Essays on Banking and Corporate Finance in Developing Countries

by

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ABSTRACT

This dissertation consists of three essays that examine banking and corporate finance in developing countries. Specifically, it explores the theoretical and empirical implications of open capital markets, foreign bank entry, and the role of bond markets during banking crises.

Chapter 1 analyzes the impact of opening capital markets using a theoretical model that incorporates both foreign and domestic lenders in the presence of asymmetric information. The model suggests that when foreign lenders are limited in their ability to obtain information about entrepreneurs, they may engage in cream-skimming by only targeting the largest, most profitable firms. This cream-skimming can induce a reallocation of credit that may either increase or decrease overall net output of the open economy. The consequences of this credit reallocation depend on the type of financial opening and the quality of domestic institutions.

Chapter 2 examines the entry of foreign banks as a specific case of opening capital markets. I estimate the impact of entry using variation in the location of foreign banks established in India following a policy change in 1994. The estimates indicate that the 10 percent most profitable firms received larger bank loans, but that on average, firms were 7.6 percentage points less likely to have a loan after entry. The decline in loans was uncorrelated with firms' profitability and driven by a decrease among group-affiliated firms. The reallocation is consistent with the presence of asymmetric information, and similar estimates are obtained using the location of pre-existing foreign firms as an instrument for the location choice of new banks.

Chapter 3, co-authored with Simon Johnson and Changyong Rhee, uses a quasi-natural experiment in Korea after the 1997-98 financial crises to assess bond markets in emerging economies. Evidence confirms that bond markets can develop quickly during a banking crisis and act as a 'spare tire' even when almost all previous private finance flowed through the banking system. However, access to bonds was feasible only for the largest firms, and there is no evidence that bond finance was better directed than bank finance. Firms with weaker pre-crisis corporate governance were no less likely to obtain bond financing.
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Introduction

In recent years, the development of financial markets in most emerging economies has accelerated, but the path of development has varied greatly. Some developing countries open their domestic financial markets to foreign capital inflows, while others attempt to create new internal markets via bonds, equity, etc. Moreover, the theoretical and empirical implications of these changes remain relatively unexplored. In this thesis, I examine some of these financial developments by exploring the theoretical implications of open capital markets, and the empirical evidence pertaining to foreign bank entry and domestic bond markets in emerging economies.

In the first chapter, “Open Capital Markets in Emerging Economies: The Social Costs and Benefits of Cream-Skimming”, I construct a theoretical model that incorporates both foreign and domestic lenders in the presence of asymmetric information. The model suggests that when institutional, geographical, or cultural barriers limit foreign lenders’ ability to obtain information about entrepreneurs, foreign lenders will engage in cream-skimming by only targeting the largest, most profitable firms. This cream-skimming can induce a reallocation of credit that may either increase or decrease overall net output of the open economy relative to the closed economy. Profitable and large domestic projects are more likely to be financed in the open economy; negative net present value (NPV) projects are less likely to be financed; and when information asymmetries are large, informationally opaque entrepreneurs with positive NPV projects are also less likely to be financed. This drop in credit to ‘opaque’ entrepreneurs can occur if domestic lenders are ill-equipped to cost-effectively identify borrowers’ types. The model suggests the type of financial opening and the quality of domestic institutions matter, and that change in the distribution of credit may be an important aspect of financial globalization.
In the second chapter, “Banking Competition in Developing Countries: Does Foreign Bank Entry Improve Credit Access?”, I examine the entry of foreign banks as a specific case of opening capital markets. I estimate the impact of entry using variation in the location of foreign banks established in India following a policy change that took place in 1994. The estimates suggest that the 10 percent most profitable firms received larger bank loans, but that on average, firms were actually 7.6 percentage points less likely to have a long-term loan. The decline in the availability of loans appears uncorrelated with firms’ profitability and is driven by a decrease in domestic bank loans to group-affiliated firms, where information asymmetries are likely more severe. The timing of this loan reallocation coincides with foreign bank entry, and similar estimates, though less precise, are obtained using the presence of pre-existing foreign-owned firms as an instrument for the location choice of new foreign banks. The empirical evidence of this chapter is consistent with the theoretical predictions of chapter 1 that foreign financial entry may have distributional consequences on domestic credit allocations in the presence of asymmetric information.

In the third chapter, “Corporate Bonds: A Spare Tire in Emerging Markets?”, co-authored with Simon Johnson and Changyong Rhee, we analyze the internal growth of domestic bond markets. In bank-dominated financial systems with weak investor protection, bond markets could potentially help (a) broaden the access to external finance, (b) reduce the power of large firms and politicians over the financial system, and (c) soften the impact of banking-related crises by acting as a ‘spare tire’. However, theory suggests the heavy reliance on banks in emerging markets is not without foundation as bank deposits are an attractive contract when property rights are not well protected. This raises the question: Can bond markets develop in these emerging economies where banks have always dominated, and would they work better than banking contracts? This chapter offers some relevant evidence from a quasi-natural experiment in Korea after the crisis of 1997-98. Evidence from Korea during and after 1998 confirms that bond markets can develop quickly even in countries where previously almost all private finance flowed through the banking system. However, access to finance
through issuing bonds was feasible only for the largest firms. Moreover, there is no evidence that bond finance was better directed than bank finance. Firms with weaker pre-crisis corporate governance were no less likely to obtain bond financing in the post-crisis years, and direct ex-post evidence suggests the largest firms receiving bonds were not better run.
Chapter 1

Open Capital Markets in Emerging Economies: The Social Costs and Benefits of Cream-Skimming

Prior to the East-Asian financial crisis, the benefits of open capital markets in emerging economies were widely praised. Open capital markets were presumed to increase risk sharing, lower the cost of capital, and alleviate domestic liquidity constraints. Greater competition from foreign lenders was also thought to improve the allocation of credit and corporate governance of entrepreneurs in emerging economies. As a result, many less-developed countries (LDCs) liberalized their capital controls during the 1980s and the early 1990s, resulting in significant financial inflows. By 1995, capital inflows averaged five percent of GDP for both developed and LDCs.¹

Following the East-Asian financial crisis, however, many questioned the presumed benefits of financial globalization.² In particular, Rodrik (1998) found no positive correlation between open capital markets and economic performance across roughly 100 countries. This evidence (or lack thereof) spurred an enormous literature studying the effect of capital controls. Subsequent empirical studies, however, have generated very little consensus regarding the effect of capital account openness on economic growth and investment. For example, Edwards (2001) finds a positive correlation between capital account openness and economic performance, but only for more developed economies. Arteta, Eichengreen, and Wyplosz (2001) find similar evidence, but note it is "decidedly fragile", while Edison, Levine, Ricci and Sløk (2003) find no effect of financial

¹ See Bosworth and Collins (1999), pp. 149.
² For example, Bhagwati (1998) argues the claims of benefits from free capital mobility are “not persuasive”.

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integration. More recent research focusing on the specific impact of foreign participation in domestic equity markets and foreign bank entry also reaches differing conclusions.4

A primary argument for the inconclusive evidence is that open capital markets increase countries' economic volatility and exposure to financial crises. Such volatility can be particularly problematic in emerging economies with inadequate institutions. Subsequently, it is thought that policies limiting the risks of financial instability will ensure the benefits of open capital markets are realized. Particular emphasis is given to the mismatching of short-term foreign liabilities and long-term domestic assets that can expose domestic intermediaries to financial panics by international lenders or large exchange rate fluctuations.5 The presumption that foreign lenders’ entry otherwise improves the domestic credit access remains largely unquestioned.

This chapter addresses this continued presumption directly by assessing whether open capital markets necessarily increase output in emerging economies, even in the absence of increased financial volatility. Standard financial theories that incorporate information asymmetries demonstrate that credit may be rationed in equilibrium (Stiglitz and Weiss 1981), and that greater competition among lenders may increase credit rationing (Petersen and Rajan 1995). Such models imply that by increasing competition from foreign lenders, opening capital markets may actually reduce credit and output in emerging economies, where the lack of information about borrowers and the absence of protection for lenders make information asymmetries particularly acute.

To illustrate this point, I develop a theoretical model of financial competition between foreign and domestic lenders that includes information asymmetries between entrepreneurs and lenders. The model extends on existing theory by directly incorporating the differences between foreign and domestic competition and by allowing lenders to differ in their access to funds and

---

3 See Eichengreen (2001) for a more detailed review of the literature.
4 For example, Bekaert, Harvey and Lundblad (2006) and Henry (2000) find positive correlations between equity market liberalization and economic performance, while Detragisiche, Tressel and Gupta (2005) and Gormley (2006) find foreign bank entry to be negatively related to domestic credit.
information about borrowers. The primary assumption driving the model is that foreign lenders have access to credit at a lower cost, but less access to information about domestic borrowers.

Making use of this variation, the model demonstrates that changes in the distribution of credit may be a more important aspect of financial globalization's impact than overall changes in economic output and investment. The theory suggests that large, profitable domestic projects are more likely to be financed in the open economy, and negative net present value (NPV) projects are less likely. This redistribution from low to high return projects can increase total factor productivity and net output in the opening economy. However, foreign lenders' entry can also reduce credit access for smaller or informationally opaque entrepreneurs with positive NPV projects. This drop in credit to 'opaque' entrepreneurs decreases net output and can occur if domestic lenders are ill-equipped to cost-effectively identify borrowers' types. Thus, the effect of opening capital markets on overall investment or net output is ambiguous when information asymmetries are large.

The intuition of these theoretical findings is straightforward. Lenders face a range of potential projects to finance, but lack information on borrower quality. When costs of screening entrepreneur quality are sufficiently high for domestic lenders, a competitive equilibrium may occur where lenders pool all borrowers rather than invest in costly screening technologies. Relative to the first-best allocation without information asymmetries, a pooling equilibrium over-finances low-return entrepreneurs and under-finances high-return entrepreneurs. The entrance of foreign lenders can break this pooling equilibrium. Using their lower cost of funds, foreign lenders can undercut domestic lending rates for the most profitable entrepreneurs. Through this 'cream-skimming', foreign competition alleviates the under-financing of high-return projects but also reduces the quality of projects being pooled by domestic lenders. This decrease in borrower quality increases incentives for domestic lenders to invest in screening technologies which reduces the number of negative NPV projects financed. However, if screening is costly, domestic lenders may instead exit some sectors of the economy entirely, leaving many positive NPV projects un-financed. Neither foreign nor domestic
lenders will find it profitable to operate in these sectors, and such exits are more likely for industries or entrepreneurs that are more informationally opaque.

The theory provides a number of testable hypotheses regarding changes in the distribution of credit following a financial opening. First, foreign entry is likely to coincide with ‘cream-skimming’ behavior by foreign lenders and a reduction of credit by domestic lenders. Gormley (2006) finds evidence of exactly this following the entry of foreign banks in India during the 1990s. Second, the model provides predictions regarding the distributional impact of various types of capital market liberalization. Types of openness that yield a smaller informational gap between domestic and foreign lenders or allow domestic lenders access to international capital markets will exhibit less ‘cream-skimming’ and a smaller likelihood that credit access is impaired for informationally opaque entrepreneurs. Third, local institutions that reduce lenders’ costs of overcoming information asymmetries will mitigate ‘cream-skimming’ and adverse distributional outcomes. To the author’s knowledge, no direct empirical studies of the latter two hypotheses exist.

The theoretical findings are related to various strands of the existing literature. The analysis of competitive financial market equilibria in the presence of imperfect information is similar to the analysis of insurance markets by Rothschild and Stiglitz (1976). Regarding the differences between foreign and domestic lenders, Detragiache, Gupta and Tressel (2005) find a similar outcome of cream-skimming by foreign banks and an adverse affect on credit access for ‘soft’ information entrepreneurs. In their model, however, foreign banks screen ‘hard’ information at a lower cost than domestic banks but screen ‘soft’ information at a higher cost. Another paper that highlights the potential distributional effects of opening capital markets is Trzcinka and Ukhov (2005). Using an international asset-pricing model, they find that foreign entry may have an adverse effect on domestic investors who purchase risky assets to hedge endowment income.

The remainder of the chapter proceeds as follows. Section 1 provides the basic setup and assumptions of the model with full commitment. Section 2 discusses the closed economy
equilibrium, and Section 3 describes the open economy equilibrium that follows the introduction of foreign competition. Section 4 analyzes the empirical and policy implications of the model. Section 5 extends the model to a repeated game without full commitment, and Section 6 discusses the robustness of the models' implications and possible extensions. Finally, Section 7 concludes.

1.1 The Basic Model

1.1.1 Agents and Technology

There are two types of agents: entrepreneurs and lenders. All agents are risk-neutral, and because of limited liability, no entrepreneur can end up with a negative amount of cash.

The real sector consists of four types of entrepreneurs, \( i \in \{Z,A,B,C\} \), and a continuum \( \theta_i \) of each type, where \( \theta_A + \theta_B + \theta_C = 1 \). The first type, Z, receive zero projects to implement, while the remaining three types each have the ability to implement one project of size \( I \in \{1, \lambda\} \), where \( \lambda > 1 \). If implemented, the project yields a verifiable return \( R_I > r^* I \), where \( r^* \) is the exogenous international cost of capital. All entrepreneurs have zero wealth and must borrow the complete amount \( I \) from lenders. Entrepreneurs that receive financing from a lender may choose action \( q \in \{0,1\} \), where \( q = 1 \) indicates the project is undertaken and \( q = 0 \) indicates the project is not. The action \( q \) is observable to lenders, and \( q = 0 \) is the only possible action for entrepreneurs of type Z.

Of the entrepreneurs with projects, there will be one type that lenders always want to finance, C (the 'cream'), another type they never want to finance, B (the 'bad'), and a third type that they only want to finance for small projects, A (the 'average'). This is formally established by having the three types differ in their ability to implement projects successfully. If financed, the 'cream' always succeed with probability 1, regardless of project size, while 'bad' entrepreneurs only succeed with probability \( p \). Projects that only succeed with probability \( p \) have a negative net expected return given the international cost of funds, \( r^* \), such that \( pR < r^* \). 'Average' entrepreneurs implement the
smaller project of size 1 with certain success, while larger projects only succeed with probability \( p \).

Therefore, the economy’s expected net output is maximized when ‘cream’ entrepreneurs are financed for projects of size \( \lambda \), ‘average’ entrepreneurs for projects of size 1, and ‘bad’ entrepreneurs are not financed. This is the first-best allocation of credit.

For simplicity, it is assumed there are relatively more ‘average’ entrepreneurs than ‘cream’ in the economy, such that \( \theta_A > \theta_c \).\(^6\) Moreover, to eliminate some uninteresting pooling equilibria in both the closed and open economies, the following assumptions are made:

\[
\theta_b > \frac{(R-r')\theta_A}{r'-pR} \quad (1)
\]

\[
\theta_z > \frac{\theta_b(r'-pR)}{p(R-r')} \quad (2)
\]

Assumption (1) ensures that the number of ‘bad’ entrepreneurs is sufficiently high to exclude equilibria where lenders can profitably pool ‘bad’ and ‘average’ entrepreneurs together. Assumption (2) ensures that the mass of entrepreneurs without projects, \( \theta_z \), rules out financial contracts that pay a positive amount to ‘bad’ entrepreneurs that abandon their low-return projects. This contract will not exist in equilibrium (and in reality) since all entrepreneurs without projects would also need to be paid this positive amount, thus rendering the contract unprofitable.\(^7\)

The financial sector consists of many perfectly competitive domestic and foreign lenders willing to extend capital in the amount of \( I \in \{1, \lambda\} \). Without the costly screening of entrepreneurs, lenders are unable to identify an entrepreneur’s type, thus providing the source of information asymmetry in the model. Lenders, however, may invest in screening technology, \( S \in \{0,1\} \), where \( S = 1 \) implies the investment is made. Investment in the screening technology allows lenders’ to perfectly identify an entrepreneur’s type.

Domestic lenders differ from foreign lenders in two key ways. First, the domestic lenders

\(^{6}\) All subsequent findings are robust to dropping this assumption so long assumption (1) is modified to also include \( \theta_b > \theta_c (R-r)/(r-pR) \) such that it is never profitable for lenders to pool ‘bad’ and ‘cream’ entrepreneurs.

\(^{7}\) Acemoglu (1998) uses a similar method to eliminate these types of contracts.
have access to an unlimited supply of domestic funds at opportunity cost, \( r \), while foreign lenders have access to an unlimited supply of international funds at opportunity cost, \( r' \), where \( r' < r \). The higher domestic cost of capital seems reasonable given the poor access to international markets and the weak deposit collection technologies of many domestic lenders in emerging economies.\(^8\)

The second difference is that foreign lenders find it more costly to screen borrowers because of distance, cultural, or institutional barriers. Specifically, domestic lenders can screen at cost \( C \) per borrower while foreign lenders must pay \( C' > C \).\(^9\) Mian (2006) finds distance barriers are an important informational cost for foreign banks in Pakistan, while Stein (2002) demonstrates that the greater hierarchical structure of foreign banks relative to domestic banks also likely makes it more costly for foreign banks to obtain the 'soft-information' necessary to screen entrepreneurs effectively.

Foreign lenders’ access to cheap international capital provides a competitive advantage, but the higher screening cost implies this advantage is largest when the per-unit cost of screening is low. Hence, the information asymmetry will induce what might be perceived as ‘cream-skimming’ behavior by foreign lenders which will have a competitive advantage in providing credit to the entrepreneurs that implement larger projects. Specifically, the following assumptions are made:

\[
\frac{r' + \frac{C'}{\lambda}}{\lambda} < r + \frac{C}{\lambda} < R 
\]

\[
R < r' + C' 
\]

Assumptions (3) and (4) are what distinguish foreign lenders from domestic lenders. The first inequality in equation (3) ensures it is always feasible to screen larger projects in the economy and that the international cost of capital is sufficiently low to offset foreign lenders’ disadvantage in

---

\(^8\) One concern about this assumption is that governments in emerging economies often provide subsidized funds to domestic lenders such that their direct cost of funds is less than the cost of capital on international capital markets. However, privileged access to funds does not necessarily imply a lower cost of funds. Domestic lenders typically have much higher non-interest costs than international lenders. For example, the average wage bill of domestic banks is twice as large as the average wage bill of foreign banks in India. By sidestepping local unions, foreign banks in India employ one-seventh the number employers per unit of assets (Hanson 2003).

\(^9\) The model would also be robust to assuming the foreign banks incur the same cost of screening, but receive a lower quality signal of an entrepreneur’s type than domestic banks.
screening larger projects relative to domestic lenders. The international cost of funds may not, however, be low enough to provide the foreign lenders an advantage in financing smaller projects, where the per-unit cost of screening is higher. In fact, equation (4) states that foreign lenders' per-unit cost of screening smaller projects is too high to profitably screen and finance these projects. It may still be feasible, however, for domestic lenders to screen and finance the smaller projects because of their lower screening cost, depending on whether \( r + C \leq R \).

1.1.2 Timing of Events

There is no discounting between periods, and the timing of events is as follows:

\( t = 0 \): entrepreneurs discover their type, \( i \)

\( t = 1 \): lenders offer financial contracts \( F \), entrepreneurs choose contracts, if any

\( t = 2 \): lenders choose investments in the screening technology, \( S \)

\( t = 3 \): lenders provide financing capital, \( I \)

\( t = 4 \): entrepreneurs receiving capital make investment decision, \( q \)

\( t = 5 \): project outcomes are realized, financial contracts are settled

1.1.3 Financial Contracts and Strategies

Let \( F_j \) represent the menu of contracts offered by lender \( j \), where \( F_j^{l,k} \) denotes a financial contract from lender \( j \) of size \( l \in \{1, \lambda\} \) and type \( k \in \{0, Z, A, B, C\} \). When \( k = 0 \), the contract is unscreened, but for \( k \neq 0 \), the contract is only available to a firms where screening reveals \( i = k \).

Each type of contract is a mapping of observables into a payment for the entrepreneur.\(^\text{10}\) Specifically,

\[
F_j^{l,k} : \{0,1\} \times \{0,R\} \rightarrow \mathbb{R},
\]

The first argument, \( q \), indicates whether the project is undertaken by the entrepreneur, and the

\(^{10}\) This mapping spans the universe of potential contracts. Thus, the concept of 'lender' used in this paper is very general and encompasses banks, stockholders, etc. However, equilibrium financial contracts where a project is actually implemented can always be replicated by a pure debt contract. For this reason, all future references will be made regarding pure debt contracts. See Appendix A for more details.
second argument, \( Y \), is the observed output on the project. Each type of contract maps into a non-negative payment since entrepreneurs have no initial wealth and cannot receive a negative payment.

Entrepreneurs that want a contract of type \( k \neq 0 \), must first submit themselves to the screening process, which maps into that contract. Specifically, the screening technology is given by

\[
T_j : \{Z,A,B,C\} \times \{0,1\} \times \{Z,A,B,C\} \rightarrow F_j \cup \emptyset
\]

The first argument is type of contract, \( k \), requested by the entrepreneur where \( k \neq i \) is allowed. The second argument is the lenders’ screening decision, \( S \), and the third argument is the entrepreneur’s true type, \( i \). It is possible for the screening process to yield no financial contract for the entrepreneur. Specifically, the screening technology of each lender \( j \) is designed to work as follows:

\[
T_j(k,S=0,i) = F_{j,k}^{i,k}
\]
\[
T_j(k,S=1,i = k) = F_{j,k}^{i,k}
\]
\[
T_j(k,S=1,i \neq k) = (F_{j,i}^{j}) \cup \emptyset
\]

If an entrepreneur that submits requests a contract of type of \( k \neq 0 \) and lender \( j \)’s screening reveals the true type is in fact \( i = k \), the entrepreneur receives \( F_{j,k}^{i,k} \) as promised. However, if screening reveals that \( i \neq k \), then the entrepreneur receives the contract designated for type \( i \), and if no such contract was offered, the entrepreneur receives no contract. Finally, if lender \( j \) does not actually screen, than the entrepreneur still gets the screened contract, \( F_{j,k}^{i,k} \).

In the basic model discussed here, I will assume that lenders can fully commit to their financial contracts in a two key ways. First, lenders will always screen financial contracts of type \( k \neq 0 \). This eliminates lenders from deterring ‘bad’ borrowers by declaring all contracts will be screened, but not actually screening them. Second, lenders can fully commit the initial terms of any contract, \( F_{j,k}^{i,k} \), and the initial menu of contracts, \( F \). This eliminates the possibility for renegotiation between lenders and entrepreneurs after screening reveals an entrepreneurs’ type. Combined with \( S = 1 \), it also ensures entrepreneurs that submit to screening have no incentive to misrepresent their
type. These full commitment assumptions greatly simplify the basic analysis, but are not critical to
the main findings. With a few extensions on the basic model, it can be shown that full commitment
by lenders is an equilibrium strategy in a repeated game. This is shown in Section 5.

Let $f(i)$ designate the contract choice of entrepreneur of type $i$, where $f(i) = \emptyset$ is allowed.
Entrepreneur $i$’s investment decision is given by $q(i)$, and an entrepreneurs’ strategy consists of its
contract choice and investment decision. A strategy configuration in this economy consists of the
set of contracts $F_j$ for each $j \in L$, and $\{f(i), q(i \mid f(i))\}$ for each $i \in E$.\textsuperscript{11} Entrepreneurs actions
are limited in that $f(i) \in F$, where $F$ is the set of all $F_j$’s and $q(i \mid f(i)) \in \{0,1\}$. For convenience,
the dependence of action $q$ on $f(i)$ will be suppressed in the main text when it will cause no
confusion. The equilibrium concept used is Subgame Perfect, and a strategy configuration will be an
equilibrium if each lender $j \in L$ is maximizing expected profits and each entrepreneur $i$ is
maximizing its expected utility given the strategies of all other agents.

The expected utility of an entrepreneur $i$ with a financial contract can be written as:
$$u : F \times \{0,1\} \rightarrow \mathbb{R}_+$$
where the first argument denotes the financial contract accepted, and the second is the choice to
implement, $q$. Given the above setup, the expected utility of a contract is

$$u(F^{i,k}, q = 0 \mid i) = F^{i,k}(0,.)$$
$$u(F^{i,k}, q = 1 \mid i) = p(i \mid I)F^{i,k}(1,R) + (1 - p(i \mid I))F^{i,k}(1,0)$$

where $p(i \mid I)$ is the probability of success for an entrepreneur of type $i$ with a project of size $I$.

Likewise, the expected profits of lender $j$ for a given financial contract,

$$\pi_j : \{Z,A,B,C\} \times \{0,1\} \rightarrow [-r(j)\lambda - C(j), (R - r(j))\lambda]$$
is a function of an entrepreneur’s type, $i$, and investment decision, $q$. The losses are limited below

\textsuperscript{11} Because the entrepreneur’s self-declaration of type, $k(i)$, is uniquely determined by the choice $f(i)$, it is not a
separate argument of the strategy profile for each entrepreneur.
by the largest amount of capital lender $j$ would ever extend, $\lambda$, at opportunity cost $r(j)$.

$C(j)$ represents the cost of screening for lender $j$. It is then easily shown that at $t = 1$ when financial contracts are offered, that

$$\pi_j(\omega = 0 | F^{j,A} = -F^{j,A}(0,\omega) - C(j)S$$
$$\pi_j(\omega = 1 | F^{j,A} = [p(i|j)R - r(j)] I - u(F^{j,A}, q = 1 | i) - C(j)S$$

where $S = 0$ for $k = 0$ and equals 1 otherwise.

Finally, let $\chi(F, F)$ be the set of entrepreneur types that accept the contract offer $F$ when the set of available financial contracts is $F$. i.e. $i \in \chi(F, F)$ if and only if $f(i) = F$. And for clarity, $f(i) = \emptyset$ is assumed the default choice of entrepreneurs when no available financial contract provides a positive expected return such that $u(f(i), q(i)) = 0 \ \forall f(i) \neq \emptyset$ and $q(i | f(i))$. Given this, the economy’s equilibrium is defined as:

**Definition of Equilibrium:** A strategy configuration, $\{f(i), q(i | f(i))\}$ for each $i \in E$ and $F$ implied by $F_j$ for each $j \in L$, constitutes an equilibrium if and only if,

1. Given $F$, each $i \in E$ chooses $f(i) \in F$ and $q(i | f) \in \{0, 1\}$ to maximize $u(f, q | i)$.

2. Each $j \in L$ chooses $F_j$ to maximize $\pi_j(i, q(i) | F_j)di$ where $q(i)$ and $i \in \chi(F_j, F)$ are given by condition 1, and $\int_{a \in \xi(F_j, F)} \pi_j(i, q(i) | F_j)di = 0$.

### 1.2 Analysis of the Closed Economy

In the closed economy, the set of lenders, $L$, consists of only domestic lenders. It is shown that either a pooling or separating equilibrium can exist depending on whether the domestic cost of screening, $C$, exceeds some threshold, $C'$, defined by equation (7).

$$C' = \lambda(R - r) - \left(R - \frac{r}{1 - (1 - p)\theta_n}\right)$$
When the cost of screening does not exceed this value, a separating equilibrium occurs in which 'cream' entrepreneurs will be financed for large projects, 'average' entrepreneurs for small projects if \( r + C \leq R \), and 'bad' entrepreneurs are never financed. However, when screening is costly, all entrepreneurs will be pooled on the smaller project using a financial contract that does not screen applicants. The 'cream' entrepreneurs will be unwilling to obtain financing for the larger project and the 'bad' entrepreneurs will be financed. Hence, the first-best allocation is achieved only when the information asymmetry (captured by \( C > 0 \)) is sufficiently small. The existence of these two closed economy allocation are stated formally in Proposition 1.

Proposition 1.

1. If \( C > \max\{r, pR\} \) and \( r^\text{vol} = r / (1 - (1 - p)\theta) \leq R \), there exists an equilibrium in which a number \( n \geq 2 \) domestic lenders offer the following financial contract to entrepreneurs:

\[
\tilde{F}^{1,0}(q, Y) = \begin{cases} 
R - r^\text{vol} & \text{if } q = 1, Y = R \\
0 & \text{otherwise}
\end{cases}
\]

All entrepreneurs of type \( i \in \{A, B, C\} \) accept finance from a randomly chosen lender and choose

\( q(i | \tilde{F}^{1,0}) = 1 \). Off the equilibrium path (i.e. when \( F \neq \tilde{F}^{1,0} \)), all entrepreneurs choose with equal probability among contracts that give the same utility.

2. If \( C \leq \max\{r, pR\} \), there exists an equilibrium in which a number \( n \geq 2 \) domestic lenders offer the following financial contract to entrepreneurs:

\[
\tilde{F}^{A,C}(q, Y) = \begin{cases} 
\lambda(R - r^C) & \text{if } q = 1, Y = R \\
0 & \text{otherwise}
\end{cases}
\]

where \( r^C = r + C / \lambda \), and all entrepreneurs of type \( i = C \) accept finance from a randomly chosen domestic lender and choose \( q(C | \tilde{F}^{A,C}) = 1 \). And if \( r + C \leq R \), domestic lenders also offer the financial contract

\[
\tilde{F}^{1, A}(q, Y) = \begin{cases} 
R - r^A & \text{if } q = 1, Y = R \\
0 & \text{otherwise}
\end{cases}
\]
where \( r^A = r + C \), and all entrepreneurs of type \( i = A \) accept finance from a randomly chosen domestic lender and choose \( q(A | \tilde{F}^{i,A}) = 1 \). If \( r + C > R \), \( f(A) = \emptyset \), and \( f(B) = \emptyset \) always. Off the equilibrium path, all entrepreneurs choose with equal probability among contracts that give the same utility.

The allocations described here are the only equilibrium allocations.

A proof of Proposition 1 is found in the appendix, but the intuition is straightforward. When the cost of screening, \( C \), is high, a lender that foregoes screening and pools all borrowers on the small project can offer the best return to ‘cream’ entrepreneurs. In this case, all firms will choose to accept a cheap (but small) unscreened contract making a pooling equilibrium possible. The pooling equilibrium, however, will only exist if domestic lenders can profitably pool all borrowers, which is true when \( r / (1 - (1 - p)\theta_B) \leq R \), and there does not exist any other contract capable of enticing ‘cream’ entrepreneurs away from the unscreened contract. This is true for \( C > \max\{C, r - pR\} \).

This pooling contract and allocation of credit is the unique equilibrium when \( C > \max\{C, r - pR\} \).

When \( C \leq C \), however, perfectly competitive domestic lenders can always offer ‘cream’ entrepreneurs a screened contract that induces them to take the larger project rather than be pooled with all other entrepreneurs. When the ‘cream’ select this larger contract, the pooled contract becomes unprofitable since it is never feasible to pool just ‘average’ and ‘bad’ entrepreneurs. Thus, the ‘average’ will only be financed in this separating equilibrium if domestic lenders can profitably offer them a screened contract. This will only occur for \( r + C \leq R \). This allocation of credit to ‘average’ and ‘cream’ entrepreneurs is the unique equilibrium allocation when \( C \leq C \).

---

12 If \( C < C < r - pR \), the competitive closed economy has no equilibrium. In this case, a pooling equilibrium cannot exist because lenders could always profitably deviate by offering to screen and finance ‘bad’ entrepreneurs willing to forego implementing their project. However, this deviation cannot itself be an equilibrium because any individual lender could further increase profits by dropping the contract. See Appendix B, Part 6 for more details. The non-existence of an equilibrium is true only when \( \theta_B \) is sufficiently small; otherwise, \( r - pR < C \) and an equilibrium exists. However, it is not the unique equilibrium contract. For example, a financial contract that pays \( \tilde{F}^{i,A}(q = 1, Y = 0) > 0 \) but is otherwise identical is also an equilibrium contract. Since \( Y = 0 \) occurs with probability zero, the payment in failure is not pinned down in equilibrium. See Appendix B for more details.
The pooling equilibrium, where \( C > \bar{C} \), provides an intriguing starting point from which to analyze the effect of opening capital markets. In the separating equilibrium, there is no room for improving the allocation of credit if ‘average’ firms are being financed, while the pooling equilibrium always fails to achieve the first-best. Funds diverted away from ‘bad’ entrepreneurs towards larger projects for ‘cream’ entrepreneurs would increase net output. This ‘over-financing’ of ‘bad’ firms and ‘under-financing’ of ‘good’ firms is a standard criticism of emerging economies. Moreover, the pooling equilibrium is most likely to occur when the cost of screening is high, which is also a common characteristic of emerging economies. Empirical evidence also suggests this is a reasonable starting point due to the lack of screening done by domestic lenders in many emerging markets.\(^{14}\)

Given this, I will now analyze the impact of allowing foreign lenders to enter the closed economy which exhibits a pooling equilibrium.

1.3 Analysis of the Open Economy

In the open economy, the set of lenders, \( L \), now consists of both domestic lenders and foreign lenders. I will express financial contracts from foreign lender \( j \) as \( F_j \).

Similar to the closed economy, the open economy equilibrium depends on the cost of screening borrowers, though it now depends on both the international and domestic cost of screening. Foreign entry has no effect on the equilibrium allocation of credit if foreign lenders’ cost of screening domestic entrepreneurs is prohibitively expensive, such that \( C^* > \bar{C} \) where

\[
\bar{C} = \lambda(R - r^*) - \left( R - \frac{r}{1 - (1 - \beta)\theta_n} \right). \tag{8}
\]

But when the foreign cost of screening is sufficiently low, such that \( C^* \leq \bar{C} \), foreign lenders’ will enter by ‘cream-skimming’ the best borrowers away from domestic lenders. This can break a closed economy pooling equilibrium and induce an output increasing reallocation of credit from ‘bad’ to

\(^{14}\) For an example involving banks in India, see Banerjee, Duflo and Cole 2003. Gormley, Johnson and Rhee (2006) also provide suggestive evidence that Korean bond holders did not screen their investments in 1998.
'cream' entrepreneurs. This 'cream-skimming' by foreign lenders, however, may reduce the ability of ‘average’ entrepreneurs to obtain financing for their positive NPV projects as stated in Proposition 2.

Proposition 2. If $C' \leq \bar{C}$, there exists an equilibrium in the open economy in which a number $n \geq 2$ foreign lenders offer the following financial contract to entrepreneurs:

$$
\tilde{P}^{i,C}(q, Y) = \begin{cases} 
\lambda(R - r^{C,i}) & \text{if } q = 1, Y = R \\
0 & \text{otherwise}
\end{cases}
$$

where $r^{C,i} = r^* + C' / \lambda$ and all entrepreneurs of type $i = C$ accept finance from a randomly chosen foreign lender and choose $q(C \mid \tilde{P}^{i,C}) = 1$. And if $r + C \leq R$, a number $n \geq 2$ domestic lenders offer

$$
\tilde{P}^{i,A}(q, Y) = \begin{cases} 
R - r^{A,i} & \text{if } q = 1, Y = R \\
0 & \text{otherwise}
\end{cases}
$$

where $r^{A,i} = r + C$ and all entrepreneurs of type $i = A$ accept finance from a randomly chosen domestic lender and choose $q(A \mid \tilde{P}^{i,A}) = 1$. If $r + C > R$, $f(A) = \emptyset$, and $f(B) = \emptyset$ always. Off the equilibrium path, all entrepreneurs choose with equal probability among contracts that give them the same utility. This is the only equilibrium allocation when $C' \leq \bar{C}$.

A formal proof of Proposition 2 can be found in the appendix, but the effect of foreign lenders’ entrance is straightforward. When foreign lenders’ cost of capital is sufficiently low, foreign lenders may be able to induce ‘cream’ entrepreneurs in a domestic pooling equilibrium to undertake larger projects by offering them more competitive contracts for larger projects. They can accomplish this despite their higher cost of screening because of their lower cost of funds. Specifically, the cutoff value of screening in the open economy will be more relaxed than that of the closed economy, such that $C < \bar{C}$ if $\lambda > 1/[1 - (1 - \rho)\theta_0]$. Therefore, when $C < C' < \bar{C}$, the economy may switch from a closed economy pooling equilibrium to an open-economy separating equilibrium.

The switch away from the pooling equilibrium, however, will not necessarily benefit ‘average’
entrepreneurs that only implement projects of size 1 with certain success. Their resulting high per-
unit cost of screening prevents foreign lenders from profitably financing these entrepreneurs, and
‘average’ firms will continue to rely on domestic lenders. But, the fraction of entrepreneurs
approaching domestic lenders with positive net present value (NPV) projects is now lower because of
foreign lenders’ cream skimming, and by assumption (1), the remaining fraction of ‘bad’
entrepreneurs is sufficiently high that pooling the ‘average’ and ‘bad’ entrepreneurs is not feasible.
So, in order for domestic lenders to finance the ‘average’ entrepreneurs in this open economy
equilibrium, \( C \) must be sufficiently low that the domestic lender can profitably screen ‘average’
entrepreneurs given their cost of funds, \( r \). This will only be possible when \( R > r + C \) holds.

So long as both the domestic and foreign costs of screening is sufficiently low, the open
economy will reflect the first-best equilibrium in terms of the projects being financed – ‘cream’
entrepreneurs are financed for the largest project, ‘average’ entrepreneurs are financed for the smaller
project, and ‘bad’ entrepreneurs are not financed. This is true despite foreign lenders’ higher cost of
screening, \( C' > C \). However, if information asymmetries are large and the domestic cost of
screening is high, such that \( R < r + C \), foreign lenders’ targeting of ‘cream’ entrepreneurs may induce
domestic lenders to exit the market entirely. In this case, the entrance of foreign lenders increases the
size of ‘cream’ projects being implemented at the cost of some ‘average’ entrepreneurs being shut out
along with the ‘bad’ entrepreneurs. While ‘average’ entrepreneurs do have positive NPV projects,
they will not be financed if both domestic and foreign lenders’ are unable to effectively screen them.

If ‘average’ entrepreneurs no longer receive financing, the overall impact of opening capital
markets on net output is unclear. This is stated formally in Proposition 3:

**Proposition 3:** In an economy that switches from the closed economy pooling equilibrium to the open economy
separating equilibrium, net output always increases if \( R > r + C \). Otherwise, net output will decline when

\[
(R - r)\theta_a > (\lambda(R - r') - C') - (R - r)\theta_c + (r - pR)\theta_b.
\]

28
A formal proof of Proposition 3 is in the appendix, but the intuition is straightforward. When \( R \geq r + C \), net output increases since the reallocation of finance away from 'bad' entrepreneurs to larger 'cream' projects always increases net output. However, when \( R < r + C \), the opening of capital markets also decreases net output from 'average' entrepreneurs. If this loss, \((R - r)\theta_A\), is sufficiently large, overall net output will be lower in the open economy.

### 1.4 Empirical Implications and Policy Analysis

The model thus provides a relatively simple explanation as to why foreign lenders' entry may not necessarily increase overall output in the opening economy. In emerging economies with significant costs to screening projects, the initial domestic allocation of credit may fail to achieve the first-best allocation because domestic lenders choose to pool risks rather than invest in costly screening technologies. While foreign lenders may be even less effective at screening domestic entrepreneurs because of institutional, cultural, or distance barriers, their access to low cost international funds may allow them to more cost effectively finance large, profitable projects. Therefore, their entry can increase the financing of profitable and very large projects, thus increasing output. At the same time, investment may be declining for other borrowers with positive NPV projects if domestic lenders lack the ability to screen them out from the negative NPV projects. The overall effect on net output is unclear. The reallocation from 'bad' to 'cream' entrepreneurs increases net output, but if 'average' entrepreneurs are no longer financed, this can reduce overall output. The theory suggests that the lack of positive correlation between opening capital markets and overall output and investment could be explained by these adverse distributional effects.

Moreover, the theory also lends itself to numerous empirical tests. First, the model indicates foreign lenders would be more likely to target the largest, most profitable entrepreneurs of the domestic economy because it is only with these entrepreneurs they can economize on their higher cost of screening and lower cost of funds. Anecdotal evidence tends to support this 'cream-
skimming’ behavior of foreign lenders in emerging economies, and Gormley (2006) finds direct
evidence of such ‘cream-skimming’ by foreign banks in India during the late-1990s. Second, the
incentive to ‘cream-skim’ and the potential adverse affect on some entrepreneurs with positive NPV
projects is more likely in sectors of the opening economy where screening is particularly costly to do.
For example, industries or types of entrepreneurs that are naturally more costly to screen are more
likely to exhibit a reallocation upon foreign entry. Third, the potential adverse effect on the ‘average’
borrower is more likely in such sectors, and when foreign lenders engage strictly in ‘cream-skimming’.

Comparative analysis on the cost of screening also suggests some interesting hypotheses. For
example, consider allowing the cost of screening to be a function of physical distance between lender
and entrepreneur, \(d\), and ‘institutional distance’, \(\tau\), where \(C_s(d,\tau) > 0\) and \(C_r(d,\tau) > 0\). For
domestic lenders, \(d = \tau = 0\), while international lenders face some positive institutional and
geographical distances, \(d', \tau' > 0\). The greater the physical distance and ‘institutional distance’ a
foreign lender is from the opening economy, the higher its screening cost relative to domestic lenders.

Now consider the variety of different openings emerging economies may implement in
practice. The first is to allow direct capital inflows such that foreigners can purchase bonds and
stocks of domestic entrepreneurs. This is probably the easiest for foreign lenders to do in that it does
not require any physical shift in location away from their home country. However, because the
foreign lenders remain abroad, the initial physical distance, \(d'\), and institutional distance, \(\tau'\) remain
unchanged. A second option for opening is to also allow foreign lenders to establish a physical
presence in the country, such as in a de novo foreign bank branch, but not allow the foreign bank to
purchase domestic banks. The shift in location of the foreign lender away from its home country
reduces the physical distance to \(d' = d = 0\), but the institutional distance, \(\tau' > 0\), remains. A third
option is to allow foreign lenders to acquire domestic banks. This option would tend to reduce both

\[\text{This type of liberalization may be preferred by governments in emerging economies as it forces foreign lenders to establish a physical presence without divesting the government's ability to implement social policy through government controlled domestic banks.}\]
physical and institutional distance of the foreign lender, though the lower 'institutional distance', 
\( \bar{\tau}^* \), may still be positive, such that \( \tau^* > \bar{\tau}^* > 0 \).\(^{16}\)

While grossly simplified, the basic model suggests that emerging economies should always attempt to reduce the 'distance' of foreign lenders, whether it is physical or institutional. If it were the case that \( C(d', \tau^*) > C > C(0, \tau^*) > R - r' > C(0, \bar{\tau}^*) \), then allowing foreign lenders to only purchase domestic bonds and stocks would have no effect on a domestic economy caught in the pooling equilibrium. Allowing them physical entry alone, however, will result in a reallocation of credit, but foreign lenders will be limited to 'cream-skimming' and 'average' borrowers may be worse off if domestic lenders find it unprofitable to screen them. Allowing foreigners to purchase domestic lenders, however, could reduce the 'distance' cost sufficiently enough that they no longer 'cream-skim', and the first-best allocation of credit is achieved.\(^{17}\) Syndicated lending, where foreign lenders provide capital directly to domestic lenders, may also increase the likelihood of achieving the first-best allocation. This is discussed in greater detail in Section 6.

In this basic setup, restrictions on foreign lenders ability to establish a physical presence or acquire domestic lenders will only increase the likelihood that the benefits of 'opening' will be limited to but a few of the largest, most profitable domestic entrepreneurs. The smaller the 'distance' gap, the less likely foreign lenders will simply 'cream-skim' and the less likely that the 'average' domestic borrower will be worse off in the open economy.

Moreover, if institutional or cultural distance decline with time, \( t \), such that \( dt^*(t)/dt < 0 \), then one might expect the amount of 'cream-skimming' done by foreign lenders to fall over time.

---

\(^{16}\) Purchasing a domestic lender's assets may not necessarily transfer all local knowledge and information to the new foreign owner. Empirical evidence of foreign bank acquisitions in Argentina suggests the foreign lender is still less likely to finance smaller entrepreneurs (Berger, Klapper and Udell 2001). Moreover, Stein (2002) implies the greater hierarchy of such entities will limit their ability to use 'soft information'.

\(^{17}\) However, allowing foreign lenders to acquire domestic financial assets could also be very costly if \( C(0, \bar{\tau}^*) > R - r' > C(0, 0) \). In this case, the foreign lender will still find it too costly to screen average borrowers, but the domestic lender may not. Therefore, transferring domestic assets to the foreign lender can actually increase the likelihood of 'average' entrepreneurs being rationed out of the market by reducing the amount of assets held by the domestic lenders willing to undertake such lending.
Thus, their initial entrance may be accompanied by a rise in credit allocated to the largest, most profitable entrepreneurs while all other borrowers find themselves suddenly rationed by domestic lenders inadequate at screening the remaining pool of projects. As time of exposure increases, however, and institutional distance, $\tau$, declines, foreign lenders will be more able and likely to target the 'average' borrowers recently shunned by ineffective domestic lenders.

Opening capital markets may also be beneficial if foreign lenders possess better screening technology, such that $C^*(d', \tau') > C(0,0) > C^*(0,0)$. If their entry allows domestic lenders to adopt or acquire the foreign screening technology, then opening capital markets may have another benefit in reducing the cost of screening for domestic banks, increasing the likelihood of achieving the first-best equilibrium where 'average' entrepreneurs are not rationed out of the credit market.\(^{18}\)

1.5 Model without Full Commitment

In the basic model, I make the assumption that lenders can perfectly commit to screen projects and fully commit the initial terms of any contract, $F^{I,t}$, and initial menu of contracts, $F$. This full commitment assumption was important in two key ways. First, it eliminated the possibility that lenders would renege on their commitment to screen. In the basic model, lenders always have an incentive to choose $S = 0$ since entrepreneurs never misrepresent their type in equilibrium. Second, after lenders invest in the screening technology, their optimization problem changes. At time $t = 3$, the cost of screening is sunk and the firms' type is known. Because of this, a lender's initial contract may no longer be optimal, and the threat to refuse financing an entrepreneur caught misrepresenting its type is not credible. For example, financing the 'average' entrepreneur caught misrepresenting its type would allow a foreign lender to recoup some of its initial loss, and renegotiation of the initial contract could benefit both the lender and entrepreneur. Therefore, 'average' entrepreneurs should know foreign lenders' threat to provide zero financing is not credible.

---

\(^{18}\) Levine (1996) argues that domestic banks may benefit directly by adopting the technologies of foreign banks and foreign banks may encourage the development of better auditing agencies, thus decreasing screening costs for all.
To address these weaknesses of the basic model, I now extend the model to a repeated game and do not make any assumptions regarding lenders' ability to commit. It will then be shown that a full commitment strategy by lenders can be derived as an optimal equilibrium strategy without affecting any of the main findings of the more basic model.

The initial assumptions regarding agents remain the same as before. The timing of the model is also similar, except that the game is now repeated and allows for renegotiation of contracts after firms' types becomes known. Within in each time-period \( t \), there is a stage game broken in six sub-periods, \( s \), where at:

- \( s = 0 \): entrepreneurs discover their type, \( i \)
- \( s = 1 \): lenders offer financial contracts \( F \), entrepreneurs choose contracts, if any
- \( s = 2 \): lenders choose investments in the screening technology, \( S \)
- \( s = 3 \): lenders renegotiate new contract, \( \hat{F} \), provide financing, \( I \)
- \( s = 4 \): entrepreneurs receiving capital make investment decision, \( q \)
- \( s = 5 \): project outcomes are realized, financial contracts are settled

There is no discounting between sub-periods, but there is discounting between time-periods. Lenders will be long-lived in that they expect to play the game for an infinite amount of periods in the future, while entrepreneurs are short-lived and only play for one period. At the start of each period, \( t \), a new continuum \( 1 + \theta z \) of entrepreneurs is born. The discount rate between time periods for each lender \( j \) is simply the inverse of their opportunity cost of funds, \( 1/r(j) \).

The feasible set of actions and contracts for entrepreneurs remain the same as before, but now lender \( j \) is allowed to renege on its commitment to screen contracts at \( s = 2 \) and allowed to renegotiate screening contracts at \( s = 3 \) after firms' types become known. Lenders are allowed to offer any renegotiated contract to the entrepreneur, but it is only accepted if the new contract

\[ \text{19 There is never any incentive to renegotiate unscreened contracts since no actions are made and no new information is learned between } s = 1 \text{ and } s = 3 \text{ for lenders of entrepreneurs accepting this type of contract.} \]
represents a pareto improvement for both the lender and entrepreneur. Given this, entrepreneurs’
decisions regarding the financial contract at \( s = 1 \) will need to incorporate a lender \( j \)'s optimal
decision on screening investment at \( s = 2 \) and incentives to renegotiate a screening contract at \( s = 3 \).

Let \( F_i(j) \) be the set of contracts initially offered by lender \( j \) during the stage game at time
\( t \). As before, \( F_{ij}^{IA} \) will designate a financial contract of size \( I \in \{0,1\} \) and type \( k \in \{O,A,B,C\} \)
offered by lender \( j \) during the stage game at time \( t \). Then, I will define \( \hat{F}_{ij}^{IA} \) as the renegotiated
contract offered at \( s = 3 \). Again, a contract is a mapping of observables into a payment for the
entrepreneur, and the screening technology remains the same as before.

Let \( f_{i}(i) \) designate the initial contract choice of entrepreneur of type \( i \), during the stage game
at time \( t \) where \( f_{i}(i) = \emptyset \) is allowed, and let \( \hat{f}_{i}(i) \) represent the contract agreed upon after
renegotiation. If no renegotiation occurs, \( f_{i}(i) = \hat{f}_{i}(i) \). Entrepreneur \( i \)'s investment decision during
the stage game at time \( t \) is given by \( q_{i}(i) \). As before, an entrepreneurs' strategy consists of its
contract choice and investment decision.

Lender \( j \)'s screening decision during the stage game at time \( t \) is given by \( S_{i}(j) \), and a
lenders' strategy consists of the initial set of contracts it offers, its screening decision, and
renegotiated set of contracts. As before, all actions in the stage game will be perfectly observable to
all agents. Therefore, each agent will condition its optimal decision based on actions taken by other
agents in previous sub-periods of the stage game.

Moreover, each agent in the stage game at time \( t \) will have perfect knowledge of the history
of actions taken by all lenders prior to period \( t \). I will define \( a_{j,t} \) as the actions of lender \( j \) during
the stage game at time \( t \) where \( a_{j,t} = \{F_{i}(j),S_{i}(j),\hat{F}_{i}(j)\} \), and \( a_{t} = \bigcup_{j \in L} a_{j,t} \). Therefore, the history
known by all agents is given by \( h_{t} = \{a_{0},a_{1},...,a_{t-1}\} \). Lastly, define \( H_{t} \) as the set of all possible
histories, \( h_t \), and assume that \( h_0 = \emptyset \). Since agents have knowledge of lenders' past actions, they will also condition their decisions in the stage game at time \( t \) based on the lenders' history. Entrepreneurs' knowledge of a lender's history will be crucial in allowing lenders to establish a 'reputation' of following through on their initial financial commitments.

A strategy configuration in this economy consists of \( \{f(i \mid h_t), q(i \mid f(i), h_t)\} \) for each \( i \in I \), \( h_t \in H_t, \forall t \) and \( \{F_i(j \mid h_t), s_i(j \mid X_i, F_t), h_t), F_i(j \mid X_i, F_t, i, h_t)\} \) for each \( j \in L \) and \( h_t \in H_t \).

As before, \( X_i, F_t, i \) is the set of entrepreneur types in period \( t \) that accept the contract offer \( F_t \) when the set of available financial contracts is \( F_t \). Entrepreneurs' actions are limited in that \( f_i(i) \in F_i \), where \( F_i \) is the set of all \( F_i(j)'s \), and \( q \in \{0,1\} \). Lenders' actions are limited in that \( S(j) \in \{0,1\} \). Since all agents' actions at time \( t \) are a function of history, \( h_t \), I will suppress this notation in subsequent text.

The expected utility of entrepreneurs at time \( t \) can again be written as:

\[
u_i : F_t \times \{0,1\} \rightarrow \mathbb{R}^+
\]

where the first argument denotes the financial contract. The second argument is the choice to implement, \( q \). Given the above setup, the expected utility of a contract is

\[
u_i(F_t^{i,k}, q = 0 \mid i) = F_t^{i,k}(0,0)
\]

\[
u_i(F_t^{i,k}, q = 1 \mid i) = p(i \mid I)F_t^{i,k}(1,R) + (1 - p(i \mid I))F_t^{i,k}(1,0)
\]

where \( p(i \mid I) \) is the probability of success for an entrepreneur of type \( i \) with a project of size \( I \).

The expected future returns for lender \( j \),

\[
\pi : \{0,1\} \times \{Z, A, B, C\} \times \{0,1\} \rightarrow \left[ -r(j) \lambda - C(j), (R - r(j)) \lambda \right],
\]

is a function the lender's screening decision, \( S(j) \), and an entrepreneur's type, \( i \), and decision, \( q \).

The losses are limited below by the largest amount of capital a lender would ever extend, \( \lambda \), at opportunity cost \( r(j) \) for lender of type \( j \). It is then easily shown, that:
\[
\pi_{j,i}(S(j),i,q = 0 \mid F^{i}_{j,s}, s \leq 2) = -F^{i}_{j,s}(0) - S(j)C(j)
\]
\[
\pi_{j,i}(S(j),i,q = 1 \mid F^{i}_{j,s}, s \leq 2) = \left[ p(i \mid I)R - r(j) \right] - u(F^{i}_{j,s}, q = 1 \mid i) - S(j)C(j)
\]
\[
\pi_{j,i}(S(j),i,q = 0 \mid F^{i}_{j,s}, s > 2) = -F^{i}_{j,s}(0)
\]
\[
\pi_{j,i}(S(j),i,q = 1 \mid F^{i}_{j,s}, s > 2) = \left[ p(i \mid I)R - r(j) \right] - u(F^{i}_{j,s}, q = 1 \mid i)
\]

Compared to the basic model discussed earlier, the lenders' future expected returns from a given financial contract is now a function of the screening decision, \(S(j)\). Moreover, it is important to note that the expected profits of the lender for going forward with a screening contract change after screening is conducted at \(s = 2\). The lender no longer considers the sunk cost of screening when solving its optimization problem. This was also true in the more basic model but irrelevant since full commitment ensured lenders only optimized their contracts at \(s = 1\). Given this, the economy's Subgame Perfect equilibrium in the repeated game is defined as:

**Definition of Equilibrium:** A strategy configuration, \(\{F_{j}(j), S_{j}(j), \hat{F}_{j}(j)\}_{t=0}^{\infty}\) for each \(j \in L\) and \(h_{i} \in H_{i}\), and \(\{f_{i}(i), q_{i}(i)\}\) for each \(i \in E\), \(h_{i} \in H_{i}, \forall t\) constitutes an equilibrium if and only if for every period \(t\) it is true that:

1. For every \(f_{i}(i)\) and \(h_{i}\), each \(i \in E\) chooses \(q_{i}(i) \in \{0,1\}\) to maximize \(u_{i,j}(\hat{f}_{j}, q_{j})\).
2. For every \(f_{j}(j)\) and \(h_{j}\), each \(j \in L\) chooses \(\hat{F}_{j}(j)\) to maximize

\[
\pi_{j,i}(S_{j}(j),i,q_{i}(i) \mid \hat{F}_{j}(j), s > 2) + V_{i}(j) \quad \text{where } q_{i}(i) \text{ is given by condition 1.}
\]

3. For every \(f_{j}(j)\) and \(h_{j}\), each \(j \in L\) chooses \(S_{j}(j)\) to maximize

\[
\pi_{j,i}(S_{j}(j),i,q_{i}(i) \mid \hat{F}_{j}(j), s \leq 2) + V_{i}(j) \quad \text{where } q_{i}(i) \text{ is given by condition 1, and} \hat{F}_{j}(j) \text{ by condition 2.}
\]

4. For every set of contracts offered, \(F_{j}\), and \(h_{j}\), each \(i \in E\) chooses \(f_{i}(i) \in \mathbb{F}_{i}\) to maximize \(u_{i,j}(\hat{f}_{j}(i), q_{j}(i) \mid S_{j}(j))\) where \(q_{j}(i)\) is given by condition 1, \(\hat{f}_{j}(i)\) by
condition 2, and \( S_j(j) \) by condition 3.

5. For every \( h_i \), each \( j \in L \) chooses \( F_j(j) \) to maximize

\[
\int_{\sigma(F_j,\pi_i)} \pi_j \left( S_j(j), i, q_i(i) \mid \tilde{F}_j(j), i \leq 2 \right) + V_j(j) \]

where \( q_i(i) \) is given by condition 1, \( \tilde{F}_j(j) \) by condition 2, \( S_j(j) \) by condition 3, and \( i \in \chi_j(F_j, \pi_i) \) by condition 4, and

\[
\int_{\sigma(F_j,\pi_i)} \pi_j \left( S_j(j), i, q_i(i) \mid \tilde{F}_j(j), i \leq 2 \right) \delta_i = 0 .
\]

6. \( V_j(j) = \sum_{m=1}^{\infty} \frac{1}{\pi_m} \left[ \int_{\sigma(F_j,\pi_i)} \pi_j \left( S_j(j), i, q_i(i) \mid \tilde{F}_j(j), i \leq 2 \right) \right] \)

where \( q_i(i) \) is given by condition 1, \( \tilde{F}_j(j) \) by condition 2, \( S_j(j) \) by condition 3, \( i \in \chi_j(F_j, \pi_i) \) by condition 4, and \( F_j(j) \) by condition 5 for all \( m \geq t + 1 \).

Given this definition, it can be shown that there exists an equilibrium allocation similar to that of the basic model. Specifically, lenders will adopt strategies to always honor their initial financial contracts, such that \( \tilde{F}_j(j) = F_j(j) \) and \( S_j(j) = 1 \) for \( k \neq 0 \). Therefore, the full commitment assumptions of the more basic model can be generated as an optimal strategy. Since the dynamics of the open economy are the same as the closed economy, I will just state the equilibrium for the open economy that exhibits a separating equilibrium similar to that of Section 3.

Proposition 4. If \( C' \leq \bar{C} \), there exists an equilibrium in the open economy in which a number

\[
n \geq \max \left\{ \frac{\theta_c (r^* - 1)}{\theta_b}, \frac{(R - r^*)(r^* - 1)}{C' - (R - r^*)}, 2 \right\}
\]

foreign lenders offer the following contract to entrepreneurs:

\[
\tilde{F}_j^{A,C}(q, Y) = \begin{cases} \lambda(R - r^C) & \text{if } q = 1, Y = R\lambda \\ 0 & \text{otherwise} \end{cases} \forall t
\]

where \( r^C = r^* + C' / \lambda \) and all entrepreneurs of type \( i = C \) accept finance from a randomly chosen foreign lender and choose \( q(C \mid \tilde{F}_j^{A,C}, h_i) = 1 \). Foreign lenders never renegotiate contracts and choose \( S_j(j) = 1 \) \( \forall t \).
And if \( r + C \leq R \), a number \( n \geq \max \left\{ \frac{\theta_c (r-1)}{\theta_a}, 2 \right\} \) domestic lenders also offer

\[
\bar{P}^{1,A}_t(q,Y) = \begin{cases} 
R - r^A & \text{if } q = 1, Y = R \\
0 & \text{otherwise}
\end{cases} \quad \forall t
\]

where \( r^A = r + C \) and all entrepreneurs of type \( i = A \) accept finance from a randomly chosen domestic lender and choose \( q(i|\tilde{F}^{1,A}, b_i) = 1 \). Domestic lenders never renegotiate contracts and choose \( S_j(j) = 1 \) \( \forall t \).

If \( r + C > R \), \( f(A|b_i) = \emptyset \), and \( f(B|b_i) = \emptyset \) always. Off the equilibrium path, \( f(B|b_i) = \bar{P}^{k,A}_{j,t} \) if domestic lender \( j \) ever failed to screen in the past and no foreign lender has failed to screen; \( f(B|b_i) = \bar{P}^{k,C}_{j,t} \) if foreign lender \( j \) ever failed to screen in the past; if \( r + C > R \), \( f(A|b_i) = \bar{P}^{A,C}_{j,t} \) if foreign lender \( j \) has ever renegotiated a contract in the past; otherwise for all other histories, \( b_i \in H_i \), entrepreneurs choose with equal probability among contracts with the same utility.

The proof of Proposition 4 can be found in the appendix, but the intuition as to why full commitment by lenders is an optimal strategy is straightforward. Lenders will always screen their projects when screening is observable and 'bad' entrepreneurs apply to lenders with any history of not screening. By not screening today, a lender avoids paying the cost \( C^* \) for the \( \theta_c / n \) entrepreneurs that accept its contract in equilibrium, but because it fails to screen, all 'bad' entrepreneurs in all future periods will choose to accept this lender's contract. The loss of 'reputation' implies a discounted future loss of \( V_t = -\theta_b C^* / (r^* - 1) \). The gains from not screening today will be outweighed by the losses tomorrow when \( n \geq \theta_c (r^* - 1) / \theta_a \). Likewise, foreign lenders will refuse to renegotiate with 'average' borrowers that take the 'cream' project because this also ruins the lenders' 'reputation'. When all 'average' entrepreneurs of the future can observe this renegotiation and approach foreign lenders' known for renegotiation, the gains from renegotiation today are outweighed by the expected losses in future periods when \( n \geq (R - r^*) (r^* - 1) / [C^* - (R - r^*)] \).
Therefore, in a repeated game where 'bad' entrepreneurs are on the lookout for lenders that occasionally do not screen projects and 'average' entrepreneurs are watching for lenders that occasionally renegotiate, it will always be optimal for lenders to commit to screening their projects and never renegotiate. Therefore, the basic model described earlier with 'full commitment' is a reasonable approximation of the repeated game version of the model.

1.6 Robustness and Extensions

This section will discuss the robustness of the basic model's main findings. First, I will demonstrate that allowing the use of syndicated loans may not necessarily mitigate the potential adverse distributional effects of foreign entry and 'cream-skimming'. Second, I will argue that the basic model's findings are robust to more general assumptions regarding the distribution of firms. And last, I will demonstrate some potential dynamic implications of the model.

1.6.1 Syndicated Loans

The model suggests two potential policy tools the domestic government could use to induce the first-best allocation of credit. The first is to reduce the cost of domestic screening such that $C \leq \min R - r, C^\dagger$. This would ensure that all projects are screened; 'cream' entrepreneurs choose larger projects, and 'bad' entrepreneurs are not financed. The second is that the government could reduce the cost of funds for domestic lenders. One natural way to do this would be allow the domestic lenders to borrow directly from international capital markets. In essence, the domestic and foreign lenders would engage in syndicated lending where foreign lenders provide the capital at cost $r^* < r$, and domestic lenders do the screening at cost $C < C^\dagger$. By combining the advantages of each type of lender, syndicated lending maximizes the likelihood of achieving equilibria where 'cream' entrepreneurs implement larger projects, and 'average' entrepreneurs are not rationed.

There are many potential reasons, however, why syndicated lending may not necessarily induce the first best allocation. First, syndicated lending only achieves the first-best allocation so long
as $r' + C \leq R$. Otherwise, 'average' entrepreneurs will still be credit rationed in any separating equilibrium. Second, any corruption among domestic lenders, which is not accounted for in the model here, might make bypassing the domestic lenders optimal.

Third, syndicated lending itself may also suffer from information asymmetries. Because screening is costly, domestic lenders will always have an incentive to shirk on their obligation to screen after foreign lenders provide capital for projects if screening is not perfectly observable. This moral hazard problem would be very similar to that of Holmstrom and Tirole (1997). In the simple model above, the moral hazard would be irrelevant since any project failure is a costless signal that screening was not done. Therefore, foreign lenders could refuse to compensate domestic lenders when projects fail, and syndicated lending is always feasible. However, if screening is imperfect, such that even 'average' entrepreneurs fail with some small probability, foreign lenders would either need to incur a cost to detect screening or provide compensation to domestic banks in excess of the true cost of screening, $C$, to ensure the domestic lenders' incentives are properly aligned. Either way, the added costs can render syndicated lending unprofitable even when $r' + C < R$.

1.6.2 Allowing for varying $\lambda$ and $R$

The basic mechanisms of the model would also be robust to allowing for a distribution of 'cream' entrepreneurs with varying project sizes, $\lambda$, and returns, $R$. The screening cost thresholds, $C$ and $\bar{C}$, would simply become entrepreneur specific in a continuous model. For instance, a 'cream' entrepreneur $i$ with a project of size $\lambda(i)$ and return $R(i)$ that implies a cost threshold, $C(i) \geq C$, would be screened and financed fully in the closed economy. However, all 'cream' entrepreneurs with small projects or returns will be pooled with 'average' and 'bad' entrepreneurs. If the mass of 'cream' entrepreneurs pooled with 'average' entrepreneurs falls too low and screening 'average' entrepreneurs is not feasible, than the pooling equilibrium breaks causing all entrepreneurs with projects that imply $C(i) < C$ to lose financing. Again, foreign entry has the potential of unraveling
the pooling equilibrium as foreign lenders will be willing to target a wider distribution of 'cream' entrepreneurs thus reducing the number of entrepreneurs pooled by domestic lenders.

1.6.3 Overlapping Generations and Dynamic Implications

The model could also be extended to an overlapping generations framework where entrepreneurs exhibit various stages of life. For instance, suppose that entrepreneurs live for two periods, where in the first stage of life, they are 'young' and in the second stage they are 'old'. When 'young', entrepreneurs are either 'average' or 'bad'. When they become 'old', all 'bad' entrepreneurs remain 'bad', while there is some stochastic process transforming 'average' entrepreneurs into 'bad', 'average' or 'cream'. A new set of young entrepreneurs is born each period, and all entrepreneurs 'die' at the end of the second period or whenever they are unable to obtain credit, whichever is earliest. If some screening cost is necessary to reassess an 'average' entrepreneur's quality in period 2, than foreign entry can also lead to a decline in future 'cream' projects.

The intuition is straightforward. When screening is very costly, domestic lenders may choose to pool all young entrepreneurs along with all old entrepreneurs that successfully implemented their first project when young. Young entrepreneurs that failed are clearly 'bad', and hence, never refinanced in old age. Again, foreign lenders will have a competitive advantage in lending to older, 'cream' entrepreneurs and will steal these projects away from domestic lenders. If domestic lenders find it costly to screen entrepreneurs in their 'young' stage of life, they may exit the market entirely. In this case, future 'cream' entrepreneurs will never develop and instead die 'young'.

1.7 Concluding Remarks

Emerging economies are often criticized for having financial sectors that seem to 'over-finance' low-return projects and 'under-finance' high-return projects. For this reason, and many others, it is typically argued that opening capital markets would improve credit access, economic growth, and investment in these economies. However, the theory developed in this chapter suggests
this type of domestic credit allocation may occur when information asymmetries are large and domestic lenders choose to pool risks rather than invest in costly screening technologies.

If true, foreign entry via open capital markets may take the form of ‘cream-skimming’ that has distributional implications. Foreign lenders’ use their lower cost of funds to offer more competitive financial contracts but only finance the largest and most profitable projects because of their higher cost of acquiring information about domestic projects. This type of entry may both redirect credit towards the largest, most profitable firms in the economy and reduce the credit access of informationally opaque entrepreneurs with positive NPV projects. The overall effect of open capital markets on output and investment can be ambiguous.

The theoretical findings imply some natural policy implications. Types of opening that lower geographic or institutional costs of foreign lenders will reduce the likelihood of an adverse effect on ‘opaque’ borrowers. Improving the quality of local institutions and the ability of domestic lenders to acquire information about entrepreneurs’ quality will also reduce adverse distributional effects.
1.8 Appendix

A – Justification for Using Pure Debt Contracts

For all financial contracts of size \( I \in \{1, \lambda \} \) and type \( k \in \{0, Z, A, B, C\} \), it is sufficient to consider only equilibrium contracts with \( F^{I,k}(q = 1, Y = RI) \geq 0 \) and \( F^{I,k}(q = 1, Y = 0) = 0 \) as long as there are multiple lenders offering identical contracts in equilibrium. This is shown in Lemma 1. Given this, when projects are implemented (such that \( q = 1 \)) these contracts can be interpreted as pure debt contracts of size \( I \) and lending rate \( R - F^{I,k}(q = 1, Y = RI) / I \).

Lemma 1: For all financial contracts of size \( I \in \{1, \lambda \} \) and type \( k \in \{0, Z, A, B, C\} \) it is sufficient to consider only equilibrium contracts with \( F^{I,k}(q = 1, Y = RI) \geq 0 \) and \( F^{I,k}(q = 1, Y = 0) = 0 \) when there are \( n \geq 2 \) lenders offering the same contracts in equilibrium.

For each financial contract, lenders must provide a non-negative payment in each state of the world when projects are implemented. This implies some payment \( F(q = 1, Y = R) \geq 0 \) for successful projects and \( F(q = 1, Y = 0) \geq 0 \) for failures.

For financial contracts where \( k \neq 0 \), this yields an expected return of

\[
\nu(F^{I,k}, q = 1 | i = k) = p(k | I) F^{I,k}(q = 1, Y = RI) + [1 - p(k | I)] F^{I,k}(q = 1, Y = 0) = \bar{\nu}
\]

and expected profit \( \pi_j(k, q = 1 | F^{I,k}) = p(k | I) [R - r(j)] I - \nu(F^{I,k}, q = 1 | k) - C(j). \)

Since all firms accepting this contract will be of type \( k \), the expected returns can always be replicated for each agent involved by using a contract where

\[
F^{I,k}(q = 1, Y = 0) = 0 \quad \text{and} \quad F^{I,k}(q = 1, Y = RI) = \bar{\nu} / p(k | I).
\]

For financial contracts where \( k = 0 \) and all borrowers accepting it in equilibrium have the same probability of success, \( \tilde{\nu}(i | I) \), a similar reasoning holds. A payment of \( F(q = 1, Y = RI) = \bar{\nu} / \tilde{\nu}(i | I) \) in success and zero otherwise can always replicate the expected payment of contracts that pay a non-zero amount in failure.
For financial contracts where $k = 0$ and all borrowers accepting the contract in equilibrium do not have the same probability of success, $p(i | I)$, the expected payment for all agents cannot be replicated using a contract with $F^{l,k}(q = 1, Y = 0) = 0$.

However, it can be shown that a contract with $F^{l,k}(q = 1, Y = 0) > 0$ cannot exist in equilibrium when $k = 0$ and not all borrowers accepting the contract have the same probability of success. Consider the case where $n \geq 2$ lenders offer a contract with $F^{l,0}(q = 1, Y = RI) = G \geq 0$ and $F^{l,0}(q = 1, Y = 0) = H > 0$. If a continuum 1 of entrepreneurs accept the contract where a fraction $\alpha$ only succeed with probability $p$, the expected return for each lender is given by $\frac{[1 - \alpha(1 - p)](RI - G) - \alpha(1 - p)H}{n}$ and this must equal zero in equilibrium. A lender that offered a contract where $F^{l,0}(q = 1, Y = RI) = G + \varepsilon$ and $F^{l,0}(q = 1, Y = 0) = 0$ for some $\varepsilon > 0$, however, would make profits of $(1 - \alpha)(RI - G - \varepsilon)$ because only entrepreneurs with probability of success 1 will take this new contract. And, for $(1 - \alpha)(RI - G - \varepsilon) > 0$ this contract will be more profitable. But, since $[1 - \alpha(1 - p)](RI - G) - \alpha(1 - p)H = 0$ in any equilibrium, it must be true that $RI > G$ when $H > 0$. Therefore, there exists some $\varepsilon$ such that $(1 - \alpha)(RI - G - \varepsilon) > 0$. Therefore, contracts with $k = 0$ and $H > 0$ can never be an equilibrium. QED

**B – Proof of Proposition 1**

There are 10 different types of financial contracts that lenders could offer: $F^{l,k}, F^{l,A} \forall k \in \{0, Z, A, B, C\}$. The proof that the equilibrium of Proposition 1 exists and is the unique allocation will be done in six parts. In part 1, I will prove that it is sufficient to only consider contracts of the form $F(1, RI) > 0$, $F(1, 0) = 0$ and $F(0, .) = 0$ when the number of lenders offering identical contracts is $n \geq 2$. In parts 2-4, I will show that 7 of the 10 financial contracts cannot be
equilibrium contracts. In part 5, I will then derive the conditions under which the three remaining financial contracts can co-exist in equilibrium. This will be sufficient to prove the allocations of Proposition 1 are unique. Finally, in part 6, I will prove that none of the non-equilibrium contracts can be used to break the equilibrium in Proposition 1.

Part 1 – When there are \( n \geq 2 \) lenders offering the same contracts in equilibrium, a contract with \( F(0,.) = G > 0 \) cannot be an equilibrium if any type of entrepreneur actually accepts the contract and chooses \( q = 0 \) in equilibrium. Any individual lender could increase profits by offering the same contract with \( F(0,.) = G - \epsilon > 0 \), for some \( \epsilon > 0 \). Entrepreneurs choosing the original contract with \( q = 0 \) would no longer take the new contract from that particular lender, while those that choose \( q = 1 \) would still do so. Since \( \pi(q = 0, i | F) < 0 \) for \( F(0,.) > 0 \), the lender’s profits would increase from this change. Therefore, it is sufficient to only consider equilibrium contracts with \( F(0,.) = 0 \).

And, from Lemma 1, we know it is also sufficient to consider only equilibrium contracts with \( F(1,R_I) \geq 0 \) and \( F(1,0) = 0 \). If \( F(1,R_I) = 0 \), however, no firm would actually accept the contract in equilibrium (since by default they choose \( f = \emptyset \) if no contract provides a positive return.) Thus, it must be possible to represent any equilibrium contract as \( F(1,R_I) > 0 \), \( F(1,0) = 0 \) and \( F(0,.) = 0 \).

Part 2 – In equilibrium, any financial contract \( F^{IA} \) yielding negative expected profits for the lender at \( t = 1 \) cannot be an equilibrium contract as lenders could increase profits by dropping the contract. This allows me to exclude financial contracts that are ex-ante unprofitable for the lender if any entrepreneur were to accept the contract. Those contracts are: \( F^{IA} \), \( F^{IB} \), \( F^{IBA} \), \( F^{IB} \), \( F^{IL} \) and \( F^{IL} \).

Given \( pR < r \), the \( F^{IA} \), \( F^{IB} \) and \( F^{IBA} \) contracts always yield a negative return for the lender if \( q = 1 \) when the contract takes the form \( F(1,R_I) > 0 \) and \( F(1,0) = 0 \), and \( C > 0 \) ensures that \( F^{IL} \) and \( F^{IL} \) each yield a negative return for the lender if accepted by entrepreneurs of type \( Z \).

Part 3 – Suppose that \( F^{IA} \) was an equilibrium contract. By assumption (1), \( \theta_d > \theta_c \).
$r_R < r$, and Part 1, this contract can only be profitable if 'cream' firms accept it, and will never be profitable if both 'cream' and 'bad' firms accept it. When $F(1, R) > 0$, $F(1, 0) = 0$ and $F(0, .) = 0$ in equilibrium, however, it is easy to see that if 'cream' firms prefer this contract in equilibrium, then it must be that $F^{A, 0}(1, R) > F^{L, 0}(1, R)$. But, $F^{L, 0}(1, R) > F^{L, 0}(1, R)$ implies that 'bad' firms must also prefer this contract since Part 2 proves that $F^{L, 0}$ and $F^{A, 0}$ are the only contracts available to bad firms in any equilibrium. Therefore, $F^{A, 0}$ can never be an equilibrium contract.

Part 4 -- Suppose $F^{L, C}$ were an equilibrium contract. Then, it must make zero profits, and by Part 1, we know the contract can be implemented as a pure debt contract. Together, this implies that $F^{L, C}$ would charge an interest rate of $r + c$ in equilibrium. But, another lender could always increase profits by offering the larger contract $F^{A, C}$ at exactly the same interest rate, and 'cream' firms would always prefer the larger contract. Therefore, $F^{L, C}$ cannot be an equilibrium contract.

Part 5 -- From Parts 1-4, we know there are only three possible types of contracts that could be offered in equilibrium: $F^{1, 0}$, $F^{L, A}$ and $F^{A, C}$. Therefore, lenders either offer an unscreened contract for small projects, a screened contract for 'average' entrepreneurs, or a large screened contract for 'cream' borrowers. Moreover, by Part 1, it is sufficient to consider only contracts with $F(1, R) > 0$, $F(1, 0) = 0$ and $F(0, .) = 0$.

If $F^{1, 0}$ is an equilibrium contract, then it must be the case that 'bad' borrowers choose it since there is no other contract available to 'bad' entrepreneurs. Therefore, by assumption (1) and $\theta_A > \theta_C$, this contract can only be profitable if both 'average' and 'cream' borrowers also select it, and it is feasible for the lender. Therefore, by the zero profit condition, $F^{1, 0}$ must offer a lending rate $r^{1, 0} = r^*/(1 - (1 - p)\theta_b)$, and will only be feasible for the lender if $r^{1, 0} \leq R$. The contract will also only exist if neither of the other two contracts is preferred by either 'average' or 'cream' entrepreneurs. The zero profit condition ensures that $F^{L, A}$ must offer an equilibrium lending rate of
\( r^A = r + C \) and \( F^{A,C} \) must offer a lending rate of \( r^C = r + C / \lambda \). By assumption (3), \( F^{A,C} \) is always feasible, but \( F^{1,A} \) will exist only if \( r + C \leq R \). Because \( F^{A,C} \) in equilibrium offers a higher return to 'cream' firms than \( F^{1,A} \) offers to 'average' firms, we need only check when 'cream' firms will prefer \( F^{A,C} \) to \( F^{1.0} \). This will occur when \( \lambda(R - r^C) \geq R - r^{pmd} \), and this is true for \( C \leq \underline{C} \). Thus, we now know that for \( C \leq \underline{C} \), \( F^{1,A} \) and \( F^{A,C} \) that pay lending rates \( r^A = r + C \) and \( r^C = r + C / \lambda \) respectively are the only possible equilibrium contracts, and for \( C > \underline{C} \), \( F^{1.0} \) that pays a lending rate \( r^{pmd} \leq R \) is the only potential equilibrium contract. Thus the allocation in Proposition 1 is unique.

Part 6 – To prove these are in fact equilibrium financial contracts, it must now be shown that none of the other non-equilibrium contracts can offer a potential profitable deviation for agents.

Consider the case where \( C > \underline{C} \), and all entrepreneurs are pooled on the small project. While enticing either 'average' or 'cream' firms to take a contract where \( F(0,\cdot) > 0 \) and then choose \( q = 0 \) can never be a profitable deviation, it is possible that taking such a loss on 'bad' firms would be profitable since lenders already take a loss on these entrepreneurs. However, by assumption (2), the losses on such a contract would always be greater for any contract where \( k = 0 \) since all entrepreneurs of type \( Z \) would also take the contract and choose \( q = 0 \). However, for \( F^{1,B} \) contracts, the lender could entice only 'bad' entrepreneurs to take the contract and choose \( q = 0 \) if \( F^{1,B}(0,\cdot) > \rho(R - r^{pmd}) \). If each 'bad' entrepreneur were to switch contracts, the lender takes a minimum loss of \( \rho(R - r^{pmd}) + C \) on the new contract per 'bad' entrepreneur, whereas the loss before was \( \rho(R - r^{pmd}) + r - \rho R \). Thus, if \( C > \rho R - r \), this deviation can never be profitable. Therefore, no contract where entrepreneurs choose \( q = 0 \) can break this equilibrium.

Given \( F^{1,B}(0,\cdot) > 0 \) can never be a profitable deviation, lenders could never increase profits by offering \( F^{1,B} \) contracts (i.e. 'bad' entrepreneurs would still implement their project at a loss, but
the lender would now take a larger loss because it screens the 'bad' firm). And clearly, it is never
profitable to offer $F^{1,2}$, $F^{4,4}$, $F^{1,\Lambda}$ or $F^{1,\Lambda \Lambda}$. The $F^{1,0}$ contract will also by unprofitable by
assumption (1), $\theta_0 > \theta_C$, and the fact that bad will always prefer the contract if 'cream' borrowers do.

This leaves only $F^{1,\Lambda \Lambda}$. However, $C > \underline{C}$ implies that lenders can never profitably induce
'cream' entrepreneurs to take a larger contract with screening. Therefore, $F^{1,0}$ is an equilibrium
contract for $C > \max \{\underline{C} \cdot r - pR\}$, $r^{\text{pool}} = r / (1 - (1 - p)\theta_b)$ and $r^{\text{pool}} \leq R$.

Now consider the case where $C \leq \underline{C}$. Clearly, no $F^{1,\text{B}}$, $F^{1,\text{F}}$ contract can be a profitable
deviation, and no $F^{1,0}$ contract can be a profitable deviation since 'bad' firms would accept it and a
pooling equilibrium with all entrepreneur types is never profitable for lenders when $C \leq \underline{C}$. This
only leaves $F^{1,4}$ and $F^{1,\Lambda \Lambda}$. But, $F^{1,4}$ can never be profitable for a lender to offer, and $F^{1,\Lambda \Lambda}$ can
never be both profitable for the lender and better for the 'cream' entrepreneur given $F^{1,\Lambda \Lambda}$.

Therefore, for $C \leq \underline{C}$, $F^{1,\text{A}}$ and $F^{1,\Lambda \Lambda}$ are the unique equilibrium contracts, which can be expressed
as pure debt contracts that pay lending rates $r^A = r + \lambda$ and $r^\Lambda = r + C / \lambda$ respectively. And, $F^{1,\text{A}}$
is an equilibrium contract if and only if $r^A \leq R$. QED

C – Proof of Proposition 2

Using the same logic as in parts 1-4 of the proof of Proposition 1, there are only two
potential foreign lender contracts that can be equilibrium contracts $F^{1,0}$ and $F^{1,\Lambda \Lambda}$, and it is sufficient
to consider contracts of the form $F_t(1, R) > 0$, $F_t(1, 0) = 0$ and $F_t(0, \text{.}) = 0$. [Unlike domestic lenders,$F^{1,\text{A}}$ cannot be an equilibrium contract for foreign lenders because of assumption (4).] And similar
to parts 5-6 of Proposition 1, it can be shown that $F^{1,0}$ only exists as a pure debt contract with
interest rate $r^{\cdot, \text{pool}} = r / (1 - (1 - p)\theta_b)$ for $C > \max \{\underline{C} \cdot r - pR\}$, $r^{\cdot, \text{pool}} \leq R$ and $F^{1,\Lambda \Lambda}$ only exists for
C\prime \leq \bar{C}, and charges a lending rate \( r^{\prime, e} = r^* + C^*/\lambda \). Moreover, it can be shown that these two contracts always exclude their domestic equivalents from being equilibrium contracts. Thus, the only other possible equilibrium contract is \( F^{1,A} \) where \( F^{1,A} \) exists only if \( r^A \leq R, C^\prime \leq \bar{C} \) just as in the closed economy. Then, using the same approach as in part 6 of the proof for Proposition 1, it is easy to see that no other available contracts break this equilibrium. QED

D – Proof of Proposition 3

For an economy to switch from a pooling equilibrium in the closed economy to the separating equilibrium in the open economy, it must be that \( C^\prime \leq \bar{C} \) and \( r^\prime \leq R \). Moreover, in the pooling equilibrium, net output is \( (\theta_A + \theta_C)(R - r) - \theta_B(r - pR) \), while in the open economy where \( r + C \leq R \), net output is \( \left( \lambda(R - r^\prime) - C^\prime \right) \theta_C + (R - r) \theta_A \). Therefore, net output will increase when:

\[
(\lambda(R - r^\prime) - C^\prime) \theta_C + (R - r) \theta_A > (\theta_A + \theta_C)(R - r) - \theta_B(r - pR)
\]

Given assumption (1) and \( \theta_A > \theta_C \), this condition is always true when \( C^\prime \leq \bar{C} \) and \( r^{\prime, mL} \leq R \).

In the open economy where \( r + R > C \), the equivalent condition for an increase in net output is easily shown to be:

\[
(R - r) \theta_A > \left( \left( \lambda(R - r^\prime) - C^\prime \right) - (R - r) \right) \theta_C + (r - pR) \theta_B \quad \text{QED}
\]

E – Proof of Proposition 4

This proof will proceed in five parts. First, I will show that all entrepreneurs are choosing the optimal investment decision \( q \) [condition 1 of the equilibrium]. Second, I will prove no lender has an incentive to renegotiate given the equilibrium contracts and investment decisions [condition 2 of the equilibrium]. Third, I will prove that screening after entrepreneurs have accepted a contract is optimal for lenders [condition 3 of the equilibrium]. Fourth, I will prove entrepreneurs always choose the optimal contract given those available, lenders’ optimal screening decision, and lenders’ optimal renegotiation strategy [condition 4 of the equilibrium]. Fifth, I will prove that given optimal
investment decisions, renegotiation decisions, screening decisions, and contract choices of entrepreneurs, that the contracts offered are an equilibrium and provide zero profits [condition 5].

Part 1 – For all $t$ and $h$, all entrepreneurs clearly choose the optimal action $q = 1$ given the contract offered. For cream entrepreneurs with $\bar{F}_{j,t}^{AS}$, $q(C | \bar{F}_{j,t}^{AS}, h_t) = 1$ maximizes utility, and for average entrepreneurs with $\bar{F}_{j,t}^{A}$, $q(A | \bar{F}_{j,t}^{A}, h_t) = 1$ clearly maximizes utility.

Part 2 – For all $t$, $h$, and $f, j$, no lender has an incentive to renegotiate the contract at $s = 3$. It is easy to see that there does not exist any other contract that can increase both the lender and entrepreneurs expected payment, so no renegotiation is possible.

Part 3 – Both foreign lenders and domestic lenders (when $r + C \leq R$) choose to screen their contracts for all $t$ and $h$. To see this, consider a foreign lender that chooses to not screen the contract it offers in period $t$ because it knows that only ‘cream’ entrepreneurs will select the contract in equilibrium. By parts 1 and 2, we know it will never want to renegotiate the contract, and the ‘cream’ entrepreneurs will always implement the project. Therefore, $S = 0$ yields the entrepreneur a return of $\pi_{j,t} = \theta_c C^r / n$, and $\pi_{j,t} < 0$. Therefore, the lender will not choose $S = 0$ when

$$0 > \frac{\theta_c C^r}{n} - \frac{\theta_b C^r}{r^* - 1}$$

The intuition for this result is straightforward. If the foreign lender attempts to skimp on its screening in any period, it gains today but loses in the future because it destroys its reputation as a
lender that always screens. With its 'reputation' gone, all 'bad' entrepreneurs will apply for the screened financial contract in the future driving up the lenders costs. The gains from not screening will be lower than the future losses when \( n \) is high because this implies the lender finances a smaller share of the 'cream' entrepreneurs and hence, benefits less from not screening. A similar argument can be used to prove that domestic lenders also never have an incentive to choose \( S = 0 \).

Part 4 – For every set of contracts offered, \( \mathcal{F}_i \), and \( h_i \), each \( i \in E \) chooses \( f_i(i) \in \mathcal{F}_i \) to maximize \( u_j(i, f_i(i), q_i(i) \mid S(j)) \). This statement is clearly true for 'cream' entrepreneurs who always get the highest possible return by selecting \( \tilde{F}_{j,i}^{A,C} \). Likewise, when \( r + C \leq R \) and \( \tilde{F}_{j,i}^{A,A} \) is offered, the 'average' entrepreneurs maximize their utility by selecting \( \tilde{F}_{j,i}^{A,A} \). However, if \( r + C > R \), then 'average' may want to choose \( \tilde{F}_{j,i}^{A,C} \) if they think the contract may be renegotiated once their type becomes known at \( s = 3 \). This is possible since at \( s = 3 \) after the screening cost is already sunk, the foreign lender could extract \( R - r - \varepsilon > 0 \) if it renegotiated and went ahead with a contract of

\[
\tilde{F}_{j,i}^{A,A}(q,Y) = \begin{cases} 
\varepsilon & \text{if } q = 1, Y = R \\
0 & \text{otherwise}
\end{cases}
\]

where \( \varepsilon > 0 \). The 'average' entrepreneur would obviously prefer this new contract over receiving no contract at all which is initial agreement. Therefore, the maximum return for the lender of renegotiation at \( s = 3 \) is \( \pi_{j,s} \left( f_j(j), i, q_i(i) \mid \tilde{F}_{j,i}, s > 2 \right) = \theta_A(R - r')/n \). But, by renegotiation in period \( t \), all 'average' entrepreneurs in the future will choose to accept this contract because the lenders' reputation for not renegotiating is destroyed. This implies \( V_i = -\theta_A \left( (r' + C') - R \right)/(r' - 1) \). Thus, renegotiation implies, \( \pi_i + V_i = \theta_A(R - r')/n - \theta_A \left( (r' + C') - R \right)/(r' - 1) \). A foreign lender that chooses to not renegotiate simply makes \( \pi_{j,i} + V_i = 0 \) because it does not provide them with a contract. Therefore, renegotiation will not be optimal when,
Again, the intuition is straightforward. If the foreign lender renegotiates the contract today, it gains back some of its initial loss in screening the ‘average’ firms that approached it, but by renegotiating when no other foreign lender does, it will receive all the ‘average’ firms again in the next period and thereafter. ‘Average’ firms will know the lender has a reputation for renegotiation and approach it forever thereafter. But, from the perspective of today, this yields a cost to the foreign lender because it always takes a loss on average firms when \( r' + C' > R \).

So, ‘average’ firms will not have an incentive to choose the foreign lender contract designed for ‘cream’ firms because they know it is not optimal for foreign lenders to renegotiate once their type becomes known. Likewise, ‘bad’ entrepreneurs will never choose either equilibrium contract, because it is never optimal for either foreign or domestic lenders to renegotiate with a ‘bad’ entrepreneur. They always make an expected loss when financing a ‘bad’ firm.

Part 5 – Given the lenders never find it optimal to renegotiate or not invest in the screening technology, the lenders are in essence ‘fully committed’ to the financial contracts, \( F^A_{j,t} \) and \( F^c_{j,t} \). Using a similar approach as in the proofs of Proposition 1 and 2, it is then possible to show that these two contracts are equilibrium contracts in the open economy and yield zero profits.
References


Chapter 2

Banking Competition in Developing Countries: Does Foreign Bank Entry Improve Credit Access?

In recent years, the liberalization of financial markets in less developed countries (LDCs) has accelerated. The motivations are many. A shortage of savings, inefficient banking systems, and poor protections for lenders result in high borrowing costs for firms in LDCs, and worse, many firms are completely rationed out of the credit market despite lucrative projects. One policy often used by LDCs to address the shortcomings of their financial system is to allow foreign banks greater access to domestic borrowers under the presumption foreign banks increase the supply of credit, improve efficiency, and provide access to new financial services. The opening of financial markets in LDCs has also become standard policy associated with the World Trade Organization (WTO) and developed nations\(^1\), and the effect of liberalization can be large and sudden. After liberalizing, roughly 50 percent of Poland and Chile’s banking assets were controlled by foreigners in 1999, up from just 2.1 and 16.3 percent respectively five years earlier.\(^2\)

The theoretical case for allowing foreign bank entry, however, is not clear because greater banking competition has theoretically ambiguous effects on aggregate credit. The standard competitive model implies that in the absence of competition, banks charge higher lending rates and pay lower deposit rates. Thus, assuming an upward sloping supply curve for deposits and downward

\(^1\) The first multilateral rules pertaining to trade in financial services were made in the General Agreement on Trades in Services (GATS) in 1993. WTO negotiations to liberalize further are ongoing, and as recently as June 6, 2005, delegations from Japan, the U.S., and other nations argued further liberalization was necessary since “Policies that impede competition, such as entry restrictions and restrictions on foreign banks, have been shown to raise the cost of financial services and hurt economic performance.” WTO Document #05-2335, Council for Trade in Services.

\(^2\) See Agénor (2003), pp. 1108.
sloping demand curve for loans, the quantity of loans should increase with greater competition from foreign banks. This may be particularly beneficial in LDCs, where banking systems are often highly concentrated. Banking theories that incorporate information asymmetries, however, demonstrate that credit may be rationed in equilibrium (Stiglitz and Weiss 1981), and that greater competition among banks may increase credit rationing (Petersen and Rajan 1995). These models imply foreign bank entry may reduce aggregate credit in LDCs, where the lack of information about many borrowers makes information asymmetries particularly acute.

Moreover, asymmetric information may have unique implications regarding which firms benefit or are adversely affected by foreign bank entry. Gormley (2006) demonstrates that foreign banks’ greater access to cheap international capital markets but higher costs of acquiring information about borrowers may limit their entry to ‘cream-skimming’ the largest, most profitable firms. By reducing the quality of domestic bank loan portfolio, this ‘cream-skimming’ improves domestic lenders’ incentives to identify and discontinue financing unprofitable firms. However, if domestic banks are ineffective at identifying firms’ quality, informationally opaque firms with profitable projects may also lose access to domestic credit following foreign entry.

Existing empirical studies also do not support the presumption that greater banking competition necessarily improves credit access in developing economies. Evidence that foreign bank entry is associated with lower profit margins among domestic banks (Claessens, Demirguc-Kunt, and Huizinga 2001) does not directly address the issue. While suggestive that competition from foreign banks affects domestic banks, it does not answer the broader theoretical question of whether the increased banking competition improves credit access. Evidence that foreign banks tend to finance only larger, more established firms (Berger, Klapper and Udell 2001, Haber and Musacchio 2004, Mian 2006) also fails to identify the overall impact on the allocation of credit in the economy. Lastly, 

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3 Characteristics unique to foreign banks may also directly increase credit access in LDCs. Foreign banks may be less susceptible to politically connected loans (Agénor 2003); domestic banks may benefit directly by adopting the technologies of foreign banks (Lensink and Hermes 2004); and foreign banks may be more efficient, have access to international capital markets, and encourage the development of better auditing agencies (Levine 1996).
country-level studies of foreign bank entry and domestic credit (Clarke, Culle and Peria 2001, Giannetti and Ongena 2005, and Detragiache, Gupta and Tressel 2005) vary in their findings and could suffer from biases if the ease with which foreign banks enter a country is correlated with other reforms, institutional change, or future growth opportunities.

Unlike previous empirical studies, this chapter uses within-country variation to identify the effect of foreign bank entry using variation in the location of foreign banks established in India following a policy change in 1994. The use of within-country variation mitigates the potential biases from differences in institutions and economic reforms that are present in country-level studies, and to my knowledge, this is the first such study of its kind. Specifically, a panel of firms is matched to the location of newly established foreign bank branches in India from the mid- to late 1990s. I compare changes in the borrowing patterns of firms located near new foreign banks to changes in borrowing patterns of other firms. Variation in how firms' report long-term loans from domestic and foreign banks in India also allows me to test which firms foreign banks target and how their entry affects firms' long-term lending relationships with domestic banks. The use of firm-level data also allows me to test for any distributional changes in credit access following foreign bank entry.

Since new foreign banks in India chose where to establish new branches, I conduct a number of falsification tests to ensure their location choices are not correlated with pre-existing trends in local lending relationships. Additionally, the presence of foreign firms before the policy change is used as an instrument for the location of new foreign banks. I assume banks chose to enter markets with a greater presence of firms from their home country, and foreign firms' presence is not otherwise related to domestic lending relationships. Various tests indicate this identification assumption holds, and the instrumental variable (IV) estimates, while not all significant at conventional levels, are similar in sign and magnitude to the ordinary least squares (OLS) estimates.

Overall, the estimates suggest that competition from foreign banks is associated with a reallocation of loans that is not necessarily a boon to most domestic firms. The 10 percent most
profitable firms located in districts with a new foreign bank receive larger loans after entry, and these loans appear to originate from foreign banks. But on average, firms were 7.6 percentage points less likely to have a long-term loan of any size. The extent and nature of the decline suggests there is a systematic drop in the supply of loans from domestic banks in response to increased competition from foreign banks. All estimates are robust to a number of specification checks, and the timing of this loan reallocation coincides with foreign bank entry.

The observed drop in domestic bank credit is also greater for group-affiliated firms, where information asymmetries are likely more acute, and foreign banks appear to target non-group firms. Both of these findings are consistent with banking and competition theories that incorporate information asymmetries. Despite the overall drop in credit, however, there is little evidence that the reduction in long-term financing significantly increases bankruptcy rates or reduces sales growth. The negative impact on bank credit appears to be mitigated by substitution to other forms of borrowing, such as financial loans from other group-affiliated firms.

This chapter is related to a number of other recent studies on the impact of financial liberalization in emerging economies. The focus on a specific type of liberalization, foreign bank entry, is similar to recent work on the impact of foreign participation in domestic equity markets (Bekaert and Harvey 2000, Bekaert, Harvey, and Lundblad 2005, Chari and Henry 2004, Henry 2000a and 2000b). This chapter also builds upon existing empirical work that makes use of firm-level and within-country geographical variation to identify the impact of greater bank competition (Cetorelli and Strahan 2006, Zarutskie 2006). Lastly, this chapters’ focus on financial reforms in India is also related to recent research on foreign direct investment liberalization in India (Chari and Gupta 2005).

The remainder of the chapter proceeds as follows. Section 1 provides a review of India’s policy change regarding foreign banks, and Section 2 describes the data. The baseline regression and identification strategy are explained in Section 3, and Section 4 reports the OLS estimates. Section 5 contains robustness checks and IV estimates. Section 6 analyzes the differential effect of entry on
group-affiliated firms along with other potential effects on finance choices, bankruptcy rates, and sales of firms. Finally, Section 7 concludes.

2.1 Description of Policy Change

Prior to 1991, India’s economy and financial system was heavily regulated and dominated by the public sector. A complicated regulatory regime required firms to obtain licenses for most economic activities, and many industries were reserved for the public sector, including much of the financial system. Bank nationalizations in 1969 and 1980 increased the public sector share of deposits to over 80 percent, and further branch licensing was rigidly controlled. Primarily focused on financing government deficits and serving government priority sectors such as agriculture, India’s public banks lacked proper lending incentives and exhibited a high number of non-performing loans.4

Following a balance of payments crisis in 1991, however, a number of structural reforms were implemented that greatly deregulated many economic activities, and in November 1991, a broad financial reform agenda was established in India by the Committee on the Financial System (CFS). The CFS was appointed by the Government of India to examine the existing financial system and make recommendations for improving its efficiency so as to more effectively meet the credit needs of firms. One of the committee’s recommendations to meet this goal was to introduce greater competition into the banking system by allowing more foreign banks to enter India.5 It was argued that the entry of additional foreign banks would improve the competitive efficiency of the Indian banking system and induce an upgrading of banking technology.

However, no significant action was taken by the Government of India regarding the CFS recommendation on foreign banks until April 1994 when the government agreed to allow for an expansion of foreign banks under the WTO General Agreement on Trades in Services (GATS). In

5 Other financial reforms recommended and implemented included the partial opening of the capital account in 1992, the reduction in pre-emption of bank resources in 1992 and 1993, the deregulation of deposit rates, and the issuance of bank licenses to nine new private banks in 1994.
the initial GATS agreement, India committed to issue five additional branch licenses to both new and existing foreign banks each year. In a subsequent supplemental agreement in July 1995, India increased the limit to eight licenses per year, and in February 1998, the limit was increased to 12. The expansion of foreign banks in India was by de novo branches only, as foreign banks were not allowed to own controlling stakes in domestic banks.

In the years preceding the signing of the GATS agreement, very few licenses for new foreign bank branches were granted, and the presence of foreign banks in India was limited. On March 31, 1994 there were 24 foreign banks with 156 branches in India. Most of these banks, however, had began operations before India's first nationalization of private banks in April 1969, and only 7 new branches had opened since 1990. Moreover, most of India's 575 districts did not have a foreign bank, as roughly 75 percent of these foreign bank branches were concentrated in districts encompassing India's three largest cities: Delhi, Mumbai, and Kolkata.

In eight years following the acceptance of GATS, however, 17 new foreign banks and 89 new foreign bank branches were opened in India bringing the total number foreign banks to 41 with 212 branches as of March 2002. The expansion of foreign banks also increased their representation outside of India's most populous cities, as the number of districts with a foreign bank increased from 18 to 26. Despite the opening of many new branches, foreign banks' overall representation of bank offices in India only slightly increased after 1994. In 1994, they accounted for roughly 0.24 percent of the 63,961 bank branches, and by 2002 this had increased to 0.31 percent.

Foreign banks' small representation of bank offices, however, underestimates their increased presence in India's long-term loan market during the 1990s, as foreign banks tend to be much larger than the average Indian bank. In March 1994, foreign banks accounted for 5 percent of all

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6 Foreign banks wishing to expand needed to seek RBI approval, as do all banks under Section 23 of the Banking Regulation Act, 1949. Requests for new branches are evaluated on the "merits of each case and taking into consideration overall financial position of the bank, quality of its management, efficacy of the internal control system, profitability, and other relevant factors". See "Master Circular on Branch Licensing," DBOD.No. BL.BC. 5/22.01.001/2004, Reserve Bank of India, Mumbai, pp. 4.

7 33 foreign bank branches closed during this time period, so the net change was only 56. 17 of these closures were from ANZ Grindlays Bank Ltd. and 5 from Standard Chartered Bank in 1998 and 1999. Standard Chartered subsequently bought the remaining Indian operations of ANZ Grindlays Bank Ltd. in 2000.
outstanding long-term loans. With their expansion of branches, their share of long-term loans increased and averaged roughly 8 percent from 1996-1998, and 10 percent from 1999-2001. More importantly, some back of the envelope calculations suggest foreign bank entry was sizeable in the 8 districts receiving their first foreign bank. By 2003, foreign banks accounted for roughly 5.5 percent of long-term loans in these districts.  

2.2 Data Description

The data used to identify the location and date of opening for each foreign bank in India is the Directory of Bank Offices published by the Reserve Bank of India (RBI). Providing the location, name, opening date, and closing date for every bank office in India, the dataset is used to construct a complete annual directory of all banks in India from 1988-2004.

Using this data, it is possible to map out the timing and location of arrival for the new foreign banks. Table I shows the number of foreign banks by district and year from 1990-2002. In the top half of the table are the 18 districts that already had a foreign bank before 1991. These include the three districts with very large metropolitan centers: Delhi, Greater Mumbai, and Kolkata. In the bottom half are the eight districts that received their first foreign bank during India's financial liberalization. As can be quickly seen, the overall increase in foreign bank branches largely coincides with the signing of the GATS in 1994, but the actual timing of entry across these 8 districts is staggered across years. The district location of new foreign banks is mapped in Figure 1 which highlights the 8 districts that receive their first foreign bank between 1991 and 2002. The 8 districts are relatively dispersed across India, spanning 7 of India’s 35 states.

8 District level data on total credit by bank-type is available beginning in 2003 in the Quarterly Handout, Reserve Bank of India, Mumbai. As of September 2003, foreign banks account for roughly 2.81 percent of total credit in the 8 districts receiving their first foreign bank between 1991-2002. From the Annual Accounts Data for Commercial Banks, RBI, Mumbai, I calculate that domestic banks lend roughly 1/3 of their total credit as long-term loans between 1994-2001, while foreign banks entering the 8 districts lend 2/3 of their total credit as long-term loans. This implies that foreign banks account for approximately 5.5 percent of long-term loans in these 8 districts.

9 Citibank and Hong Kong & Shanghai Banking (HSBC) were responsible for half of the new foreign bank branches in the 8 districts. Other banks opening branches in these districts were ABN AMRO, American Express Bank Ltd., ANZ Grindlays, BNP Paribas, Crédit Lyonnais, Deutsche Bank (Asia), Société Générale, and Standard Chartered. Each had pre-existing branches elsewhere in India at the time of entry in the 8 districts.
The bank location data is matched up to the Prowess dataset compiled by the Centre for Monitoring Indian Economy (CMIE). Prowess is a panel dataset of firms from 1988-2002 where Indian and foreign firms with assets plus sales greater than 40 million Rupees (approx. $900,000) are included in the dataset. The dataset provides the annual financial and accounting data of each firm along with descriptive variables including the ownership, year of incorporation, and registered address. Using each firm's address, it is possible to track their financial status at the district level and to merge this data to the district location of the new foreign banks in India.

Table II provides pre-reform summary statistics of the firms included in Prowess. The summary statistics reported in Table II are restricted to only non-financial, domestic firms included in the Prowess data by 1991. This is done to represent accurately the unbalanced sample of firms used in later regressions. Since the Prowess data is limited to relatively large firms, the sample only contains firms from 176 of India's 575 districts. In the table, these firms are broken down into three categories based on district location. The first column reports summary statistics for firms found in the 18 districts with a foreign bank presence by 1991. These districts are more densely populated and heavily banked than all other districts. Firms in these districts are also twice as large on average, in terms of total assets, than all other firms in India which are reported in the other two columns. The second column provides statistics for firms in the 8 districts that receive their first foreign bank from 1991-2002, and column three provides the summary statistics for firms found in districts still without a foreign bank by the end of 2002. The 8 districts with a new foreign bank are also more densely populated and heavily banked than the remaining 154 districts that do not receive a foreign bank by 2002, but not nearly to the extent as districts already having a foreign bank.

10 The Prowess data used in this paper was provided by the IMF through their visiting scholars program. The analysis and conclusions in this paper, however, are my own and do not necessarily represent those of the IMF.
11 CMIE compiles the financial data using the audited annual accounts that all registered companies in India must submit to the Registrar of Companies. The cutoff level of firm size in the Prowess dataset seems to be an arbitrary point chosen to limit the size of the database. Firms' locations are determined primarily using their registered office address -- see the appendix for more details.
12 In Table II and for the remainder of this paper, all financial variables from Prowess are adjusted for inflation using India's consumer price index, base year = 2000. The CPI data was obtained from the IMF-IFS database.
13 See Appendix Table I for an exact description of which observations are dropped from later regressions.
The main comparison of interest in this chapter is between firms located in the 8 districts receiving their first foreign bank in the 1990s to those located in districts without a foreign bank. Among firms in these districts, bank credit accounts for roughly 2/3 of total borrowings. Short-term bank credit, which is defined as all cash credits, bank overdrafts, and working capital loans from banks with maturity less than a year, accounts for roughly 1/2 of their bank borrowings, while long-term loans with maturity of one year or more from banks and financial institutions (FIs) account for the other half of bank borrowings in each type of district.\(^\text{14}\)

The distinction between 'bank' and 'FI' loans is important as it allows for a partial separation of long-term loans provided by domestic and foreign banks. While the Prowess data does not provide a direct measure of loans from foreign banks, these loans will be included, along with loans from domestic commercial banks, in a firm's stock of 'bank' loans. Only about 44 percent of firms in districts without a foreign bank had such loans in 1993 as India's commercial banks typically do not provide many long-term loans. The direct effect of new foreign bank loans will be picked up by changes in the 'bank' loan variable, though the variable will also capture lending changes from India's domestic commercial banks.\(^\text{15}\) 'FI' loans, however, report firms' loans from India's development banks and will capture the indirect effects of foreign entry on domestic lending patterns. These development banks are domestic entities and the primary providers of long-term loans in India.\(^\text{16}\) 81 percent of firms in districts without a foreign bank in 1993 had an 'FI' loan in 1993, and because they specialize in long-term loans, the FIs are particularly likely to be affected by the entry of foreign banks.

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\(^\text{14}\) The remainder of total borrowings consists of bonds (9%), fixed deposits (3%), corporate & promoter loans (5%), and other borrowings (7%) that include deferred payments, miscellaneous loans, and corporate paper.

\(^\text{15}\) It is also possible that some foreign bank loans may be classified elsewhere as 'FI' loans. When a loan is provided through a consortium and a breakdown of the loan by bank is not available, Prowess classifies the loan as a 'FI' loan.

\(^\text{16}\) The development banks include the Industrial Development Bank of India (IDBI), Industrial Finance Corporation of India (IFCI), and Industrial Credit and Investment Corporation of India Limited (ICICI). FIs were established in the 1950's and 1960's with the express purpose of providing long-term financing to firms and were subsidized by the Indian government through the Long-Term Operations Funds, which was funded by RBI profits. The special status of FIs, however, was curtailed in the early 1990s and regulations inhibiting the provision of long-term loans by other banks were removed as part of a general reform to put FIs and banks on equal footing in terms of regulations, supervision, and operations. Many of the FIs officially became private banks in 1993 and 1994, though the Prowess dataset still reports loans from these institutions separately. See Tarapore (1999), pp. 67, 77-78 for more details.
According to the Annual Accounts Data for Commercial Banks published by the RBI, long-term loans accounted for 70 percent of total loans for Citibank and HSBC from 1996-2001. Lastly, the sum of ‘FI’ and ‘bank’ loans captures firms’ total long-term borrowings from banks in India.

2.3 Empirical Strategy and Identification Assumptions

The basic OLS specification used in this chapter is the following:

$$y_{i,d,t} = \beta_0 + \beta_1 \text{Foreign Bank}_{d,t} + \alpha_i + \delta_t + \epsilon_{i,d,t}$$ (1)

The dependent variable is a firm-level outcome variable $y$ for firm $i$, located in district $d$, in year $t$. The variable $y$ will entail measures of firms' outstanding stock of loans from banks and FIs, and the different financial measures used are discussed below. The $\text{Foreign Bank}$ variable is an indicator for the presence of a foreign bank in district $d$ in year $t$ that is turned on for all firms in the district if a foreign bank was present in that year. A full set of firm dummies, $\alpha_i$, absorb any fixed differences in firms' use of loans such that the coefficient of interest, $\beta_1$, is estimated only using within firm changes. The time dummies, $\delta_t$, control for any country-level trends. Finally, because the variation of foreign entry occurs at the district level, the standard errors are clustered at the district.

In this base specification, the effect of foreign bank entry is captured by the coefficient $\beta_1$ which is estimated using the changes in the $\text{Foreign Bank}$ indicator for firms located in the eight districts that receive their first foreign bank from 1991-2002 relative to firms in districts that never receive a foreign bank. The primary control group used is all firms found in districts that did not have a foreign bank at any point from 1991-2002. Firms headquartered in the 18 districts with a pre-existing foreign bank are dropped from the regression. As shown in Table II, these districts are likely to be a poor control group since they are significantly more urban and contained firms that were much larger on average. As a robustness check, the regressions are also run using a smaller control

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17 All subsequent findings are similar when the district-level share of foreign banks is used instead of an indicator.
18 Including these 18 districts does not significantly alter the main findings. See Section 5 for more details.
group consisting only of firms found in the 9 districts that receive their first foreign bank in 2003 and 2004. These 9 districts potentially provide a better control group in that one might consider them "next in line" for foreign bank entry and hence, very similar to the 8 districts that receive their foreign bank earlier. The effect of foreign bank entry will be properly identified under the assumption that the trend in use and size of firms’ loans in these eight districts would have been the same as those in the control group in the absence of the foreign bank.

The basic specification in equation (1), however, does not allow us to test whether foreign bank entry differentially affects firms. This is done using a second specification, equation (2), that includes the interaction, Foreign Bank \times ROA, where ROA is the demeaned average percent return over total assets of firm i from 1991-1993. Profits are measured using profit after taxes net of non-recurring transactions. A full set of year and profit interactions, \delta \times ROA, are also included to allow firms across India to trend differently as a function of their past profitability.

\[ Y_{i,d,t} = \beta_0 + \beta_1 \text{Foreign Bank}_{i,d,t} + \beta_2 (\text{Foreign Bank}_{i,d,t} \times \text{ROA}_i) + \alpha_t + \delta_{d,t} + \epsilon_{i,d,t} \] (2)

In this second specification, \beta_1 still describes the main effect of foreign bank entry since ROA is demeaned, whereas, \beta_2 describes the marginal effect of having a higher ROA beforehand. Inclusion of the interaction of Foreign Bank \times ROA tests whether a firm’s profitability matters more for credit access after foreign banks enter the district, under the assumption that a firm’s past ROA is a positive predictor of future potential. This allows us to assess whether foreign bank entry is associated with a reallocation of credit from less profitable to more profitable firms, as would be indicated by \beta_2 > 0. Moreover, if there is a drop in credit driven predominately by fewer loans allocated to politically connected, unprofitable firms, this would also be indicated by \beta_2 > 0.

Finally, it is implicitly assumed that the effect of foreign bank entry is localized and realized

19 The 9 districts are Aurangabad, Bhopal, Faridabad, Lucknow, Nagpur, Patna, Rajkot, Surat, and Thane.
20 Firms’ average ROA from 1991-1993 is in fact positively correlated to ROA levels from 1994-2002. Pre-entry ROA is used rather than actual ROA since profits after 1993 are an endogenous outcome of foreign bank entry.
predominately by firms headquartered in the district with a foreign bank. Both specifications
presume that firms in India borrow from banks located near their registered address, and that these
banks are located in the same district. In general we expect this to hold as empirical work regarding
lending relationships in other countries has demonstrated the average distance between firms and
their bank is usually quite small.\(^{21}\) However, even if this assumption is not fully true, this would only
bias the results against finding an effect of foreign bank entry. If firms borrow from outside their
district, then firms located outside the eight treated districts may in fact be ‘treated’ causing the
estimates to understate the true effect. Moreover, the ability to borrow from banks outside the
district will only mitigate the local impact of foreign bank entry thus making it more difficult to
discern an impact of foreign bank entry at the district level.

To measure firms’ access to loans, a number of dependent variables, \(y\), will be used. First, to
test the effect on the amount of loans a firm reports, three different variables will be used: the stock
of long-term commercial bank loans (\(Bank\ \text{Loans}\)), the stock of loans from domestic development
banks (\(FI\ \text{Loans}\)), and the stock of loans from both commercial and development banks (\(Total\ \text{Long-
Term\ Loans}\)). All three measures are normalized by firms’ total assets as they stood in the beginning of
the sample in 1991. Second, a set of indicators that equal 1 for firms with a loan from the given
source are used to test for changes in the likelihood of a firm having a loan. While the two sets of
financial measures are similar in nature, their distinction is important. The first set will capture
whether firms in districts receiving a foreign bank experience a relative change in the \(amount\) of
financing they receive, while the second set of indicators will test for whether a firm’s \(likelihood\) of
having a loan is affected by foreign bank entry.

\(^{21}\) Analyzing small firms in the U.S., Petersen and Rajan (2002) finds that the average distance between a firm and its
main bank was 67.8 miles in 1993, and the median distance was 5 miles. The Indian districts included in this sample
had an average size of 2,457 square miles. While the U.S. firms sampled were on average 6 times smaller than the
firms found in the Prowess data, it is likely the Indian firms also borrow locally as the positive relation between
distance and borrowing costs are greater in a developing country such as India.
2.4 OLS Estimates

2.4.1 Impact on Total Long-Term Loans

The OLS estimates of the relation between long-term loans and the presence of a foreign bank are reported in Table III. Columns (1)-(4) report the coefficients using an indicator for having a long-term loan as the dependent variable, while columns (5)-(8) report the coefficients when the dependent variable is the stock of total long-term loans normalized by assets.

Rather than being a boon for domestic firms, foreign bank entry is associated with a reduction in domestic firms' likelihood of having long-term loan that is unrelated to firms' profits. In the basic regression with all firms and no additional controls or interactions [column (1)], foreign bank entry coincides with a 7.6 percentage point drop in firms' likelihood of having a long-term loan relative to firms located in districts without a foreign bank. Inclusion of the ROA interactions in column (2) demonstrate that the decrease is largely unrelated to firms' ROA, and if anything, there is weak evidence a firms' ROA is marginally less important following foreign bank entry. The decline in long-term loans is robust to the inclusion of industry-year interactions [column (3)] and restriction to the eventually “treated” control group [column (4)].

The drop in the number of firms with a long-term loan is relatively large. As noted in Table II, roughly 88 percent of all firms had a long-term loan in 1993. By 2002, however, this dropped to around 78 percent as there was a general decline in the long-term loans provided by India’s development banks. The drop, however, was larger in districts with a new foreign bank as shown in Figure 2, and the timing coincides with the general expansion of foreign banks from 1994-2002.

The timing of this drop also seems to coincide with foreign bank entry within each district. Of the 8 districts receiving their first foreign bank between 1991-2002, Pune experienced the largest entry in that foreign banks accounted for roughly 15.3 percent of long-term loans in Pune by 2003.

While not shown, the negative relation between foreign bank entry and firms’ likelihood of a loan is also robust to the use of a fixed effects probit estimation. For this paper, however, the linear probability model is preferred as the probit model suffers from large small-sample biases when estimated with fixed effects (Greene 2004) in what is known as the 'incidental parameters problem'.

67
As shown in Figure 2, the drop in loans in Pune was particularly large, and begins in 1996 about one year after foreign bank entry. In 1995 when foreign banks first began entering Pune, 92 percent of firms had a long-term loan. By 2002, only 74 percent had a long-term loan. More robustness checks on the timing of this decrease within each district are provided in Section 5.23

There is evidence, however, that foreign bank entry is associated with an increase in the relative importance of firms' ROA in the amount of long-term financing allocated, suggesting a distributional effect of entry. In the regression with no interactions [Table III, column (5)], there is no significant evidence of a change in loan sizes, though the estimate is negative suggesting overall loan amounts decreased.24 However, inclusion of the ROA interactions in column (6) indicates that a one percentage point higher ROA corresponds to a 0.011 increase in the loan to asset ratio for firms in districts with a foreign bank relative to firms in districts without a foreign bank. The average loan to asset ratio of firms from 1994-2002 was about 0.48. The magnitude of the coefficient implies that a one standard deviation increase in firms' ROA is associated with an increase in their loan to asset ratio that is approximately 1/10 standard deviations larger when a foreign bank is present in their district. The estimates are robust to the inclusion of industry-year interactions [column (7)] and the restriction to the eventually "treated" control group [column (8)].

Overall, the estimates of Table III are consistent with the theoretical framework of Gormley (2006) where foreign entry is associated with a reallocation of credit that does not necessarily benefit all borrowers. The more profitable firms see an increase in their relative amount of loans, while other firms see a drop in their likelihood of having a long-term loan of any sort. The question remains, however, as to whether this reallocation is efficient. In this regard, the drop in loans does not appear to be driven by a decline in loans allocated to only the most unviable, politically-connected firms.

23 Figure 2, Panel B also indicates foreign bank entry is associated with a level change in loans rather than a change in trend as the largest drop occurs in the first year following foreign bank entry. OLS specifications that allow for both a change in level and trend find the downward drop in levels remains negative and significant (though slightly smaller in magnitude) while the estimated change in trend is negative but not significant at conventional levels. 24 The loan-asset ratio being a noisier measure of credit relative to the indicator may explain the lack of a significant negative effect on loan amounts.
This would yield a positive coefficient for the marginal effect of a firm's ROA, not a negative coefficient as seen in columns (1)-(4) of Table III. Instead, the decrease in credit seems to be unrelated to firms’ potential, and if anything, the relation is the opposite of what one might expect. This is suggestive that some positive NPV projects were unable to obtain financing after foreign bank entry because of interaction between information asymmetries and greater financial competition.

If some firms do receive better financial services after entry, part of the decline in loans could also be demand driven if local domestic firms within the same industries face greater competition in their output market. Given that these are relatively large firms, however, such local changes are unlikely to affect the aggregate demand for their output, and a robustness check in Section 5.3 also suggests the decline in loans is not demand driven.

### 2.4.2 “Direct” versus “Indirect” Effects

To better understand where the changes in loan allocations are coming from, the regressions are now conducted separately for loans from banks and FIs. Again, the regressions pertaining to bank loans will proxy for the “direct” effect of foreign bank entry, while the FI loan regressions will capture the “indirect” effect of foreign bank entry on the domestic development banks. The regressions for bank and FI loans are reported in Tables IV & V.

In Table IV, we see that the decrease in the likelihood of having a long-term loan is driven entirely by a fall in FI loans [columns (5)-(8)] rather than loans from banks [columns (1)-(4)]. This implies that competition from foreign banks indirectly affects the allocation of credit by India’s domestic development banks. Again, a firm's ROA does not appear to have any effect on whether it is less likely to receive an FI loan. Therefore, there does not appear to be any evidence to support the hypothesis that domestic lenders respond positively to competition by adopting new screening technologies and improving their credit allocation. Instead, domestic development banks respond to the competition from foreign banks by systematically reducing the number of domestic firms they extend long-term loans to, regardless of their potential, and this decrease in loans from the domestic
banks is not offset by an increase in loans from foreign banks.\textsuperscript{25}

In Table V, we see that the relative increase in importance of firms' ROA for the amount of loans is driven primarily by an increase in slope for bank loans [columns (1)-(4)] rather than FI loans [columns (5)-(8)]. This suggests the increase in loans to more profitable firms is driven by new loans from the foreign banks rather than domestic banks. If the specification is modified to allow for both a level and trend changes after foreign bank entry (not shown), I find evidence of positive effect in the interaction term in both levels and trend for the amount of bank loans. This is consistent with the hypothesis that foreign banks’ lending increases with time after their initial entry.

2.4.3 Evidence of ‘Cream-Skimming’

Contrary to a general reallocation of credit from less to more profitable firms, however, the positive interaction in Table V appears driven by an increase in bank loans to only the top 10 percent of firms in terms of ROA. It is easy to see this in Figure 3, which breaks down the trend in bank loans/assets of firms from 1991-2002 based on their ROA from 1991-1993. As seen in Figure 3, the trend in loans to the most profitable 10 percent of firms was relatively flat from 1991-1995. Beginning in 1996, however, there is a very large growth in loans for the top 10 percent in districts with a foreign bank, while the top 10 percent in other districts do not show any increase in loans. The increase in loans to more profitable firms is restricted to the top 10 percent, however, as there is no evidence that foreign bank entry is associated with an increase in loan amounts for firms with an ROA above the median but not in the top 10 percent or for firms with an ROA below the median.

The estimates in Table VI confirm that the positive interaction on loan sizes is caused predominately by the top 10 percent of firms. In columns (1)-(3), the top 10 percent of firms in

\textsuperscript{25} It is difficult to discern exactly where the domestic capital went. One possible explanation is that FIIs raised less capital on external markets via the issuance of bonds, commercial paper, etc.. While data is only available beginning in 1996, the real value of external capital raised by development banks was constant from 1996-1998 and declining thereafter. Another is that bank capital was redirected elsewhere. From 1992-1993, 24 percent of bank deposits were held as government securities, but from 1994-1998, it increased to 29 percent, exceeding the statutory requirement of 25 percent. Data limitations, however, do not allow us test whether either of these changes were driven by development banks with branches located in districts with new foreign banks.
terms of $ROA$ are dropped from the regressions. The positive effect on the size of loans to more profitable firms seen in Table V is now completely gone, supporting the finding that the earlier results were primarily driven by an increase in bank loans to very profitable firms. The increase in loans also seems to be primarily caused by only the largest firms. Dropping firms with assets in 1991 exceeding the median, as done in columns (4)-(6) also eliminates the increase in loans. These findings support the theory that information asymmetries are particularly difficult for foreign banks to overcome leading them to only finance the most profitable and largest firms in the economy.

Overall, the figures and OLS estimates are supportive of models incorporating asymmetric information. The increase in loans to the most profitable 10 percent of firms is suggestive that these firms were under-financed in the closed economy, and that foreign bank entry improves the allocation of credit by targeting more loans to these firms. However, competition from foreign banks also seems to lead to a systematic reduction in long-term lending by the domestic development banks that is not offset by a corresponding increase in loans from foreign banks. While part of this decline in credit may be the consequence of an efficient reduction in loans to very unprofitable or politically connected firms, the extent of the drop and its non-relation to a firm’s past profits is suggestive that some viable domestic firms were also less likely to receive a loan after entry.\footnote{It is possible, however, that the capital was efficiently reallocated to smaller, younger firms not captured in the Prowess data. The reduction in FI loans may also be offset by increases in credit from other, more efficient non-bank sources of credit, though there is no evidence to indicate this is true. See Section 6.3 for more details.}

### 2.5 Robustness Checks & IV Estimates

While the initial regressions are supportive of predictions that additional competition from foreign banks will induce a reallocation of credit when information asymmetries are large, one might be concerned about a potential selection bias in the OLS estimates. Since foreign banks endogenously chose where to locate new branches in India, it is possible the foreign banks selected into districts that were either already trending differently in bank or FI loans or were going to trend differently in the future for reasons other than the entrance of the foreign bank.
2.5.1 Testing for Pre-Trends

To test for a pre-existing trend in bank and FI loans, two variables are added to the basic regressions of Tables III-V. The first variable is an indicator, $fake$, that turns positive in the three years prior to the entrance of a foreign bank. For example, in Ludhiana where the first foreign bank shows up in 2001, this variable is equal to 1 in years 1998-2000, and zero all other years. The second variable added is the interaction $fake \times ROA$. Results of this specification are shown in Table VII.

If the most profitable firms were already seeing an increase in their bank loans in the three years prior to the foreign bank’s arrival, then we would find a positive coefficient for the interaction term, $fake \times ROA$. Additionally, if domestic firms in the foreign bank districts were already exhibiting a reduction in their access to development bank loans before the foreign bank’s arrival, we should find a negative coefficient for $fake$ in the regressions using an indicator for FI loans as the dependent variable. However, as shown in Table VII, the increase in bank loan amounts to the most profitable firms [columns (1)-(4)] and the reduction in FI loans to all firms [columns (5)-(8)] are not present in the three years before foreign bank entry. In neither case can we reject the null hypothesis that the point estimate for $fake$ or $fake \times ROA$ is zero. There is no evidence that foreign banks selected into districts with pre-existing differential trends in bank or FI loans.

Moreover, both the increase in bank loans to the most profitable firms and the drop in FI loans to the average firm appear to occur one to two years following foreign bank entry within each district. Figure 4, Panel A plots the point estimates from an OLS regression of bank loans/assets onto indicators for years pertaining to foreign bank entry for firms with an $ROA$ in the top 10 percent. As shown in Figure 4, there is no evidence of an increase in bank loans/assets in the years preceding foreign bank entry or in the year of actual entry. However, one year following entry, bank loans/assets increase, and the increase becomes and stays significant at the 5 percent level beginning two years after foreign bank entry. Figure 4, Panel B plots the point estimates from a similar regression using all firms and an indicator for FI loans as the dependent variable. Again, the point
estimates indicate the decline in FI loans begins approximately one to two years after initial entry.

2.5.2 IV Estimates

However, there is still the concern that foreign banks could have selected into districts that were going to trend differently in the future for reasons unrelated to the actual entry.

A review of press releases of the foreign banks establishing new branches in India during the late 1990s suggests new branch locations in India were chosen to decrease the distance to existing borrowers and to establish a presence in high-growth cities. Inaugurating the opening of a new branch in Surat in 2004, Sanjay Nayar, Citigroup Country Officer for India, stated “We're very happy to move closer to our clients...” Regarding the opening of a new branch in Vadodara in 2005, Naill Booker, CEO of HSBC -- India, stated, “The markets in western India hold enormous potential for growth and there are huge opportunities for us...” While the location choice based on existing clients is unlikely to pose an identification problem, the selection into high-growth districts could cause a positive bias in the OLS estimates if these districts would have seen a growth in loans even in the absence of foreign banks. Or, this selection into high-growth districts could also cause a negative bias if the rapid growth by new industries (e.g. software) in these districts coincides with slower growth rates for firms in older, more established industries.

To address this potential identification problem, the pre-1994 presence of foreign firms is used as an instrument for the location of new foreign banks. I assume that foreign banks are more likely to enter districts with firms from their home country in order to preserve pre-existing relationships or take advantage of their competitive advantage in obtaining information about the firms in their home country. This tendency for foreign banks to follow their customers abroad has been noted in a number of countries, and seems to occur in India also. Within the sample of data,

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27 Sabi (1988) finds a positive correlation between the amount of U.S. FDI and banking assets in 23 less-developed countries from 1975-1982. Yamori (1998) finds that Japanese financial companies tend to invest in countries with greater amounts of Japanese FDI. Brealey and Kaplanis (1996) find a positive correlation between the number of foreign banks present in a country and the amount of FDI from the parent country of the foreign banks.
there are 52 foreign-owned firms spread across 26 of the 162 districts. 5 of the 8 districts that receive their first foreign bank during the 1990s have a foreign-owned firm present in 1993.

To test the relation between the location of foreign banks and foreign-owned firms, the following first stage regression is used:

$$\text{Foreign Bank}_{i,t} = \text{const.} + \text{Foreign Firm}_{i,1993} \times \text{Post-1993}_{t} + \alpha_i + \varepsilon_{i,t}$$

The instrument for Foreign Bank is the interaction between a district level indicator variable for having a foreign-owned firm present in 1993, Foreign Firm, and a post-1993 year indicator. This is a firm-level regression with firm and time dummies, and the standard errors are clustered at the district level. The results of the first stage are reported in Table VIII. As can be seen, the presence of a foreign-owned firm in 1993 is a positive and significant predictor of a foreign bank being present in the years 1994-2002. The estimates imply that the presence of foreign-owned firm in 1993 increased a districts' likelihood of receiving a foreign bank after 1994 by about 34 percentage points relative to districts that did not have a foreign-owned firm.

In order for the instrument to be valid, however, the location of foreign firms, in itself, should be uncorrelated with the borrowing trends of domestic firms. While the original location choice of foreign firms was also probably strategic, this assumption seems plausible in that the median year of incorporation for foreign firms used in the sample is 1974, nearly 20 years prior to the liberalization of the mid-1990s. Therefore, the location of foreign-owned firms is less likely to be directly correlated to domestic lending patterns in the mid- to late 1990s than the location choice of the new foreign banks. The IV estimates reported below are also very similar when the sample is restricted to foreign firms established at least 10 years prior to India's liberalization in 1994.

Moreover, there is no evidence that domestic firms in districts with a foreign bank were

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28 The location of foreign direct investment (FDI) within the U.S. suggests foreign firms tend to locate in areas with lower taxes, higher per-capita incomes, lower wages, and more extensive transportation infrastructures (Coughlin, Terza and Arromdee 1991, Hines 1996). Cheng and Kwan (2000) find similar results for China.

29 Using only these older foreign firms further limits endogeneity concerns regarding the location choice of recently established foreign firms. These estimates are available from the author upon request.
trending differently in their use of long-term loans in the 5 years prior to the signing of the GATS in 1994. This is seen in Figure 5, which plots the percentage of firms with an FI loan and the average bank loan to asset ratio of firms from 1989-2002. Bank loans show a similar downward trend in the five years prior to foreign bank entry in both districts with and without a foreign firm in 1993, and the number of firms with FI loans was trending up in both types of districts from 1989-1993.

With the instrument seeming to satisfy the identification assumptions, I now proceed to the IV estimates of equation (2). The interaction \( \text{Foreign Firm} \times \text{Post-1993} \) is used to instrument for the location of foreign banks, \( \text{Foreign Bank} \), and the interaction \( \text{Foreign Firm} \times \text{Post-1993} \times \text{ROA} \) is used to instrument for \( \text{Foreign Bank} \times \text{ROA} \). The IV estimates are reported in Table IX.

The IV estimates appear to confirm the OLS estimates. While the estimates are less precise, the arrival of a foreign bank is still associated with a drop in the average firm’s likelihood of receiving a long-term loan [Table IX, column (3)]. The IV estimates suggest foreign bank entry is associated with a 12.4 percentage point reduction in firms’ likelihood of having either a bank or FI loan, which is larger than OLS estimate of 7.5 percentage points. Moreover, foreign bank entry is still associated with a positive and significant increase in the marginal importance of ROA for bank loan sizes [column (5)], and the magnitude of the effect is similar to the OLS estimate.

2.5.3 Additional Robustness Checks

Overall, both the drop in firms’ likelihood of having a long-term loan and the increase in the relative importance of firms’ past ROA in determining the size of bank loans after foreign bank entry are robust to using a number of different specifications and control variables. The inclusion of additional controls, including urban-year interactions,\(^{30}\) state-year interactions, firm-size year interactions, log of total non-foreign banks, and the log of private banks does not alter the findings. Dropping firms that permanently exit the dataset before 2002 or further restricting the data to

\(^{30}\) Districts with a metropolitan center exceeding 1 million persons in the 2001 were designated as 'urban'.
balanced panel of firms also does not impact the basic findings.

Including firms located in the 18 districts with pre-existing foreign banks also does not change the OLS or IV results, though a number of the estimates are no longer significant at conventional levels. However, the inclusion of these districts confounds the effect estimated by the indicator *Foreign Bank* as some of the districts exhibit a complete exit by foreign banks between 1991 and 2002. With their inclusion, the basic specification no longer just estimates the effect of foreign bank entry but the average effect of entry and exit. There is no reason to believe the two events should induce equal effects as the foreign banks that exit are likely to be much different than the new foreign banks. Excluding the districts exhibiting a complete exit by foreign banks between 1991 and 2002, I again find a significant negative effect of foreign bank entry on FI loans and a significant positive effect on the importance of past ROA for bank loans.

Another concern might be that the drop in long-term credit is caused by the growth of industries concentrated in the treated districts. While industry-year interactions would pick up any differential trends for these industries, one might still be concerned that their growth could have an indirect effect on borrowing by other local firms. One such example could be the software industry, which is typically less dependent on long-term capital and experienced significant growth in the late 1990s. Five of the eight treated districts had software-related firms by 2002 compared to only 14 of the 154 non-treated districts. However, the estimates are robust to restricting the control group to only districts with software industries by 2002.

Lastly, if foreign firms or the most profitable domestic firms receive better financial services after entry, local domestic firms within the same industries as these firms are likely to face greater competition. In this case, the decline in loans could be demand-driven as domestic firms respond negatively to increased competition from other firms. However, this does not seem to be the case. Excluding domestic firms identified in the same industry and district as foreign firms does not change

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31 Foreign banks exit Kozhikode and South Goa in 1999; Amritsar, Kamrup, Simla and Srinagar in late 2002.
the estimates. Excluding firms found in the same industry as treatment firms with an ROA in the top 10 percent also does not affect the estimates. Therefore, the observed decline in domestic loans appears to reflect a decrease in the supply of credit rather than a change in demand.

2.6 Alternative Specifications

2.6.1 Group versus Non-Group Firms

If information asymmetries play an important role in explaining the reallocation of credit following foreign bank entry, then we would expect foreign bank competition to affect firms with opaque informational structures more than other firms. To test this hypothesis, the sample is divided into firms associated with a business group and all other non-group firms. The information hurdle faced by lenders is likely higher for firms associated with a business group because of their complicated networks and the relative ease of diverting funds within the group. The moral hazard problem faced by banks, another form of information asymmetry, are also particularly acute within business groups as the gap between the control and ownership rights of the controlling shareholder or family creates incentives for the owners to expropriate resources of the firm.

Given that information asymmetries are greater for group-affiliated firms, we should expect to see foreign bank competition have a stronger negative effect on the amount of credit allocated to these firms. If foreign banks face greater difficulties in screening group-affiliated firms, then we should also expect to find foreign banks more likely to target non-group firms. Both of these predictions in fact seem to be true in the example of India.

In Table X, estimates pertaining to a firm’s likelihood of having an FI loan are presented separately for group and non-group firms. It is immediately clear that the systematic decrease in

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32 Groups in India are typically controlled via a complicated network of company shareholdings, and their existence pre-dates liberalization in 1947. See Dutta (1997) and Ghemawat and Khanna (1998) for more details. CMIE tracks group affiliation in Prowess through “continuous monitoring of company announcements and a qualitative understanding of the group-wise behavior of individual companies” (Prowess Help Files, Data Dictionary). Khanna and Palepu (1999) find the CMIE classification to be consistent with other available lists of Indian groups.

33 Bertrand, Mehta and Mullainathan (2002) find that such ‘tunneling’ is in fact present in India business groups.
firms' likelihood of having an FI loan is caused predominantly by a reduction in credit to the group-affiliated firms [columns (1)-(5)] rather than non-group firms [columns (6)-(10)]. The decrease in credit is significant in all specifications, and again unrelated to firms' profitability. In separate regressions (not shown), the decline in loans to group-affiliated firms is equally strong for firms with group members located in districts containing India’s largest cities versus those without. Therefore, the decline in domestic loans to these group-affiliated firms does not appear driven by a substitution away from local credit markets towards credit obtained by group members located in large cities.

The non-group firms, however, see a relative drop in the marginal importance of ROA for the likelihood of having an FI loan [columns (6)-(10), Table X], but in Table XI, we see that the marginal importance of past profits in obtaining a bank loan is greater after foreign bank entry for the non-group firms [columns (6)-(10)]. While the estimates are only marginally significant, they suggest that profitable, non-group firms dropped their relationships with domestic development banks and became clients of the new foreign banks. This is not true, however, of the group-affiliated firms [columns (1)-(5)]. Not only are group-affiliated firms less likely to receive an FI loan following foreign bank entry, the relative importance of their past ROA is less with regards to their ability to obtain bank loans. This finding suggests that foreign banks were less inclined to lend to group-affiliated firms, irrespective of their past profitability.

We might expect to find similar results for other standard measures of informational 'opaqueness', such as the size and age of the firm. However, no evidence was found that smaller or younger firms in India experienced a greater drop in domestic credit after entry. One explanation may be that the Prowess dataset contains only relatively large firms such that size and age do not provide a meaningful measure of information asymmetries among these firms.

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34 Because tunneling likely makes past profits a noisier predictor of future potential for group-affiliated firms, this finding is difficult to interpret. While the systematic drop in credit among these firms is suggestive that foreign bank competition adversely affects the ability of domestic banks to finance informationally opaque firms, it is possible past profits do not adequately proxy for group-firms’ future potential. If so, the drop in loans could be occurring for unviable group-firms previously protected by their group’s ability to lobby politicians for preferential credit access prior to 1991. In this scenario, the drop in credit could be an efficient outcome of foreign bank entry.
2.6.2 Total Sales and Bankruptcy

If competition from foreign banks induces a reallocation of loans, it is also possible the entry of a foreign bank could affect firm sales and bankruptcy rates.\textsuperscript{35} While there is no significant relation between foreign bank entry and the likelihood of bankruptcy [Table XII, columns (1)-(5)], there is evidence that a firm’s ROA was relatively more important for sales after foreign bank entry [Table XII, columns (6)-(10)]. The IV estimate [column (10)] indicates that an increase in the ROA by 1 percent was associated with a 6.1 percent higher growth rate after foreign bank entry. However, the main effect on total sales is actually negative in the IV, such that the average firm, in terms of ROA, exhibits a decline in sales after entry. However, the decline in sales is not significant, and it is not possible to make a strong inference given the imprecise estimates. The lack of large main effects on either bankruptcy rates or sales growth may also suggest that some of the firms receiving fewer bank loans were productive and had access to positive NPV projects.\textsuperscript{36}

2.6.3 Borrowing from Other Firms

The inability to find large effects on sales growth may also result from firms’ ability to substitute into other forms of finance to mitigate the reduction in bank loans and diminish the real effect on sales and bankruptcy rates. If the entrance of the foreign banks is systematically inducing a contraction of FI and bank loans, then we might expect to find firms increase their use of borrowings from other sources. Additionally, the more profitable firms that benefit from foreign bank entry should substitute away from other more expensive sources of external finance. One such potential source would be financial loans from other firms. In general, such loans are considered less desirable

\textsuperscript{35} Bankruptcy is measured by when a firm registers with the Board for Industrial and Financial Reconstruction (BIFR), which is designated under the 1985 Sick Industrial Companies Act (SICA) to determine sickness and expedite the revival of viable firms or closure of unviable firms. Registration is available to companies with accumulated losses exceeding net worth, and companies approved for reorganization receive protection from creditors until completion. See the BIFR website (bifr.nic.in) for more details. The names of registered companies and date of registration are publicly available on the BIFR website and are matched to the Prowess data using company names. 15 percent of the sample observations declare bankruptcy by 2002.

\textsuperscript{36} There is also little evidence that foreign bank entry affects the combined sales or output of the sample firms within districts. Such district-level estimates are available from the author upon request.
and more costly than loans from specialized intermediaries like banks. Table XIII reports the OLS and IV regressions pertaining to a firm's loans from other firms.

Foreign bank entry does in fact appear to be weakly associated an increase in corporate loans by less profitable firms and a drop in loans by more profitable firms. The negative coefficient for the interaction term, $Foreign Bank \times ROA$, suggests that more profitable firms were less likely to borrow from other firms after foreign bank entry, and the positive main effect, though not significant at conventional levels, suggests other firms saw an increase in their use of corporate loans. The estimates are robust to the inclusion of industry-year interactions [column (3)] and the restriction to the smaller control group [column (4)]. The IV estimates [column (5)] also suggest a reallocation of corporate loans. Columns (6)-(10) of Table XIII demonstrate that the change in total corporate borrowing [columns (1)-(5)] is predominately caused by a reallocation of loans from group-affiliated firms. The increase in loans within groups coincides with earlier evidence that group-affiliated firms are more likely to see a decrease in loans after foreign bank entry than non-group firms.

Two other alternative forms of long-term financing available to Indian firms are debentures and fixed deposits. Both are likely only available to the most creditworthy firms since they are obtained directly from individuals rather than through an intermediary. To test whether foreign bank entry affected such direct borrowings, separate regressions were run using debentures and fixed deposits, but there was no evidence of a change in firms’ usage of either. There is also no significant evidence of a change in various measures of trade credit, a form of short-term borrowing between firms, or in the amount of capital raised via the issuance of shares.

2.7 Conclusion

The entrance of new foreign banks to India is associated with a reallocation of loans. The most profitable 10 percent of firms receive larger loans, but on average, firms are 7.6 percentage points less likely to have a long-term loan of any size. The findings suggest that foreign banks finance
only the most credit-worthy firms, and that the decline in loans, which is most pronounced among group-affiliated firms, is caused by a systematic fall in domestic bank loans.

This reallocation of loans following foreign bank entry in India suggests that information asymmetries in the market for loans are a significant factor in LDCs. While credit access is improved for many credit-worthy firms, the extent and nature of the drop in loans to informationally opaque firms, as captured by a firms’ group affiliation, suggests that some firms with positive net present value projects may have found it difficult to obtain loans after entry. Theory indicates this may occur when information asymmetries are large and domestic banks are ill-equipped to effectively screen potential clients. Moreover, the reallocation in bank loans does not seem to translate into large effects on either bankruptcy rates or sales growth, suggesting some of the firms receiving less credit had access to positive NPV projects. Firms’ ability to substitute into financial loans from other firms, particularly group-affiliated firms, appears to mitigate the effects of fewer domestic bank loans.

The findings are robust to using a number of different specifications and control variables, and the timing of the loan reallocation coincides with foreign bank entry within each district. Moreover, the decline in domestic credit appears to be driven by shifts in the supply of loans rather than the demand for loans. The OLS estimates are also robust to using the presence of pre-existing foreign-owned firms as an instrument for the location choice of new foreign banks in India.

Overall, the empirical findings presented in this chapter suggest that reducing the information barriers endemic to LDC credit markets may further improve the allocation of credit following liberalization and increase the range of firms foreign banks are willing to finance upon entry. For example, policymakers may consider strengthening accounting standards disclosure rules and credit evaluating agencies. By reducing banks’ costs of obtaining information about firms, such policies may increase the range of firms foreign banks finance and reduce the scope for a systematic drop in loans from domestic banks in response to increased competition.
2.8 Data Appendix – Determining Firm Location within Prowess

The Prowess dataset reports the district location of each firm’s registered office, head office and registrar office. Nearly all firms (about 95 percent) report the district location of their registered office, while only 25 percent report district location of their head office or registrar office. To determine a firm’s location, the district of the registered office is used primarily. The registered office is the address each firm of more than 20 persons in India must submit to the Registrars of Companies (RoC) as dictated by the Companies Act, 1956. All communications and notices to the company are addressed to the registered office and is the official address of the company where statutory books and records must be kept. Every company must affix this address outside of every office or place at which activities of the company are carried out, and firms are required to file their balance sheet and annual return each year with the RoC. If the district location of the registered office is missing, however, the district location of the head office is used next, and the district location of the registrar address is used last. Only about 2 percent of firms are missing the district location of all three offices.
References


Figure 1 – Indian Districts with First Foreign Bank Entry between 1991-2002
Figure 2. Event Study Graphs of Foreign Bank Entry, 1991-2002. 'Districts with a Foreign Bank by 2002' represents all firms located in districts that receive their first foreign bank between 1991-2002, and 'Districts with No Foreign Bank' represents all firms located in districts without a foreign bank by 2002. 'Pune' represents only firms located in that district. The percent of firms with a long-term loan in each type of district is calculated using domestic, non-financial firms with positive sales and assets in 1991.
Figure 3. Average Bank Loans over 1991 Assets by ROA. ‘Districts with a Foreign Bank by 2002’ represents firms located in districts that receive their first foreign bank between 1991-2002, and ‘Districts with No Foreign Bank’ represents firms located in districts without a foreign bank by 2002. Each line represents the average bank loans / 1991 assets of firms with positive sales and assets in 1991 where ROA is the average return on assets of firms from 1991-1993.
Figure 4. Timing of Changes in Loan Allocation. This figure plots point estimates from fully saturated OLS regressions of loan measures onto indicators for years pertaining to actual foreign bank entry. The regressions include firm and year dummies and use yearly observations from 1991 to 2002 for firms with positive assets and sales in 1991 but not located in a district with a foreign bank by 1991. In Panel A, the dependent variable is bank loans / 1991 assets, and the regression is restricted to firms with an ROA above the 90th percentile, where ROA is the average return on assets return on assets of firms from 1991-1993. In Panel B, the dependent variable is FI Loan Indicator, and all firms are included. While both regressions are fully saturated, only point estimates for five years preceding and following foreign entry are plotted. The standard errors were clustered at the district level, and the 95th percentile confidence intervals are shown.
Figure 5. **Falsification Tests of Instrument.** ‘Foreign Firm Districts’ represents firms located in districts with a foreign firm present in 1993, and ‘Non-Foreign Firm Districts’ represents firms located in districts without a foreign firm in 1993. Averages are calculated using domestic, non-financial firms with positive sales and assets in 1989 but not located in districts with a foreign bank before 1991.
### Table I

**Number of Foreign Bank Branches in India by District and Year**

Number of foreign bank branches calculated using the *Directory of Bank Offices*. Bank numbers represent total branches as of March 31 for each year.

<table>
<thead>
<tr>
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</tr>
</tbody>
</table>

| **Districts Receiving First Foreign Bank** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Thiruvananthapuram | Kerala | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |      |      |      |      |      |
| Ahmedabad          | Gujarat         | 2    | 2    | 3    | 3    | 5    | 5    | 5    | 8    | 8    |      |      |      |      |
| Pune               | Maharashtra    | 1    | 1    | 4    | 5    | 5    | 5    | 5    | 6    |      |      |      |      |      |
| Chandigarh         | Chandigarh      | 1    | 1    | 1    | 1    | 1    | 2    | 2    |      |      |      |      |      |      |
| Gurgaon            | Haryana         | 1    | 1    | 1    | 2    |      |      |      |      |      |      |      |      |      |
| Vadodara           | Gujarat         | 1    | 1    | 2    | 2    |      |      |      |      |      |      |      |      |      |
| Jaipur             | Rajasthan       | 1    |      |      |      |      |      |      |      |      |      |      |      |      |
| Ludhiana           | Punjab          | 1    |      |      |      |      |      |      |      |      |      |      |      |      |

| **Total Foreign Bank Branches** | 149 | 151 | 151 | 152 | 156 | 167 | 174 | 187 | 198 | 196 | 198 | 209 | 212 |      |
Table II
Summary Statistics by Type of District, Using 1993 Data

Summary statistics are presented by the degree of district-level foreign bank presence. Statistics for districts with a foreign bank by 1991 are presented in column (1) while statistics for districts with no foreign bank in 1991 but with a foreign bank by 2002 are reported in column (2), and statistics for districts still without a foreign bank by 2002 are presented in column (3). Firm statistics are un-weighted averages calculated using 1993 Prowess data for all domestic, non-financial firms with positive sales and assets in 1991. Population and district area data are obtained from the 1991 Census and the Directory of Bank Officers. District level characteristics are calculated using un-weighted means.

<table>
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<th>Districts with No Foreign Bank in 1991</th>
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<td>(2)</td>
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<td><strong>Firm Characteristics</strong></td>
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<tr>
<td>Total Assets (10 mn. Rp.)</td>
<td>511.78</td>
<td>229.21</td>
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<tr>
<td>1991-1993 Average ROA (%)</td>
<td>2.48</td>
<td>3.75</td>
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<tr>
<td>Short-Term Bank Credit / Total Borrowings</td>
<td>0.380</td>
<td>0.344</td>
</tr>
<tr>
<td>Long-Term Bank &amp; FI Loans / Total Borrowings</td>
<td>0.298</td>
<td>0.337</td>
</tr>
<tr>
<td>Short-Term Bank Credit / Assets</td>
<td>0.148</td>
<td>0.123</td>
</tr>
<tr>
<td>Long-Term Bank Loans / Assets</td>
<td>0.041</td>
<td>0.023</td>
</tr>
<tr>
<td>FI Loans / Assets</td>
<td>0.106</td>
<td>0.118</td>
</tr>
<tr>
<td>% of Firms with Long-Term Loan</td>
<td>80.2</td>
<td>87.5</td>
</tr>
<tr>
<td>% Firms with Bank Loan</td>
<td>42.2</td>
<td>43.1</td>
</tr>
<tr>
<td>% Firms with FI Loan</td>
<td>69.3</td>
<td>80.6</td>
</tr>
<tr>
<td><strong>District Banking &amp; Population Characteristics</strong></td>
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<tr>
<td>Population / Km2</td>
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<td>1228</td>
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<tr>
<td>Total Banks / Million People</td>
<td>135</td>
<td>118</td>
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<tr>
<td>% Share of Private Banks</td>
<td>11.32</td>
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<td><strong>Number of Districts</strong></td>
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<td><strong>Number of Firms</strong></td>
<td>1047</td>
<td>156</td>
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Table III
Effect of Foreign Bank Entry on Total Long-Term Loans

This table reports coefficients from regressions of total long-term loans onto district and firm characteristics using OLS with firm and year fixed effects. The dependent variable is an indicator for having a long-term loan in columns (1)-(4) and the stock long-term loans normalized by 1991 assets in columns (5)-(8). Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. ‘Foreign Bank’ is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. ‘ROA’ is a firm’s 1991-1993 average percent return on assets, demeaned. Columns (3) & (7) include 4-digit industry-year interactions. Columns (4) & (8) restrict the sample to ‘treated’ firms located in districts with a foreign bank by 2004. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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<th>Dependent Variable =</th>
<th>Indicator for Long-Term Loan</th>
<th>Long-Term Loans / 1991 Assets</th>
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</thead>
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<td>-0.075***</td>
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<tr>
<td></td>
<td>(0.028)</td>
<td>(0.028)</td>
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<tr>
<td>Foreign Bank * ROA</td>
<td>-0.003*</td>
<td>-0.003</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
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<tr>
<td>Observations</td>
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<td>7088</td>
</tr>
<tr>
<td>R-squared</td>
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<td>0.56</td>
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<td>Number of Districts</td>
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<tr>
<td>ROA-Year Interactions</td>
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<tr>
<td>4-Digit Industry-Year Interactions</td>
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<td>&quot;Treated&quot; Control Group Used</td>
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Table IV
Effect of Foreign Bank Entry on Access to Bank and FI Loans

This table reports coefficients from separate regressions of bank and FI loan indicators onto district and firm characteristics using OLS with firm and year fixed effects. The dependent variable is an indicator for having a bank loan in columns (1)-(4) and an indicator for FI loans in columns (5)-(8). Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (3) & (7) include 4-digit industry-year interactions. Columns (4) & (8) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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<td>R-squared</td>
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<td>4-Digit Industry-Year Interactions</td>
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<tr>
<td>&quot;Treated&quot; Control Group Used</td>
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Table V
Effect of Foreign Bank Entry on Size of Bank and FI Loans
This table reports coefficients from regressions of bank and FI loan sizes onto district and firm characteristics using OLS with firm and year fixed effects. The dependent variable is the stock of bank loans normalized by 1991 assets in columns (1)-(4) and the stock of FI loans normalized by assets in columns (5)-(8). Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (3) & (7) include 4-digit industry-year interactions. Columns (4) & (8) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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<tr>
<td></td>
<td>(1) (2) (3) (4)</td>
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<tr>
<td>Foreign Bank</td>
<td>0.041 0.029 0.030 0.035</td>
<td>-0.089 -0.108 -0.211</td>
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<td></td>
<td>(0.069) (0.063) (0.070) (0.046)</td>
<td>(0.093) (0.090) (0.202) (0.081)</td>
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<td>Foreign Bank * ROA</td>
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<td>0.005 0.004 0.012***</td>
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<td>(0.002) (0.003) (0.002)</td>
<td>(0.006) (0.007) (0.004)</td>
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<tr>
<td>Observations</td>
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<td>7088 7088 7088 2617</td>
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<tr>
<td>R-squared</td>
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Table VI
Scope of Foreign Bank Entry Effect on Size of Bank Loans

This table reports coefficients from regressions of bank loans normalized by 1991 assets onto district and firm characteristics using OLS with firm and year fixed effects and ROA-Year Interactions. Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. Columns (1)-(3) drop firms with 'ROA' exceeding the 90th percentile, and columns (4)-(6) drop firms with assets in 1991 exceeding the median. 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (2) & (5) include 4-digit industry-year interactions. Columns (3) & (6) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Firms Dropped</th>
<th>ROA &gt; 90th Percentile</th>
<th>1991 Assets &gt; 50th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Foreign Bank</td>
<td>-0.012</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>Foreign Bank * ROA</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Observations</td>
<td>6387</td>
<td>6387</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.39</td>
<td>0.46</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>162</td>
<td>162</td>
</tr>
<tr>
<td>4-Digit Industry-Year Interactions</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>&quot;Treated&quot; Control Group Used</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
### Table VII

**Pre-Trend Falsification Tests**

This table reports coefficients from regressions using OLS with firm and year fixed effects. The dependent variable is the stock of bank loans normalized by 1991 assets in columns (1)-(4) and an indicator for FI loans in columns (5)-(8). Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. 'Fake' is an indicator equal to 1 in the three years prior to foreign bank entry in the given district, and 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (3) & (7) include 4-digit industry-year interactions. Columns (4) & (8) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Variable =</th>
<th>Bank Loans / 1991 Assets</th>
<th>Indicator for FI Loan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>Fake</td>
<td>-0.028</td>
<td>-0.026</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>Foreign Bank</td>
<td>0.023</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.054)</td>
</tr>
<tr>
<td>Fake * ROA</td>
<td>-0.001</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Foreign Bank * ROA</td>
<td>0.005**</td>
<td>0.008**</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Observations</td>
<td>7088</td>
<td>7088</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.42</td>
<td>0.43</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>162</td>
<td>162</td>
</tr>
<tr>
<td>ROA-Year Interactions</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4-Digit Industry-Year Interactions</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>&quot;Treated&quot; Control Group Used</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

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Table VIII
First Stage Regression
This table reports coefficients from regressions using OLS with firm and year fixed effects. The dependent variable is 'Foreign Bank', which is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. On the RHS, 'Foreign-Owned Firms in 1993', an indicator equal to 1 for firms located in districts with at least one foreign-owned firm in 1993, is interacted with a post-1993 year indicator. Yearly observations from 1991 to 2002 are included for firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Variable = 'Foreign Bank'</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign-Owned Firms in 1993 * Post-1993</td>
<td>0.341***</td>
</tr>
<tr>
<td></td>
<td>(0.131)</td>
</tr>
<tr>
<td>Observations</td>
<td>7088</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.65</td>
</tr>
</tbody>
</table>
### Table IX

**Instrumental Variable Estimates of Foreign Bank Entry**

This table reports coefficients from regressions of various loan measures onto district and firm characteristics using instrumental variable estimates with firm and year fixed effects, and ROA-year interactions. 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Instruments used are 'Foreign-Owned Firm in 1993' * post-1993 year dummy and 'Foreign-Owned Firm in 1993' * 'ROA' * post-1993 year dummy, where 'Foreign-Owned Firms in 1993', an indicator equal to 1 for firms located in districts with at least one foreign-owned firm in 1993. Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Variable =</th>
<th>Indicator for...</th>
<th>Amount / 1991 Assets for...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FI Loan</td>
<td>Bank Loan</td>
</tr>
<tr>
<td>Foreign Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.131</td>
<td>-0.124</td>
</tr>
<tr>
<td></td>
<td>(0.089)</td>
<td>(0.137)</td>
</tr>
<tr>
<td>Foreign Bank * ROA</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Observations</td>
<td>7088</td>
<td>7088</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.65</td>
<td>0.46</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>162</td>
<td>162</td>
</tr>
</tbody>
</table>
**Table X**

Access to FI Loans for Group versus Non-Group Firms

This table reports coefficients from regressions of FI loan indicator onto district and firm characteristics using OLS and IV with firm and year fixed effects. Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. The sample is restricted to 'Group' firms in columns (1)-(5) and 'Non-Group' firms in columns (6)-(10). 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (3) & (8) include 4-digit industry-year interactions. Columns (4) & (9) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Columns (5) & (10) report the IV estimates. Instruments used in the first stage are 'Foreign-Owned Firm in 1993' * post-1993 year dummy and 'Foreign-Owned Firm in 1993' * 'ROA' * post-1993 year dummy. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th></th>
<th>Group Firms</th>
<th>Non-Group Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Foreign Bank</td>
<td>-0.105***</td>
<td>-0.107***</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>Foreign Bank * ROA</td>
<td>0.003</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Observations</td>
<td>4140</td>
<td>4140</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.58</td>
<td>0.59</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>121</td>
<td>121</td>
</tr>
<tr>
<td>ROA-Year Interactions</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4-Digit Industry-Year Interactions</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>&quot;Treated&quot; Control Group Used</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Specification</td>
<td>OLS</td>
<td>OLS</td>
</tr>
</tbody>
</table>

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Table XI
Access to Bank Loans for Group versus Non-Group Firms

This table reports coefficients from regressions of a bank loan indicator onto district and firm characteristics using OLS and IV with firm and year fixed effects. Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. The sample is restricted to 'Group' firms in columns (1)-(5) and 'Non-Group' firms in columns (6)-(10). 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (3) & (8) include 4-digit industry-year interactions. Columns (4) & (9) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Columns (5) & (10) report the IV estimates. Instruments used in the first stage are 'Foreign-Owned Firm in 1993' * post-1993 year dummy and 'Foreign-Owned Firm in 1993' * 'ROA' * post-1993 year dummy. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Variable = Indicator for Bank Loans</th>
<th>Group Firms</th>
<th>Non-Group Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Bank</td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>0.015</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>(0.051)</td>
<td>(0.056)</td>
</tr>
<tr>
<td>Foreign Bank * ROA</td>
<td>-0.011***</td>
<td>-0.009**</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Observations</td>
<td>4140</td>
<td>4140</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.45</td>
<td>0.45</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>121</td>
<td>121</td>
</tr>
<tr>
<td>ROA-Year Interactions</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4-Digit Industry-Year Interactions</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>&quot;Treated&quot; Control Group Used</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Specification</td>
<td>OLS</td>
<td>OLS</td>
</tr>
</tbody>
</table>
Table XII

Effect of Foreign Bank Entry on Bankruptcy Rates and Sales

This table reports coefficients from regressions using OLS and IV with firm and year fixed effects. The dependent variable is an indicator equal to 1 if the firm has declared bankruptcy with the Board for Industrial and Financial Reconstruction in columns (1)-(5) and the log of total sales in columns (6)-(10). Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (3) & (8) include 4-digit industry-year interactions. Columns (4) & (9) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Columns (5) & (10) report the IV estimates. Instruments used in the first stage are 'Foreign-Owned Firm in 1993' * post-1993 year dummy and 'Foreign-Owned Firm in 1993' * 'ROA' * post-1993 year dummy. Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Variable =</th>
<th>Bankruptcy</th>
<th></th>
<th></th>
<th></th>
<th>Log(Sales)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td>Foreign Bank</td>
<td>-0.0264</td>
<td>-0.0244</td>
<td>-0.0097</td>
<td>-0.0001</td>
<td>-0.0763</td>
<td>0.046</td>
<td>0.002</td>
<td>-0.114</td>
</tr>
<tr>
<td></td>
<td>(0.0243)</td>
<td>(0.0252)</td>
<td>(0.0201)</td>
<td>(0.0285)</td>
<td>(0.0504)</td>
<td>(0.101)</td>
<td>(0.110)</td>
<td>(0.117)</td>
</tr>
<tr>
<td>Foreign Bank * ROA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.025**</td>
<td>0.030**</td>
<td>0.038***</td>
</tr>
<tr>
<td></td>
<td>-0.0007</td>
<td>0.0000</td>
<td>-0.0011</td>
<td>0.0016</td>
<td></td>
<td>(0.0012)</td>
<td>(0.012)</td>
<td>(0.012)</td>
</tr>
<tr>
<td></td>
<td>(0.0016)</td>
<td>(0.0011)</td>
<td>(0.0015)</td>
<td>(0.0017)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>7872</td>
<td>7872</td>
<td>7872</td>
<td>2880</td>
<td>7872</td>
<td>7032</td>
<td>7032</td>
<td>7032</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.53</td>
<td>0.54</td>
<td>0.62</td>
<td>0.59</td>
<td>0.53</td>
<td>0.81</td>
<td>0.82</td>
<td>0.85</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>162</td>
<td>162</td>
<td>162</td>
<td>17</td>
<td>162</td>
<td>162</td>
<td>162</td>
<td>162</td>
</tr>
<tr>
<td>ROA-Year Interactions</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4-Digit Industry-Year Interactions</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>&quot;Treated&quot; Control Group Used</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specification</td>
<td>OLS</td>
<td>OLS</td>
<td>OLS</td>
<td>OLS</td>
<td>IV</td>
<td>OLS</td>
<td>OLS</td>
<td>OLS</td>
</tr>
</tbody>
</table>
Table XIII
Effect of Foreign Bank Entry on Loans from Other Firms

This table reports coefficients from regressions using OLS and IV with firm and year fixed effects. The dependent variable is stock of loans from all firms normalized by 1991 assets in columns (1)-(5) and loans from group firms only in columns (6)-(10). Yearly observations from 1991 to 2002 are included for domestic, non-financial firms with positive sales and assets in 1991 but not located in a district with a foreign bank by 1991. 'Foreign Bank' is equal to 1 for firms located in a district with a foreign bank in the given year, and zero otherwise. 'ROA' is a firm's 1991-1993 average percent return on assets, demeaned. Columns (3) & (8) include 4-digit industry-year interactions. Columns (4) & (9) restrict the sample to 'treated' firms located in districts with a foreign bank by 2004. Columns (5) & (10) report the IV estimates. Instruments used in the first stage are 'Foreign-Owned Firm in 1993' * post-1993 year dummy and 'Foreign-Owned Firm in 1993' * 'ROA' * post-1993 year dummy, where 'Foreign-Owned Firms in 1993' is an indicator equal to 1 for firms located in districts with at least one foreign-owned firm in 1993.

Standard errors, clustered at the district-level, are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Variable =</th>
<th>Loans from All Firms / 1991 Assets</th>
<th>Loans from Group Firms / 1991 Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Foreign Bank</td>
<td>0.013</td>
<td>0.020</td>
</tr>
<tr>
<td>(0.021)</td>
<td>(0.026)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>Foreign Bank * ROA</td>
<td>-0.008**</td>
<td>-0.009**</td>
</tr>
<tr>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Observations</td>
<td>7088</td>
<td>7088</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.47</td>
<td>0.48</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>162</td>
<td>162</td>
</tr>
<tr>
<td>ROA-Year Interactions</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4-Digit Industry-Year Interactions</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>&quot;Treated&quot; Control Group Used</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Specification</td>
<td>OLS</td>
<td>OLS</td>
</tr>
</tbody>
</table>
### Appendix Table I

**Firm Observations Dropped by Year**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Number of Firms in Prowess Data</strong></td>
<td>2068</td>
<td>2415</td>
<td>3013</td>
<td>4004</td>
<td>5144</td>
<td>5607</td>
<td>5720</td>
<td>5658</td>
<td>5984</td>
<td>6385</td>
<td>5559</td>
<td>3571</td>
</tr>
<tr>
<td><strong>Observations Dropped</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing District Location</td>
<td>13</td>
<td>21</td>
<td>42</td>
<td>71</td>
<td>106</td>
<td>127</td>
<td>131</td>
<td>126</td>
<td>146</td>
<td>163</td>
<td>119</td>
<td>50</td>
</tr>
<tr>
<td>No Sales or Assets in 1991</td>
<td>61</td>
<td>458</td>
<td>1085</td>
<td>2021</td>
<td>3135</td>
<td>3589</td>
<td>3723</td>
<td>3697</td>
<td>4006</td>
<td>4369</td>
<td>3748</td>
<td>2249</td>
</tr>
<tr>
<td>Foreign-Owned Firms</td>
<td>202</td>
<td>198</td>
<td>199</td>
<td>194</td>
<td>192</td>
<td>189</td>
<td>192</td>
<td>198</td>
<td>199</td>
<td>200</td>
<td>188</td>
<td>118</td>
</tr>
<tr>
<td>Financial or Banking Firms</td>
<td>89</td>
<td>86</td>
<td>82</td>
<td>86</td>
<td>83</td>
<td>85</td>
<td>85</td>
<td>84</td>
<td>81</td>
<td>81</td>
<td>72</td>
<td>58</td>
</tr>
<tr>
<td>In District with Foreign Bank in 1991</td>
<td>1047</td>
<td>1015</td>
<td>992</td>
<td>1000</td>
<td>994</td>
<td>984</td>
<td>970</td>
<td>959</td>
<td>969</td>
<td>993</td>
<td>922</td>
<td>698</td>
</tr>
<tr>
<td><strong>Number of Firms in Regressions</strong></td>
<td>656</td>
<td>637</td>
<td>613</td>
<td>632</td>
<td>634</td>
<td>633</td>
<td>619</td>
<td>594</td>
<td>583</td>
<td>579</td>
<td>510</td>
<td>398</td>
</tr>
</tbody>
</table>
Chapter 3

Corporate Bonds: A Spare Tire in Emerging Markets?*

There is strong evidence that bank-dominated financial systems are associated with three main problems. First, banks are subject to capture in ways that result in heavy lending to owners, politicians or the largest firms (La Porta, Lopez-de-Silanes, and Zamarippa 2003, Maurer and Haber 2004, Rajan and Zingales 2004), and this lending often leads to bad loans (Khwaja and Mian 2005). Second, partly as a result of related lending, banks repeatedly find themselves in crises that involve, among other things, several years of restricted lending where the real economy suffers as a result (Dell'Ariccia, Detragiache, and Rajan 2005, Boyd et al 2002). And third, as noted by Alan Greenspan, the absence of alternative capital markets reduces flexibility and hampers the economy’s ability to overcome these banking crises. In essence, these bank-dominated economies lack a "spare tire".1

One way potentially to improve the flexibility and range of financial contracts in these bank-dominated economies would be to develop a corporate bond market. For example, the recent proposals for stimulating a pan-Asian Bond Market and developing domestic corporate bond markets in Latin America imply, among other things, strengthening the ability of corporate borrowers to attract funds directly from households.2 If feasible, such bond markets could help broaden access, reduce the power of large firms and politicians over the financial system, and soften the impact of banking-related crises by increasing range of contracts available. Furthermore, bond investors may be

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1 This chapter is co-authored with Simon Johnson and Changyong Rhee.
2 These proposals are being developed with the involvement of the Asian Development Bank, ASEAN+3 Finance Ministers and the Inter-American Development Bank.
less likely to become captive lenders, and thus, firms with poor corporate governance will be less able to accumulate exorbitant amounts of debt.

However, theory suggests the heavy reliance on banks in emerging economies is not without foundation. In the theory of banking advanced by Diamond and Rajan (2001 and 2005), bank deposits are an attractive contract when property rights of investors are not well protected, and it can be rational for these investors to keep their funds as demandable deposits in banks. It provides a simple contract not easily subject to renegotiation, for which monitoring is relatively straightforward (look to see if there is a line of people running to remove deposits). This kind of rigidity helps protect small investors during good times.\(^3\)

This raises the question: Can bond markets develop rapidly in these in these emerging economies where banks have always provided most of firms’ external financing, and would they work better than banking contracts when protections for investors and well-established institutions are lacking?

This chapter offers some relevant evidence from a quasi-natural experiment in Korea after the crisis of 1997-98. Korea in 1997 had many of the classic features of a system in which almost all private financial flows were through the banking system. A great deal of economic power was concentrated in the hands of a few business groups (chaebols), which enjoyed privileged access to credit, over-invested in low profitability sectors, and had weak corporate governance. Banks, while nominally under state control, enjoyed close relationships with chaebols (Kim 2004). There is strong evidence that this structure contributed to the severity of the economic crisis in 1997-98.

When the crisis broke at the end of 1997, the Korean banking system stopped lending in net terms (i.e., repayments were greater than new loans). However, almost immediately a bond market sprang to life, with firms able to obtain funding directly from households. This market was a private initiative, with government permission but without direct government support. Seen in terms of

\(^3\) Rajan and Tokatlidis (2005) make the more general argument that when public institutions are weak, private contracts will tend to be limited, rigid, and inflexible.
Diamond and Rajan (2001 and 2005), the market offered more flexible (easier to renegotiate) contracts to households compared with bank deposits, as well as a wider range of terms on debt for firms than had previously been available through the banking system.

This post-crisis bond market was large relative to pre-crisis years. From 1990-1997, net flows from financial intermediaries were on average twice as large as net flows from bonds. Moreover, almost all of these bonds prior to 1998 were a form of disguised bank lending, i.e., banks were capped in their loans to firms, but they could circumvent this control by buying bonds issued by the same firms and guaranteeing the return to depositors. In contrast, during 1998 there were net repayments to the banking sector and almost all of the net finance to the Korean corporate sector in the course of 1998 came in the form of bonds. The ratio net bond flows to GDP in 1998 roughly equaled the average ratio of net loan flows to GDP from 1990-1997.

This experience by itself answers the first question – a bond market can develop rapidly even where all finance has previously run through the banking system. It also suggests that the switch to bond market finance acted as a ‘spare tire’ and softened the blow from the banking crisis. But were these more flexible contracts widely available to firms or less prone to collapse?

In regard to their availability, a look at the data suggests that the largest firms gained disproportionate access to funds. The Herfindahl index of total gross funds, within our balanced panel of manufacturing firms, rose from 1.2 in the early and mid-1990s to 2.0 in 1998 and 1.6 in 1999. The top 5 chaebol received 34% of net finance in 1996 and 46% in 1998. Interestingly, the positive effects of size were only for the very largest. Chaebols 6 through 30 (as ranked in 1996) received 17% of net finance in 1996 and only 15% in 1998. The largest five chaebol also raised much more bond financing than anyone else, including the next 25 chaebol. The largest five accounted for 53% of net bond flows in 1998, while the next top 25 only accounted for 11%.

Was this because the largest firms were better run or had better projects, or was it just that investors saw them as too big to fail? This is a difficult question because post-crisis performance was
likely affected by whether or not a firm could obtain external funding. Moreover, pre-crisis performance measures are likely not informative as crisis of this nature dramatically changes relative profitability of projects, so previously profitable firms may now be unviable.

However, there is a reasonable econometric strategy that exploits established features of emerging markets in general and Korea in particular – specifically the finding that corporate governance matters for firm-level outcomes in emerging markets. The literature has established that firms with weaker corporate governance had less good performance in Korea before the crisis (Joh 2003) and less good stock price outcomes during the crisis (Baek, Kang and Park 2004). If the bond market was allocating capital on the basis of likely performance, it is reasonable to expect that more capital should have flowed to firms with better corporate governance. We find no evidence, however, that the bond market allocated credit to firms with better corporate governance.

Ex post, we have more direct evidence that the largest firms receiving bonds were not better run than other firms. Daewoo, which was responsible for a large share of the bonds issued after the financial crisis, went bankrupt. Hyundai, another large issuer of debt in 1998 also had a de facto default in 2000.4

This evidence suggests that while bond financing may add flexibility and be an important tool for the fast recovery of a crisis-hit and a bank-dominated economy it may not necessarily be more efficient at allocating resources than the banking system. Our regression analysis, however, does not enable us to unpack why exactly the bond market preferred the largest firms irrespective of their poor corporate governance structures. Was the problem with the bond market, for example, due to bad information or underdeveloped bond rating agencies? Qualitative evidence suggests risk was not factored into bond prices and the largest chaebols were able to borrow because investors thought them too large to fail.

4 Unable to rollover its debt, the company was only able to avoid bankruptcy through government measures initiated to avoid another collapse similar to Daewoo. Through these measures, the Korean Development Bank purchased bonds from troubled companies such as Hyundai.
The Korean experience also fits with growing evidence that firm-level corporate finance and corporate governance arrangements matter for country-level macroeconomic outcomes (Morck, Wolfenzon, and Yeung 2005). The link seems to be particularly strong for crises in emerging markets where firms with weaker corporate governance are more likely to suffer stock price declines when a crisis hits (Johnson et al. 2000, Mitton 2002, Lemmon and Lins 2003). All of this literature builds directly on the measurement of investor protection in La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997 and 1998).

The growth of the Korea’s bond market also relates to growing evidence regarding the importance of legal institutions for financial development (Beck, Demirgüç-Kunt, and Levine 2003) and how market-based or bank-based financial systems may matter for economic development (Beck and Levine 2002). Our paper also builds upon existing work concerning the nature of business groups in Korea (Bae, Kang and Kim 2002), the separation of ownership and control frequently found in these firms (Claessens, Djankov, and Lang 2000), and the readjustment of credit extended to these groups following the financial crisis (Borensztein and Lee 2002).

The remainder of the chapter proceeds as follows. Section 1 explains the nature of South Korea’s financial system through the mid-1990s. Section 2 explains our identification strategy, and Section 3 describes the data. Section 4 reports our reduced form regressions. Section 5 offers a range of robustness checks, and Section 6 concludes.

### 3.1 South Korea’s Financial System

#### 3.1.1 External Finance through 1997

From the 1960s into the 1980s, the South Korean financial system allocated credit at the behest of the government. These directed credits were provided to firms that fulfilled government priorities, particularly through developing exports (Krueger and Yoo 2003). By the 1990s, there had been some attempted switch towards a more market-based system. However, almost all external
financing for firms continued to flow through banks.

Official aggregate flow of funds data from the Bank of Korea demonstrate this. Bank finance, as captured by total indirect financing plus bank purchases of corporate bonds, dominated until 1997. Before 1997, total annual financial flows to the corporate sector were around 25 percent of GDP, of which financial intermediaries provided between 45 and 60 percent.\(^5\) Other important sources of funds before the crisis were commercial paper (17.5% of all funding in 1996), stocks (10.9%), and overseas borrowing (10.4%).

3.1.2 The Bond Market before 1998

Prior to the crisis, corporate bonds, not government bonds, played a dominant role in the Korean bond market and 3-year maturity corporate bonds were the benchmark securities. However, despite its large nominal size, the corporate bond market was quite inactive because, prior to 1998, corporate bonds were essentially disguised bank loans rather than capital market instruments.

Before the Asian financial crisis, Korean banks routinely guaranteed corporate bonds and held them to the maturity. Bond investment by banks was an alternative method to extend loans to a specific company when banks could not extend loans to the company due to loan exposure regulation. By investing in bonds, banks could escape the regulation which limited loan exposure per firm as bond holding was classified as portfolio investment, not loans. Also, as banks were mostly buy-and-hold investors, there was no need for introducing a "mark-to-market" system. The government's regulation on interest rates also hampered the development of corporate bond markets. Instead of putting a ceiling on interest rates, the government took an indirect approach. It controlled the supply of corporate bonds (new issuance of corporate bonds had to be pre-approved) to manage market interest rates.

Before the crisis in 1997, the Korean bond market also did not have well-functioning credit

\(^5\) For example, in 1996 total financing to the corporate sector was 118,769 x 10 Won. Of this, 14% came from bank lending directly and 17.5% came from banks through their purchases of bonds. A further 13.9% came from non-bank financial intermediaries. See Appendix Table 2 for the complete aggregate finance data from 1990-2002.
rating agencies, primary dealer, etc. And the demand base for bonds was also very concentrated, with more than 80% of the total bond outstanding being held by banks and investment trust companies (ITCs, hereinafter). As they were mostly buy-and-hold investors, there was little trading in the secondary market and bonds were regarded as a saving tool rather than an investment tool.

3.1.3 External Finance in 1998

The corporate bond market changed drastically with the crisis. Guaranteed corporate bonds immediately disappeared from the market. Due to the financial crisis, banks and ITC's could no longer afford to provide a financial guarantee to bond issuers. Almost all corporate bonds issued after the crisis are non-guaranteed bonds.

The monthly average amount of corporate bonds issued was less than 3 trillion won prior to the crisis. But, it increased to 7 trillion won in the second half of 1998. For all of 1998, the Bank of Korea reports net bond financing was 45.9 trillion won, while there were net repayments to the financial intermediaries of 15.9 trillion won. Moreover, the net finance flows from bonds in 1998 roughly equaled the net flows of financial intermediaries before the crisis. This surge in bond issues was financed by household savings and the drawing down of bank deposits.

In addition to the official aggregate flow of funds data from the Bank of Korea, we can track financial flows using a firm-level dataset from a private company, the National Information Credit Evaluation (NICE). Described in greater detail below, these data cover primarily the manufacturing sector and include up to 9,000 firms.

Figure 1A shows the main net financial flows to the Korean corporate sector during the 1990s as reported by the Bank of Korea, and Figure 1B shows the analogous flows in our NICE.

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6 Pre-1998, the average exchange rate between the Korean won and U.S. dollar was 800 won per dollar, and in 1998 the average exchange rate was 1400 won per dollar. Thus, pre-crisis gross monthly bonds issued were valued around $3.75 billion, and net bond flows for all of 1998 were about $32.8 billion.

7 Net bond flows were 9.5 percent of GDP in 1998, whereas net flows of 'indirect finance' were about 9 percent of GDP from 1990-1997. See Appendix Table 2 for more details.

8 This movement was triggered by the financial restructuring policy, mainly involving banks and merchant banking companies (MBCs). Funds left banks, partly because of increased uncertainty about which banks would survive, and partly because banks could not compete with the interest rates offered by investment trust companies (ITCs).
dataset over the same period. Note that the Bank of Korea construction of net bond flows used in Figure 1A does not include bonds issued overseas with foreign currency denomination, while our measurement of bond flows from the NICE data does include such bonds. Moreover, we cannot separate out commercial paper from our loans in the NICE data. Hence, the combination of “Indirect Finance” and commercial paper financial flows reported by the Bank of Korea is the closest aggregate measure to what we refer to as “Net Loans” in the NICE dataset.

Despite these differences in how the two datasets are constructed, the two series show the same general pattern, and our data from NICE picks up this dramatic switch from bank-based finance to the issuing of bonds. Figure 1B shows a very similar pattern to Figure 1A. For firms within our dataset, gross bond flows in 1998 were 82.4 trillion won, whereas gross trade credit between firms was approximately 55 trillion won.

Only after the government placed a limit on the amount of bonds that chaebol could issue on October 28, 1998, did the amount of corporate bonds issued start to decline. Figure 1A also shows clearly how hard the corporate bond market was hit by the collapse of the Daewoo group in July 1999. After the Daewoo crisis, the amount of corporate bonds issued was almost negligible, as investors became very sensitive to corporate credit risk.

While the large increase in bonds in 1998 increased the flexibility of Korea's financial market and likely mitigated the crisis, the question remains as to whom received these flows.

For this we turn to the NICE data, the descriptive statistics of which are in Table 1. Between 500 and 900 firms received some flows from issuing bonds in each year. This is a high number, although an order of magnitude less than those that received gross loan flows in each year prior to the crisis. Within the NICE dataset, nearly 600 firms issued bonds in 1998. Of these, about 500 were not affiliated with the top 30 chaebol.

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9 At the time of bankruptcy, Daewoo was the third largest chaebol in Korea. Even after the financial crisis, Daewoo continued to pursue its expansionary policy. It expanded its car factory in Poland and merged with the financially distressed Ssangyong motor company, one of its domestic rivals in Korea. After Daewoo's bankruptcy, the Korea Asset Management Company (KAMCO) purchased Daewoo's non-performing loans and debts, which were estimated at more than 57 billion US dollars, with public funds to prevent systematic risk to the financial market.
The flow of funds in this fashion, however, was highly concentrated. The Herfindahl index for gross loan flows was around 1 before the crisis. The Herfindahl index for gross bond flows was higher, and in 1998 around 3. This suggests that the largest firms obtained disproportionately more funds from issuing bonds. In fact, the 64 firms associated with the top five chaebols and actively issuing bonds in 1998 accounted for 53% of the gross bond flows, though they only account for 1% of the firms with financial flows in 1998. And the 68 firms associated with the top 6-30 chaebols and actively issuing bonds in 1998 accounted for 12% of gross bond flows in 1998.10

### 3.2 Identification Strategy

Economic recovery requires that firms invest appropriately in new projects. But firms often try to bailout existing old projects, particularly if they have weak corporate governance and seem “too big to fail”. Providers of external finance therefore have to differentiate between good and bad projects.

We are interested in testing whether firms with better projects received more financing through the bond market. The relationship of interest is:

\[ F_{i,T} = \alpha + \beta \cdot P_{i,T} + \varepsilon_{i,T} \]

where \( F_{i,T} \) is a measure of the finance obtained by firm \( i \) in period \( T \), i.e., after the crisis, \( P_{i,T} \) is a measure of the return on the firm's projects in \( T \) (and beyond), and we are interested in the size and sign of \( \beta \). The problem is that we do not have a good measure of \( P \). Using measures of performance after the crisis is not appealing as these are likely affected in part by access to finance.11 Using measures of performance from before the crisis is also not appealing as relative prices have changed a great deal.

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10 Total gross bond flows in 1998 for firms within the NICE data were 79.6 trillion Won, of which firms in top 5 chaebols accounted for 42 trillion Won and firms in top 6-30 chaebols accounted for 9.9 trillion Won.

11 Specifically, large firms with access to the bond market may have performed better simply because they could obtain credit when other firms that continued to rely on banks could not. For example, Daewoo, which issued a large share of the bonds in 1998, was probably able to avoid bankruptcy longer than it otherwise could have because of its ability to issue bonds.
However, the recent corporate governance literature suggests that, in general, corporate
governance arrangements matter for firm-level performance. Furthermore, there is growing evidence
that corporate governance mattered for performance specifically in Korea before, during and after the
crisis (Joh 2003, Baek, Kang and Park 2004, Black, Jang, and Kim 2006). Making use of this idea, we
can estimate the following specification:

$$F_{i,T} = \alpha + \beta \cdot G_{i,T-s} + Z'_{i,T-s} \cdot \gamma + \epsilon_{i,T}$$

where $F_{i,T}$ is the finance obtained by firm $i$ in period $T$, which is after the crisis; $G_{i,T-s}$ is the
corporate governance of firm $i$ in period $T-s$, which is before the crisis; and $Z'_{i,T-s}$ is a vector of firm-
level controls, which are all measured before the crisis.

The identification here rests on three assumptions. First, the crisis was a surprise to all
concerned, so that corporate governance and other arrangements were not designed with the crisis in
mind. Second, corporate governance is to some extent persistent, i.e., cannot be quickly changed,
particularly during a crisis. Third, firms with bad corporate governance not only performed worse
before the crisis, which is Joh's (2003) result, but also that it would be reasonable to suppose that in
early 1998 these same firms would not make good use of external funds.12

3.3 Data Description

We employ a dataset compiled by the National Information Credit Evaluation (NICE). One
of the largest Korean credit evaluating firms, NICE compiles and verifies firms' annual financial
statements submitted to the Korea Securities Supervisory Board. After excluding observations on
financial firms, the NICE data set contains the financial statements for approximately 7,000 non-

In our regressions, we restrict the sample to only those firm-year observations that have at

12 Note that we cannot use pre-crisis corporate governance in an instrumental variables framework because it may
affect post-crisis projects through pre-crisis financing arrangements (e.g., debt overhang) or some other channel.
Therefore our regressions should be interpreted just as reduced forms.
least one non-missing financial cash flow from either bonds, equity, or loans. In doing this, we lose about 1,250 observations per post-1997 year (or approximately 15% of our total observations), leaving us with about 7,500 observations in 2000. Additionally, NICE also maintains a smaller dataset pertaining to the ownership of these firms. When available, the ownership data contains a list of up to eight names of the largest shareholders. Pre-crisis ownership data, however, is only available for about 3,500 firms. The pattern of total finance flows exhibited in the economy-wide data (Figure 1A) and full sample of firms (Figure 1B) also persists in the more restricted samples. Below we report results both with as many firms as possible and with a balanced panel that uses only firms that are in our NICE dataset in every year from 1996 to 2000.

3.3.1 Chaebol Membership

A firm's chaebol affiliation was determined using the Korean Fair Trade Commission (KFTC) annual publication of the thirty largest chaebols, according to total assets. This is the standard measure used both in the literature and by practitioners in Korea.

A firm is classified as chaebol-affiliated based on the 1996 listing of the top 30 chaebols. Of the 343 firms included in the top 30 by the KFTC for 1996, 281 of them are found in the NICE data, of which ownership data are available for 173 firms, and 102 were listed firms. While these chaebol affiliated firms only account for approximately 4% of the NICE firms for 1996, they account for approximately 40% of total assets and 47% of total sales for that year. The top five chaebols alone (Hyundai, Samsung, LG, Daewoo, and SK) account for 24% of total assets and 34% of total sales. All remaining firms are considered non-chaebol.

There was some merger activity during the period of interest, and it is not clear how exactly to treat firms that join or leave a chaebol. In our base regressions, we drop all firms that become a

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13 Both missing and zero values are reported as 'missing' within the NICE data. Therefore, missing values are assumed to be zero so long as one other financial measure is non-missing. Assuming all missing flows are zeros does not affect our main findings.

14 Appendix Table 3, Panel A summarizes how the sample is reduced when we use a balanced panel of firms or require certain variables to be present in order to use a firm's data from NICE.
member of a top 30 chaebol during 1997-2000 or leave a chaebol during 1997-98. However, in our robustness checks, we add these firms to the sample and confirm that our results are robust to treating these firms as either non-chaebol or chaebol and clustering the standard errors on either pre- or post-crisis affiliation.¹⁵

In our base regressions, we cluster the standard errors by chaebol to avoid overstating the findings, which might occur if financing decisions or idiosyncratic shocks occur at the group level rather than among individual firms. Our results are robust to not clustering. Our results also survive dropping all firms that go bankrupt, including Daewoo, which was the largest chaebol bankruptcy.

### 3.3.2 Financial Flows: Bonds, Loans, and Equity

Our measures of firm-level financial flows, i.e., bonds, loans, and equity, are derived from operating activity cash flow data reported by firms. Net bond flows are calculated using the difference between cash flows from increases and decreases of debentures payable by the firm for a given year. Likewise, net flows from loans are the cash flows from increases in short- and long-term borrowings minus cash losses from decreases in short- and long-term borrowings. Net equity is the sum of cash flows from increases in capital stock, payments of margin for new stock offerings, and paid-in capital in excess of par values, minus the cash losses from a decrease in capital stock.¹⁶

Even after weighting the finance flows by assets, chaebol-affiliated firms had higher average finance flows for all three types of financing in 1996, as shown in Table 2. However, in both 1998 and 1999, chaebol-affiliated firms were largely missing from the market for loans and those in our balanced panel actually had negative average net loan flows over assets of -5.2% and -15% respectively. While non-chaebol affiliated firms also experienced a drop in loan financing after the crisis, the average drop was much smaller, and net loan flows over assets for those in our balanced

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¹⁵ See Appendix Table 3, Panel B for more details on exactly how many firms join or leave chaebols from 1996-2000.

¹⁶ Before constructing each of the variables, however, missing finance flow observations within firms were assumed to be zeros. Additionally, negative cash flow observations are clear data entry errors, and the absolute value of these observations is used. This only occurs in four observations. See Appendix Table 1 for more details on how each financial variable is constructed from the NICE data.
panel were 0.53% and -0.27% in 1998 and 1999.

Immediately following the crisis, bond financing replaced loans as the most prominent form of financing among chaebols. Chaebol-affiliated firms saw an average rise of net bond flows over assets in 1998 while non-chaebol firms had their lowest average bond-usage in 1998. By 1999, however, equity financing became the primary source of funding among chaebol-affiliated firms. In 1999, the net equity flows over assets average reached a 1996-2000 high of 5.8% for chaebols. Non-chaebols had a steadily increasing average usage of equity financing after the crisis.

3.3.3 Profits

We use two measures of profits: net income and ordinary income. Ordinary income is calculated as the revenues from sales plus dividends and gains on the valuation of securities minus the cost of sales, administrative and sales expenses, and interest payments. Net income is the same as ordinary income but also deducts taxes and extraordinary items. Both measures of profit performance are normalized by total assets.

As seen in Table 2, weighted net incomes of chaebol affiliated firms were only 0.25% and -0.95% in 1996 and 1997, while the average performance of non-chaebols was higher at 1.9% and 0.09%. This lower performance for chaebols continues in 1998 and 1999, coinciding with the years in which they received higher weighted financing from both the bond and equity markets. Only in 2000 was the average performance of all chaebols higher than that of non-chaebols.\(^\text{17}\) Though, in 2000, the average Korean firm, non-chaebol and chaebol alike, was losing money.

3.3.4 Corporate Governance

Korean firms were almost all controlled by their largest shareholder. Typically this would be the founder or founding family. In most cases, it was possible to control a company while holding only a minority of the shares and in the case of chaebol, the controlling family often owns only a

\(^{17}\) As shown in Table 2, however, the average performance of firms in top 5 chaebols was higher than that of non-chaebols in 1998.
small minority of shares.

We use two variables to measure corporate governance: 'control-ownership rights gap' and 'ownership concentration'. Both of these variables were used by Joh (2003) and are derived using the ownership data provided by NICE. To calculate the 'ownership' or 'cash-flow' rights of the controlling family, Joh sums the ownership stakes (in percent) for personal holdings among the largest 8 shareholders reported by NICE. Thus, all institutional shareholders (financial institutions and non-financial corporations), foreign owners, government, and employee stock ownership are excluded when calculating the ownership concentration of the controlling family of shareholders. It is necessary to sum over all personal shareholdings since some shares are often controlled by spouses or family members of the spouse and it is not possible to distinguish such family connections (In Korea, wives do not adopt their husband's last name). The 'control' rights of these shareholders are then approximated using the total sum of ownership stakes for all 8 of the largest shareholders, including the non-personal holdings excluded from the measure of 'ownership' rights. 18

Following Joh, we take the difference between the calculated 'control' and 'ownership' rights to obtain a measure of the degree to which ownership and control rights are aligned within each firm. Firms with a greater spread between the control and ownership stakes of the top shareholders are more susceptible to poor management and misaligned incentives. Therefore, a larger control-ownership gap is negatively correlated with better corporate governance and various forms of firm performance (Joh 2003, Lemmon and Lins 2003, Baek, Kang, and Park 2004).

The inability of some institutional or smaller shareholders to exercise voting rights under Korean regulations can also allow a large shareholder to maintain control with a very small ownership stake. To account for this second type of poor corporate governance, we use Joh's measurement of ownership concentration as a second proxy for corporate governance. Controlling shareholders with a larger ownership stake likely face better incentives, and thus, ownership concentration is positively

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18 See Joh (2003) for more details on constructing the both measures of corporate governance.

The correlation between both measures of corporate governance and profitability of Korean firms found within NICE are as we would expect. Joh finds that profitability before the crisis was lower where (1) the controlling family’s ownership was lower and (2) the gap between control rights and cash flow rights was higher. Table 3 reports summary statistics on these measures, and other variables we use in our analysis.

Within the NICE data set, 173 chaebol-affiliated firms had an average control-ownership gap of 48.3% while 3,883 non-chaebol firms had a smaller average gap of 20.1%. This finding confirms Joh’s findings and anecdotal evidence that chaebol-affiliated firms are more likely to have been controlled by shareholders through indirect means.

Within our data, we see that ownership concentration of non-chaebol firms is much higher than that of chaebol-affiliated firms. Table 3 shows that non-chaebol firms had an average ownership concentration of 47.7% while chaebol-affiliated firms had an average of only 9.8%. Again, the summary statistics support the anecdotal evidence that chaebols are controlled by shareholders with very small ownership stakes.

### 3.3.5 Additional Controls

Included in many of the regressions are a number of additional control variables pertaining to pre-crisis firm characteristics. Each control is measured specifically with regards to 1996. The log of total assets is used to control for overall firm size since larger firms naturally borrow more in levels. The log of total liabilities controls for a firm’s level of indebtedness and exposure to risk. Additionally, training, R&D, and advertising expenditures are each controlled for with missing values assumed to be zeros. The liquidity of the firm’s assets is captured by the variable ‘cash’ which is the sum of assets pertaining to cash and marketable securities. Again, missing values are assumed to be zeros. Finally, a firm’s market share is calculated based on its share of total sales within the NICE
data for its specific 4-digit industry code. Firms with missing total sales observations are dropped in
the regressions that include market share as a control.\textsuperscript{19}

3.4 Results and Interpretation

Our main regression results are presented in Table 4, where the dependent variable is the log
of gross bond flows in 1998. In the first panel we look at the effect of being a chaebol using
dummies for being in either a top 5 or top 6-30 chaebol.

In doing this, we find that the top 5 chaebol dummy is positive and highly significant. It
remains significant even when we control for size and other variables, and with controls, affiliation
with a top 5 chaebol is associated with a 1.2 log point increase in gross bond flows for a firm in 1998.
This effect is large. One log point in the gross bond flows regression is about half a standard
deviation in our sample, and the average log of gross bond flows in 1998 for all Korean firms is 16.3.
This finding holds even if you drop Daewoo from the regression and only consider the remaining
four largest chaebols.

The dummy for being a chaebol in the top 30 (but not the top 5) is also significant, but loses
some significance when we add other controls. The magnitude of the effect for the smaller chaebols
is also about one-fourth of that observed for the largest five chaebols.

When we add our corporate governance measure of ownership concentration in the second
panel, it is not robustly significant either as a main effect or interacted with a dummy for top 30
chaebol. However, the top 5 chaebol dummy remains large and highly significant. The results are
similar in the third panel where our corporate governance measure is the control-ownership rights
gap. While chaebol affiliation is a strong predictor of gross bond flows in 1998, neither ownership
concentration nor the control-ownership rights gap appear to be associated with gross bond flows
following the crisis.

As expected, size is a strong positive predictor of gross bond flows and log of total debt in

\textsuperscript{19} See Appendix Table 1 for a complete listing of all variables used and how they are constructed.
1996 is a negative and significant predictor. Our other controls for cash, market share, and expenses do not seem strongly related to bond flows in 1998. The tables that follow show our results are robust to alternative samples, alternative measures of bond flows, and alternative forms of clustering. The results are also robust to nonlinear size controls.

While the aggregate evidence confirms that bond markets can develop quickly and act as a 'spare tire' during a banking crisis, the firm-level regressions suggest access to bonds was feasible only for the largest firms. The largest five chaebol received a disproportionate amount of bond financing in 1998. The remaining top 30 chaebols (numbers 6-30) were also more likely to receive bond financing in 1998, but the top 5 chaebol were still predominantly favored.

Moreover, there is no evidence that bond finance was better directed or sensibly used. The primary beneficiaries of bonds, the largest five chaebols, on average had very poor corporate governance structures (see Table 3). There is also little evidence that bonds were allocated in larger amounts to non-chaebol firms with better corporate governance. Nor is there evidence that bond investors accounted for the credit risk of individual firms. Rhee and Oh (2001) find that the interest rate paid on bonds by defaulting companies, including Daewoo, and firms possessing an A+ credit rating were very similar in 1998 and 1999.²⁰

Combined, the evidence suggests that households were willing to forgo demand deposits during the crisis because they ex ante regarded corporate bonds as safe investments. One potential explanation for this is that the largest chaebols were regarded by the public as too large to fail.

3.5 Robustness Checks

3.5.1 Equity Finance in 1999

Equity flows in 1999 offer an interesting falsification test. Our conjecture is that investors

²⁰ Rhee and Oh (2001) compare the yield to maturity of defaulted bonds at date of issuance against the average yield on three-year corporate bonds with an A+ credit rating from December 1997 to June 1999. They find no average difference between the yields. The evidence, while not conclusive, is suggestive of a general ignorance of credit risk by investors in Korea.
wanted to invest in the largest firms and chose to do so through bonds in 1998. If this is the case, then when global equity markets rose strongly and equity investment came into fashion in 1999, investors should have chosen to invest directly in the largest firms.

This is what we see in Table 5. The panels of this table have the same structure as Table 4, except the dependent variable is now the log of gross equity flows in 1999. In the first panel, we again see that the effect of being a chaebol is highly significant and large for both the top 5 chaebol and top 30 (but not top 5) dummies. The size effect for chaebol in 1999 is similar to that in 1998, although perhaps a little smaller.

Now corporate governance matters, but there is no indication that the market is getting it right, i.e., putting more money into firms with better governance. More ownership concentration is associated with less issues of equity and a larger control-ownership gap is associated with more issues of equity. Moreover, firms affiliated with a chaebol, which on average had worse corporate governance structures, were more likely to receive equity financing in 1999. Of course, there are difficult issues of supply and demand, which we cannot sort out, but still, this evidence is suggestive.

3.5.2 Banking After the Crisis

In 2000, when net bank financing for the entire Korean economy first became positive again, we see less evidence that chaebols were more likely to receive bank financing. This is shown in Table 6B, where the dependent variable is the log of gross loan flows in 2000. Table 6A uses log of gross loan flows before the crisis in 1996 as a comparison.

In the first panel of Table 6B, both chaebol dummies are positive and significant indicating chaebols were more likely to receive loans in 2000. However, the magnitude is smaller than that seen for bonds in 1998 and equity in 1999. Moreover, once we add the corporate governance measures and controls for size, the chaebols dummies are no longer significant.

Table 6A demonstrates that the weaker relation between chaebol affiliation and loan financing was also true in 1996. Comparing Table 6A to Table 4, funding from bonds in 1998 was
more concentrated than bank lending before the crisis despite that the crisis was due in part to these large firms' failures.

Similar to bonds and equity, however, there is still no evidence that the banks were more likely to allocate loans to firms with better corporate governance.

3.5.3 Alternative Samples

Our findings are also robust to a number of alternative samples. In Table 7, we instead use net bond finance flows normalized by total assets as the dependent variable, and we report our corporate governance results for ownership concentration.21 Beyond providing an additional check, the use of net bond flows allows us to check whether the findings are robust to excluding bond financing used to roll-over existing bonds. We also test the importance of chaebol affiliation and corporate governance for each post-crisis year: 1998, 1999 and 2000.

Similar to our earlier findings, the top 5 chaebol dummy is still positive and significantly related to bond flows in 1998. Affiliation with a top 30 chaebol (not in the top 5) is also positively related to net bond finance flows. However, in 1999 and 2000, there is less evidence that chaebols received more bond financing than other firms. The large reduction in bond financing that occurred following the collapse of Daewoo may explain this decline. The failure of Daewoo likely increased the sensitivity of bond holders to risk and eliminated their perception that the largest chaebols were 'too large to fail'. Again, there is no evidence that ownership concentration predicts the amount of bonds firms received.

Table 8 restricts our sample to only the largest 500 firms in terms of total assets in 1996 to ensure that firm size is not driving our earlier findings. Despite the smaller sample, the findings are similar to those in Table 7. The findings for net bond flows over assets also do not change when we restrict the sample to a balanced panel of firms as done in Table 9.

21 The findings when using the control-ownership gap instead are similar and available from the authors upon request.
Lastly, Table 10 reports the estimates for net equity finance flows normalized by assets using a balanced panel. Similar to our findings for gross equity flows in Table 5, affiliation with a top 30 chaebol is positively related to equity financing in 1999 even after controlling for firm size, corporate governance, and other firm characteristics. The top 5 chaebol is also positive and significant for net equity financing over assets in 1998.

3.5.4 Alternative Measures

In our identification strategy, we presume that firms with better pre-crisis corporate governance to be more likely to make effective use of financing in the post-crisis years. As noted, earlier evidence pertaining to Korean firms and corporate governance before and during the crisis suggest this to be true (Joh 2003, Baek, Kang and Park 2004). In Table 11, we test this directly by regressing net income over assets onto our chaebol dummies and measure of ownership concentration for each post-crisis year.

In 1998, the coefficient estimate for ownership concentration is positive and significant. This suggests that firms with better corporate governance were more profitable, even though there is no evidence they were more likely to receive bonds in 1998. While weaker, ownership concentration is also a positive predictor of net income / assets in 1999. In 2000, it is no longer significant. Our findings for profits are similar when we use net income over assets as the dependent variable.

The top 5 chaebol dummy is also positively related to net income over assets in 1998. However, this is hard to interpret as we are unable to disentangle the top 5 chaebols' preferential access to bonds in 1998. Were chaebols better able to navigate the financial crisis? Or, were they more profitable because they had preferential access to bond financing in 1998?

3.5.5 Within Chaebol Allocation of Finance

One potential issue that may limit our ability to identify significant relationships between pre-crisis chaebol affiliation, corporate governance, and post-crisis financing is the transfer of funds
within chaebols. Anecdotal evidence suggests that many chaebols are dominated by a few large firms that obtain a majority of the financing for the entire chaebol and then reallocate this money within the group.

We do find evidence that a small number of firms within each chaebol obtain a majority of the groups' outside financing. While nearly all of the top thirty chaebols were involved in some form of bond financing in 1998, only half of the chaebol-affiliated firms were involved in any form of bond financing in 1998, and only about 10 percent of the chaebol-affiliated firms were responsible for the aggregate increase in net bond flows. The distribution of equity financing at its peak in 1999 among chaebol-affiliated firms is very similar.22

Overall, the concentration of bond and equity financing within chaebols raises some potential issues regarding our identification strategy. If bond and equity financing is redistributed within chaebols, this will obscure the true effect of corporate governance on post-crisis financing.23 Such reallocations might imply that investors' willingness to purchase bonds depends on the overall ownership structure of the chaebol rather than the corporate governance structure of any individual firm in the chaebol.

3.6 Conclusion

Crises in emerging markets involve large output losses in part because financial intermediaries fail and credit contracts sharply. Tight monetary policy can stabilize the exchange rate, but higher interest rates contribute to financial distress. South Korean experience in 1998 offers a seemingly appealing exception: the severe currency crisis triggered a freeze in new bank lending, but the bond market sprang to life. In 1998, the bond market provided almost all the funds raised by firms, allowing firms to borrow directly from households and bypass the troubled banking system. In

22 This concentration of external finances raised differs significantly for pre-crisis finance flows from loans. Only 2% of chaebol-affiliated firms in 1997 had zero net loan flows, which is consistent with arguments that larger firms have advantageous access to capital markets.

23 This reallocation of money could occur through both direct loans among firms within a chaebol or more discrete forms of propping and tunneling.
essence, the bond market acted as a ‘spare tire’.

The evidence suggests that households were willing to forgo demand deposits during the banking crisis because they ex ante regarded corporate bonds as safe investments. This switch to bond financing was possible, not because of political favors or corruption, but because the largest chaebols were regarded by the public as too large to fail. The extreme concentration of economic power in Korea, the product of 40 years of a government-led financial market, made this form of financial development under duress and economic recovery possible.

Korea’s experience, however, demonstrates two main findings. First, only relatively large firms had access to direct financing via the bond or equity markets. Funding from bonds was even more concentrated than bank lending before the crisis, despite the fact that the crisis was due in part to large firms over-expanding based on cheap credit. Smaller firms, even with their better corporate governance structures, were unable to access the new capital markets when banks stopped lending. Second, it is not clear which system – direct financing or indirect financing – works better in allocating funds more efficiently. In Korea, banks did a poor screening job prior to the crisis, and capital markets did equally poor after the crisis. Perceived as too large to fail, some chaebols, especially Daewoo, kept on pursuing expansionary strategies financed by bond issues. Ex post, there was essentially a bailout of many corporations by households who bought their bonds and the government who eventually bailed out these households following Daewoo’s collapse in 1999.24

Overall, there are two important functions of a financial market: to provide liquidity and to allocate credit efficiently. Our evidence demonstrates that bond markets can provide liquidity to relatively large firms in bank dominated emerging economies, particularly during a banking crisis. However, capital markets have many pre-requisites, such as reliable credit rating agencies, no ‘too big to fail’ beliefs, etc. In their absence, capital markets in emerging economies may allocate credit poorly leading to subsequent crises. In other words, the ‘spare tire’ may simply be a ‘donut’ tire that is inadequate for prolonged use or for driving at the standard speed limits.

24 See Oh and Rhee (2001) for more details.
References


November, 1371-1411.


Figure 1A:

Figure 1B:
### Table 1 -- Descriptive Statistics of the NICE Data (By Year, 1996-2000)

<table>
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<td></td>
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<td></td>
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<td>Number of NICE Firms with Non-zero Gross Bond Flows</td>
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<td>828</td>
<td>591</td>
<td>634</td>
<td>517</td>
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<td>145</td>
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<td>18.6</td>
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<td>1212</td>
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<td>39</td>
<td>49</td>
<td>16</td>
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<td>Firms Associated with a Top 6-30 Chaebol in 1996</td>
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<td>23</td>
<td>16</td>
<td>62</td>
<td>25</td>
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<td>Average Log Gross Equity Flows</td>
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<td>14.1</td>
<td>14.0</td>
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<td>14.4</td>
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<td>Firms Associated with a Top 5 Chaebol in 1996</td>
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<td>16.5</td>
<td>17.5</td>
<td>18.6</td>
<td>16.8</td>
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<tr>
<td>Firms Associated with a Top 6-30 Chaebol in 1996</td>
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<td>15.7</td>
<td>16.2</td>
<td>17.3</td>
<td>15.3</td>
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<tr>
<td>Herfindahl Index for Gross Equity Flows</td>
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<td>1.69</td>
<td>2.21</td>
<td>1.91</td>
<td>1.76</td>
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Summary statistics are presented for a balanced panel of firms from 1996-2000. All variables are presented in percents. Standard deviations are presented below the means in parentheses. Financial flows are calculated using cash flow data reported under financing activities. Ordinary income is revenues from sales plus dividends and gains on securities, minus the cost of sales, administrative and sales expenses, and interest payments. Net Income is ordinary income minus taxes and extraordinary items. All measures are normalized by total assets. The top 30 chaebols are determined using the 1996 KFTC listing.

<table>
<thead>
<tr>
<th>Financial Flows</th>
<th>Top 5 Chaebols (N=84)</th>
<th>Top 6-30 Chaebols (N=134)</th>
<th>Non-Chaebol Firms (N=3665)</th>
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<tr>
<td>Net Bond Flows / Assets</td>
<td>5.61</td>
<td>5.33</td>
<td>10.07</td>
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<td>(6.40)</td>
<td>(6.10)</td>
<td>(8.68)</td>
<td>(7.50)</td>
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<td>Net Loan Flows / Assets</td>
<td>8.93</td>
<td>9.53</td>
<td>-7.14</td>
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<td>(10.5)</td>
<td>(9.9)</td>
<td>(12.2)</td>
<td>(14.2)</td>
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<td>Net Equity Flows / Assets</td>
<td>3.65</td>
<td>0.95</td>
<td>4.15</td>
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<td>(11.5)</td>
<td>(2.65)</td>
<td>(9.54)</td>
<td>(9.82)</td>
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<td>Profit Measures</td>
<td>Top 5 Chaebols (N=84)</td>
<td>Top 6-30 Chaebols (N=134)</td>
<td>Non-Chaebol Firms (N=3665)</td>
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<tr>
<td>Net Income / Assets</td>
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<td>1.83</td>
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<td>(10.5)</td>
<td>(5.2)</td>
<td>(6.7)</td>
<td>(23.7)</td>
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<td>Ordinary Income / Assets</td>
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<td>(10.5)</td>
<td>(4.9)</td>
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<td>(17.9)</td>
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Table 3 -- Pre-Crisis (1996) Summary Statistics

All reported summary statistics are with regards to firm observations in 1996. The balanced panel subcategory refers to firms found in a balanced panel from 1996-2000. Standard deviations are presented below the means in parentheses. Ownership concentration is the sum of personal shareholder stakes found in the ownership data. The control-ownership rights gap is the difference in the total sum of shareholdings for large shareholders and personal shareholding stakes. The debt ratio is total liabilities over total assets. Cash is marketable securities plus cash assets. Market share is with respect to total sales within 4-digit industry codes. Profits is measured using ordinary income normalized by total assets. All variables are given in percentages except for log of total assets.

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<td></td>
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<td>(N=3883)</td>
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<td>Top 6-30 Chaebols Only (N=134)</td>
<td>Non-Chaebol Firms (N=3665)</td>
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<td>Ownership Concentration (%)</td>
<td>45.87</td>
<td>7.25</td>
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<td></td>
<td>(34.97)</td>
<td>(17.91)</td>
<td>(20.42)</td>
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<td>Control-Ownership Rights Gap (%)</td>
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<td>45.00</td>
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<td>Log of Total Assets</td>
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<td>Debt Ratio (%)</td>
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<td>(25.30)</td>
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<td>Training Expenditures / Assets (%)</td>
<td>0.07</td>
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<td>(0.27)</td>
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132
Table 4: Post-Crisis Gross Bond Flows, Chaebol Affiliation & Corporate Governance (All Firms)
The table reports coefficients from firm-level regressions of 1998 gross bond flows onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Dependent variable is the log of 1998 gross bond flows (in 1000s of Won). All RHS variables are measured with respect to 1996 levels. Ownership concentration is Job's sum of personal shareholdings using the largest eight shareholders identified by NICE. The Control-Ownership Gap is Job's difference between the sum of all large shareholdings and the sum of only personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997-2000 and firms that exit a chaebol from 1997-98 are dropped. 'Debt' refers to total liabilities (in 1000s of Won). 'Training' and 'Advertising' refer to expenditures (in 1000s of Won) on training and advertising. 'Cash' is the sum of cash assets and marketable securities (1000s of Won). Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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<td>3.44 ***</td>
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<td></td>
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Table 5: Post-Crisis Gross Equity Flows, Chaebol Affiliation & Corporate Governance (All Firms)

The table reports coefficients from firm-level regressions of 1999 gross equity flows onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Dependent variable is the log of 1999 gross equity flows (in 1000s of Won). All RHS variables are measured with respect to 1996 levels. Ownership concentration is Jol's sum of personal shareholdings using the largest eight shareholders identified by NICE. The Control-Ownership Gap is Jol's difference between the sum of all large shareholdings and the sum of only personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997-98 and firms that exit a chaebol from 1997-98 are dropped. 'Debt' refers to total liabilities (in 1000s of Won). 'Training' and 'Advertising' refer to expenditures (in 1000s of Won) on training and advertising. 'Cash' is the sum cash assets and marketable securities (1000s of Won). Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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134
Table 6A: Pre-Crisis Gross Loan Flows, Chaebol Affiliation & Corporate Governance (All Firms)

The table reports coefficients from firm-level regressions of log 1996 gross loan flows onto firm characteristics using OLS with standard errors clustered around chaebol affiliation. Dependent variable is the log of 1996 gross loan flows (in 1000s of Won). Ownership concentration is Job's sum of personal shareholdings using the largest eight shareholders identified by NICE in 1996. The Control-Ownership Gap is Job's difference between the sum of all large shareholdings and the sum of only personal shareholdings using the largest eight shareholders identified by NICE in 1996. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. All remaining RHS variables are measured with respect to 1995 levels. 'Debt' refers to total liabilities (in 1000s of Won). 'Training' and 'Advertising' refer to expenditures (in 1000s of Won) on training and advertising. 'Cash' is the sum cash assets and marketable securities (1000s of Won). Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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Table 6B: Post-Crisis Gross Loan Flows, Chaebol Affiliation & Corporate Governance (All Firms)
The table reports coefficients from firm-level regressions of 2000 gross loan flows onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Dependent variable is the log of 2000 gross loan flows (in 1000s of Won). All RHS variables are measured with respect to 1996 levels. Ownership concentration is Joh's sum of personal shareholdings using the largest eight shareholders identified by NICE. The Control-Ownership Gap is Joh's difference between the sum of all large shareholdings and the sum of only personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997-2000 and firms that exit a chaebol from 1997-98 are dropped. 'Debt' refers to total liabilities (in 1000s of Won). 'Training' and 'Advertising' refer to expenditures (in 1000s of Won) on training and advertising. 'Cash' is the sum cash assets and marketable securities (1000s of Won). Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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Panel A: No Corporate Governance Measures

Panel B: Corporate Governance Measure #1, Ownership Concentration

Panel C: Corporate Governance Measure #2, Control-Ownership Rights
Table 7: Post-Crisis Net Bond Flows, Chaebol Affiliation & Ownership Concentration (All Firms)

The table reports coefficients from firm-level regressions of post-crisis net bond flows onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Dependent variables are the post-crisis ratio of net bond flows over total assets, in percentage terms. All RHS variables are measured with respect to 1996 levels. For yearly regressions, all firms with non-missing observations are included. Regressions that average over 1998-2000 use all firms with at least one post-crisis, non-missing dependent variable. Ownership concentration is Jo’s sum of personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997-2000 and firms that exit a chaebol from 1997-98 are dropped. ‘Debt’ refers to total liabilities. ‘Training’, ‘R&D’, and ‘Advertising’ refer to expenditures on training, R&D, and advertising. ‘Cash’ is the sum cash assets and marketable securities. Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

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<th>Training / Assets</th>
<th>R&amp;D/ Assets</th>
<th>Cash/ Assets</th>
<th>Advertising / Assets</th>
<th>Market Share %</th>
<th># of Firms</th>
<th>R-Sq.</th>
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</thead>
<tbody>
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<td>Avg. Bonds / Assets (1998-2000)</td>
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<td>(1.48)</td>
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<td>-0.64 *</td>
<td>-28.05</td>
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<td>(0.017)</td>
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<td>Bond Flows / Assets (2000 ONLY)</td>
<td>1.55 ***</td>
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<td>0.46</td>
<td>1.02 *</td>
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<td>-0.87 **</td>
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<td>-3.03</td>
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<td>-0.85 **</td>
<td>-25.93</td>
<td>-7.09</td>
<td>-1.94 **</td>
<td>5.79 *</td>
<td>0.018</td>
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<td>(0.33)</td>
<td>(16.66)</td>
<td>(10.04)</td>
<td>(0.93)</td>
<td>(3.46)</td>
<td>(0.016)</td>
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</tbody>
</table>
Table 8: Post-Crisis Net Bond Flows, Chaebol Affiliation & Ownership Concentration (Largest 500 Firms)

The table reports coefficients from firm-level regressions of post-crisis net bond flows onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Only the largest 500 firms (in total assets) in 1996 are included. Dependent variables are the post-crisis ratio of net bond flows over total assets (in percent). All RHS variables are measured with respect to 1996 levels. For yearly regressions, all firms with non-missing observations are included. Regressions that average over 1998-2000 use all firms with at least one post-crisis, non-missing dependent variable. Ownership concentration is Joh’s sum of personal shareholdings using the largest eight shareholders. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top chaebols. Firms entering a top 30 chaebol from 1997-2000 and firms that exit a chaebol from 1997-98 are dropped before determining the Top 500. 'Debt' refers to total liabilities. 'Training', 'R&D', and 'Advertising' refer to expenditures on training, R&D, and advertising. 'Cash' is the sum cash assets and marketable securities. Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Var.</th>
<th>Top 5 Chaebol</th>
<th>6-30 Chaebol</th>
<th>Ownership Conc. * Top</th>
<th>Owner Conc.</th>
<th>Log of Total</th>
<th>Debt/Assets</th>
<th>Training / Assets</th>
<th>R&amp;D/Assets</th>
<th>Cash/Assets</th>
<th>Advertising / Assets</th>
<th>Market Share %</th>
<th># of Firms</th>
<th>R-Sq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. Bonds / Assets (1998-2000)</td>
<td>6.05 ***</td>
<td>1.29</td>
<td>-0.50</td>
<td>-24.44</td>
<td>(1.65)</td>
<td>(1.54)</td>
<td>(0.82)</td>
<td>(26.93)</td>
<td>5.94 **</td>
<td>1.30</td>
<td>-0.21</td>
<td>-24.26</td>
<td>0.14</td>
</tr>
<tr>
<td>Bond Flows / Assets (1998 ONLY)</td>
<td>10.20 ***</td>
<td>4.77 **</td>
<td>-1.98 **</td>
<td>-4.29</td>
<td>(0.89)</td>
<td>(1.80)</td>
<td>(0.96)</td>
<td>(7.75)</td>
<td>8.74 ***</td>
<td>4.27 **</td>
<td>-0.88</td>
<td>-4.86</td>
<td>1.14 ***</td>
</tr>
<tr>
<td>Bond Flows / Assets (1999 ONLY)</td>
<td>6.51</td>
<td>-2.94</td>
<td>-0.23</td>
<td>-67.93</td>
<td>(4.84)</td>
<td>(4.23)</td>
<td>(1.09)</td>
<td>(78.69)</td>
<td>8.24</td>
<td>-2.26</td>
<td>-1.15</td>
<td>-68.68</td>
<td>-1.24</td>
</tr>
<tr>
<td>Bond Flows / Assets (2000 ONLY)</td>
<td>1.54 **</td>
<td>2.44 **</td>
<td>0.96</td>
<td>-0.80</td>
<td>(0.78)</td>
<td>(1.60)</td>
<td>(1.72)</td>
<td>(4.35)</td>
<td>0.89</td>
<td>2.27 **</td>
<td>1.77</td>
<td>-0.64</td>
<td>0.58 *</td>
</tr>
</tbody>
</table>

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Table 9: Post-Crisis Net Bond Flows, Chaebol Affiliation & Ownership Concentration (Balanced Panel)
The table reports coefficients from firm-level regressions of post-crisis net bond flows onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Only firms in a 1996-2000 balanced panel were included. Dependent variables are the post-crisis ratio of net bond flows over total assets, in percentage terms. All RHS variables are measured with respect to 1996 levels. For yearly regressions, all firms with non-missing observations are included. Regressions that average over 1998-2000 use all firms with at least one post-crisis, non-missing dependent variable. Ownership concentration is Joh's sum of personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997-2000 and firms that exit a chaebol from 1997-98 are dropped. 'Debt' refers to total liabilities. 'Training', 'R&D', and 'Advertising' refer to expenditures on training, R&D, and advertising. 'Cash' is the sum cash assets and marketable securities. Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Var.</th>
<th>Top 5 Chaebol</th>
<th>6-30 Chaebol</th>
<th>Ownership Conc.</th>
<th>Owner Conc. * Top</th>
<th>Log of Total</th>
<th>Debt/Assets</th>
<th>Training / Assets</th>
<th>R&amp;D/Assets</th>
<th>Cash/Assets</th>
<th>Advertising / Assets</th>
<th>Market Share %</th>
<th># of Firms</th>
<th>R-Sq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. Bonds / Assets (1998-2000)</td>
<td>5.16 ***</td>
<td>1.26</td>
<td>-1.05 ***</td>
<td>-11.73</td>
<td>(0.89)</td>
<td>(1.67)</td>
<td>(0.16)</td>
<td>(10.93)</td>
<td>3.77 **</td>
<td>0.42</td>
<td>-0.39 *</td>
<td>-12.10</td>
<td>0.57 ***</td>
</tr>
<tr>
<td>Bond Flows / Assets (1998 ONLY)</td>
<td>9.77 ***</td>
<td>5.12 ***</td>
<td>-1.07 ***</td>
<td>-4.90</td>
<td>(0.79)</td>
<td>(1.29)</td>
<td>(0.19)</td>
<td>(3.30)</td>
<td>7.50 ***</td>
<td>3.74 **</td>
<td>-0.05</td>
<td>-5.63 *</td>
<td>0.92 ***</td>
</tr>
<tr>
<td>Bond Flows / Assets (1999 ONLY)</td>
<td>4.03</td>
<td>-3.28</td>
<td>-1.21 ***</td>
<td>-27.69</td>
<td>(2.68)</td>
<td>(4.48)</td>
<td>(0.27)</td>
<td>(32.83)</td>
<td>3.31</td>
<td>-3.71</td>
<td>-0.82 *</td>
<td>-27.79</td>
<td>0.31</td>
</tr>
<tr>
<td>Bond Flows / Assets (2000 ONLY)</td>
<td>1.67 **</td>
<td>1.93 **</td>
<td>-0.86 ***</td>
<td>-2.39</td>
<td>(0.53)</td>
<td>(0.65)</td>
<td>(0.23)</td>
<td>(2.28)</td>
<td>0.50</td>
<td>1.23 **</td>
<td>-0.29</td>
<td>-2.87</td>
<td>0.49 ***</td>
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<tr>
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<td>0.51</td>
<td>1.24 **</td>
<td>-0.30</td>
<td>-3.13</td>
<td>0.47 ***</td>
<td>-0.79 **</td>
<td>-16.37</td>
<td>-5.65</td>
<td>-1.87 *</td>
<td>5.57</td>
<td>0.002</td>
<td>2570</td>
<td>0.03</td>
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Table 10: Post-Crisis Net Equity Flows, Chaebol Affiliation & Ownership Concentration (Balanced Panel)

The table reports coefficients from firm-level regressions of post-crisis net equity flows onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Only firms in a 1996-2000 balanced panel were included. Dependent variables are the post-crisis ratio of net equity flows over total assets, in percentage terms. All RHS variables are measured with respect to 1996 levels. For yearly regressions, all firms with non-missing observations are included. Regressions that average over 1998-2000 use all firms with at least one post-crisis, non-missing dependent variable. Ownership concentration is Jh's sum of personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997-2000 and firms that exit a chaebol from 1997-98 are dropped. 'Debt' refers to total liabilities. 'Training', 'R&D', and 'Advertising' refer to expenditures on training, R&D, and advertising. 'Cash' is the sum cash assets and marketable securities. Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
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<th>Dependent Var.</th>
<th>Top 5 Chae-</th>
<th>6-30 Chae-</th>
<th>Ownership Conc.</th>
<th>Owner Conc. * Top</th>
<th>Log of Total</th>
<th>Debt/ Assets</th>
<th>Training/ Assets</th>
<th>R&amp;D/ Assets</th>
<th>Cash/ Assets</th>
<th>Advertising/ Assets</th>
<th>Market Share %</th>
<th># of Firms</th>
<th>R-Sq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Equity / Assets (1998-2000)</td>
<td>1.96 * (1.14)</td>
<td>0.98 (1.00)</td>
<td>-0.93 * (0.53)</td>
<td>-2.34 (2.93)</td>
<td>3.22 ** (0.98)</td>
<td>1.72 * (0.72)</td>
<td>-1.66 ** (2.65)</td>
<td>-2.27 (0.26)</td>
<td>-0.55 ** (0.82)</td>
<td>2.04 ** (0.25)</td>
<td>29.48 (55.67)</td>
<td>119.06 (91.77)</td>
<td>-4.45 ** (1.92)</td>
</tr>
<tr>
<td>Equity Flows/Assets (1998 ONLY)</td>
<td>2.18 ** (0.76)</td>
<td>-1.26 (0.79)</td>
<td>-0.67 (0.42)</td>
<td>3.83 (7.36)</td>
<td>2.46 ** (0.90)</td>
<td>-1.14 (0.80)</td>
<td>-1.14 ** (0.51)</td>
<td>3.19 (7.09)</td>
<td>-0.20 (0.17)</td>
<td>3.66 *** (0.98)</td>
<td>25.29 (65.08)</td>
<td>27.94 (19.95)</td>
<td>-4.24 ** (1.73)</td>
</tr>
<tr>
<td>Equity Flows/Assets (1999 ONLY)</td>
<td>4.46 ** (2.11)</td>
<td>3.72 ** (1.33)</td>
<td>-0.71 (0.44)</td>
<td>4.95 * (2.76)</td>
<td>4.59 ** (2.12)</td>
<td>3.79 ** (1.37)</td>
<td>-0.89 (0.60)</td>
<td>5.16 * (2.73)</td>
<td>-0.09 (0.17)</td>
<td>1.28 (0.99)</td>
<td>65.11 (64.95)</td>
<td>31.03 * (18.21)</td>
<td>-2.35 (2.83)</td>
</tr>
<tr>
<td>Equity Flows/Assets (2000 ONLY)</td>
<td>-0.78 (1.51)</td>
<td>0.47 (2.06)</td>
<td>-1.40 (1.41)</td>
<td>5.89 (4.21)</td>
<td>2.60 (1.76)</td>
<td>2.52 (1.94)</td>
<td>-2.94 (1.92)</td>
<td>-4.85 (3.87)</td>
<td>-1.37 * (0.72)</td>
<td>1.19 (1.73)</td>
<td>2.86 * (1.72)</td>
<td>2.50 (1.94)</td>
<td>-2.71 (1.73)</td>
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</table>
Table 11: Post-Crisis Net Income, Chaebol Affiliation & Ownership Concentration (Balanced Panel)

The table reports coefficients from firm-level regressions of post-crisis net income / total assets onto pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. Only firms in a 1996-2000 balanced panel were included. Dependent variables are the post-crisis ratio of net income over total assets, in percentage terms. All RHS variables are measured with respect to 1996 levels. For yearly regressions, all firms with non-missing observations are included. Regressions that average over 1998-2000 use all firms with at least one post-crisis, non-missing dependent variable. Ownership concentration is J-h's sum of personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and Top 6-30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997-2000 and firms that exit a chaebol from 1997-98 are dropped. 'Debt' refers to total liabilities. 'Training', 'R&D', and 'Advertising' refer to expenditures on training, R&D, and advertising. 'Cash' is the sum cash assets and marketable securities. Market share is measured using 4-digit industry codes. Standard errors are reported in parentheses. * = 10% level, ** = 5% level, *** = 1% level.

<table>
<thead>
<tr>
<th>Dependent Var.</th>
<th>Top 5 Chaebol</th>
<th>6-30 Chaebol</th>
<th>Owner Conc.</th>
<th>Owner Conc. * Top</th>
<th>Log of Total</th>
<th>Debt / Assets</th>
<th>Training / Assets</th>
<th>R&amp;D / Assets</th>
<th>Cash / Assets</th>
<th>Advertising / Assets</th>
<th>Market Share %</th>
<th># of Firms</th>
<th>R-Sq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. Income/Assets (1998-2000)</td>
<td>-0.91</td>
<td>1.85</td>
<td>6.53 **</td>
<td>5.96</td>
<td>(8.45)</td>
<td>(5.00)</td>
<td>(3.36)</td>
<td>(10.30)</td>
<td>12.57</td>
<td>11.13</td>
<td>9.63</td>
<td>29.45</td>
<td>-2.98 **</td>
</tr>
<tr>
<td>Net Income/Assets (1998 ONLY)</td>
<td>4.62 **</td>
<td>-2.08</td>
<td>7.10 ***</td>
<td>-0.22</td>
<td>(1.72)</td>
<td>(5.02)</td>
<td>(1.56)</td>
<td>(13.77)</td>
<td>11.69 ***</td>
<td>2.44</td>
<td>5.90 ***</td>
<td>16.1</td>
<td>-2.33 ***</td>
</tr>
<tr>
<td>Net Income/Assets (1999 ONLY)</td>
<td>-3.97</td>
<td>-2.65</td>
<td>2.95 ***</td>
<td>2.41</td>
<td>(6.73)</td>
<td>(2.68)</td>
<td>(0.89)</td>
<td>(9.99)</td>
<td>1.41</td>
<td>0.73</td>
<td>1.59 *</td>
<td>6.35</td>
<td>-1.89 ***</td>
</tr>
<tr>
<td>Net Income/Assets (2000 ONLY)</td>
<td>-3.38</td>
<td>10.27</td>
<td>9.52</td>
<td>15.70</td>
<td>(19.72)</td>
<td>(12.33)</td>
<td>(9.73)</td>
<td>(19.12)</td>
<td>24.60</td>
<td>30.22</td>
<td>21.41</td>
<td>75.84</td>
<td>-4.72</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>(39.12)</td>
<td>(29.49)</td>
<td>(21.95)</td>
<td>(75.66)</td>
<td>(3.71)</td>
<td>228.1</td>
<td>30.62</td>
<td>25.14</td>
<td>11.35</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>(52.63)</td>
<td>(26.80)</td>
<td>(12.33)</td>
<td>(93.26)</td>
<td>(14.24)</td>
<td>175.5</td>
<td>4017.0</td>
<td>515.4</td>
<td>2745.9</td>
</tr>
</tbody>
</table>
Appendix Table 1 -- Definition and Source of Variables

All variables except the price index and chaebol indicators are obtained from either the NICE datasets. Numbers given in parentheses represent the actual NICE code for that particular variable.

Financial Flow Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Bond Flows</td>
<td>Constructed using the 'cash flows from financing activities' section of the NICE financial data set. Gross bond flows = &quot;Increase in debentures payable&quot; (_43121). All missing values were assumed to be zeros so long as at least one other financial cash flow variable was non-missing for that given firm-year observation.</td>
</tr>
<tr>
<td>Gross Equity Flows</td>
<td>Constructed using the 'cash flows from financing activities' section of the NICE financial data set. Gross equity flows = &quot;Increase in capital stock&quot; (_43140) + &quot;Payment of margin for new stock offering&quot; (_43150) + &quot;Increase in Paid-in capital in excess of par values&quot; (_43161). All missing values were assumed to be zeros so long as at least one other financial cash flow variable was non-missing for that given firm-year observation.</td>
</tr>
<tr>
<td>Gross Loan Flows</td>
<td>Constructed using the 'cash flows from financing activities' section of the NICE financial data set. Gross loan flows = &quot;Increase in short-term borrowings&quot; (_43111) + &quot;Increase in long-term borrowings (Foreign Currency)&quot; (_43122). All missing values were assumed to be zeros so long as at least one other financial cash flow variable was non-missing for that given firm-year observation.</td>
</tr>
<tr>
<td>Net Bond Flows</td>
<td>Constructed using the 'cash flows from financing activities' section of the NICE financial data set. Net bond flows = Gross bond flows - &quot;Redemption of debentures payable by purchase&quot; (_43521). All missing values were assumed to be zeros so long as at least one other financial cash flow variable was non-missing for that given firm-year observation.</td>
</tr>
<tr>
<td>Net Equity Flows</td>
<td>Constructed using the 'cash flows from financing activities' section of the NICE financial data set. Net equity flows = Gross equity flows - &quot;Decrease in capital stock&quot; (_43550). All missing values were assumed to be zeros so long as at least one other financial cash flow variable was non-missing for that given firm-year observation.</td>
</tr>
<tr>
<td>Net Loan Flows</td>
<td>Constructed using the 'cash flows from financing activities' section of the NICE financial data set. Net loan flows = Gross loan flows - &quot;Redemption of short-term borrowings&quot; (_43511) - &quot;Redemption of long-term borrowings (foreign currency)&quot; (_43522). All missing values were assumed to be zeros so long as at least one other financial cash flow variable was non-missing for that given firm-year observation.</td>
</tr>
</tbody>
</table>

Ownership Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control-Ownership Rights Gap</td>
<td>This variable is obtained directly from Joh (2003), who creates the variable using the ownership data provided by NICE. For each firm, the NICE ownership data lists the largest eight shareholders and their direct</td>
</tr>
</tbody>
</table>
ownership stake (in percent) of that firm. 'Control-Ownership Rights Gap' is calculated by summing over the ownership stakes for all of the largest eight shareholders and then subtracting 'ownership concentration' (see below for construction of this variable). In all regressions, this variable is given as a fraction rather than a percent.

Ownership Concentration

This variable is obtained directly from Joh (2003), who creates the variable using the ownership data provided by NICE. For each firm, the NICE ownership data lists the largest eight shareholders and their direct ownership stake (in percent) of that firm. 'Ownership concentration' is calculated by simply summing the ownership stakes for "personal" holdings among the top shareholders. All institutional shareholders (financial institutions and non-financial corporations), foreign owners, government, and employment stock ownership stakes are excluded from this calculation. In all regressions, this variable is given as a fraction rather than a percent.

Chaebol Indicators

Top 5 Chaebol Indicator

The top 5 chaebols are determined using the Korean Fair Trade Commission's (KFTC) annual publication of the largest 30 chaebols based on total assets. The Top 5 Chaebols indicator in the regressions uses the 1996 KFTC listing. For firms associated with a top 5 chaebol in 1996, the indicator equals "1", while the indicator equals zero for all other firms. The top 5 chaebols are Hyundai, Samsung, Daewoo, SK, and LG.

Top 6-30 Chaebol Indicator

The top 6-30 chaebols are determined using the Korean Fair Trade Commission's (KFTC) annual publication of the largest 30 chaebols based on total assets. The Top 6-30 Chaebols indicator in the regressions uses the 1996 KFTC listing. For firms associated with a top 6-30 chaebol in 1996, the indicator equals "1", while the indicator equals zero for all other firms.

Firm Characteristics

Advertising Expenditures

Equals the NICE financial dataset variable "Advertising Expense" (_24730). All missing values are assumed to be zeros.

Cash

Calculated using the NICE financial data on current assets. Cash = "Cash" (_11111) + "Marketable Securities" (_11120). All missing values are assumed to be zeros.

Debt Ratio

= Total Liabilities / Total Assets. Missing values are left missing.

Market Share

Calculated using the NICE financial dataset variable "Total Sales" (_21000). Missing total sales are assumed to be zeros. The market share is calculated using the four digit industry codes provided by NICE.

R&D Expenditures

Calculated using the NICE financial data on expenses. R&D expenditures = "R&D Costs" (_24780 + _24765) + "Usual R&D Expenses" (_24770). All missing values are assumed to be zeros.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Assets</strong></td>
<td>Equals the NICE financial dataset variable &quot;Total Assets&quot; (_14900). Missing values are left missing.</td>
</tr>
<tr>
<td><strong>Total Liabilities</strong></td>
<td>Equals the NICE financial dataset variable &quot;Total Liabilities&quot; (_16900). Missing values are left missing.</td>
</tr>
<tr>
<td><strong>Training Expenditures</strong></td>
<td>Equals the NICE financial dataset variable &quot;Training Expense&quot; (_24440). All missing values are assumed to be zeros.</td>
</tr>
</tbody>
</table>

### Profit Variables

| **Net Income** | Calculated using the NICE financial dataset variable "Net Income [or loss] Before Income Taxes" (_29000). According to Joh (2003), the accounting definition of net income is ordinary income minus extraordinary items. |
| **Ordinary Income** | Calculated using the NICE financial dataset variable "Ordinary Income [or loss]" (_27000). According to Joh (2003), the accounting definition of ordinary income is operating income (sales minus the cost of sales, selling expenses, and administrative expenses) minus interest payments plus dividends and gains on securities. |

### Price Index

The NICE financial dataset reports nominal values. These nominal values were indexed for inflation using the Consumer Price Index (CPI) issued by the Korean Central Bank. The base year is 2000.
## Appendix Table 2 -- Korean Corporate Sector Net Finance Flows, 1990-2002

All values are given in units of one billion Won. SOURCE: Bank of Korea

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Financing</td>
<td>50753</td>
<td>58180</td>
<td>54889</td>
<td>64982</td>
<td>89040</td>
<td>100016</td>
<td>118769</td>
<td>118022</td>
<td>27664</td>
<td>51755</td>
<td>65759</td>
<td>50645</td>
<td>83318</td>
</tr>
<tr>
<td>Direct Financing</td>
<td>21512</td>
<td>22079</td>
<td>21348</td>
<td>31928</td>
<td>32490</td>
<td>48071</td>
<td>56097</td>
<td>44087</td>
<td>49496</td>
<td>24792</td>
<td>17204</td>
<td>37735</td>
<td>20009</td>
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<tr>
<td>Corporate Paper</td>
<td>1902</td>
<td>-2211</td>
<td>4183</td>
<td>9017</td>
<td>4405</td>
<td>16096</td>
<td>20737</td>
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<td>-16116</td>
<td>-4764</td>
<td>4399</td>
<td>-3777</td>
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<tr>
<td>Bonds</td>
<td>10931</td>
<td>14065</td>
<td>6616</td>
<td>9452</td>
<td>12606</td>
<td>15351</td>
<td>21213</td>
<td>27460</td>
<td>45907</td>
<td>-2827</td>
<td>-2063</td>
<td>11444</td>
<td>-7857</td>
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<tr>
<td>Stocks</td>
<td>5987</td>
<td>6665</td>
<td>7177</td>
<td>9542</td>
<td>13198</td>
<td>14445</td>
<td>12981</td>
<td>8974</td>
<td>13515</td>
<td>41137</td>
<td>20751</td>
<td>16191</td>
<td>28720</td>
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<tr>
<td>Indirect Finance</td>
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<td>24343</td>
<td>19912</td>
<td>20373</td>
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<td>31855</td>
<td>33231</td>
<td>43375</td>
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<td>2198</td>
<td>11728</td>
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<td>51102</td>
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<tr>
<td>Banks</td>
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<td>11541</td>
<td>8313</td>
<td>8487</td>
<td>18442</td>
<td>14898</td>
<td>16676</td>
<td>15184</td>
<td>259</td>
<td>15525</td>
<td>23279</td>
<td>3196</td>
<td>41137</td>
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<tr>
<td>Non-Banks</td>
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<td>12803</td>
<td>11599</td>
<td>11887</td>
<td>21208</td>
<td>16957</td>
<td>16555</td>
<td>28191</td>
<td>-16550</td>
<td>-13267</td>
<td>-11551</td>
<td>-3690</td>
<td>8606</td>
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<tr>
<td>Overseas Borrowings</td>
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<td>2402</td>
<td>3892</td>
<td>996</td>
<td>5857</td>
<td>8392</td>
<td>12383</td>
<td>6563</td>
<td>-9809</td>
<td>11577</td>
<td>16820</td>
<td>633</td>
<td>2446</td>
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<td>Other</td>
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<td>9355</td>
<td>9737</td>
<td>11685</td>
<td>11044</td>
<td>11699</td>
<td>17058</td>
<td>23997</td>
<td>3839</td>
<td>13228</td>
<td>19967</td>
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<td>Nominal GDP</td>
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<td>340208</td>
<td>398838</td>
<td>448596</td>
<td>491135</td>
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<td>529500</td>
<td>578665</td>
<td>622123</td>
<td>684264</td>
</tr>
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</table>
Appendix Table 3 -- Observations Dropped and Chaebol Definitions

Panel A -- Number and Type of Observations Available

<table>
<thead>
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</thead>
<tbody>
<tr>
<td><strong>Total Number of Firms in NICE dataset</strong></td>
<td>6975</td>
<td>7877</td>
<td>7574</td>
<td>8950</td>
<td>8429</td>
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<tr>
<td>Firms with Non-missing Financial Flows</td>
<td>5276</td>
<td>6408</td>
<td>6022</td>
<td>7628</td>
<td>7551</td>
</tr>
<tr>
<td><strong>Firms with 1996 Ownership Data Available</strong></td>
<td>3422</td>
<td>3327</td>
<td>3033</td>
<td>3042</td>
<td>2855</td>
</tr>
<tr>
<td>Firms associated with a Top 5 Chaebol in 1996</td>
<td>55</td>
<td>55</td>
<td>54</td>
<td>52</td>
<td>54</td>
</tr>
<tr>
<td>Firms associated with a Top 6-30 Chaebol in 1996</td>
<td>112</td>
<td>111</td>
<td>103</td>
<td>98</td>
<td>95</td>
</tr>
<tr>
<td><strong>Firms in a Balanced Panel (1996-2000)</strong></td>
<td>3883</td>
<td>3883</td>
<td>3883</td>
<td>3883</td>
<td>3883</td>
</tr>
<tr>
<td>Firms associated with a Top 5 Chaebol in 1996</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Firms associated with a Top 6-30 Chaebol in 1996</td>
<td>87</td>
<td>87</td>
<td>87</td>
<td>87</td>
<td>87</td>
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</tbody>
</table>

Panel B -- Changes in the Top 30 Chaebol Definitions

<table>
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</thead>
<tbody>
<tr>
<td>NICE firms that exit a &quot;1996 Top 30 Chaebol&quot; during 1997-1998</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Number with both ownership &amp; financial data available</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>NICE firms that enter a &quot;1996 Top 30 Chaebol&quot; after 1996</td>
<td>14</td>
<td>16</td>
<td>18</td>
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<td>39</td>
</tr>
<tr>
<td>Number with both ownership &amp; financial data available</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>5</td>
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<tr>
<td>NICE firms associated with a Top 30 chaebol ONLY after 1996</td>
<td>n.a.</td>
<td>79</td>
<td>136</td>
<td>161</td>
<td>155</td>
</tr>
<tr>
<td>Number with both ownership &amp; financial data available</td>
<td>34</td>
<td>59</td>
<td>70</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>&quot;1996 Top 30 Chaebol&quot; firms that enter bankruptcy</td>
<td>n.a.</td>
<td>8</td>
<td>12</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Number with both ownership &amp; financial data available</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>13</td>
</tr>
</tbody>
</table>

1 Financial flows are calculated by replacing missing values with zeros so long as at least one other financial cash flow in that particular firm-year observation is non-missing.
2 There is no need to worry about these firms since none of them have both ownership & financial data.
3 These firms are dropped from our baseline regressions. Our results are robust to their inclusion as either a "Top 30 Chaebol" or as a "non-chaebol" firm.
4 These firms are not dropped from baseline regressions but results are robust to their inclusion as a "Top 30 chaebol".
5 Three of the top 30 chaebols (Han Bo #14, Sammi #26, Kuk Dong #28) drop out of the top 30 in 1997 due to bankruptcy. Kia #8 and Hanil #27 drop out beginning in 1998 because of bankruptcy. Hanla #16 and Haitai #25 drop out beginning in 2000 because of bankruptcy. Daewoo #3 does not officially drop out of the top 30 until 2001 because of bankruptcy (and hence, is not included in these numbers). Dropping these firms (along with Daewoo) does not affect our results.