.000]***	0.151 [0.002]***	0.109 [0.025]**	0.192 [0.182]	0.166 [0.224]	0.151 [0.253]	0.109 [0.419]
Other Macro-controls	yes	yes	yes	yes	yes	yes	yes	yes
Industry Dummies	yes	yes	yes	yes	yes	yes	yes	yes
Observations	4349	4395	3568	3568	4349	4395	3568	3568

Bank corruption is the response to the question "Is the corruption of bank officials as an obstacle for the operation and growth of your business (1-no obstacle, 2- minor obstacle, 3- a moderate obstacle, 4-major obstacle)". Bank concentration (Deposit) is the fraction of total deposits held by the five largest banks in the industry. Bank concentration (Asset) is the fraction of total assets held by the five largest banks in the industry. Entry barrier measures the entry into banking requirement, which is a variable developed based on eight questions regarding whether various types of legal submission are required to obtain a banking license. The index ranges from 0 (low entry requirement) to 8 (high entry requirement). Higher values indicate greater stringency. Application Denied is the percentage to which applications to enter banking are denied in the past five years. Private Bank Ownership indicates of the banking system's assets in the banks that are 50 percent or more owned by private investors. Foreign Bank Ownership indicates the share of banks owned by foreign investors. Government is a dummy variable which equals to 1 if any government agency or state body has a financial stake in the ownership of the firm, 0 otherwise. Foreign is a dummy variable which equals to 1 if any foreign company or individual has a financial stake in the ownership of the firm. Law enforcement is a firm level survey indicator which measures the enforceability of court's decision with a higher value indicating better law enforcement. Law enforcement is a firm level survey indicator which measures the fairness and impartialness of court's decision with a higher value indicating more fairness. Firm size is the natural logarithm of firm sales in US\$. Exporter is a dummy variable that takes on value one if the firm is an exporter and zero otherwise. Creditor Rights is an index which measures the power of secured lenders in bankruptcy defined in laws and regulations. The index ranges from 0 to 4 with a higher value indicating stronger creditor rights. Deposit Insurance indicates whether there is an explicit deposit insurance scheme and whether depositors were fully compensated the last time a bank failed. Other macro controls (GDP per capita and inflation) and industry dummies are also included. For brevity, the coefficients are not presented but are available upon request. The regressions are run with ordered probit, which is based on standard maximum likelihood estimation with heteroskedasticity-robust standard errors. Furthermore, we allow for clustering within countries to allow for possible correlation of errors in model (5) to (8). Detailed variable definitions and sources are given in the table 1. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively. P-values based on robust standard errors are in parentheses.

Table 5: Information, Competition and Corruption

	(1)	(2)	(3)	(4)	(5)	(6)
Public Credit Registry	0.111 [0.446]	0.157 [0.257]	0.097 [0.473]	0.006 [0.966]	0.039 [0.801]	0.018 [0.909]
Private Bureau	-0.483 [0.008]***	-0.405 [0.022]**	-0.318 [0.055]*	-0.296 [0.094]*	-0.361 [0.043]**	-0.357 [0.040]**
Public Registry Age				0.006 [0.221]		
Private Bureau Age			-0.006 [0.007]***	-0.007 [0.001]***		
Firm Auditing		-0.274 [0.001]***	-0.224 [0.001]***	-0.223 [0.001]***	-0.300 [0.001]***	-0.285 [0.000]***
Bank Concentration (Deposit)					1.064 [0.004]***	
Bank Concentration (Asset)						0.820 [0.042]**
Entry Barrier					0.211 [0.007]***	0.235 [0.006]***
Application Denied					0.386 [0.099]*	0.454 [0.060]*
Private Bank Ownership	-0.001 [0.795]	-0.002 [0.539]	-0.006 [0.020]**	-0.006 [0.016]**	-0.003 [0.268]	-0.003 [0.319]
Foreign Bank Ownership	-0.002 [0.574]	-0.002 [0.527]	-0.007 [0.021]**	-0.006 [0.035]**	-0.007 [0.044]**	-0.008 [0.030]**
Government	-0.278 [0.003]***	-0.251 [0.009]***	-0.308 [0.000]***	-0.304 [0.000]***	-0.29 [0.003]***	-0.295 [0.002]***
Foreign	-0.167 [0.001]***	-0.137 [0.015]**	-0.129 [0.027]**	-0.13 [0.026]**	-0.138 [0.026]**	-0.141 [0.021]**
Competitor	-0.012 [0.805]	-0.006 [0.899]	0.002 [0.971]	-0.007 [0.897]	0.018 [0.734]	0.015 [0.784]
Fair Court	-0.048 [0.013]**	-0.042 [0.032]**	-0.041 [0.035]**	-0.044 [0.027]**	-0.051 [0.004]***	-0.052 [0.005]***
Law Enforcement	-0.097 [0.000]***	-0.097 [0.000]***	-0.093 [0.000]***	-0.093 [0.000]***	-0.084 [0.000]***	-0.082 [0.000]***
Firm Size	0.002 [0.868]	0.006 [0.600]	0.008 [0.446]	0.008 [0.457]	0.000 [0.984]	0.000 [0.988]
Exporter	-0.204 [0.000]***	-0.169 [0.001]***	-0.146 [0.005]***	-0.154 [0.002]***	-0.184 [0.001]***	-0.176 [0.002]***
Creditor Rights	-0.055 [0.339]	-0.06 [0.280]	-0.033 [0.564]	-0.036 [0.543]	-0.046 [0.445]	-0.049 [0.386]
Deposit Insurance	0.225 [0.086]*	0.237 [0.060]*	0.269 [0.031]**	0.264 [0.026]**	0.224 [0.032]**	0.256 [0.015]**
Bank Accounting Disclosure	0.042 [0.698]	0.087 [0.385]	0.054 [0.604]	0.066 [0.501]	0.147 [0.222]	0.15 [0.165]
Other Macro Controls	yes	yes	yes	yes	yes	yes
Industry Dummies	yes	yes	yes	yes	yes	yes
Observations	4,350	4,076	3,935	3,935	3,270	3,270

Bank corruption is the response to the question "Is the corruption of bank officials as an obstacle for the operation and growth of your business (1-no obstacle, 2- minor obstacle, 3- a moderate obstacle, 4-major obstacle)". Public Credit Registry is a dummy variable which takes on value one if a public credit registry operates in the country by the end of 1999, zero otherwise. Public Registry Age is the years of establishment since the starting date of the public credit registry. Private Bureau is a dummy variables which takes on value one if a private credit bureau operates in the country by the end of 1999, zero otherwise. Private Bureau Age is the years of establishment since the starting date of oldest private credit bureau in the country. Firm auditing is a dummy variable which takes on value one if the firm provide its shareholders with annual financial statements that have been reviewed by an external auditor, and 0 otherwise. Higher value indicates more information disclosure of the firm. Bank concentration (Deposit) is the fraction of total deposits held by the five largest banks in the industry. Bank concentration (Asset) is the fraction of total assets held by the five largest banks in the industry. Entry barrier measures the entry into banking requirement, which is a variable developed based on eight questions regarding whether various types of legal submission are required to obtain a banking license. The index ranges from 0 (low entry requirement) to 8 (high entry requirement). Higher values indicate greater stringency. Application Denied is the percentage to which applications to enter banking are denied in the past five years. Private Bank Ownership indicates of the banking system's assets in the banks that are 50 percent or more owned by private investors. Foreign Bank Ownership indicates the share of banks owned by foreign investors. Government is a dummy variable which equals to 1 if any government agency or state body has a financial stake in the ownership of the firm, 0 otherwise. Foreign is a dummy variable which equals to 1 if any foreign company or individual has a financial stake in the ownership of the firm. Law enforcement is a firm level survey indicator which measures the enforceability of court's decision with a higher value indicating better law enforcement. Law enforcement is a firm level survey indicator which measures the fairness and impartialness of court's decision with a higher value indicating more fairness. Firm size is the natural logarithm of firm sales in US\$. Exporter is a dummy variable that takes on value one if the firm is an exporter and zero otherwise. Creditor Rights is an index which measures the power of secured lenders in bankruptcy defined in laws and regulations. The index ranges from 0 to 4 with a higher value indicating stronger creditor rights. Deposit Insurance indicates whether there is an explicit deposit insurance scheme and whether depositors were fully compensated the last time a bank failed. Bank Accounting is an indicator which measures whether the income statement includes accrued or unpaid interest or principal on performing and nonperforming loans and whether banks are required to produce consolidated financial statements. Higher value indicates more informative bank account. Other macro controls (GDP per capita and inflation) and the industry dummies are also included. For brevity, the coefficients are not presented but are available upon request. The regressions are run with ordered probit, which is based on standard maximum likelihood estimation with heteroskedasticity-robust standard errors. Furthermore, we allow for clustering within countries to allow for possible correlation of errors in all the models. Detailed variable definitions and sources are given in the table 1. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively. P-values based on robust standard errors are in parentheses.

Table 6: Magnitude of the Effects: Competition, Information and Corruption

		1	2	3	4
Bank Concentration	1 standard dev. increase	-0.067	0.006	0.018	0.043
	Change from Minimum to Maximum	-0.299	0.025	0.078	0.196
Application Denied	1 standard dev. increase	-0.048	0.004	0.013	0.030
	Change from Minimum to Maximum	-0.173	0.002	0.042	0.128
Entry Barrier	1 standard dev. increase	-0.080	0.007	0.022	0.051
	Change from Minimum to Maximum	-0.357	0.081	0.104	0.171
Private Bureau	Change from 0 to 1	0.071	0.141	-0.025	-0.041
Firm Auditing	Change from 0 to 1	0.057	0.113	-0.018	-0.033
Deposit Insurance	Change from 0 to 1	-0.051	-0.101	0.012	0.028
Government	Change from 0 to 1	0.059	0.117	-0.019	-0.034
Foreign	Change from 0 to 1	0.028	0.056	-0.007	-0.016

The estimation is based on model 5 in table 5. Bank concentration is the fraction of total deposits held by the five largest banks in the industry. Application Denied is the percentage to which applications to enter banking are denied in the past five years. Entry barrier measures the entry into banking requirement, which is a variable developed based on eight questions regarding whether various types of legal submission are required to obtain a banking license. The index ranges from 0 (low entry requirement) to 8 (high entry requirement). Higher values indicate greater stringency. Private Bureau is a dummy variable which takes on value one if a private credit bureau operates in the country by the end of 1999, zero otherwise. Firm auditing is a dummy variable which takes on value one if the firm provide its shareholders with annual financial statements that have been reviewed by an external auditor, and 0 otherwise. Government is a dummy variable which equals to 1 if any government agency or state body has a financial stake in the ownership of the firm, 0 otherwise. Foreign is a dummy variable which equals to 1 if any foreign company or individual has a financial stake in the ownership of the firm. Numbers in column 1, 2, 3, 4, indicate the change in the probability that an average firm rates the corruption of bank officials as no obstacle, a minor obstacle, a moderate obstacle and a major obstacle, respectively due to the change of the bank competition and information variable as indicated in the second column.

Table 7: Probit Analysis: Competition, Information and Corruption

	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	Probit	Probit	IV Probit	IV Probit	IV Probit
Bank Concentration (Asset)	0.936 [0.047]**		0.887 [0.054]*	2.435 [0.000]***		1.324 [0.017]**
Bank Concentration (Deposit)		1.066 [0.024]**			2.395 [0.000]***	
Entry Barrier	0.298 [0.005]***	0.314 [0.005]***	0.249 [0.007]***	1.114 [0.000]***	1.174 [0.000]***	0.774 [0.000]***
Application Denied	0.629 [0.049]**	0.699 [0.029]**	0.542 [0.058]*	2.160 [0.010]**	2.601 [0.002]***	0.983 [0.009]***
Public Registry			0.030 [0.860]			0.207 [0.170]
Private Bureau			-0.359 [0.043]**			-0.328 [0.023]**
Firm Auditing			-0.319 [0.002]***			-0.037 [0.647]
Private Bank Ownership	-0.005 [0.160]	-0.005 [0.221]	-0.006 [0.062]*	-0.008 [0.009]***	-0.006 [0.051]*	-0.006 [0.052]*
Foreign Bank Ownership	-0.010 [0.028]**	-0.010 [0.027]**	-0.009 [0.031]**	-0.011 [0.050]*	-0.009 [0.109]	-0.010 [0.035]**
Government	-0.310 [0.002]***	-0.309 [0.002]***	-0.312 [0.001]***	-0.356 [0.002]***	-0.349 [0.003]***	-0.417 [0.000]***
Foreign	-0.200 [0.001]***	-0.194 [0.001]***	-0.155 [0.019]**	-0.192 [0.021]**	-0.169 [0.044]**	-0.246 [0.002]***
Competitor	0.051 [0.446]	0.050 [0.451]	0.029 [0.618]	0.125 [0.028]**	0.128 [0.027]**	0.101 [0.081]*
Fair Court	-0.044 [0.017]**	-0.043 [0.020]**	-0.038 [0.037]**	0.003 [0.925]	0.009 [0.788]	0.001 [0.981]
Law Enforcement	-0.086 [0.000]***	-0.085 [0.000]***	-0.093 [0.000]***	-0.037 [0.135]	-0.036 [0.158]	-0.059 [0.019]**
Firm Size	-0.016 [0.125]	-0.016 [0.126]	0.007 [0.585]	0.003 [0.673]	0.000 [0.965]	0.007 [0.410]
Exporter	-0.180 [0.001]***	-0.171 [0.001]***	-0.161 [0.006]***	-0.119 [0.100]	-0.119 [0.106]	-0.140 [0.050]**
Creditor Rights	-0.046 [0.484]	-0.047 [0.468]	-0.057 [0.368]	-0.050 [0.182]	-0.038 [0.327]	-0.074 [0.043]**
Deposit Insurance	0.222 [0.101]	0.251 [0.075]*	0.258 [0.028]**	1.450 [0.000]***	1.570 [0.000]***	0.982 [0.000]***
Bank Accounting Disclosure	0.123 [0.428]	0.107 [0.461]	0.177 [0.202]	0.271 [0.045]**	0.154 [0.224]	0.308 [0.021]**
Other Macro-controls	yes	yes	yes	yes	yes	yes
Industry Dummies	yes	yes	yes	yes	yes	yes
Observations	3,489	3,489	3,270	2384	2384	2206

Bank Corruption Dummy is the response to the question "Is the corruption of bank officials as an obstacle for the operation and growth of your business?", where "no obstacle" is equal to zero and "minor", "moderate" and "major" is equal to one. Bank concentration (Deposit) is the fraction of total deposits held by the five largest banks in the industry. Bank concentration (Asset) is the fraction of total assets held by the five largest banks in the industry. Entry barrier measures the entry into banking requirement, which is a variable developed based on eight questions regarding whether various types of legal submission are required to obtain a banking license. The index ranges from 0 (low entry requirement) to 8 (high entry requirement). Higher values indicate greater stringency. Application Denied is the percentage to which applications to enter banking are denied in the past five years. Public Credit Registry is a dummy variable which takes on value one if a public credit registry operates in the country by the end of 1999, zero otherwise. Private Bureau is a dummy variables which takes on value one if a private credit bureau operates in the country by the end of 1999, zero otherwise. Firm auditing is a dummy variable which takes on value one if the firm provide its shareholders with annual financial statements that have been reviewed by an external auditor, and 0 otherwise. Higher value indicates more information disclosure of the firm. Private Bank Ownership indicates of the banking system's assets in the banks that are 50 percent or more owned by private investors. Foreign Bank Ownership indicates the share of banks owned by foreign investors. Government is a dummy variable which equals to 1 if any government agency or state body has a financial stake in the ownership of the firm, 0 otherwise. Foreign is a dummy variable which equals to 1 if any foreign company or individual has a financial stake in the ownership of the firm. Law enforcement is a firm level survey indicator which measures the enforceability of court's decision with a higher value indicating better law enforcement. Law enforcement is a firm level survey indicator which measures the fairness and impartialness of court's decision with a higher value indicating more fairness. Firm size is the natural logarithm of firm sales in US\$. Exporter is a dummy variable that takes on value one if the firm is an exporter and zero otherwise. Creditor Rights is an index which measures the power of secured lenders in bankruptcy defined in laws and regulations. The index ranges from 0 to 4 with a higher value indicating stronger creditor rights. Deposit Insurance indicates whether there is an explicit deposit insurance scheme and whether depositors were fully compensated the last time a bank failed. Bank Accounting is an indicator which measures whether the income statement includes accrued or unpaid interest or principal on performing and nonperforming loans and whether banks are required to produce consolidated financial statements. Higher value indicates more informative bank account. Other macro controls (GDP per capita and inflation) and industry dummies are also included. For brevity, the coefficients are not presented but are available upon request. Regressions in column (1) to (3) are run with probit with clustered errors, while regressions in column (4) to (6) are run with IV probit. In column (4) and (5), we use the English and French legal origin, ethnic fractionalization, and absolute value of latitude as instrumental variables of bank competition measures. In column 6, we include the religion composition, the proxy of cultural heritage, as additional IVs for bank competition and information sharing measures. Detailed variable definitions and sources are given in the table 1. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively. P-values based on robust standard errors are in parentheses.

Table 8: Information, Competition and Corruption with More Macro Controls

	(1)	(2)	(3)	(4)	(5)
Bank Concentration (Deposit)	1.173 [0.002]***	0.861 [0.014]**	1.051 [0.003]***	1.07 [0.004]***	1.04 [0.003]***
Application Denied	0.565 [0.009]***	0.306 [0.230]	0.443 [0.077]*	0.453 [0.061]*	0.457 [0.074]*
Entry Barrier	0.206 [0.012]**	0.233 [0.003]***	0.225 [0.010]***	0.235 [0.005]***	0.231 [0.010]***
Public Credit Registry	-0.064 [0.691]	-0.007 [0.960]	0.015 [0.921]	0.018 [0.908]	0.014 [0.931]
Private Bureau	-0.398 [0.017]**	-0.355 [0.036]**	-0.324 [0.086]*	-0.358 [0.045]**	-0.326 [0.069]*
Firm Auditing	-0.276 [0.001]***	-0.278 [0.000]***	-0.28 [0.000]***	-0.285 [0.000]***	-0.282 [0.000]***
Private Bank Ownership	-0.005 [0.117]	-0.003 [0.284]	-0.003 [0.331]	-0.003 [0.316]	-0.003 [0.363]
Foreign Bank Ownership	-0.011 [0.013]**	-0.007 [0.066]*	-0.008 [0.031]**	-0.008 [0.029]**	-0.008 [0.035]**
Government	-0.32 [0.001]***	-0.299 [0.001]***	-0.297 [0.002]***	-0.295 [0.002]***	-0.293 [0.002]***
Foreign	-0.134 [0.031]**	-0.134 [0.027]**	-0.142 [0.021]**	-0.141 [0.020]**	-0.141 [0.021]**
Competitor	0.003 [0.949]	0.019 [0.719]	0.021 [0.690]	0.014 [0.793]	0.022 [0.690]
Fair Court	-0.055 [0.003]***	-0.049 [0.011]**	-0.047 [0.016]**	-0.052 [0.007]***	-0.046 [0.021]**
Law Enforcement	-0.086 [0.000]***	-0.079 [0.001]***	-0.082 [0.000]***	-0.082 [0.000]***	-0.08 [0.000]***
Firm Size	0.007 [0.582]	0.003 [0.820]	-0.0002 [0.989]	0.0002 [0.986]	-0.0005 [0.969]
Exporter	-0.188 [0.000]***	-0.166 [0.003]***	-0.169 [0.002]***	-0.177 [0.001]***	-0.165 [0.002]***
Creditor Rights	-0.068 [0.178]	-0.056 [0.271]	-0.054 [0.319]	-0.049 [0.387]	-0.052 [0.334]
Deposit Insurance	0.276 [0.012]**	0.233 [0.025]**	0.26 [0.014]**	0.254 [0.016]**	0.271 [0.012]**
Bank Accounting Disclosure	0.227 [0.054]*	0.101 [0.411]	0.127 [0.262]	0.152 [0.171]	0.132 [0.234]
Democracy	-0.029 [0.887]				
Openness	0.007 [0.106]				
Voice and Accountability		-0.225 [0.086]*			
Government Effectiveness			-0.095 [0.420]		
Rule of Law				0.008 [0.930]	
Control of Corruption					-0.096 [0.357]
Other Macro-controls	yes	yes	yes	yes	yes
Industry Dummies	yes	yes	yes	yes	yes
Observations	3,270	3,270	3,270	3,270	3,270

Bank corruption is the response to the question "Is the corruption of bank officials as an obstacle for the operation and growth of your business (1-no obstacle, 2- minor obstacle, 3- a moderate obstacle, 4-major obstacle)". Bank concentration (Deposit) is the fraction of total deposits held by the five largest banks in the industry. Bank concentration (Asset) is the fraction of total assets held by the five largest banks in the industry. Entry barrier measures the entry into banking requirement, which is a variable developed based on eight questions regarding whether various types of legal submission are required to obtain a banking license. The index ranges from 0 (low entry requirement) to 8 (high entry requirement). Higher values indicate greater stringency. Application Denied is the percentage to which applications to enter banking are denied in the past five years. Public Credit Registry is a dummy variable which takes on value one if a public credit registry operates in the country by the end of 1999, zero otherwise. Private Bureau is a dummy variables which takes on value one if a private credit bureau operates in the country by the end of 1999, zero otherwise. Firm auditing is a dummy variable which takes on value one if the firm provide its shareholders with annual financial statements that have been reviewed by an external auditor, and 0 otherwise. Higher value indicates more information disclosure of the firm. Private Bank Ownership indicates of the banking system's assets in the banks that are 50 percent or more owned by private investors. Foreign Bank Ownership indicates the share of banks owned by foreign investors. Government is a dummy variable which equals to 1 if any government agency or state body has a financial stake in the ownership of the firm, 0 otherwise. Foreign is a dummy variable which equals to 1 if any foreign company or individual has a financial stake in the ownership of the firm. Law enforcement is a firm level survey indicator which measures the enforceability of court's decision with a higher value indicating better law enforcement. Law enforcement is a firm level survey indicator which measures the fairness and impartialness of court's decision with a higher value indicating more fairness. Firm size is the natural logarithm of firm sales in US\$. Exporter is a dummy variable that takes on value one if the firm is an exporter and zero otherwise. Creditor Rights is an index which measures the power of secured lenders in bankruptcy defined in laws and regulations. The index ranges from 0 to 4 with a higher value indicating stronger creditor rights. Deposit Insurance indicates whether there is an explicit deposit insurance scheme and whether depositors were fully compensated the last time a bank failed. Bank Accounting is an indicator which measures whether the income statement includes accrued or unpaid interest or principal on performing and nonperforming loans and whether banks are required to produce consolidated financial statements. Higher value indicates more informative bank account. Democracy measures the long term democratic in all years since 1950 as of 2000. Openness is measured as the imports of goods and services as % GDP in 2000. Voice and Accountability is a survey indicator which measures the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media. Government Effectiveness and Rule of Law are survey indicators which measure the bureaucratic efficiency and legal system effectiveness, respectively. Control of Corruption measures the control of corruption in the country with a higher value indicating better control. Other macro controls (GDP per capita and inflation) and industry dummies are also included. For brevity, the coefficients are not presented but are available upon request. The regressions are run with ordered probit, which is based on standard maximum likelihood estimation with heteroskedasticity-robust standard errors. Furthermore, we allow for clustering within countries to allow for possible correlation of errors in all the models. Detailed variable definitions and sources are given in the table 1. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively. P-values based on robust standard errors are in parentheses.

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