Incentives, Supervision, and Organizational Hierarchy:

A Loan-Level Investigation of Banking

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Abstract

This paper uses a unique data set that contains detailed information on *every* corporate loan outstanding in the banking sector of Pakistan during 2001/2002 (52,000 loans). Using a simple empirical methodology that allows us to separately measure ex-ante monitoring, ex-post monitoring, "softness", renegotiation, recovery and litigation of loans, the paper presents a number of new findings. First, concerns about weak external supervision can be overcome by market-discipline coupled with private incentives for banks. Second, government involvement is the key to poor banking. Third, even with private markets, the organizational hierarchy of banks can seriously limit their ability to lend to "soft information" firms - firms in greatest need of intermediation.

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1 Introduction

The importance of banks as financial intermediaries is recognized by most. However, little is known about the relative importance of factors such as regulation, market discipline, incentives, government intervention, and organizational design for the proper *functioning* of banks. The contribution of this paper lies in separately identifying and measuring the relative importance of these factors.

From sharp and sudden downturns such as the East Asian crisis, to long and persistent slowdowns such as the Japanese recession, banks are often at the center stage of controversy. There is no shortage of suggestions on how to organize and run the banking sector, but little is known empirically about the relative merits of these suggestions. For example, how important are strong and independent external regulatory institutions for the prevention of banking crises? Is external supervision inevitable or can market-discipline coupled with private incentives be relied upon? Should governments get involved in banking in order to fix the "failures" that might plague weak financial markets? Or do the political economy and inefficiency costs of government intervention out-weigh any "social" benefits? Should foreign entry of banks be encouraged in order to import the "culture", technology, resources and human capital that might otherwise be lacking in a weak economy? Or does the very organizational design of foreign banks limit their ability to lend to clients most in need of intermediation? This paper hopes to address these questions cleanly.

The strategy employed in this paper is as follows. We write down a very basic and simple theoretical framework to convince the reader that questions raised above cannot be adequately answered by either looking at macro or bank-level data. The theory highlights the need of detailed loan-level micro information in order to seriously answer the questions above. It further suggests specific tests in that direction. We then utilize a unique loan-level data set to carry out these tests. The data set contains detailed and comprehensive loan-level information on *every* corporate loan outstanding in the banking sector in Pakistan during 2001/2002. There are over 52,000 such bank-loans that we analyze in the empirical section. Detailed information on the identity of the lender and borrower; type and amount of the loan given out; default and repayment history; and recovery, renegotiation, and litigation under default, allow us to perform a number of new tests. The tests exploit differences in regulation, incentives, control, and organizational design across different bank types, namely government, private domestic and foreign banks.

The strength of the empirical methodology used in this paper can be illustrated with a simple hypothetical example. Suppose we are interested in finding out whether stricter external supervision

forces banks to be "tougher" on their borrowers by limiting shirking and looting by the borrowers. There are two types of banks: banks that face high external supervision, the "H" types, and banks that face low external supervision, the "L" types. The question then is, can we simply compare the aggregate loan portfolios of H and L, and figure out which bank is being "tougher" on its clients?

The answer is No. Say an aggregate loan comparison reveals that H banks have lower default rates than L banks. This does not necessarily imply that H is tougher and more successful than L in preventing moral hazard. The reason is that aggregate loan numbers are confounded by firm selection or ex-ante monitoring as well. The two types of banks could be equally "tough" on the firms they lend to, and yet lend to very different markets segments: H to low risk and low return firms, and L to high risk but high return firms. In other words, the higher default risk of type L banks is not necessarily indicative of "bad risk" taken by the L-types. In order to prove that H is tougher on its clients than L, we need to show that the *same* firm will be monitored tougher by H compared to L. In other words, we need to separate the aggregate default risk of a bank into default risk due to ex-post monitoring (i.e. monitoring performed on a firm after it has been selected for financing), and default risk due to ex-ante monitoring (i.e. the firm selection criteria of banks).

Our empirical methodology can then be understood as follows. We exploit the fact that there are firms that borrow from both types of banks. Using these firms, we can separate out the ex-post monitoring risk. The idea is to use firm-fixed effects, and look at whether the *same* firm borrowing from both H and L, defaults more to L or not. Notice that this approach completely takes out any effect of *firm-choice*: any differences in the default risk of the *same* firm across different banks can *only* be attributed to differences in ex-post monitoring of the two banks. So if L shows higher default risk even when we condition solely on ex-post monitoring risk, then we can safely say that H is "tougher" and more successful than L in preventing moral hazard.

The empirical section will show that in similar fashion we can utilize the detailed nature of our data set to accurately measure ex-ante monitoring, various "hardness" attributes of bank-loans, loan-recovery, renegotiation, and litigation. These empirical results can then be used to make three broad points.

First, concerns about weak external supervision can be overcome by market-discipline coupled with private incentives for banks. Our ability to separate ex-post monitoring from ex-ante monitoring, allows us to focus exclusively on the "toughness" of a bank to prevent moral hazard problems. We show that despite being subject to weaker supervision than foreign banks (that are supervised by tougher supervision at home, and also have their worldwide reputation at stake), private domes-

tic banks perform as good as foreign banks on ex-post monitoring of firms. However, government banks that neither have the market discipline, nor the private incentives, perform a lot worse on this dimension.

Second, the key ingredient that leads to bad banking is government involvement. Government banks perform worse than both private domestic and foreign banks on all measures of bank performance. Not only are government banks substantially inferior in terms of limiting moral hazard (ex-post monitoring), they also fail quite miserably at solving adverse-selection problems (ex-ante monitoring), and recovery and renegotiation of bad loans. As we discuss in the paper, it is very hard to justify these drawbacks as a result of "social objectives" of government banks.

Finally, we show that despite having competitive markets, and private incentives, the organizational design of a bank can constrain its ability to perform certain functions. We show that foreign banks, that belong to large multi-national banking chains, because of their hierarchical organizational structure find it difficult to lend to "soft information" firms. At the time of firm selection (or ex-ante monitoring), private domestic banks are significantly more likely to lend to "soft information" firms than foreign banks. Foreign banks tend to focus exclusively on "hard information" firms. These are firms that can publicly and credibly reveal their "good type". Examples of such firms include foreign multi-national firms, and domestic firms that are part of large conglomerates. We show that better "soft information" allows private domestic banks to recover more through renegotiation than foreign banks who have to rely more on costly and less effective means of litigation in order to recover bad loans. The "soft information" constraint that we document in this paper is consistent with the predictions of recent work by Stein[2002]. Since the value-added in financial intermediation really comes from successful lending to "soft information" firms, i.e. firms that would not otherwise have gotten funding in the capital markets, our results highlight an important limitation of foreign banks in emerging markets.

The magnitude of our results are large and significant (both economically and statistically). The ex-post monitoring default risk of both private domestic and foreign banks is around 6%, and about twice as large for government banks (11% to 15%). This fact is worth repeating in another way: the *same* firm, borrowing the *same* type of loan, is *twice* as likely to default on government banks as either foreign or private domestic banks. The ex-ante monitoring default risk is about 5% for foreign banks, about 7.5% *higher* for private domestic banks, and about 30% *higher* for government banks. The huge differential between government and foreign banks can only be attributed to poor, political, or corrupt choice of firms by the banks. However, we show

(both theoretically and empirically) that the 7.5% differential between foreign and private domestic banks actually highlights *better* screening and ex-ante monitoring abilities of private domestic banks. The differential reflects the ability of private domestic banks to lend to "soft information" firms. We show this through a number of tests. First, foreign banks are twice *more* likely to lend to "hard" information firms such as larger firms, firms with foreign ownership, firm belonging to large conglomerates, and firms requiring *less* non-funded loans in the form of guarantees. Second, conditional on default, private domestic banks are actually *better* than foreign banks in recovery of the bad loan. Private domestic banks recover 21% of the defaulted loan amount, compared to 9.2% for foreign banks. This reduces the *net* difference in ex-ante monitoring risk from 7.5% to 6%. Third, conditional on default, foreign banks litigate 60% of the time, whereas private domestic banks only litigate 30% of the time. Consequently, private domestic banks recover significantly more often through bilateral renegotiations, rather than through the costlier and less effective means of recovery through the involvement of a third party (i.e. litigation). All these facts combined suggest that private domestic banks have higher ex-ante monitoring risk *not* due to bad selection criteria (such as "looting" or "related lending"), but due to their ability to lend to "soft information" firms which happen to be slightly riskier than the well-established "hard information" firms, but probably positive NPV decisions nonetheless.

This paper is related to a number of different strands in the literature. It is impossible to justly summarize all of this literature here. We therefore outline some of this work as a way of illustration. The theoretical literature on banking (see Freixas and Rochet [1998] for an excellent survey) has focused on the role of banks as delegated monitors (e.g. Diamond [1984]), and as institutions responsible for extracting information from firms ("soft" information in the terminology above). This role of banks as intermediaries helps alleviate some of the agency and informational failures in the capital markets. However, such intermediation is not without costs, and introduces its own set of moral hazard and other agency problems requiring some sort of external monitoring or supervision (see Dewatripont and Tirole [1999] for an excellent survey). Then there are papers such as Stein [2002], Aghion and Tirole [1997], Baker, Gibbons, and Murphy [1995], that discusses how different types of organizational and contractual designs impact the nature of incentives and informational flow in a firm. Finally this paper is also related to the work on renegotiation and incomplete contracts such as Aghion and Bolton [1992], Cremer [1995], and Huberman, and Kahn [1988] that discusses why and when contracts are likely to be renegotiated between the two parties.

Despite the voluminous theoretical work related to banking mentioned above, empirical work

in the area has been seriously lagging behind. The reasons are partly methodological, but mainly data limitations. This paper hopes to make a significant contribution towards narrowing this gap between theory and empirics. The paper does so by directly measuring specific functions of banks that are often discussed in the theoretical literature, but seldom measured in the empirical work, such as, ex-ante and ex-post risk, "softness" of loans, and recovery, renegotiation, and litigation of loans. This then allows us to address issues dealing with supervision, incentives, market-discipline and organization.

The rest of the paper is organized as follows. Section 2 builds the theoretical framework for this paper. Section 3 presents the data and summary statistics. Section 4 separates the default risk of banks into ex-ante and ex-post monitoring to measure the relative importance of weaker incentives versus weaker external supervision. Section 5 computes different measures of "hardness" for bank-loans, and Section 6 looks at the recovery, renegotiation, and litigation of bad loans. Section 7 performs some robustness checks, and Section 8 concludes.

2 A Simple Model of Banking

We outline a simple model that highlights the impact of differences in supervision, incentives, and organizational design on the two primary functions of banks[1]:
(i) ex-post monitoring of firms to solve the moral hazard problem, and
(ii) ex-ante monitoring of firms or "screening" to solve the adverse selection problem[2].

Ex-post monitoring refers to the relationship a bank maintains with a firm *after* extending credit to it. The relationship involves continuous monitoring of the activities and performance of the firm in order to insure that the bank credit is used for the purposes identified in the credit proposal, and that the firm is putting sufficient effort and energy in making the project successful.

Ex-ante monitoring on the other hand refers to the screening and selection of firms *before* extending credit to them. The purpose of such screening is to weed-out firms with unproductive investment opportunities. It is the specialized institutional and human capital of banks that make them superior over competitive capital markets in performing these screening and monitoring tasks.

[1] There are of course other functions of banks as well, such as the provision of liquidity (see e.g. Diamond, Rajan [2001]), but this aspect of banking is beyond the scope of this paper.

[2] For example, Broecker [1990], Diamond [1984] and [1991], Holmstrom [1992], Holmstrom and Tirole [1997], Rajan [1992], Townsend [1979], and Krasa and Villamil [1992].

2.1 Ex-post Monitoring (Moral Hazard)

Consider an environment with many firms borrowing from a bank to finance their investment projects[3]. Each investment project requires one unit of capital to be financed by the bank. To get financing, a firm signs a loan contract with the bank that gives the firm one unit of capital in return for a promise to payback r to the bank next period. For simplicity we assume that the bank can raise funds externally through deposits at a gross cost of 1.

Once a firm has the required capital, it chooses a probability p that determines the riskiness and productivity of the project. The choice p is non-contractible, with $p\epsilon[p_0, p_1]$. For a given project choice p,the project yields $R(p)$ with probability p, and 0 otherwise. There is a limited liability constraint for firm i.e. it pays back r in the good state, but nothing in the bad state.

The expected output from a project is thus given by, $E(p) = pR(p)$. All agents are risk neutral. In addition, the following assumptions hold, (i) $R(p_1) > r$, (ii) $R'(p) < 0$,(iii) $E'(p_0) < r$, (iv) $E'(p) > 0$, and (v) $E''(p) < 0$. The first two assumptions guarantee that the firm will always be able to pay back the loan in the good state. It is therefore best from the bank's perspective that the firm chooses p_1. The second assumption also highlights the trade-off between risk and return. The third assumption, it will turn out, implies that the firm wants to choose the riskiest project once it has the required funds. Finally, the last two assumptions guarantee that p_1 is the social optimum.

The technology choice p, coupled with assumptions (i) through (v) generate the moral hazard problem: It is socially efficient for the firm to choose p_1, but once financing has been provided, the firm would like to "shirk" and choose p_0 instead. In what follows, we discuss how banks can potentially help to solve this moral hazard problem by "forcing" the firm to choose the socially efficient level of effort.

The bank has access to a monitoring technology that allows it to impose a cost, e^m, on the firm if the firm chooses a p different from the one agreed upon. The cost of monitoring for the bank is given by $C(e^m)$, where $C(.)$ is an increasing and convex function. This introduces an incentive compatibility constraint for the firm of the form:

$$pR(p) - pr \geq p_0R(p_0) - p_0r - e^m \tag{1}$$

[3]The model is related to work by Banerjee[2000]

Since the marginal benefit of increasing p for the firm is less than r (assumptions (iii) and (v)), the firm wants to set p as low as possible. Hence, (1) must bind in equilibrium. This gives p strictly as a function of the monitoring level e^m. Moreover, as shown in the appendix, $p(e^m)$ is increasing and concave in e^m. This simple dependence of p on e^m will be useful in solving the model later on.

The IC constraint highlights the fundamental tension between a firm and its bank due to moral hazard. Given a debt contract, the firm wants to choose the riskiest project, or the lowest possible p. The bank, on the other hand, wants to minimize the probability of default, and wants the firm to choose the safest project, or the highest possible p. The equilibrium choice of p will depend on the level of monitoring "effort" or e^m chosen by the bank. The monitoring effort will be determined by the objective function of the bank, which is given by:

$$U_B^{MH} = \theta \left[p(e^m)(r-1) - (1 - p(e^m))\rho \right] - C(e^m) \tag{2}$$

θ captures the incentives or cash-flow rights of the bank ($1 \geq \theta \geq 0$), and ρ captures the percentage of bad loans that a bank has to provide for ($1 \geq \rho \geq \underline{\rho}$). ρ signifies the strength of supervision on a bank. Perfect supervision should imply that $\rho = 1$: a bank must provide for each dollar of loan that does not get repaid. Maximizing (2) with respect to e^m gives us the simple first order condition; $C^{'}(e^m) = p^{'}(e^m)\ \theta[r + \rho - 1]$, and the following proposition.

Proposition 1 *The level of ex-post monitoring e^m, and hence the project choice p varies monotonically with incentives θ, and the strength of supervision ρ .*

2.2 Ex-ante Monitoring or Screening (Adverse Selection)

Section 2.1 discussed the role of banks *after* extending credit to a firm. We now discuss the role of banks *before* they decide to extend credit to a firm. Since firms in our economy have limited liability, *all* types of firms would want to get credit from the bank, including firms that have no productive investment opportunities. As pointed out earlier, this gives rise to an adverse selection problem that banks have to deal with. In order to focus squarely on the adverse selection problem, we remove the moral hazard problem from our earlier set up. In particular, instead of p being a non-contractable firm choice, assume that p is fixed for a given firm. However, p differs across firms, is distributed uniformly on $[p_0, p_1]$, and is unobservable. All firms look alike based on observables. This introduces the adverse selection problem: a bank would want to separate "high quality" firms (high p) from "low quality" firms (low p). The rest of the set up remains the same as in the previous section.

Equilibrium with Screening

The bank has access to a screening technology. The screening technology can be thought of as the review process that a firm must pass through, in order to obtain credit from the bank. The screening technology costs the bank $(\frac{1}{\gamma})C(e^s)$, where γ is a bank screening productivity parameter. e^s reflects the screening "effort" put in by the bank. As before $C(e^s)$ is an increasing and convex function. We assume that there is a fixed cost of screening (i.e. $C(0) > 0$), and normalize e^s such that if a bank puts in e^s units of screening effort, it will be able to successfully screen and identify firms with $p \geq (p_1 - e^s)$. The intuition behind screening technology is quite simple. It is easiest to screen the top quality firms, and as you start screening worse quality firms, screening them successfully requires higher level of effort.

There is another interpretation of the convexity of the cost function which we are going to adopt in this paper. It implies that firms with higher values of p (i.e. p close to p_1) are "hard information" firms in the sense mentioned in the introduction. Such firms are relatively easy to screen as their information is credibly verifiable. However, as we move down to lower p firms, the firm becomes progressively "softer", i.e. more soft information is involved in evaluating such firms. Consequently higher and higher levels of screening effort are required to successfully screen such softer firms. This naturally introduces a correlation between the riskiness of a firm, and its "softness". Firms with more soft information will tend to be riskier as well. However, they can still be productive firms in the sense of being positive NPV investments.

We assume that applying to a bank is cost-less for firms, and therefore all firms apply to a bank in equilibrium. The choice of screening effort e^s will be determined by the bank's objective function which is given by:

$$U_B^S = \theta \left(\int_{(p_1 - e^s)}^{p_1} [p(r-1) - (1-p)\rho] \, dp \right) - \left(\frac{p_1 - p_0}{\gamma} \right) C(e^s) \tag{3}$$

(3) reflects the fact that since *all* firms of total measure $(p_1 - p_0)$ apply for credit, the total screening cost for a bank is given by $\left(\frac{p_1 - p_0}{\gamma}\right) C(e^s)$. However, only the top e^s firms get selected by the bank after screening, and from each firm the bank earns $[p(r-1) - (1-p)\rho]$. We assume that banking is competitive such that a bank can only earn π, the required rate of return, on each dollar lent out. This implies that once a firm has been screened, the interest rate r offered to the firm will be given by the following "no-profit" condition $p(r-1) - (1-p)\rho \equiv \pi$, or:

$$r = \frac{p(1-\rho) + \rho + \pi}{p} \tag{4}$$

(4) implies that riskier firms (small p) are given a higher interest rate, and lax supervisory standards (low ρ)allow the bank to offer a lower interest rate.

Plugging (4) into (3) and integrating the expression gives us the bank's objective function:

$$U_B^S = \theta.\pi.e^s - \left(\frac{p_1 - p_0}{\gamma}\right) C(e^s) \tag{5}$$

The first order condition of (5) gives us the following result: A bank will screen *more* and hence have a *riskier* overall portfolio (i.e. e^s is higher) if it has a better screening technology (higher γ).

For welfare analysis later on, it will be useful to define p^{eff}, the "efficiency" threshold level of p such that it is socially efficient to lend to all firms with $p \geq p^{eff}$. Since the required rate of return on bank capital is $(1 + \pi)$, p^{eff} is given by the identity $E(p^{eff}) = (1 + \pi)$. In a first best world, a firm should be given financing if and only if $p \geq p^{eff}$.

Equilibrium without Screening

An implicit assumption in the result above is that the bank will actually *decide* to screen the firms applying to it for a loan. The bank could alternatively decide *not* to screen incoming firms, and instead offer *all* incoming firms a fixed interest rate $\overline{r}$. We now investigate *when* a bank would want to adopt this no-screening strategy instead of screening all firms as in our analysis above.

The decision to screen or not will be determined by comparing the bank's profit if it decides to screen (i.e. U_B^S given by (5)), and its profit U_B^{NS} if it decides not to screen. If a bank decides not to screen and offers everyone a common interest rate $\overline{r}$, then all firms with $R(p) \leq \overline{r}$ would be interested in getting a loan from the bank. Since $R(p)$ is strictly decreasing in p, its inverse exists. This implies that the bank will lend to all firms in the range $[p_0, \overline{p}]$, where $\overline{p} = R^{-1}(\overline{r})$. The expected riskiness p^E of the firms will be given by, $p^E = \frac{p_0 + \overline{p}}{2}$ and the bank's profitability is given by:

$$U_B^{NS} = \theta.(\overline{p} - p_0)[p^E(\overline{r} - 1) - (1 - p^E)\rho] \tag{6}$$

Maximizing (6) with respect to $\overline{r}$, a bank will screen if and only if $U_B^S > U_B^{NS}$. This gives us the

following result.

Proposition 2 *For any given ρ, there exists a $\underline{\theta}$ such that:*

(a) *If incentives are too low ($\theta < \underline{\theta}$) the bank will choose not to screen firm applicants, and instead offer all firms the same interest rate $\overline{r}$. It will lend to all firms in the interval $[p_0, \overline{p}]$, including all inefficient firms with p^{eff}. The bank will thus be lending to the riskiest, and the least productive firms in the economy.*

(b) *If incentives are strong enough, ($\theta > \underline{\theta}$), the bank will decide to screen. The bank will screen more and hence have a riskier overall portfolio (i.e. e^s is higher) if it has a better screening technology (higher γ). However, the riskier portfolio will be more efficient as it includes more of the socially efficient firms with $p > p^{eff}$.*

Corollary: If Proposition 2b holds, banks with better screening technology will lend more (as a fraction of their overall portfolio) to "soft information" firms, while banks with poorer screening technology will lend more to "hard information" firms.

The formal proof of the proposition is given in the appendix. The intuition behind proposition 2a is that if incentives are too low, U_B^{NS} is close to zero which dominates having to incur the fixed cost of screening should the bank decide to screen. On the other hand if incentives are high enough, the premium of selecting high quality firms dominates the "pooling equilibrium" of no-screening where the bank gets the worst firms in the economy. In fact the pooling firms actually generate a loss for the bank so as the level of incentives or cash-flow rights increase, the bank incurs more and more of this cost. With θ high enough it is no longer worth not to screen the firms.

2.3 Bank Organizational Design: Foreign, Private Domestic, and Government Banks

The theory highlighted how differences in bank characteristics such as cash-flow rights (θ), supervision (ρ), and screening productivity (γ) impact the effectiveness of banks in conducting ex-ante and ex-post monitoring of their clients. It also gave us clues about the type of firm (i.e. soft vs hard information) that each bank would lend to. We now discuss reasons why these bank characteristics might differ across different bank types.

There are three dominant types of organizational designs for banks in emerging economies: Private Domestic, Foreign, and Government. The main distinction between these three types of banks lies in the *identity* of who owns the cash-flow and control rights of the banks. Private

Domestic banks are privately owned and managed by domestic shareholders. This means that both cash flow rights and control rights rest with the domestic shareholders of the bank. Foreign banks are also privately owned and managed, but differ in a couple of critical ways with private domestic banks. First, the cash-flow and control rights rest with *foreign* rather than *domestic* shareholders. Second, unlike their local counterparts, foreign banks are typically part of a larger chain of multi-national banks spread in different parts of the world. This separates foreign banks from private domestic banks in terms of their hierarchical organizational design. The longer distance between shareholders (residing in the west), and bank managers (residing in emerging economies) for foreign banks implies that foreign banks have *more* layers of bureaucracy between top management and local bank managers. Government banks on the other hand are neither privately owned nor managed. The cash-flow rights (ownership) rests with the government and ultimately the tax-payers. The control rights however rests with the government employees (bureaucrats) hired to run the bank.

The cash-flow and control right differences in the organizational design of the three types of banks lead to important differences in the characteristics of these banks in terms of our model above.

First, an obvious implication of private ownership is that θ is close to 1 for foreign and private domestic banks, whereas it is close to 0 for government banks where bank management receives few (if any) cash-flow rights from the bank.

Second, differences in the ownership structures of the three banks have important implications about how tightly these banks will be supervised (level of ρ). The strength of supervision of a bank depends both on the capacity of the regulatory authority to monitor the bank, and also the internal incentives of a bank to be conservative. These factors suggest that foreign banks will be tightly supervised in an emerging economy for the following reasons: (i) In addition to the domestic regulatory authority, foreign banks are also subject to their "home" country regulatory authority. Since the home regulatory authority resides in a developed country, it could be more effective in enforcing prudential regulations. Foreign banks could therefore have stricter monitoring than private or government domestic banks. (ii) Even if domestic and foreign banks faced the same level of regulation, foreign banks could endogenously adopt more conservative banking policies than domestic banks. The reason is that foreign banks because of their world-wide reputation at stake, could face a larger cost of default in an emerging economy, compared to domestic banks. For example, foreign banks often have a large network of branches outside the emerging economy under

question. If the bank takes too much risk through imprudent banking in the developing country, leading to a bank failure or default, it can have large negative consequences through reputation on its operations worldwide. Hence, anticipating such higher cost of risky behavior, foreign banks may end up devising internal monitoring mechanisms to curb their level of risk. (iii) A third reason for a more prudent behavior by foreign banks can be understood in the context of the agency problem of bank owners trying to monitor the level of risk taken by their managers. Suppose both foreign and domestic banks have the same preference for adopting prudent behavior. However, they must incentivise their bank managers for moral hazard reasons. For example, the bank manager might collude with a firm to "loot" the bank. Foreign banks might be able to provide better incentives to managers through promises of promotion to better "global" positions that domestic banks cannot offer due to their limited scope in operations[4]. For all these reasons, the supervision parameter ρ is likely to be close to 1 for foreign banks. Whether foreign banks are actually more strictly supervised than private domestic banks remains an empirical question. The reason is that oversight from the domestic regulatory authority, coupled with endogenous reasons for the private bank to maintain its reputation and hence access to future cash-flows could be enough to guarantee tight regulation (i.e. ρ close to 1) for private domestic banks. We will be able to address whether this is actually the case, in the empirical section that follows. The theory developed in this section will help us in this regard. For example, if both private domestic and foreign banks exert the same level of ex-post monitoring, then Proposition 1 implies that the two banks must have similar supervision (since they already have similar cash-flow incentives). Finally, government banks are likely to be the least tightly regulated (low ρ). The reason is that government banks have no incentives to self-regulate themselves in the absence of cash-flow rights. Moreover, the hands of the domestic regulatory authority are heavily tied up when it comes to dealing with government banks. For example, whereas a regulatory authority can credibly threaten a private bank with the suspension of license, such threats are immaterial when it comes to government banks.

The third difference in the organizational design of the three banks has to do with the hierarchical structure of the banks. As we have already pointed out, foreign banks due to their multi-national nature have a larger hierarchical structure than private domestic banks. This hier-

[4]There is actually one argument that can go in the opposite direction of foreign banks taking on higher risks. The argument is that since foreign banks can diversify themselves better internationally, they will have a higher capacity of taking on more risk than domestic banks in a single emerging economy. However, this argument only applies to the "good" type of risk, i.e. risk that leads to higher overall returns. The type of risk that regulation is most concerned with is the "bad" type of risk, such as looting or inefficiently low level of monitoring by the bank, which is the type of risk under question in this paper. In the empirical strategy that follows, we will explicitly isolate the bad type of risk to focus on the regulatory aspect of banking.

archical structure is going to have important implications for the screening productivity parameter γ for foreign banks. Greater distance between ownership and management in the case of foreign banks implies that management is controlled from a distance through a system of well-documented hierarchy. Rules concerning do's and don'ts are well-defined so that employees can be monitored and incentivized even at an arm's length relationship. Domestic banks on the other hand are more flexible in their organizational design. Since they are managed and controlled locally, they can afford a more decentralized system of governance where an individual manager is given more control and discretion. The basic theory concerning this idea is well laid out by Stein [2002] in a recent paper. As the Stein [2002] paper argues, the fundamental constraint that a centralized and hierarchical structure like that of foreign banks imposes is that they have to rely on "hard information" in making lending decisions. In the context of banking, hard information includes a credible track record such as past sales, revenue, exports etc. Domestic banks on the other hand have flatter organizational structures. This (keeping everything else constant) allows top management and ownership to give a lot more power in the hands of the local bank managers allowing them to use "soft information" in making lending decisions as well.

"Soft information" is information that cannot be verified by anyone other than the person who produces it. For example, a bank manager through repeated interviews with a young firm manager might be convinced that the manager is a smart, honest and hard working entrepreneur with a high probability of success. The ability to use such "soft information" by domestic banks implies that private domestic banks are going to be much more productive in screening potential applicants as opposed to foreign banks. This will translate into higher γ for private domestic banks than foreign banks. Should government banks be better at using soft information as well? The answer is likely to be no. First, with a lack of incentives it is not clear whether government banks would use *any* information at all. Second, even under the efficient government hypothesis, government banks could also be organizationally-constrained to rely on hard information. The reason is that formal checks and balances in a government organization can only work when punishments and rewards are based on credible or hard information.

3 Data and Summary Statistics

The theory highlighted how differences in the organizational design of banks can lead to differences in the ex-ante monitoring and ex-post monitoring of banks and hence their efficiency and risk

exposure. We now take our theory to data to test how the three dominant bank organizational structures compare in terms of their monitoring functions in the real world. Testing a theory of the bank at the micro level like the one described in section 2, has been difficult in the literature. The reason is that empirical work on banking has so far been unable to separately identify the ex-ante and ex-post monitoring risks associated with banking. Most of the studies on banking to date compare characteristics of *aggregate* loan portfolios across banks. However, as pointed out in the introduction such a comparison almost by definition precludes separate identification of the two forms of monitoring. A major contribution of the empirical work in this paper is that we are able to cleanly separate ex-ante monitoring from ex-post monitoring. This enables us - as the theory points out - to make precise statements about the relative performance of banks belonging to different organizational forms.

3.1 The Data

We have detailed loan level information on *all* bank loans outstanding in Pakistan during 2001-02[5]. The information was provided to us by the State Bank of Pakistan which supervises and regulates all banking activity in the country. There are a total of 44,281 distinct borrowers and 52,536 loans borrowed from 33 commercial banks in Pakistan. Thus our unit of observation is at the level of bank-borrower (52,536 observations). The data set contains information on the identity of the borrower and its bank, the amount of the loan, the amount overdue, duration of overdue, breakup by principal and interest, break up by type of loan (funded vs. non-funded), group affiliation of the borrower, bank branch where the loan was issued, loan recovered, loan under litigation, and new loans given out in the past 12 months. Since we are interested in understanding the role of organizational structure in banking, we classify the 33 commercial banks into government, private domestic, and foreign. We also classify borrowers into two classes, private sector borrowers and government sector borrowers. Table I summarizes the loan characteristics of our data set by these bank and borrower classifications.

3.2 Loan Characteristics - Overall

Column 1 of Panel A in Table I shows that there are 6 government, 9 private domestic and 18 foreign banks in Pakistan. Government banks are the biggest source of lending in the private sector (column 2) with 295 billion Rs, but private domestic and foreign are comparable with 229

[5]The only requirement is that the loan be above a minimum threshhold, which is only 500,000 Rs (~$10,000)

and 223 billion Rs of lending respectively[6]. This is important as it shows that all three types of banks are significant players in the banking sector in Pakistan. Total lending to the private sector is 747 billion rupees, which is about two-thirds of overall bank lending in Pakistan. Columns (3) and (4) in Panel A show that the average loan size is much bigger for government and foreign banks (16.4 and 16.2 million respectively) than private domestic banks (11.2 million). This is an important indication about the type of firms that these banks are lending to, a fact that we would explore in greater detail later on. Finally, columns (5) and (6) in Panel A show large variation in the default rates across the three banks. Default percentage, defined as loans classified as "over-due" divided by total loans is 31.7% for government banks, 8.0% for private domestic banks, and 4.9% for foreign banks. The differences in default rates are large, particularly for government banks. However, as we have pointed out earlier, these default rates pertain to the *aggregate* loan portfolio, and as such no definite judgement can be made about the performance of these banks based solely on these aggregate numbers. For example, one could argue that government banks have a high default rate not because of poor monitoring and screening, but because they lend to "social sector" clients which are inherently less profitable. These social sector loans may not be profitable by themselves, but they create sufficient social externalities to be socially viable. Examples could be subsidizing infant industries where learning is important, or public goods such as education and environment. We will therefore perform a more sophisticated analysis aimed at answering such potential concerns as highlighted by the theory section.

Panel B of Table I shows that government borrowing comprises almost one third of overall borrowing from the banking sector in Pakistan. There are only 105 government agencies/firms that borrow this significant portion of the overall domestic credit. As is to be expected, government borrowing is heavily biased towards government banks, and has a low default rate compared to default rate on private loans. However, a surprising finding of Panel B is that government is also more likely to default on government banks compared to private banks. The default rate of government borrowing from government banks is 6.1%, whereas it is only 1.7% and 1.4% for private domestic and foreign banks.

In the analysis that follows, we will only focus on loans to the private sector. The main reason we do this is that the theory we discussed in section 2 assumes loans are given to *private* firms that are profit-maximizing at the individual level. Government borrowing is often not based on profit-maximization, and involves all sorts of political and social concerns. As Table I shows, government

[6]It will be helpful to keep in mind, that 60Rs approximately equals 1 US $ during the sample period.

borrowers do look very different from private sector borrowers. However, we would like to emphasize that *all* of our results are completely robust to the inclusion of government loans in the data (in fact our results are only strengthened if we include government firms).

3.3 Loan Characteristics - By Loan Type

Table I presented summary statistics for the overall loan portfolio of each borrower. Our data also contains information about the *type* of loan borrowed by a firm. In particular, we know how the overall loan is divided into the following four categories: (i) fixed, (ii) working capital, (iii) letter of credit, and (iv) guarantees/other. "Fixed" loan refers to medium and long term loans given out by the bank. "Working Capital" loans are short term loans (usually under six months duration) given out to fulfill short term working capital needs of a firm. "Letter of credit" refers to the amount of insurance or guarantee that a bank provides on behalf of the firm's imports. Finally, "guarantees/other" refers to the amount of insurance (or guarantees) provided by the bank on behalf of the firm in relation to certain deals of contracts that the firm may have signed. The first two categories are considered "funded" loans, since the entire loan amount is actually transferred from the bank to the borrower. The last two categories are referred to as "non-funded" since the amount written under the category is never actually paid to the firm. The amounts under "non-funded" categories refer to the amount that the bank will pay to a third party (such as the exporter) incase its client firm reneges on its promise (such as the importing firm failing to pay the exporter its dues).

Figure 1 shows the distribution for the proportion of each bank-loan type in the data set. The histograms show the clear bimodal distribution of each bank-loan type. We can therefore safely classify each observation in our data set (at the bank-borrower) level into one of the four bank-loan types. Table II then presents summary statistics across the four bank-loan types.

Panel A of Table II shows that working capital loans are the most common type of loans given out, making up 60.1% of the overall lending, followed by fixed loans (19.0%), letter of credit (11.8%), and guarantees (9.0%). A further breakdown of the four bank-loan types across the three types of banks reveals that all types of banks roughly lend out the same proportion as working capital loans (about 60%), but government and foreign banks are more biased in favor of fixed loans (28.9% and 16.8%) than private domestic banks (8.3%). Consequently, private domestic banks lend out a larger fraction of their overall portfolio in the form of "non-funded" loans than either government or foreign banks.

Panel B shows the distribution of default rates across bank-loan types and bank types. As one might expect, longer term loans (fixed loans) have higher default rates (28.7%) than shorter term loans (17.7%). Non-funded loans have very low default rates, with average default rates of 0.5% and 3.5% for LC's and guarantees respectively. The main reason for low default rates of non-funded loans is that such loans are almost always backed up by high quality collateral such as the imported goods, and cash. However, as in Table I the one consistent fact is that government banks have the highest default rates across all bank-loan types. For example, they have a default rate of 11.4% on guarantees that they provide when the guarantees provided by private domestic and foreign banks have almost negligible default rate. We will investigate the differential default rates across bank types in a lot more detail later on.

Panel C shows differences across bank-loan types in turnover. Turnover refers to *new* loans given out by the bank during the past 12 months, compared to the existing stock of loans already outstanding. The ratio is calculated only for non-defaulted loans, since for a loan under default, additional amount given out is zero by definition (i.e. state bank does not allow banks to do this). The turnover numbers are not available for government banks. Working Capital loans have the highest turnover (39.8%) which is to be expected because of their shorter maturity durations, followed by fixed loans (33.2%), LC's (13.2%), and guarantees (10.1%). Private domestic banks tend to have a higher turnover with the funded loans having 15% to 20% higher turnover.

Panel D shows the number of observation (at bank-borrower level) in each bank-loan / bank-type category.

What we want to take away from Table II is the fact that there are significant differences across bank-loan types in default and turnover. In the analysis that follows, we therefore control for *all* such differences across bank-loan types, by including bank-loan fixed effects in all our regressions.

4 Separating Ex-post and Ex-ante Monitoring

Tables I & II showed that foreign banks have the best performing loans in terms of default followed by private domestic banks, with government banks lagging far behind. Panel A in Table III breaks down the overall default rate in terms of its various components in a regression framework. Before looking at the results of Panel A in Table III, it is instructive to look at the probability distribution of the default rate variable across loans. Figure 2 shows that the probability distribution of the default rate across loans is bipolar. Loans are either not in default at all (default rate close to 0),

or completely in default (default rate close to 1). This implies that running regressions with the default rate as the dependent variable is almost like running a linear probability model. All of our regressions therefore have heteroskedasticity consistent standard errors[7]. Moreover, all observations are weighted by the size of the loan so that the coefficient estimates are economically meaningful[8].

Before comparing default rates and other variables across bank-types in a regression framework, it is worth discussing the proper computation of standard errors. Since our data set is at the bank-firm level, and we are essentially exploiting variation across banks, a major source of potential correlation among observations must be taken into account. This source of correlation comes from the fact that firms borrowing from the same bank are likely to be correlated on account of the common bank. We control for this correlation by clustering our standard errors at the bank-level, essentially using only the variation across the 33 banks in our data set to compute standard errors. We feel confident that our standard error estimates are fairly conservative as a result.

Column (1) of Panel A in Table III first runs the overall default ratio against bank-loan type fixed effects, and dummies for government banks and private domestic banks with foreign banks being the omitted variable. The results confirm the observation of Table 1 statistically. Foreign banks have the lowest default rate, with private domestic banks and government banks having a default rate that is 4.4% and 24.7% higher than foreign banks respectively. The government banks' difference is highly significant, but the difference in overall default rate between private domestic and foreign banks is not statistically significant[9]. The result on overall default rate can perhaps be better appreciated by looking at Figure 3 which plots the CDF of total lending for a given bank-type against the default rate of firms in their portfolio. For example, the y-axis value corresponding to a default rate of 10% corresponds to the fraction of overall lending that is given out to firms with a default rate of 10% or lower. The figure once again highlights the huge discrepancy between government and private banks.

Next a breakdown of default rates into loans that are overdue for less than a year (column (2)), and loans that have been over due for more than a year (column (3)) shows that most of the overdue loans have been overdue for more than a year. However, within both categories, we see that foreign banks have the lowest default rates, followed by private domestic and government

[7] The standard concern with linear probability models that the predicted probabilities may lie outside of the unit interval is not a concern in our framework as we only compute differences across bank types.

[8] The results of the unweighted regressions are qualitatively similar. We feel that size weighted results are economically more meaningful in their magnitudes.

[9] The size of the coefficient may be considered large though as it implies private domestic banks have almost twice the default rate than foreign banks.

banks. Finally, column (4) separates out overdue interest, and only looks at the principal amount overdue. It also confirms the pattern of earlier results, showing that the principal default rate is 4.8% and 23.9% higher for private domestic and government banks respectively. Whereas the coefficient on government banks is extremely large and highly significant, the coefficient on private domestic banks is never significant. Thus on average although private domestic banks have higher default rates than foreign domestic banks, the difference is not statistically significant. However, as Panel B of Table III will show, the key to understanding default-rate differences between foreign and private domestic banks is to separate the risk by ex-post and ex-ante monitoring.

The results of Panel A are instructive, but as the theory showed, they fail to establish whether differences in default rates can truly be attributed to poorer monitoring by government and private domestic banks compared to foreign banks. For example, Proposition 1 and 2a showed that higher default rates could be a result of poor ex-post monitoring, and selection rules. But then proposition 2b showed that even banks with *better* screening capabilities will end up having higher default rates. So it is crucial to figure out if higher default rates for a bank are due to *poorer* ex-post monitoring, or *better* ex-ante monitoring. These two cases clearly have completely opposite efficiency and welfare implications. Higher default rates due to better screening ability reflect superior performance rather than inferior!

An example of better screening in the context of private domestic banks as explained earlier could be the ability to lend to "soft information" firms. Examples of "soft information" firms include young domestic firms with positive NPV investment opportunities. Such firms may be riskier, but deserve to be given lending due to their higher return as well. However, since these firms do not have a credible past record ("hard information") they will be unable to borrow from foreign banks. Private domestic banks however will be able to lend to such firms. Such lending may increase the default rate of private domestic banks, but that only reflects good banking rather than bad. Banks are *supposed* to lend to such firms. In short, to be able to say whether proposition 2b holds or not, we have to separate the overall risk into risk due to ex-ante monitoring, and risk due to ex-post monitoring.

4.1 Measuring Default Risk Due to Ex-Post Monitoring

Ex-post monitoring refers to the firm-bank relationship *after* a firm has been selected. In other words, in order to separate out the effect of ex-post monitoring, we have to perfectly control for the endogeneity of firm choice or selection. The micro details on our data allow us to do exactly

that. Of the 44,176 unique borrowers in our data set, there are 2,514 unique firms that borrow from two or more different *types* of banks. We will refer to these firms as "multi-source" firms. For these 2,514 multi-source firms, comparing the default rates across bank types after the inclusion of firm fixed effects perfectly controls for firm choice. Fixed effects specification means that we will be computing whether the *same* firm selectively defaults at a higher rate to one type of bank vs. another. If it does, then that difference can *only* be attributed to ex-post monitoring by the banks.

Columns (1) through (4) of Panel B in Table II perform this fixed-effects regression for the multi-source firms. The regressions are run separately for each of the four multi-source categories. Column (1) reports the results for the 392 firms that borrow from *all three* types of banks. The results are striking. The same firm is 5.0% more likely to default on government banks than foreign banks. It only marginally defaults more on a private domestic bank (1.06%), and the difference is not statistically significant. This result is confirmed by column(2) as well. Firms borrowing only from foreign and private domestic banks, are only 1.1% more likely to default on private domestic banks, and this difference is not statistically significant either. This suggests that both foreign and private domestic banks are equally tough on ex-post monitoring. However, government banks perform quite poorly as ex-post monitors. This view is further supported from the results in columns (3) and (4). Firms borrowing only from foreign and government banks, default 8.6% more on government banks, while firms borrowing only from private domestic and government banks default 5.7% more on government banks. Thus we universally observe the same pattern. Foreign and private domestic banks are equally tough as ex-post monitors, but government banks consistently under-perform. The same firm is *twice* as likely to default on government banks as opposed to privately owned banks.

This result can only be attributed to differences in ex-post monitoring between government banks, and private banks. Proposition 1 showed that cash-flow rights (or incentives) and regulation are the two critical variables that determine ex-post monitoring. This theoretical result, coupled with the empirical results of Columns (1) through (4) in Panel B, allow us to deduce the relative supervision done by private domestic and foreign banks. In particular, since both foreign and private domestic banks are privately held, we know that cash-flow rights or θ is close to 1 for both these bank-types. Moreover, since private domestic and foreign banks have the same level of ex-post monitoring, it must imply that the two banks provide same level of supervision as well, i.e. $\rho^F \sim \rho^{PD}$. If regulation (ρ) were significantly lax for private domestic banks compared to foreign banks, then we should have seen significantly worse ex-post monitoring for private domestic banks

like we see for government banks. The weak ex-post monitoring result for government banks is also perfectly in line with proposition 1. Given the low cash-flow rights (θ), as well as supervision (ρ), government banks are poor ex-post monitors. A criticism of this particular interpretation of results on government banks may be that the same firm defaults more on government banks because government banks provide implicit subsidies to firms because of "social" concerns. We will discuss this issue in detail when we do robustness checks in section 7. The results in section 7 will show that such a criticism does not hold in the data.

Columns (1) through (4) of Panel C in Table III show the aggregate lending patterns across the four types of multi-source firms. The results show that multi-source firms on average borrow comparable amounts from each source. Private domestic banks tend to lend in relatively smaller amounts (columns (1) and (4)) than government and foreign banks, but that is to be expected due to their smaller loan size overall (Table I column (4)).

4.2 Measuring Default Risk Due to Ex-Ante Monitoring (Screening)

Having separately measured the risk due to ex-post monitoring, we now turn our attention towards measuring ex-ante monitoring risk, or risk due to the selection of firms by banks. A general problem with separating out ex-ante risk is that when we look at risk characteristics of firms chosen by a particular bank, the risk contains *both* ex-ante as well as ex-post monitoring by the bank. However, since we have already separated out and measured the risk due to ex-post monitoring, we can now separately measure the ex-ante monitoring risk across the three types of banks. Column (5) of Panel B, Table II does that by comparing default risk of firms which *only* borrow from one type of bank. There are 41,662 such unique firms or borrowers. The results show that the default risk of firms borrowing only from private domestic banks is 8.5% higher than foreign firms. The same risk is 38.4% *higher* for government banks. This risk includes *both* ex-ante and ex-post monitoring risk. However, from columns(1) through (4) we already have an idea for the ex-post monitoring risk. The ex-post monitoring risk is about the same for foreign and private domestic banks. At best the ex-post risk is only marginally higher for private domestic banks by about 1%. Thus out of the 8.5% default difference between foreign and private domestic banks, about 7.5% should be attributed to differences in ex-ante monitoring. Similarly, columns (1) and (3) showed that the default risk due to ex-post monitoring of government banks was 5.0% to 8.6% higher than foreign banks. The difference was larger for firms which did not borrow from private domestic banks. Firms which borrow from more types of banks most like reflects the "quality" of the firm - an

attribute which is reflected in the ex-ante monitoring risk. This suggests that ex-ante risk also *interacts* with ex-post risk for government banks: good quality firms, i.e. firms with low ex-ante risk, are likely to be *easier* to monitor for government banks ex-post as well. Given this firms which borrow from only one type of bank will have a *greater* differences due to ex-post monitoring between foreign and government banks. Since the ex-post monitoring difference was 8.6% between foreign and government banks for firms borrowing only from these two banks, the difference might be greater for firm borrowing from only one type of bank. Lets assume for now that 8.6% of the difference between such firms can be attributed to ex-post monitoring[10]. Then the about 29.8% (38.4-8.6) of the default risk difference between foreign and government banks in column (5) can be attributed to differences in ex-ante monitoring of the two banks. Column (5) of Panel C shows the overall lending to single-source firms by the three types of banks.

We have established that private domestic banks and government banks have 7.5% and 29.8% higher risk than foreign banks due to ex-ante monitoring respectively. What factors can we attribute this differential to? Proposition 2a and 2b showed that there are two main reasons for banks to have higher ex-ante monitoring risks: (i) If they have low cash-flow rights and low regulation, then they will have no incentive to screen, and will lend to the worst quality firms; and (ii) If they have good screening technology, then they will be able to lend to tough clients as well who may be riskier by nature, but will have high returns as well. The two reasons have completely opposite welfare implications and hence must be investigated further.

First, let us focus on the 29.8% higher ex-ante monitoring risk for government banks. Is it due to non-screening of firms (proposition 2a), better screening of firms (proposition 2b), or simply due to some efficient "social" objective of government banks that makes them lend to riskier firms? As we have pointed out earlier, section 7 will show that "social" objectives cannot explain any of our government results. We therefore focus on which part of proposition 2 holds.

Institutional facts about government banks, plus the results on ex-post monitoring have already shown that government banks have the poorest incentives (cash-flow rights), as well as supervision. This points out that we are much more likely to fall under the conditions of proposition 2a (i.e. that incentives are too low), vs. proposition 2b. This interpretation is given a further boost by the magnitude of the ex-ante monitoring risk of government banks. The ex-ante monitoring risk for government banks is 29.8% higher than foreign banks, which is enormous given that the average

[10]Section 7 will analyze in detail to what extent differential ex-post monitoring risk across bank-types interacts with firm type.

default rate for foreign banks is only around 5%. Government banks do indeed seem to be fishing from the bottom of the pool, just as proposition 2a predicted. This interpretation will be given a further boost in the next section, where we show that government lending is not systematically correlated to either hard or soft-information firms. All of this suggests that government banks are either lending randomly, or lending for political and corruption reasons, which implies they get the worst quality customers in equilibrium.

Next, we look at the higher ex-ante monitoring risk for private domestic banks. Is this also due to poor or non-screening of firms like government banks, or is proposition 2b a better explanation for explaining private domestic banks? Once again, our results from the ex-post monitoring risk provide important clues. The results on ex-post monitoring risk established that private domestic banks have the same level of incentives (θ) and supervision (ρ) as foreign banks. This suggests that proposition 2a *cannot* explain the ex-ante monitoring results: private domestic bank do not have higher ex-ante monitoring due to poor or non-screening of firms because if that were the case, then private domestic banks should also have had poorer ex-post monitoring. Consequently it must be proposition 2b, i.e. differences in screening technology, that explains the ex-ante monitoring risk differential between private domestic and foreign banks. In the next section we shall *directly* test for this interpretation: Do private domestic banks really have better screening technology in terms of lending to "soft information" firms compared to foreign banks?

5 Screening Productivity: Measuring "Hard Information"

To test directly for the predictions of Proposition 2b, we test if private domestic banks are more likely to lend to "soft information" firms. "Soft information" refers to any information which cannot be credibly communicated to a third party, such as the top management of a bank. For example, a student's academic grades in his courses would constitute as "hard information", whereas the information contained in his advisor's recommendation letter would be considered "soft information". In terms of banking, past history of firms such as high exports, high sales growth, or good repayment history will be considered as "hard information", whereas information such as management and entrepreneurial skills of the firm owner will be considered "soft information". We construct different measures for the "hard information" content of a firm, and then test whether they are correlated more with foreign banks compared to private domestic banks.

Our first hard information variable measures the proportion of lending given out to firms that are

part of large conglomerates. To do that, we first classify firms into "groups". Our data set contains the names (and tax identification numbers) of all directors of a firm. Using this information, we classify firms into groups such that *two firms belong to the same group if they have a director in common*. We then use this group definition to classify firms into four categories: (i) Single Firms - these are firms whose directors do not sit on the board of any other firm (64.3% of the firms fall in this category); (ii) 2-Firm Groups - these are firms which have exactly one more firm that shares at least one director in common with it (13.3% of the firms fall in this category), (iii) (3to41)-Firm Groups - these are bigger groups with 3 to 41 firms that jointly satisfy our group definition condition above (11.3% of the firms fall in this category), and (iv) The Big Group - the remaining 11.1% of the firms all form one big group. Moreover these 11.1% firms in the big group collectively borrow 60.3% of aggregate private sector lending in the economy! The existence of such a high concentration of ownership and capital into a single closely connected group of directors is an interesting fact in itself. We explore the behavior of such groups and implications for the economy in a later paper. For now we want to document how the lending by each of the three types of banks is distributed across these 4 types of groups. For the 52,131 private borrower observations in our data set, we have director information for 48,212 observations, and are thus able to classify these observations into the four group categories above.

Columns 1a through 1d in Table IV report the results. The results show that lending is severely biased in favor of large groups and conglomerates by foreign banks compared to private domestic banks. Even government banks lend significantly more to larger groups than private domestic banks. For example, foreign and domestic banks lend 74.1% and 61.4% respectively to the Big Group firms, whereas private domestic banks lend 45.6% to this groups, a drop of about 30% over foreign banks. Column (2) tests these differences in a regression framework. We regress (size-weighted) a dummy for being in the Big Group against bank-types and bank-loan types. The results confirm finding of column 1d statistically as well. Private domestic banks lend 27.2% less than foreign banks to the big conglomerate firms, while government banks lend 14.9% less to such firms. All coefficients are highly significant. Since being in a conglomerate is clearly "hard information", the result suggest foreign banks lending substantially more along that dimension.

One could make an "omitted variable" criticism for the regression in column (2). It can be argued that big conglomerate firms are really proxying for "good risk" firms, and *not* "hard information" as our identification assumes. In that case, column (2) is simply capturing that private domestic banks lend to riskier firms regardless of their informational content. However, such an

"omitted variable" criticism is not valid on two accounts. First, the coefficient on government banks is *less* negative than the coefficient on private domestic banks. If being in a conglomerate seriously captured the riskiness of a firm, then since government banks have far worse portfolios than private banks, we would have expected the coefficient on government banks to be *more* negative than private domestic banks. Second, and more importantly, we can actually directly control for such omitted variable concerns by putting in the direct measure of firm riskiness namely its default rate. Column (3) does exactly that, and shows that the coefficient on private domestic bank (26.6%) is almost exactly the same as in column (2). The coefficient on firm default rate is negative and significant, showing that firms in big conglomerates default less. However, this does not explain why private domestic banks lend less to conglomerate firms than foreign banks. This solidifies our position that the private domestic dummy is indeed capturing informational content of firms.

The second "hardness" measure that we construct is whether a firm borrows from multiple banks or not. If a firm is lending from other banks as well, this is credible "hard" information that can be used by a bank. Column (4) of Table IV shows that foreign banks lend 78.5% of their portfolio to multi-bank firms, but private domestic banks lend 21.1% less to such firms. Once again the result is unchanged by the inclusion of firm default rate (column (5)), showing that the previous result was not driven by omitted variable concerns.

The third measure of "hardness" that we construct is whether the firm belongs to a foreign multi-national chain or not. We have information on whether a firm belongs to such a chain for firms with total credit line across all banks exceeding 50 million rupees. We are thus left with 5,540 observations. The "foreign" classified firms have internationally recognized and audited statement of accounts which can be credibly verified publicly. Therefore under proposition 2b, foreign banks will find it much easier to lend to foreign firms. Column (6) tests for this and finds that this is indeed the case. Foreign banks lend 14.3% of their portfolio (subject to sample selection) to foreign firms, whereas private domestic banks only lend only 3% (14.3 - 11.3) to such firms. Even government banks lend more to foreign banks (6.35%). The result for private domestic banks is once again robust to the inclusion of firm riskiness (column (7)).

A recurrent feature of the inclusion of firm riskiness in columns (3), (5), and (7) is that unlike private domestic banks, the coefficient on government banks does move towards zero appreciably. In fact, in column (7) the government coefficient is no longer significant once we control for the omitted risk variable. This suggests that the omitted variable concern mentioned earlier does explain part of the government banks coefficient, but does not influence the private domestic dummy at all.

The results of Table IV confirm the implication Proposition 2b that private domestic banks have better screening technology for soft information firms. We showed that our results cannot be driven by the omitted variable concern of firm riskiness, and hence can be interpreted in terms of the informational content of firms. The results of the next section will further substantiate our claim, when we show that better use of "soft information" by private domestic banks allow them to recover a larger fraction of bad loans than either government or foreign banks. Moreover, softer information further helps private domestic banks as they are significantly more likely to recover loans through bilateral renegotiation, rather than appealing to a third party to resolve the dispute (i.e. litigation).

6 Recovery, Litigation, and Renegotiation

For loans that go into default, we have information on how much cash was recovered from these loans in the past 12 months, and whether the recovery was made after litigation in a court of law, or through bilateral renegotiation. Information on the amount and mode of recovery is not only important for understanding the effectiveness of bank in going after bad loans, but it can also shed interesting light on the *type* of relationship that a bank maintains with its firms. For example, if a bank is more likely to litigate with a third party (the courts) instead of settling a bad loan through bilateral negotiation, then this indicates the bank having a more arms length relationship with the firm. In the context of our hard and soft information set up, if a bank has more soft information on a firm, it may be better able to negotiate with the firm (e.g. if the bank can observe information which is non-verifiable in a court of law). We therefore perform a number of tests looking at the differential recovery, litigation, and renegotiation of loans across bank-types. Table V reports the results.

Column (1) regresses a dummy which is one if some portion of the bad loan is recovered and 0 otherwise on bank-types. The regression is run only on the bad loans sub-sample (i.e. loans which are under full or partial default). The results show that foreign banks recover some cash from 20.4% of their bad loans. However, private domestic banks are much more effective in recovery, recovering from an additional 14.2% bad loans as well. Governments are the worst in recovery, although their difference is not significant relative to foreign banks. Column (2) repeats the regression of column (1), but this time uses the *percentage* of bad-loan recovered as the dependent variable. The regression is size-weighted so that the coefficients are economically meaningful. The story of

column (1) now becomes even more stark. Foreign banks only recover 9.2% of their defaulted loans, whereas private domestic banks recover more than twice, or 20% (9.2+11.8) of their defaulted loans. As before governments recover the least amount (5.4%).

A direct implication of results in column (2) is that the differential default risk estimates for private domestic banks were an *over-estimate*. For example, ex-ante monitoring default risk was 7.5% higher for private domestic banks over foreign banks. However, after we account for the fact that private domestic banks recover 11.8% more of their default loans than foreign banks, the ex-ante monitoring risk differential reduces to 6.5% (i.e. 7.5 - (11.8% * 8.5%) where 8.5% is the approximate *level* of default of private domestic banks).

However in this section we want to focus more on the *way* private domestic banks recover their bad loans relative to foreign banks. Column (3) runs the litigation indicator variable (equal to 1 if a bad loan is under litigation in a court) on bank-types. It shows that foreign banks are *twice* as likely to litigate on their bad loans as private domestic banks. Foreign banks litigate almost 60% of their bad-loans, while private domestic banks only litigate about 30% of their bad loans. Government banks lie in between with a litigation rate of about 45%. Columns (4) and (5) then interact the two recovery variables with litigation to see if banks have differential success in litigation versus renegotiation. The results show that domestic banks are significantly more successful than foreign banks in recovering loans through renegotiation (i.e. absence of litigation), but less successful than foreign banks in recovering loans through litigation. This is again consistent with our earlier result that private domestic bank have a comparative advantage in lending to "soft information" firms over foreign banks. Recovery through renegotiation is easier if one has more non-verifiable (i.e. soft) information. A number of theory papers looking at renegotiation have made this point.

7 Robustness, and Alternative Hypotheses

In this section we do some robustness checks on our results so far, and also discuss the plausibility of some alternative explanations for our findings.

Standard Errors

We have already mentioned how clustering at the bank level, with only 33 banks, takes care of any concerns of observations within the same bank being correlated. Columns (1) and (2) of Table VI, Panel A compare the standard errors of one of our standard regressions without this correlation

correction (column(1)), and standard errors with the correction (column (2)). It can be seen that the correction does indeed increase the standard errors by a factor of about 2. Clustering at the bank level was thus critical for correct hypothesis testing.

There is another potential source of correlation in some regressions that we have not taken account for. This concerns the correlation of observations of the same firm borrowing from different banks. We would like to make two points with regards to this concern. First, the concern is not there by definition for the regression in Column (5) of Table III, Panel B since it is run on single-source firms only. Similarly, this problem does not exist for the remaining regressions in Panel B which remove any first order correlation among firm-observations by demeaning the observations at the firm-level. The ex-ante and ex-post monitoring results are thus robust to this concern. Second, to get an idea of the magnitude of the firm-correlation concern, we repeat the regression of column (1) in Table VI using firm level clustering. There are 45,100 clusters in 52,131 observations suggesting that this correlation in only going to have a minor impact on standard errors. This is indeed the case as standard errors for column(3) are very similar to those of column(1). A further drop of our reported standard errors by this magnitude would not change the significance of any of our results. Since mechanically clustering only allows to cluster by one variable, we chose to cluster by banks in our paper.

Market Discipline

We claimed that our result on ex-post monitoring suggest that private domestic banks in spite of being subject to weaker external supervision at home, are equally tough on the firms they lend to. This was not the case with government banks. We argued that the results suggest that even in the absence of strong external supervision, private incentives coupled with market-discipline (coming through the cost of deposits) are sufficient to force banks to act diligently. An important fact to keep in mind in this regard is that there is no major government-backed explicit deposit insurance in Pakistan. So private markets should respond to changes in risk of a private bank. We now propose a direct test to confirm our interpretation.

The test is simple, and involves computing the response of market to changes in the riskiness of banks. Our measure of market response is the credit rating of a bank as published by private credit rating institutions (PACRA for domestic banks, and Moody's for international banks). Since government banks are backed up by the government, government bank ratings should not respond negatively to the riskiness of the banks (higher credit score is *good*). We formally test for this in

Column (4) of Panel A by regressing government banks' overall credit rating (score of 1 to 6) on the overall default risk of the bank's portfolio. The correlation between credit rating and default is actually huge, positive and close to being significant at 5%[11], suggesting a strong moral-hazard problem. Government banks with stronger implicit government backing get better credit ratings, and take higher risks. The lack of market-discipline creates the moral hazard problem that is responsible for bad-risk taken by government banks. The same test on private domestic banks (Column(5), Panel A) gives us exactly the opposite result. Higher level of risk by private domestic banks does indeed lead to worse credit ratings. The correlation is negative and significant at the 1% level, with an R-sq of 41%. This provides strong evidence of a market-discipline link in operation. Finally, the correlation is negative for foreign banks as well, but it is much smaller in absolute magnitude than private domestic banks, and statistically insignificant[12]. This result is probably driven by the fact that the ratings that Moody provides are based on the foreign banks international portfolio, and thus are uncorrelated with the local loan portfolio of these banks.

The strong positive correlation of credit ranking and risk for government banks, but a strong negative correlation for private domestic banks confirms our interpretation of market discipline forcing private banks to behave prudently.

Selection Effect on Multi-Source Firms

When we backed out the ex-ante monitoring risk differential from results of Column (5) in Table III, Panel B, we assumed that the ex-post monitoring differential across bank-types will be the same for single-source firms as for multi-source firms that we computed in Columns(1) through (4). We now explicitly test for this assumption. The idea is to first highlight variables that determine the selection of a firm as a multi-source firm, and then use such selection variables to test if the overall risk differential across bank-types is correlated to the selection variable.

The variable that explains the biggest portion of multi-source selection is log of firm size, where firm size is defined as the sum of total borrowing across *all* banks by a given firm. Column (1) runs an indicator variable for multi-source firms on log of firm size and a constant, and find that this variable alone explains 32% of the variation in the indicator variable. The regression is run at the firm level (hence 44,176 observations). Column (2) repeats the exercise, but includes other potential explanatory variables as well such as firm group category, foreign dummy, firm default

[11] Even though we only have 6 data points!

[12] The number of observations for foreign banks is 16 instead of 18 because credit ratings for two of the foreign banks are not available.

rate, and firm funded to total loan ratio. The result shows that the new variables almost add no explanatory power. R-sq only increases by 2% to 34%.

We then repeat the estimates of ex-post monitoring regressions in Table III, by including an interaction term of log(firm size) with bank-types as well. The results of this interaction term are reported in Panel C of Table VI. The result shows that the difference between domestic and foreign banks' in terms of ex-post monitoring is increasing in size. Since single-source firms are on average smaller than multi-source firms, this result suggests that our estimate of ex-post monitoring differences for these firms was an over-estimate. The log of firm size of single-source firms is 3.6 units smaller than multi-source firms. We should therefore adjust the ex-post monitoring result from multi-source firms by 1.8% (=3.6*0.5). A better estimate of ex-post monitoring difference between domestic and foreign firms for single-source is then 1-1.8=-0.8%. This correction will not change any of our interpretations above. In fact it only makes them stronger as private domestic banks do even better at ex-post monitoring than foreign banks for smaller firms.

A similar calculation for government banks from Table VI, Panel C reveals that the ex-post monitoring risk difference between government banks and foreign banks will *increase* by 5.4% (=3.6*1.5) for single-source firms compared to multi-source firms. Thus the ex-ante risk differential for government banks will be 24.4% (=29.8-5.4) for single-source firms. Even after this correction, our qualitative interpretations remain the same.

Government Lending

We have seen that government banks perform the poorest by a large margin on all dimensions measured. Our interpretation so far has been that these results mostly reflect inefficient, corrupt, and political lending by government banks. A more benign interpretation might have been that our results are driven by government banks having different but "socially" efficient objective functions. We feel that this is an implausible interpretation given our results. First, the publicly stated goal of government commercial banks is *not* "social". There are other specific financial institutions that have been set up for targeting social enterprises, such as micro-enterprises, agriculture, and small businesses. Second, the "social" explanation mostly relies on government banks lending to a different clientele. For example, government banks might be lending to young firms, or infant industry firms with positive learning spillovers in future. These firms individually may be riskier and negative NPV, but their social value necessitates the involvement of government banks. So if government banks show higher default rates because of such lending, that can be taken as evidence

of corruption or inherent inefficiency on part of government run banks. However, our results on ex-post monitoring completely control for such criticism. We found that the same firm borrowing the same type of loan defaults more to government banks. This result cannot be explained away by the usual "social" explanation mentioned above. A more nuanced social explanation can still be that government banks also provide social subsidies to firms who may already have access to private credit. However, legitimate reasons for the existence of such social subsidies at a vast scale are hard to justify. Third, our results in Table IV showed that government banks are in fact *more* likely to lend to larger, well-established firms, including foreign firms compared to private domestic banks. This evidence flies in the face of any social explanation. Firms with legitimate social concerns such as small firms with no other external financing source, agricultural firms, and infant industry firms are all likely to be smaller, non-conglomerate firms, with no other external lender. Table IV tells us that none of this is true for government banks in comparison to private domestic banks in the country. We therefore reject the social explanation for our results.

8 Concluding Remarks

This paper undertook an empricial investigation of some of the key issues in banking, namely incentives, supervision, market discipline, and organizational structure. The extensive breadth and depth of our data set allowed us to address some issues for the first time empirically, and revisit others with a new approach. As the theory section showed, our ability to differentiate empirically between ex-ante and ex-post monitoring allowed us to test a number of hypotheses about incentives, supervision, and organizational hierarchy. Similarly, access to loan-level variables made it possible to measure the informational content of loans, while controlling for loan types and risk attributes. Finally, access to information such as default, renegotiation, and litigation allowed us to test directly for various implications of theories of organization.

We hope that the results of this empirical investigation would provide a deeper and clearer understanding of factors that influence banking. Our results highlight the importance of private incentives, and market-discipline for better banking, while at the same time cautioning against the dangers of government involvement. Moreover, even with private markets, organizational contraints of foreign banks can limit the ability of such banks to lend to "soft" information firms that require subjective evaluation.

The paper provides useful information for guiding banking reforms in emerging economies.

It cautions against the over-indulgence of governments in running the banking sector, which has typically been the norm in many emerging markets. On the positive side, the paper shows that weak legal and regulatory frameworks do not need to be a binding constraint for effective supervision. Policies promoting private incentives and market-discipline can overcome some of these deficits. Whereas foreign competition and entry of foreign banks may import healthy competition and technology, the paper suggests than the view that foreign entry alone can serve as the panacea for all banking ills is misplaced. In particular, efforts to promote local private banking industry should accompany liberalization of the banking sector to foreign banks.

As a word of caution against misinterpretation, we would like to highlight what this paper does *not* imply. Our results suggest that large scale intervention by governments in lending to the private sector is not efficient. This does not imply that *all* forms of government interventions in the form of subsidies or otherwise is inappropriate. There may be legitimate grounds for government intervention in specific areas such as providing subsidized loans for education, and technology adoption. However, such grounds should be viewed as an exception rather than the rule.

Finally, one may wonder about the generalizability of our results to the developing world at large. This issue is addressed in a related paper Mian[2003]. The paper constructs a bank-level data set of over 1,600 banks from 100 emerging economies, and shows that the bank-level cross-country evidence is also consistent with the results of this paper.

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Theory Appendix

Claim: $p(e^m)$ is increasing and concave in e^m.

Proof: Differentiate (1) with respect to e^m to get:

$p'(e^m) = \frac{-1}{E'(p)-r} > 0$ for all e^m, from assumptions (iii) and (v).

Differentiate the above expression again to obtain:

$p''(e^m) = \frac{-[p'(e^m)]^2 E''(p)}{E'(p)-r} < 0$, from assumptions (iii) and (v).

Proof of Proposition 2:

Let's take the limit as $\theta \longrightarrow 0$. Then,

$U_B^S \longrightarrow -\left(\frac{p_1-p_0}{\gamma}\right) C(0) < 0$, and

$U_B^{NS} \longrightarrow 0$.

Since the pooling equilibrium generates a loss for the bank, i.e. $[p^E(\overline{r}-1)-(1-p^E)\rho] < 0$, and we have $\frac{\partial U_B^{NS}}{\partial \theta} < 0$, and $\frac{\partial U_B^S}{\partial \theta} > 0$.

Therefore, $\exists\ \underline{\theta}$ such that for $\theta < \underline{\theta}$, $U_B^S < U_B^{NS}$ and the firm decides not to screen.

Table I
Loan Characteristics - Overall

	(1) # of Banks	(2) Total Lending	(3) # of Loans	(4) Avg. Loan Size	(5) Total Over Due	(6) Default Percentage [100*(5)/(2)]
Panel A: Private Sector Loans (44,176 unique borrowers)						
Government	6	295,000	17,967	16.4	93,500	31.7
Domestic	9	229,000	20,414	11.2	18,400	8.0
Foreign	18	223,000	13,750	16.2	11,000	4.9
All Banks	*33*	*747,000*	*52,131*	*14.3*	*122,900*	*16.5*
Panel B: Government Sector Loans (105 unique Borrowers)						
Government		258,000	181	1425	15,800	6.1
Domestic		40,700	99	411	685	1.7
Foreign		36,900	125	295	507	1.4
All Banks		*335,600*	*405*	829	*16,992*	*5.1*

The table shows summary statistics for the data (bank-borrower level). Government, Domestic, and Foreign refers to the type of bank, where domestic refers to private domestic banks. Panel A reports results for only private sector borrowers, while Panel B reports resutls for only government sector borrowers. Total Lending, Avg. Loan Size, and Total Over Due are all in Millions of Rupees.

Table II
Loan Characteristics - By Loan Type

	Funded		Non - Funded	
	Fixed	Working Capital	Letter of Credit	Guarantees / Other
	(1)	(2)	(3)	(4)
Panel A: Percentage of Total Lending				
Government	28.9	57.2	7.1	6.8
Domestic	8.3	63.4	15.8	12.6
Foreign	16.8	60.8	14.0	8.4
All Banks	*19.0*	*60.1*	*11.8*	*9.0*
Panel B: Default Percentage				
Government	41.6	32.9	1.5	11.4
Domestic	13.4	10.9	0.3	0.0
Foreign	7.1	6.0	0.1	0.8
All Banks	*28.7*	*17.7*	*0.5*	*3.5*
Panel C: Turnover				
Government	n.a.	n.a.	n.a.	n.a.
Domestic	55.3	61.2	47.4	29.7
Foreign	33.7	46.2	32.1	34.5
All Banks	*37.4*	*56.4*	*44.0*	*31.1*
Panel D: Number of Bank Loans				
Government	2,648	13,344	936	1,039
Domestic	1,324	13,253	3,799	2,038
Foreign	5,674	6,086	1,119	871
All Banks	*9,646*	*32,683*	*5,854*	*3,948*

The table refers to all private sector loans (i.e. government sector loans are excluded). Panel A reports the percentage of total lending that falls in the given loan-type category. Panel B reports the default percentage for that category. Panel C reports the turnover for a given loan-type/bank-type category. Turnover is defined as new financing given out in the last 12 months, as a percentage of the stock of loan outstanding. "n.a." refers to Not Available.

Table III
Measuring Risk: Separating Monitoring and Screening Risk

	(1)	(2)	(3)	(4)	(5)
Panel A: Over-all Risk					
	Total Overdue	Overdue less than a year	Overdue more than a year	Principal Overdue	
Government	24.7***	2.0***	22.7***	23.9***	
	(2.6)	(0.6)	(2.0)	(2.1)	
Domestic	4.4	0.37	4	4.8	
	(3.1)	(0.4)	(2.8)	(3.5)	
Loan Type Fixed Effects	YES	YES	YES	YES	
# of obs.	52,131	52,131	52,131	52,131	
Panel B: Separating Ex-ante and Ex-post Monitoring Risk					
	Multi-source Firms: Ex-post Monitoring				
	All Three	Foreign and Domestic Only	Foreign and Government Only	Domestic and Government Only	Single Source: (Ex-ante + Ex-post)
Government	5.0***		8.6***	5.7***	38.4***
	(1.0)		(1.2)	(1.9)	(1.6)
Domestic	1.06	1.1		---	8.5**
	(1.0)	(1.0)			(4.0)
Foreign	---	---	---		---
# of obs.	2,533	2,509	965	2,678	43,446
# of unique borrowers	392	961	362	799	41,662
Panel C: Total Lending by Bank and Firm Type					
	All Three	Foreign and Domestic Only	Foreign and Government Only	Domestic and Government Only	Only One Type
Government	91.7		27.3	59.1	116.5
Domestic	58.0	32.8		23.3	115.3
Foreign	98.5	35.7	22.8		65.9

The table refers to all private sector loans (i.e. government sector loans are excluded). The dependent variable in Panel A is constructed as a percentage of the total loan outstanding. The dependent variable in Panel B is the total over-due as a percentage of the total loan outstanding. Regressions in columns (1) through (4) of Panel B are first-differenced at the borrower level. Regressions in Panel A and B are weighted by the size of the loan. All regressions report standard errors that are clustered at the bank-level (there are a total of 33 banks). "--" refers to the omitted category (coefficient on the constant not reported). Total lending in Panel C is in billions of rupees.

Table IV
Measuring "Hard Information"

	(1a)	(1b)	(1c)	(1d)	(2)	(3)	(4)	(5)	(6)	(7)
	Percentage Lending to the 4 Group Categories									
	Single Firms	2-Firm Groups	(3 to 41) Firm Groups	The Big Group	Big Group Dummy	Big Group Dummy	%age Lending to Multi-Bank firms	%age Lending to Multi-Bank firms	%age Lending to Foregin Firms	%age Lending to Foregin Firms
Government	19.7	7.7	11.3	61.4	-14.9***	-11.5**	-14.7**	-9.22**	-7.95**	-4.85
					(4.44)	(4.77)	(5.83)	(5.41)	(3.79)	(3.95)
Domestic	24.8	12.3	17.3	45.6	-27.2***	-26.6***	-21.1***	-20.1***	-11.3***	-10.76***
					(5.42)	(5.57)	(5.10)	(5.0)	(3.66)	(3.77)
Constant (Foreign)	10.8	4.9	10.2	74.1	---	---	78.5$^{\Psi}$	78.5$^{\Psi}$	14.3$^{\Psi\Psi}$	14.3$^{\Psi\Psi}$
Default Rate						-0.0014***		-0.0022***		-0.0014***
						(0.000467)		(0.00030)		(0.00043)
Domestic * SIZE75-100										
Bank-Loan Type F.E.					YES	YES	YES	YES	YES	YES
# of obs.					48,212	48,212	52,131	52,131	5,540	5,540

The table refers to all private sector loans (i.e. government sector loans are excluded). All regressions are weighted by the size of the loan. All regressions report standard errors that are clustered at the bank-level (there are a total of 33 banks). "--" refers to the omitted category (coefficient on the constant not reported). Firm Size is the sum of the principal loan amount outstanding across all banks for a single firm. Ψ78.5 is the unconditional average lending to single-bank firms by foreign banks. ΨΨ14.3 is the unconditional average lending to foreign firms by foreign banks.

Table V
Recovery, Litigation, and Renegotiation

	Recovery		Litigation	Litigation And Recovery	
	(1)	(2)	(3)	(4)	(5)
	Recovery Conditional on Default	Percentage Recovered Conditional on Default [WLS]	Litigation Conditional on Default	Recovery Conditional on Default	Percentage Recovered Conditional on Default [WLS]
Government	-5.0	-3.8	-15.1**	-4.9	-8.0*
	(5.10)	(3.36)	(6.50)	(6.90)	(4.27)
Domestic	14.2**	11.8**	-30.4***	15.9**	13.1***
	(6.87)	(4.88)	(7.13)	(7.05)	(4.00)
Constant (Foreign)	20.4***	9.2***	59.6***	23.5***	15.0***
	(3.67)	(2.79)	(4.96)	(4.90)	(2.70)
Government * Litigation				-1.9	9.6**
				(6.66)	(4.09)
Domestic * Litigation				-11.1*	-5.9
				(6.42)	(3.71)
Litigation				-5.2	-13.8***
				(5.92)	(2.90)
# of obs.	10,349	10,349	10,349	10,349	10,349

The table refers to all private sector loans in default (i.e. government sector loans are excluded). All regressions report standard errors that are clustered at the bank-level (there are a total of 33 banks).

Table VI
Robustness, and Alternative Hypotheses

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
	Standard Error Check			Market Discipline		
	Total Overdue [robust s.e.]	Total Overdue [s.e. clustered at bank-level]	Total Overdue [s.e. clustered at firm-level]	Government Banks' CR	Domestic Banks' CR	Foreign Banks' CR
Government	24.7***	24.7***	24.7***			
	(1.70)	(2.6)	(1.84)			
Domestic	4.4***	4.4	4.4***			
	(1.47)	(3.1)	(1.48)			
Constant (Foreign Omitted)	---	---	---	0.85	5.14***	5.16***
				(2.00)	(0.20)	(0.36)
Bank Overall Risk				21.20	-11.0***	-3.69
				(11.53)	(3.07)	(6.81)
Loan Type Fixed Effects	YES	YES	YES			
# of clusters	52,131	33	45,100			
# of obs.	52,131	52,131	52,131	6	9	16
R-sq				0.39	0.41	0.02
Panel B: Selection into Multi-Source Category						
	1 if Firm Multi-Source [Probit]	1 if Firm Multi-Source [Probit]				
Log(Firm Size)	0.0249***	0.0245***				
	(0.0059)	(0.0059)				
Other Controls	No	Yes				
# of obs.	44,176	40,289				
R-sq	0.32	0.34				
Panel C: Heterogeneity of Ex-post Monitoring						
	All Three	Foreign and Domestic	Domestic and Government	Foreign and Government		
Domestic * Log(Firm Size)	0.56	0.47**	n.a.	n.a.		
	(0.49)	(0.23)				
Government * Log(Firm Size)	-1.22***	n.a.	-0.89**	-1.73***		
	(0.39)		(0.38)	(0.46)		
# of obs.	2,533	2,509	2,678	965		

"Other Controls" include Group Categories, Foreign Firm Dummy, Firm Default Rate, and Firm Funded Ratio. Column (1) of Panel B includes a constant as well (not reported). Unless otherwise stated, standard errors are clustered at the bank-level (33 banks in total). "---" refers to the omitted category (constant not reported). Regressions in Panel C also include a constant, bank-type dummies, and Log(Firm Size) as independent variables (coefficients not reported). "n.a." means Not Applicable.

Figure 1: Distribution of Bank-Loan Types

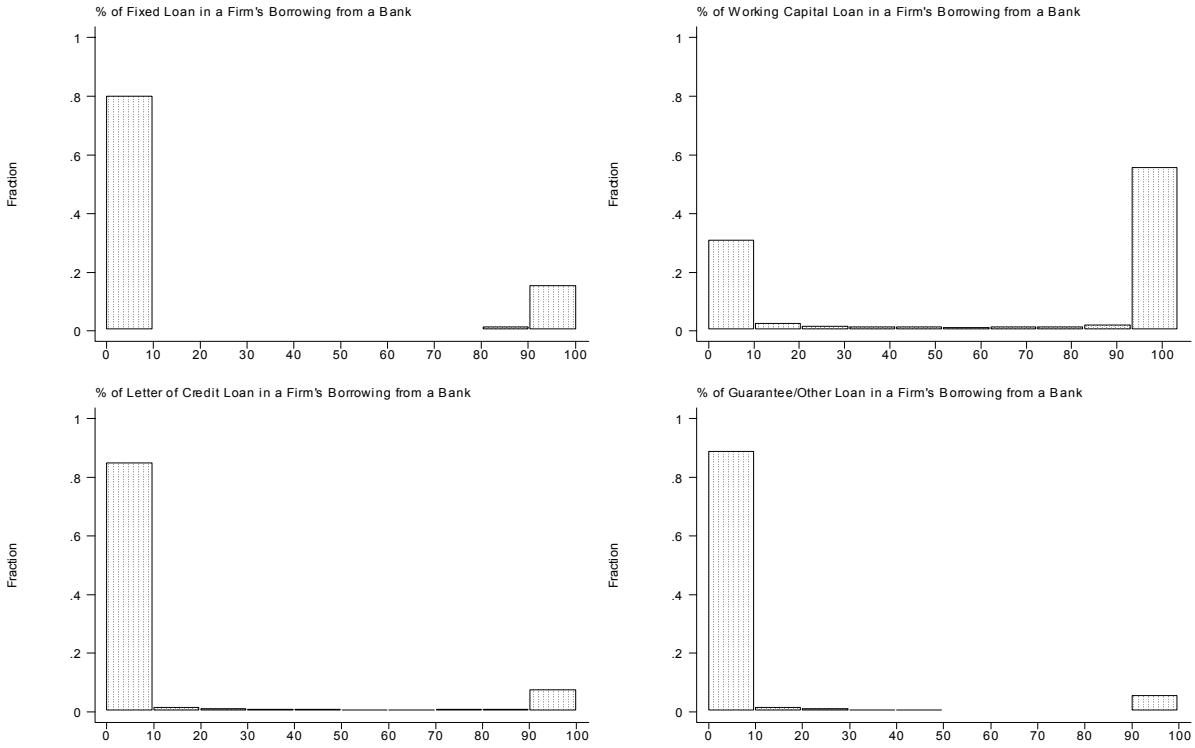

Figure 2: Probability Distribution of Firm Default Rate

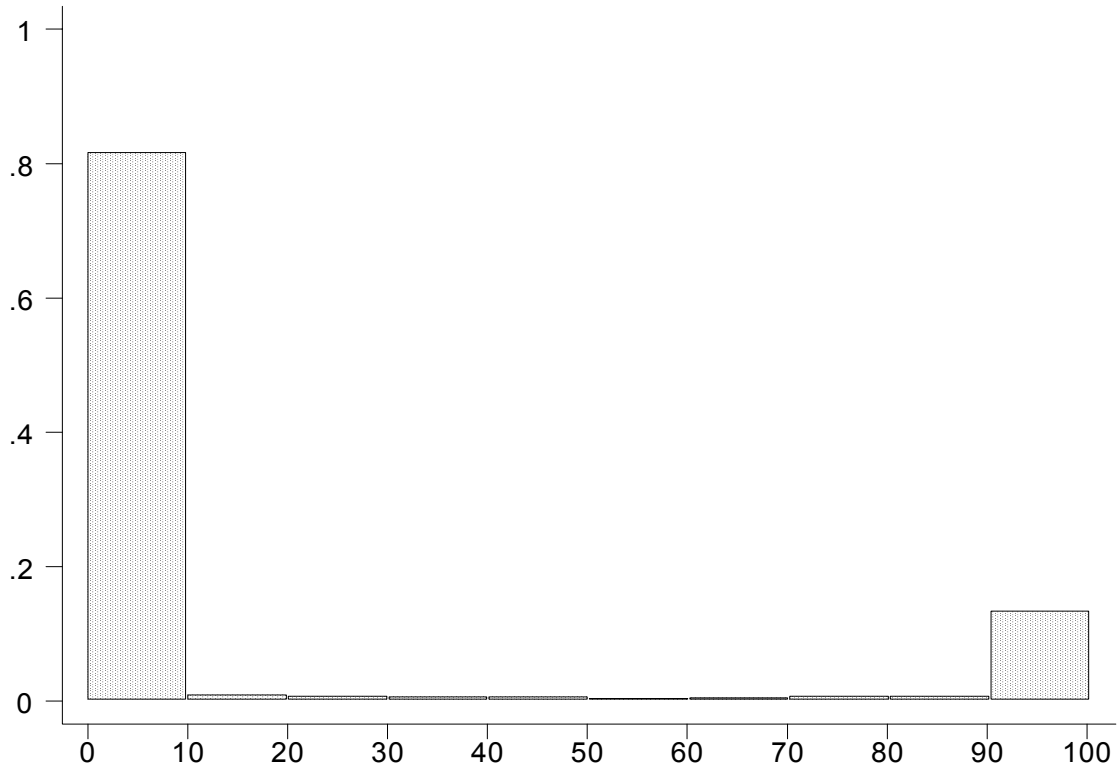

Figure 3: CDF of Total Lending Against Firm Default Rate