Relationship Lending, Accounting Disclosure, and Credit Availability during Crisis

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Abstract

This paper examines whether the intensity of banking relationships, measured by the low number of banks a firm does business with, and accounting disclosure benefit firms with greater credit availability during periods of financial stress. We use survey data conducted by the World Bank, which include observations of small and medium sized firms in Indonesia, Korea, Philippines, and Thailand, for the Asian financial crisis years. In our model specifications, we treat the firm's decision to build multiple banking relationships, to pledge collateral, and provide independent audits when applying for loans as endogenous variables. We find that with diverse borrowing, while Korean and Thai firms experience a higher likelihood of credit constraint, the Philippine firms enjoy greater credit availability. For Indonesian firms, lending relationships have no significant effect on credit availability. Moreover, we do not find evidence of greater credit availability for firms with independent audits. The country-varying results are consistent with the structure and the health of the banking systems in these countries.

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1. Introduction

The extant bank relationship research argues that establishing a lending relationship with a bank can reduce asymmetries of information and create value to the borrower. This value can come either in the form of reduced interest rate for loans and prices for other services offered by the bank or as a commitment to extend loans in times of crisis[1].

Previous empirical studies of the relationship banking primarily focus on the impact of relationship on prices of services, specifically loan rates, offered by the bank. While informative, these studies do not control for possible intertemporal nature of bank relationships. For example, a positive correlation between bank relationship and interest rate paid on bank loans cannot constitute evidence against the value of relationship if firms accept higher loan rates with the expectation and promise of credit availability in tough times. In other words, interest rate paid can be a function of a number of factors including, expectation of lower rates in the future, commitment of doing business in crisis times, purchases of other services, and probability of being held up by the bank in the future. Such diverse possibilities can cause loan rate and relationship banking to have an ambiguous correlation. Indeed, while Berger and Udell (1995) reports relationship duration has a negative impact on the loan rate, Degryse and Van Cayseele (2000) provides evidence that the correlation is positive, and Petersen and Rajan (1994) and Elsas and Krahnen (1998) repot no significant correlation.

We depart from earlier studies by examining correlation between relationship banking and credit availability in crisis times. Specifically, we examine the interaction

[1] For excellent literature reviews see Boot (2000), Degryes and Ongena (2002), Ongena and Smith (2000).

between loan denial rates and the intensity of the bank-relationship at four Asian countries in the vicinity of crisis years of 1996 through 1998 using data from a survey undertaken by the World Bank. We measure the intensity of relationship by the number of financial institutions that the firm borrows from, in which the intensity is highest if a firm uses only one bank. We also allow the credit availability to be jointly determined with the decision to post collateral and choice of the number of banks for doing business. We should note that we are not the first to examine the impact of lending relationship on credit availability during a period of sharp financial stress. Using the loan records of a 19th century U.S. bank, Bodenhorn (2003) shows evidence that borrowers with bank relationship are more likely to have loan terms renegotiated during a financial crisis. Our paper provides the first cross-country evidence on relationship banking when countries are in economic crisis.

Another contribution of the paper is that we control, for the first time, the effects of financial transparency and disclosure on credit availability. This aspect of lending is important because to the extent that banks function as information processors, transparency and disclosure reflected in independently audited financial information can either substitute or compliment the long term lending relationship. Finally, we investigate the impact of lending relationship to change across countries allowing for the possibility that different regulatory environments and banking structures to have non-uniform effects on the value of relationship banking.

Our main finding is that lending relationship exhibits country-varying impact on credit availability. Both Korean and the Thai firms benefit from strong lending relationship, while the opposite is true for the Philippine firms who actually benefit from

dispersed lending relationship during the crisis time. The intensity of lending relationship has insignificant impact on Indonesian firms. Such country-varying results are consistent with the underlying banking structure and the health of the banking system in each of these individual countries.

In Korea and Thailand, mergers and massive numbers of bank closures reduced bank competition and caused flight to quality by both banks and depositors. Thus as predicted by Petersen and Rajan (2001) banking relationship gained significance in decisions to extent financing to credit-constrained firms in crisis times. In addition, our finding of Korean and Thai firms with concentrated borrowing to be less credit constrained is consistent with the prior literature that shows that knowledge of the borrowers reduces the adverse selection problem banks face during periods of financial distress (Bodenhorn, 2003; Boot and Thakor, 1994; Cole, 1998; Diamond, 1991; Harhoff and Korting, 1998; and Peterson and Rajan, 1995).

In contrast, the Philippine banks were relatively well capitalized so were able to extend loans to borrowers whose dispersed lending relationship functioned as insurance during crisis time, a similar finding as Houston and James (1996). The Philippine results also confirm the intuition of Detragiache, Garella and Guiso (2000), in that diverse lending relationship provides insurance for borrowers to obtain credit.

The result of no correlation between relationship banking and credit availability for Indonesia is quite interesting. We attribute this finding to the banking structure in Indonesia, where state owned banks dominate the lending activities. Hence, in such systems a different relationship other than described in the literature might be needed to secure loans in crisis times. Thus, we provide the first evidence that a large share of state-

ownership of the banking sector could destroy the value of banking relationships in crisis times.

We also report that, contrary to predictions of Leuz and Verrecchia (2000), using external independent auditors has an insignificant impact on firms' access to credit in Thailand and Indonesia and decreases credit availability for Korean firms. The Philippines is excluded from the sample because external audit is mandatory for all firms. In line with Fischer and Verecchia (2002) and Fan and Wong (2002), the audited information might contain little valuable information in Thailand and Indonesia. Therefore, banks may largely ignore external audit when making credit decisions. The results for Korea suggest that external audit is not informational substitutes for building strong relationships with banks but rather complements what is known about the borrower.

The remainder of this paper is organized as follows. Section 2 provides the background information on the banking structure and environment. Section 3 describes sample and data. Section 4 outlines the model, which we base our empirical study. Section 5 presents the empirical results. Section 6 extends the study by examining the impact of accounting disclosure on credit availability in the presence of relationship banking. Section 7 is the conclusion.

2. State of the banking industry of sample countries in the vicinity of the crisis

Before we start our analysis it is constructive to summarize the banking structure and environment in our sample countries during the period bracketing the crisis.

In Indonesia, there were 228 banks and finance companies as of July 1997 (Economist, 1998). During the crisis, more than one-third, 83 banks and finance

companies were closed in Indonesia. According to Barth, Brumbaugh, Ramesh, and Yago (1998), a large share of banks assets in Indonesia is in state-owned banks. As of 1994, 48% of banks assets in Indonesia are in state-owned banks compared to 13% for Korea and 7% for Thailand. Although assets in private national banks, joint venture banks with foreign involvement, and foreign banks have been rising, Barth et. al (1998) argue that state-owned banks still heavily influence the Indonesian banking system. Barth et. al (1998) state, "…An important nuance, for example, is that the average size of the state-owned banks (in Indonesia) is approximately double that of private and joint and foreign banks."

The country hardest hit during the Asian financial crisis was Indonesia. The dramatic depreciation of the exchange rate (70% devaluation) and the collapse of confidence in the financial sector triggered capital flight in late 1997 and early 1998. Bank of Indonesia raised commercial interest rates in an effort to stop the depreciation of the rupiah and to control inflation.

The combination of exchange rate depreciation and soaring interest rates led to a rapid rise in non-performing loans in the banking sector. It can be speculated, that given state-owned banks playing a large role in the banking sector, the credit quality of the loans may have been poor even prior to the crisis. The crisis had further deteriorated the loan quality of the banking sector. At the end of 1998, nonperforming loans constituted 57% of the total loans.

In Korea, there were 56 banks as of July 1997 (Economist, 1998). Among the 56 banks, 26 were publicly traded commercial banks and 30 were merchant banks, which mainly lent to large Korean companies. Prior to the crisis, the government required

Korean banks to exclusively fund economic growth. The "lending to the unprofitable Chaebols indicated that Korean banks were poorly managed and regulated, were barely profitable, had bad asset quality, were illiquid and were not well capitalized." (World Bank, 2000).

When the crisis hit at the end of 1997, to defend the currency depreciation and comply with the IMF's policy advices, the government followed a tight monetary policy. As a result, interest rate soared and the banks' asset quality deteriorated from poor to catastrophic as the economy went into recession. The average non-performing loans peaked at 20% at the end of 1998.

There is also evidence that Korea suffered not only from the credit crunch through the balance sheet and lending channels, but also through a flight to quality in bank lending and deposits. According to Ding, Domac and Ferri (1998), Korea experienced a sharp increase in the risk premium on corporate debt as well as the increased spread between the overdraft lending rate and the yield on corporate bonds. Most importantly, banks increased their holdings of government securities relative to their total assets during the crisis period. Interestingly, depositors also manifested a flight to quality by transferring deposits from insolvent banks to solvent banks.

In addition to the credit crunch and flight to quality, Korean banks also faced danger of being closed, merged, or nationalized. The government took a firm stand by implementing stringent loan loss reserve requirements. The non-performing loans were sold at estimated market values that led banks to realize serious losses. The government through nationalization recapitalized those banks unable to raise sufficient capital. Under the government intervention, mergers and branch closures reduced the number of banks.

The number of commercial banks is reduced to 17 from 26 before the crisis, and the number of merchant banks is reduced to 13 from 30 (World Bank, 2000).

The Philippine banking system is broadly split between commercial, thrift and rural banks. About 52 commercial banks dominate the system with a market share close to 90%. The biggest commercial banks are majority-owned prominent Filipino business families. The Philippine industry has close relationship with the banks. Banks often serves as the financial arms of conglomerates (World Bank, 2000).

The Philippine banks were well capitalized before and during the crisis: As of June 30, 1997, only 3% of total loans were non-performing, and banks responded to the central bank's initiatives to build up loan loss reserves. Even at the end of June 1998, the Philippine banks remained relatively well capitalized by international standards, with an average capital/weighted risk ratio of 15.5%. The impaired loans, however, reached a level of 16% at the end of 1998. The major banks are well capitalized. The level of problem loans being experienced by the Philippines banks is well below that of the Thai banks.

The Philippine banking system resembles an oligopolistic structure because a few number of banks control a large share of the market. This oligopolistic characteristic is manifested through almost uniform lending and deposit rates throughout the whole banking system despite cost structure differences.

The fall of exchange rate and the rise in interest rates did not induce the Philippine economy to suffer from a credit crunch. Ding, Domac and Ferri. (1998) document that neither the general risk premium nor the bank dependent borrowers' specific spreads shows notable increases.

In Thailand there were 17 banks and 91financial companies as of July 1997. The market was highly concentrated with five largest private banks constituting 60% of the Thai banking system. Thai banks' asset quality was poor due to excessive loan growth prior to the crisis. However, unlike the Korean banks, Thai banks enjoyed high profits before the crisis.

The liberalization in access to offshore borrowing, inadequate standards and enforcement of bank supervision led to Thailand's external liquidity and financial sector crisis in mid-1997. Thailand suffered a short-term external liquidity crisis.

The prolonged period of high interest rates caused the GDP to contract 8% in 1998. This caused banks' asset quality to become catastrophic. Unlike the Korean government, the Thai government intervened little in the sales of non-performing loans. The non-performing loans mounted to 45% at the end 1998 (Ding, Domac and Ferri [1998]).

In 1998, the Thai authorities nationalized 6 of the 13 commercial banks, closed one and merged one with a state-owned bank. In addition, the government closed 56 finance companies, which reduced the source of financing for small business (Ding, Domac and Ferri [1998]). Such massive closures of financial institutions inevitably reduced the available credit. The Thai corporate sector experienced a severe reduction in domestic and foreign demand for their goods and services. Thus, in addition to the contraction in supply of credit, there was a contraction in demand for credit.

3. Sample and data

The data come from a private sector firm level survey undertaken by the World Bank following the Asian financial crisis, at the end of 1998. The survey includes the

majority of the medium and large size enterprises from Asian countries that experienced the Asian financial crisis. These countries are Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand. A large majority of the survey respondents (76%) were single plant firms. In each country the plants/firms are selected from five to seven sectors, including auto parts, chemicals, construction materials, food, electronics, garments and textiles, and machinery. These sectors are the largest contributors to GDP or trade and their products are largely tradable goods. Only firms with at least 20 employees are included in the survey. The surveyed plants/firms of each country are randomly chosen from pools of large, medium, and small firms. Most of these firms are unlisted. Each size category of firm accounts roughly for one third of the total surveyed firms. Data are collected using similar currency instruments and sampling methodologies so that cross-country comparisons can be made directly (Hallward-Driemeier, 2000). The Malaysian data are not accessible outside the World Bank.

The stated objective of the World Bank survey is "to collect up to date information on the financial structure, labor profile, production, and management due to the impact of the Asian financial crisis on manufacturing establishments." To achieve this objective the firms are asked to provide information on three specific periods. The first period is from January 1 to June 30, 1997, the second period is July 1 to December 30, 1997, and the last period is 1998. The year 1998 represents the crisis period and the first half of 1997 represents the pre-crisis period.

Table 1 reports summary statistics of the variables used in our study. The data include 697 Indonesian firms, 849 Korean firms, 550 Philippine firms and 633 Thai firms. Our focal variable Credit Constraint measures whether or not the availability of

credit has become more restrictive for the firm since the onset of the financial crisis (July 1997). For Korea and Thailand, the firms were asked “For each source, how has the availability of credit to your plant changed since the onset of the crisis?” The types of sources indicated were, domestic banks, foreign banks, other domestic financial institutions, local moneylenders, family/friends, suppliers, partner firms, bond market, and equity market. The firms were then to indicate the severity of credit availability by marking 1 through 5, where “1=much more restrictive”, “2=somewhat more restrictive, 3=same, 4=somewhat less restrictive; 5 = much less restrictive.” Our Credit Constraint variable takes the value of one if the response was 1 or 2 for domestic banks and other domestic financial institution. In other words, we assume that firms did not experience credit constraint if they responded “3=same”, “4=somewhat less restrictive”, or “5=much less restrictive”.

For Indonesia and the Philippines, the question posed to the firms is “Which creditors have become more restrictive in making credit available to your firm since the onset of the regional financial crisis (July 1997)?” The types of sources indicated are identical to the ones given in Korean and Thai survey but firms were not given to rate the strength of the restrictiveness. Instead, they are simply asked to identify the source that became more restrictive. In the case of Indonesia and Philippines our Credit Constraint variable takes the value of one if the response shows that the firm has observed more restrictive credit from domestic banks and other domestic financial institutions.

We observe that the percentage of the number of firms constrained for credit since the onset of the crisis across the sample countries are 67.26%, 52.97%, 55.96%, and 55.61% for Indonesia, Korea, the Philippines, and Thailand, respectively. The relatively

high percentage of firms in Indonesia that felt credit constraint is consistent with general conditions of the economy at the time. As indicated above, at the end of 1998, nonperforming loans constituted 57% of the total loans of the banking system. Hence, the resulting decline in bank capital led to severely restricted bank lending, which is entirely consistent with our finding that Indonesian firms felt the most credit constraint during the crisis.

Our next focal variable, Lender Diversity, is constructed from answers to the question, "With how many financial institutions do you currently do business with?" We interpret the answers to this question such that the smaller the number of financial institutions a firm does business with the stronger is its relationship with its lenders. Thus, our premise is that relationship gets weaker as Lender Diversity gets larger. Table 1 shows that there exists some variation in how firms structure their relationship with banks in different countries. Korean firms have a borrowing relationship, on average, with six banks. In contrast Indonesian firms have the most concentrated borrowing relationship followed by the Thai firms.

Table 2 further examines the distribution of Lender Diversity in our sample. Similar to the results in Table 1, we observe that Indonesia shows the most concentrated borrowing. Roughly 77% of the sample firms in Indonesia do business with only two banks. Thailand and Philippines follow Indonesia with 65.2% and 51.3 %, respectively. Korean firms, on the other hand, show the most dispersed borrowing relationship.

The mean (median) values of the variable Lender Diversity in Indonesia, Korea, the Philippines, and Thailand are 2.07(2.00), 6.20(4.00), 3.51(2.00), and 2.76(2.00), respectively. This shows that average firms in the four Asian countries maintain multiple

banking relationships rather than a single relationship. This finding is consistent with Ongena and Smith (2000), who find that single-bank relationships are relatively uncommon among firms from 20 European countries. When contrasted with Ongena and Smith's finding that the mean value of bank relationships firms do business with is 5.6 over the entire sample of European countries, our findings seem to suggest that bank relationship in our four sample Asian countries is quite similar to the European experience.

Turning back to Table 1, our third variable, Collateral, shows answers to the question, "Do you typically have to provide collateral to receive bank loans with maturities less than 6 months, 6 months to 12 months, 12 months or more?" If a respondent marks any of these three maturities we classify the firm as one, which posts collateral. Table 1 shows that collateral posting is most frequent in Korea, which also happens to be the country where Bank Diversion is the highest. On the other hand, collateral posting in Indonesia and Philippines is less frequent than in Korea.

The External Audit variable is constructed from answers to the question, "Are your financial statements audited by an independent accounting firm?" From Table 1, we observe that the Philippines have the largest ratio of being audited by an independent accounting firm (88.9%). This result is expected because independent auditing is mandatory in this country. In contrast, only half of Indonesian firms and about 65% of Korean firms get audited. We should note that in these countries independent auditing is not mandatory.

The Research and Development (R&D) variable is constructed from answers to the question, "Does this firm perform R&D for product/process in 1997?" From Table 1,

we observe that there is a wide variation in share of firms that conduct R&D across countries. Korea has the largest share of firms with R&D (96.1%) while Indonesia has the least share of firms (19.4%). This variable is missing for Thailand in the survey data.

Foreign direct investment (FDI) shows the ownership structure of the firm. Firms are asked to identify the type of ownership of the enterprise. Ownership is classified in terms of domestic, foreign-owned, and joint-venture with a foreign firm. A foreign owned is defined as one having at least 10% foreign ownership. We denote foreign direct investment to exist if the firm is foreign-owned or has joint venture with a foreign firm. Table 1 shows that while in Indonesia and Korea about 16% of the firms have foreign direct investment and this ratio jumps to 36.5% in Philippines.

The variable Outside Credit indicates firms with outstanding loan/credit. The summary statistics shows that large share of firms during the crisis had outstanding credit. In three countries, well above 50% of firms have outstanding credit. The firms with outstanding credit make up 87%, 73.1%, and 67.7% in Indonesia, Thailand, and the Philippines, respectively. Korea had the least share of firms (43.0%).

To construct the variable Government Incentives, we utilize different questions across the sample countries. For Indonesia, Government Incentives shows the number of "1=Facilities for foreign investment" and "2=Facilities for domestic investment" responses to the survey question, "Government facilities/incentive received by this factory?" For Korea, the variable shows the number of "a=Financial support", "b=Tax support" responses to the survey question, "Does this factory enjoy incentives/promotion from the government?" For the Philippines, the variable shows the number of "1=yes" responses to the question, "Get some incentive from the government?" The shares of

firms receiving some form of Government Incentives in Indonesia, Korea, and the Philippines are 32.2%, 46.0%, and 38.4%, respectively. This variable is not available for Thailand in the survey data.

The next two variables provide the firm industry and size information, which are supplied by the respondents. We observe that the sample is biased toward medium and large size firms, which employ more than 50 employees. In terms of industry distribution, we see that no one industry dominates the sample.

4. Analysis of relationship banking: Model specification

The intuition that underlines our empirical modeling is that a firm enters into relationship banking through concentrated borrowing with the objective to increase the likelihood of access to bank credit in tough times. We examine the validity of such expectation by investigating whether the firms with strong lending relationships benefit from better access to credit during the period of Asian financial crisis.

We specify the probability of a firm experiencing credit constraint as a function of explanatory variables *Lender Diversity*, *Collateral*, and **X**.

$$CreditConstra\,\text{int} = \alpha + \beta_1 * Lender\ \ Diversity^R + \beta_2 * Collateral^H + X\beta_3 + \varepsilon \qquad (1)$$

Credit Constraint is a binary variable equal to one if the firm experienced credit constraint since the onset of the financial crisis and zero otherwise. In equation (1), α is the constant, β_1, β_2, and β_3 are the coefficients of variables *Lender Diversity*, *Collateral*, and **X**, and ε is white noise.

Lender Diversity, the log number of financial institutions from which a firm borrows, measures the strength of lending relationship. *Collateral* is a binary variable

equal to one if the firm had to pledge collateral for a loan, and zero otherwise. **X** is a vector of variables that measures firm characteristics.

The variable *Lender Diversity* is an alternative measure of the strength of the relationship, which is generally measured by the duration of the relationship and the scope of the relationship. With low lender diversity, or more concentrated borrowing, the firm is more likely to turn to the same bank repeatedly for its credit needs. Cole (1998) uses the national survey of small finances data of 1993 to examine the impact of lending relationship on availability of credit. He finds that borrowers with fewer lenders are more likely to obtain extended credits. He interprets this result as the rendered value of private information of borrowers with multiple lenders. Interestingly, Cole documents that the length of lending relationship plays no important role conditional on a pre-existing lending relationship.

Moreover, the lender diversity can also capture the scope of the relationship (interaction over multiple products). With low lender diversity, the firm is more likely to obtain multiple financial services from the same lender. When the borrower obtains multiple financial services from the same bank, the bank can obtain more precise information about the borrower and spread fixed costs of information production over multiple products (Petersen and Rajan [1994]). These benefits can reduce the costs of providing loans and services, and increase the credit availability to the firm. Other studies have also used the scope of relationship to measure the strength of bank relationships (Allen, Saunders, and Udell [1991], Nakamura [1993]).

There are a number of problems in estimating equation (1). The firm's decision to choose the number of banks it does business with (Lender Diversity) may be endogenous.

In choosing the number of banks firms consider the costs and benefits of having multiple bank relationships. For instance, lower quality firms may build relationships with greater number of banks to exploit differences in borrower information collection, loan screening technologies, and risk tolerance across banks. Hence, lower quality firms can increase the probability of obtaining a bank credit by building multiple bank relationships. When in need of credit, low quality firms can apply to multiple banks until one grants a loan.

In response, we implement a two-stage model where the *Lender Diversity* is estimated in a first-stage before estimating equation (1). We model *Lender Diversity* as a function of firm characteristic variables including proxies for the expected net benefits of having multiple lending relationships.

$$Lender\ \ Diversity\ \ = \ \ \theta + X * \gamma + I\kappa_1 + \mu \qquad (2)$$

In equation (2), θ is the constant, γ and κ_1 are the vectors of coefficients of variables **X** and **I**, and μ is white noise. **X** is a vector of variables used in equation (1) while **I** is a set of instrumental variables.

The residual from this regression, the information content in *Lender Diversity* that is orthogonal to the firm characteristics and its expected net benefits from multiple relationships, $Lender\ Diversity^R$, is used in equation (1). This method allows us to measure the effect of the intensity of lending relationship on credit availability while controlling for endogeneity.

Collateral is a binary variable equal to one if the firm had to pledge collateral for a loan, and zero otherwise. It is widely recognized that the requirement of a collateral pledge is set simultaneously with the loan decision. The literature identifies two functions of collateral in credit decisions. First, collateral serves as a positive signal of

borrower quality (Besanko and Thakor [1987], Chan and Kanatas [1985]). Second, collateral serves as an insurance against ex-post loan quality that would allow the borrower to shift uncompensated risk to the lender.

While some studies ignore the implicit cost of loans such as collateral (Petersen and Rajan [1994]), others treat collateral as an exogenous regressor in their loan-rate regressions (Berger and Udell [1994, 1995]). To allow credit decision and collateral requirement to be set jointly, we follow Brick, Kane, and Palia (2003) and treat collateral (implicit cost) and loan decision as simultaneous variables.

Whether or not the borrower is required to make a collateral pledge is a function of the loan decision, and therefore the collateral and the error term in equation (1) are generally correlated. To cope with the problem of causal inference between collateral and loan denial, we use the method of instrumental variables. By using instrumental variables, we assume that there exists an observable covariate that affects collateral pledge but is uncorrelated with the error term in equation (1). In the first stage, we model the optimal choice of whether to require collateral as a function of firm-specific heterogeneity terms.

$$Collateral = \delta + X\psi + I\kappa_2 + \upsilon \qquad (3)$$

In equation (3), δ is the constant, ψ and κ_2 are the vectors of coefficients of variables **X** and **I**, and υ is white noise. In the second stage, the predicted collateral pledge from equation (3), $Collateral^H$, is used to explain the credit availability decision in equation (1).

The choice of exogenous variables **X** in equations (1), (2), and (3) is based on the existing literature which has identified a set variables that can explain the decision to

grant a loan, build multiple banking relationship and pledge collateral. These variables, described below, are main control for the riskiness and the possibility of engaging in multiple banking relationships.

In specific, the vector of exogenous variables **X** include FDI, logarithmic transformation of number of employees, interest coverage ratio, leverage ratio, R&D, and the industry dummy variables. FDI is a binary dummy variable indicating whether or not the firm has foreign direct investment. Firms with foreign direct investment can benefit from greater credit availability since foreign affiliates can provide financial needs of the firm. The log transformation of number of employees measures the firm's size. Larger firms tend to have lower default risk. Moreover, the log of number of employees can also proxy the firm's age since older firms tend to have more employees. Petersen and Rajan [1994] argue that both the firm's size and age can measure the firm's investment opportunities. Brick, Kane and Palia (2003) find that firm size is positively correlated with collateral pledge. The variables interest coverage ratio and the leverage ratio measure the firm's financial condition. The interest coverage ratio is defined as the ratio of net income to total interest expense which measures whether the firm's income can cover its interest expenses. The leverage ratio is the ratio of total liability to total assets which measures the debt capacity the firm has already exhausted (Petersen and Rajan [1994]), Brick, Kane and Palia [2003]). Both of these financial variables control for the observable risk of the borrower that determine the credit decision. The variable R&D is a binary dummy variable indicating whether or not the firm invests in research and development. Plausibly, firms investing in research and development have greater investment opportunities and growth potential (Houston and James [2001]). The industry

dummy variables include auto parts, chemicals, electronics, food, garments and textile, and construction industries. The dummy variables may proxy the industry-specific riskiness that affects credit decisions (Berger and Udell [1995]). The industry dummy variables may also proxy the firm's investment opportunities (Petersen and Rajan [1994]). In addition, Cosci and Meliciani (2002); Detragiache, Garella and Guiso (2000); Ongena and Smith (1998) find that firm size, leverage, age and profitability, technology intensity, investment opportunity can explain the number of lending relationship.

The vector **I** in equations (2) and (3) is the set of variables used to instrument both *Lender Diversity* and *Collateral*. Different combinations of the variables such as log transformation of total assets, government incentives, fixed-to-total assets ratio, and export are used to instrument the variables *Lender Diversity* and *Collateral*. The size of the firm, as measured by log transformation of total assets, can be used to instrument both *Lender Diversity* and *Collateral*. Large firms, which tend to be more complex firms, may decide to build multiple banking relationships to diversify firm-specific credit risks. The firm size may also be correlated with *Collateral* since a firm's default probability may be related to its size. Larger firms are less likely to default and hence less likely to post *Collateral* when applying for a loan. The variables outstanding credit and fixed-to-total assets ratio may be correlated with *Collateral*. Firms with outstanding credit are more risky and may need to post *Collateral* at higher frequency. The firm's fixed assets serve a similar function as *Collateral*. The variable, government incentives, is also used to instrument *Collateral* and *Lender Diversity*. On one hand, government incentives serve as a cushion and decrease the participating firm's probability of default. On the other hand, only firms in weak and poor condition may qualify to participate in government

programs. For these reasons, government incentives may be related to *Collateral*. Government incentives may also affect the number of banking relationships a firm builds. If government programs provide financial assistance, the firms' need to rely on bank loans may decrease. The variable export can also serve as an instrumental variable. Firms that exported their goods may have suffered less during the crisis and thus less likely to default.

5. Empirical Results

Table 3 reports the OLS estimation of *Lender Diversity* (Equation 2). We observe that the firm's asset size (measured by the logarithm of the total assets) is positively and significantly related to the number of bank relationships in Indonesia, Korea, and the Philippines. This finding is consistent with the arguments of Detragiache, Garella and Guiso (2000), which indicate that by banking with multiple banks, firms can allow banks to diversify firm-specific credit risk. Such risk diversification may be especially important for large firms, which tend to be more complex firms. Alternative interpretation is that smaller firms may be less likely to enter into multiple banking relations if there are duplication of monitoring costs and free-rider problems. Such costs would reduce the effectiveness of multiple relationships in reducing hold-up problems. In contrast, firm's asset size is unrelated to *Lender Diversity* in Thailand.

The firm's leverage ratio has a significant positive effect in Indonesia showing that firms with high default risk maintain lending relationships with more banks. The significant negative effect of interest coverage ratio on *Lender Diversity* in Korea and the Philippines suggests that more profitable firms maintain fewer lending relationships. This finding is consistent with Detragiache, Garella and Guiso (2000), which find that for

small and medium-sized Italian manufacturing firms, their profitability is negatively correlated with multiple banking relationships. The variable R&D has a significant positive effect on the number of lenders for Indonesia. This finding is consistent with multiple banking reducing entrepreneurial rent appropriation (Von Thadden [1994]). We are unable to test the effect of R&D on *Lender Diversity* for Thailand because the variable R&D is not available for Thailand in the survey data.

Table 4 shows a probit regression of equation (3), which models the incidence of collateral posting. We should note that equation (3) is not estimated for Thailand because the variable *Collateral* is missing for Thailand in the survey data.

For all three countries, Indonesia, Korea, and the Philippines, collateral posting is negatively related with the interest coverage ratio with statistical significance. In other words, the firms with higher net income relative to their interest expense are viewed as less risky and the lender does not need extra protection. Moreover, in Indonesia and Korea, firms with outstanding credit are more likely to post collateral. Plausibly, firms with other outstanding credit are viewed as riskier firms and are required to post collateral at higher frequency. The higher fixed-to-total assets ratio increases the likelihood of collateral posting in Indonesia.

In addition, a number of other variables explain the collateral decision in Korea and the Philippines. For instance, Korean firms with foreign direct investment are less likely to post collateral while firms with R&D, and bigger asset size are more likely to post. In the Philippines, size of the firm and collateral are negatively correlated implying that size provides an advantage to the firm in the form of reduced need to post collateral. This finding is consistent with the conjecture that larger firms are less likely to default.

In both Korea and the Philippines, the firms with government incentives are more likely to post collateral. The variable government incentives may proxy financial weakness of the firm. Plausibly, the public policy objective is to provide assistance to firms that are in poor and weak condition.

Before estimating the system of equations using the instrumental variables approach, we estimate equation (1) using actual *Lender Diversity* and *Collateral*. Table 5 reports a probit regression of *Credit Constraint* dummy variable on *Lender Diversity*, *Collateral*, and X. As noted earlier, the variables *Collateral* and *R&D* are missing for Thailand in the survey data. Hence, we estimate the model specification without *Collateral* and R&D as explanatory variables for Thailand.

We observe that a firm's credit constraint probability on average increases as the *Lender Diversity* increases in Korea and Thailand showing that firms with strong bank relationships benefit by greater credit availability during crisis period. Contrary to our a priori belief, *Collateral* has a positive sign for Indonesia, Korea, and the Philippines. In other words, posting collateral significantly increases the likelihood of a firm experiencing credit constraint during crisis. This counterintuitive result may be due to ignoring the potential endogeneity.

We find that the impact FDI has on credit availability differs across countries. While it has an insignificant effect in Indonesia and Korea, it reduces the likelihood of credit constraint in the Philippines and increases the likelihood in Thailand. The coefficient estimates for the firm's size and leverage are consistent with these variables measuring the firm's riskiness. The firm size has the expected negative coefficient in Indonesia, Korea, and Thailand. This finding is consistent with the conjecture that larger

firms are less likely to default. Similarly, the leverage ratio has the expected positive sign in Indonesia, Korea, and Thailand. This shows that firms with high default risk are more likely to be constrained for credit during crisis period. However, the coefficient estimates of firm's size and leverage are statistically significant only for Korea.

By estimating the system of equations (1), (2), and (3), we can alleviate potential endogeneity problems. Before reporting the estimation results, we briefly describe the variables used to instrument our endogenous variables. Based on the statistical tests (described below) to determine whether our instrumental variables are appropriate, we use a different combination of variables to instrument *Lender Diversity* and *Collateral* across countries. In all four countries, we used log transformation of total assets as an instrument. In addition, outstanding credit and fixed-to-total assets ratio are used in Indonesia. Outstanding credit and government incentives are used in Korea while government incentives and fixed-to-total assets ratio are used in Philippines. In Thailand, export is used in addition to log of total assets. Given cross country differences in the structure of the banking system, credit decision practices, regulation, and the magnitude of the crisis, there is no reason to believe that same variables can be used uniformly as instrumental variables.

In determining whether our instrumental variables are appropriate to use; we test whether our instrumented variables, $Lender\ Diversity^R$ and $Collateral^H$, are exogenous following the approach described in Rivers and Vuong (1988). After estimating equations (2) and (3), we keep residuals, $Lender\ Diversityl^R$ and $Collateral^R$, from these regressions. Then, we estimate equation (1) with explanatory variables X, Lender Diversity, Collateral, and $Lender\ Diversity^R$ and $Collateral^R$. Then, we perform an F test

on the coefficients of *Lender Diversity*^{R} and *Collateral*^{R}. We fail to reject the hypothesis that *Lender Diversityl*^{R} and *Collateral*^{H} are jointly zero (see Wooldridge [2002]). Our tests suggest that the country-specific instrumented variables used are exogenous and our instrumental variables are appropriate.

Table 6 reports the multivariate probit results explaining the determinants of the credit constraint with *Lender Diversity*^{R}, *Collateral*^{H}, and X as explanatory variables. We find that the direction and significance of the correlation between *Lender Diversity*^{R} and credit availability vary across our sample countries. While we observe no significant correlation in Indonesia, for the Philippines, the coefficient estimate of *Lender Diversity*^{R} is negative and significant. In other words, Philippine firms benefit from doing business with multiple banks. In contrast, in Korea and Thailand, *Lender Diversity*^{R} and *Credit Constraint* are significantly and positively related. This observation shows that firms benefit by avoiding credit constraint during the crisis period by concentrating its relationship with a small number of banks. These results shows that establishing a close relationship with a bank can have differing impact on credit availability in tough times in different countries. However, the sources of these differences can be traced in the structure and the health of the banking system in each of these countries during the Crisis.

In the case of Indonesia, the lack of a significant correlation between lending relationships and credit availability during the crisis can be explained by the severe credit crunch experienced during the crisis and the dominance by state-owned banks. As we indicated above Indonesia was the hardest hit country during the Crisis. The resulting fall in bank capital led to severely restricted bank lending. This is consistent with a large share of firms included in our sample experiencing credit constraints (67% of our sample

firms reported experiencing credit constraints since the beginning of the crisis). Our finding shows the severity of the credit crunch where even firms with strong banking relationships were not exempt from credit constraints.

Another potential explanation of why building strong banking relationship had no effect on firms avoiding credit constraint during crisis is attributed to the strong presence of state-owned banks in Indonesia. To the extent that credit decisions are based on criteria other than best credit risk, the presence of relationship banking described in the theory will not be observed in state-owned banking systems.

In Korea, the scene was quite different from Indonesia. As indicated above, one major impact of the crisis was that there was flight to quality in bank lending as a result of record bank failures. The banks were more cautious in making credit decisions following high-profile bankruptcies. Namely, banks became more risk averse. With limited resources to lend, information on borrowers was critical in determining the credit allocation to borrowers. Established lending relationships alleviated the adverse selection problem banks faced. Therefore, borrowers with close banking relationships were more likely to obtain credit. In addition, given the reduced number of banks, the competition between banks should be reduced as well. This reduction could further limit the available credit to borrowers who did not establish close lending relationship as predicted by Petersen and Rajan (2001). Moreover, given that Korean banks were poorly capitalized, borrowing from multiple lenders did not insure access to credit in time of crisis (Detragiache, Garella and Guiso [2000]).

Philippines is an interesting case where doing business with a smaller number of banks actually hurt the firms and caused them to be severely credit constrained. Such

relationship is plausible given the state of the economy in the Philippines during the crisis. The fall of exchange rate and the rise in interest rates did not induce the Philippine economy to suffer from a credit crunch. According to Ding, Domac and Ferri (1998), neither the general risk premium nor the bank dependent borrowers' specific spreads show notable increases. Though facing a higher interest rate since the onset of the crisis, the borrowers without establishing banking relationships could still obtain credit. A major reason for such credit availability was that banks were well capitalized with relatively strong balance sheets and sound capital structures. This pattern could explain why large firms tend to borrow from more than one bank. Given the close tie with banks, dispersed lending relationship could enhance the probability of obtaining credit. It is important to note that most of the firms continued to be profitable during the crisis. With low default risk, banks were willing to extend loans. Hence, contrary to Petersen and Rajan (2001) predictions, the dispersed lending relationships actually increased borrowers' probability to obtain credit in the less-competitive banking market of the Philippines. On the other hand, given that Philippine banks were relatively well capitalized, borrowing from multiple lenders actually insured the access to credit in time of crisis (Detragiache, Garella and Guiso [2000]).

The Thailand case is similar to the Korean case where we observe a significant and positive relationship between the number of bank relationships and credit constraint. Again, given the state of the economy and the banking system this finding is quite plausible. As indicated above, the Thai corporate sector, similar to Korea, faced severe credit crunch as a result of massive bank failures. Fewer remaining banks and finance companies in the banking system meant less competition. Thus, less competition

increased the value of lending relationships as predicted by Petersen and Rajan (2001). Moreover, given that Thai banks were poorly capitalized, borrowing from multiple lenders did not insure access to credit in time of crisis (Detragiache, Garella and Guiso [2000]).

In sum, the collective evidence highlights how important is the healthiness of the banking system for firms reaping the benefits of establishing a relationship with a bank in tough times. When banks are poorly capitalized and face default they become more selective in their loan decisions. In such an environment we observe that relationship banking is helpful and firms benefit from working with smaller number of banks as in the case of Korea and Thailand. This is consistent with earlier studies which observe that having information on the borrowers reduces the adverse selection problem banks face during periods of financial distress (Bodenhorn [2003], Boot and Thakor [1994], Cole [1998], Diamond [1991], Harhoff and Korting [1998], and Peterson and Rajan [1995]). In contrast, when the banking system is healthy and well capitalized as the case for the Philippines, diverse lending relationship provides insurance for borrowers to obtain credit as predicted by Detragiache, Garella and Guiso (2000). Finally, dominance of state-owned banks in a banking system actually destroys the value of relationship banking and increases the possibility that credit would flow into inefficient projects in tough times.

When we estimate the effect of $Collateral^{H}$, we find that posting collateral no longer has a significant positive effect on credit availability of firms in Indonesia. This differs from the result observed in Table 5, where actual *Collateral* is reported; its coefficient estimate is positive and significant. This suggests that ignoring potential endogeneity in variable *Collateral* could lead to biased estimates. The insignificance of

Collateral can be interpreted as the large share of state-owned banks in Indonesia having little incentive to secure loan repayment. In contrast, the Korean and Philippines firms were more likely to experience credit constraint when they posted collateral. Such a finding that banks are more likely to constrain credit and require collateral posting during crisis period fits the moral hazard explanation discussed in Boot and Thakor (1994).

The coefficient estimates of the control variables X remain largely the same as those without using the instrumental variables approach. The coefficient of the firm's size is statistically negative for Korea. The firm's leverage is positive with statistical significance in Korea. Again, these findings are consistent with riskier firms experiencing greater likelihood of credit constraint during crisis period. Moreover, the positive correlation between leverage and credit constraint in Korea is consistent with the results in Holstrom and Tirole (1997) where capital-poor firms are the first to get squeezed when bank capital decreases. While these variables are not statistically significant for Indonesia and Thailand, the firm's size is positively correlated with *Credit Constraint* in the Philippines. Instead, FDI is significant and negative for the Philippines which suggests that foreign affiliate can have the same impact as collateral.

As a robustness check, we've also constructed *Lender Diversity* as a binary dummy variable equal to 0 if a firm has a single banking relationship and 1 if it has multiple relationships. Rajan (1992) has shown that firms may be subject to hold-up problem by maintaining a single relationship. However, the firms can alleviate the hold-up problem by introducing competition among banks through building multiple relationships. When the binary dummy variable is used to estimate the system of

equations (1), (2), and (3), the results remain largely the same as when using the log number of lenders.

6. Relationship banking and accounting disclosure

Recent studies in accounting literature have added insights to our understanding of how accounting disclosure can also alleviate information asymmetries and agency costs. Leuz and Verrecchia (2000) use data on publicly traded firms in Germany to test the theoretical prediction that increased level of accounting disclosure reduces asymmetric information and lowers the firm's cost of capital. In particular, they document that firms that switched from German generally accepted accounting principles (GAAP) to International Accounting Standards (IAS) or U.S. GAAP experienced reduced cost of capital measured by the bid-ask spread and trading volume. In parallel, they show that when firms use debt financing, increased level of accounting disclosure would enhance firms' probability to obtain the credit.

There are also studies, which show that when agents have incentives to report accounting information with bias, the effectiveness of accounting disclosure in reducing asymmetric information and agency costs may be limited. Along this line of research include Fischer and Verecchia (2002), Fan and Wong (2002), who showed that in Asian countries the legal environment and disciplinary mechanisms are weak. In these countries, the reputation costs may be lower so that the informational content of the audit report would be low. In addition, DeFond, Wong, and Li (2000) find that the lack of demand for quality audits may render it difficult for external auditors to be effective monitors. Backman (1999) argues that auditing is culturally inappropriate in Asia where business transactions tend to be more relationship based. Hence, monitoring and double-

checking a firm's accounts can offend and may lead to open confrontation between owners and investors.

In this section, drawing on the accounting literature, we investigate whether or not external audit benefit the borrowing firm by avoiding credit constraints during the crisis. The rationale to examine the external audit along with relationship lending is that banks can rely on accurately audited financial information of firms to make loan-granting decisions. In fact, according to McKinsey (2000), "Global Investor Opinion Survey on Corporate Governance", most surveyed investors (71%) think that accounting disclosure is the most important factor for investment decision. Independent auditors are more likely to reveal a firm's true financial information to a bank than the firm's internal auditors. To the extent that banks function as information processors, transparency and disclosure reflected in independently audited financial information can substitute or compliment the benefits of a long term lending relationship.

In addition, low risk borrowers have incentives to signal their credit worthiness to banks. Offering independently audited information can differentiate low risk borrowers from the high risks who can strategically refuse to use independent auditors. Given that these two factors are not substitutes, firms' access to bank credit should be jointly determined by the intensity of lending relationship as well as the transparency and disclosure of firms' financial information. However, when banks require firms to obtain external audit as a part of the loan application process, then the signaling motive can be diminished. This may not be an uncommon practice for the Asian countries included in our sample. The correlation between external audit and firms are required to get their financial statement external audit for loan application is as high as 0.63.

6.1. Model specification

We expand the model of the probability of a firm being constrained for credit during crisis by including an indicator of firm's accounting disclosure.

$$Credit\ \ Constra\text{int} = \alpha + \xi_1 * Lender\ \ Diversity^R + \xi_2 * Collateral^H + \xi_3 * Audit^H + X\xi_4 + \varepsilon \qquad (4)$$

Audit is a binary variable equal to one if the firm's financial statements are independently audited, and zero otherwise. When making loan decisions, banks are likely to consider the accuracy and the reliability of the firm's financial information. Alternatively, banks can require a firm's financial statements to be independently audited when making loan decisions. The firms can also voluntarily have its financial statements audited by an independent agency to increase their access to credit from a bank. In response to potential endogeneity in external audit indicator variable, we model the choice of whether or not to have financial statements audited by an independent agency.

$$Audit = \varphi + X\varsigma + I\kappa_3 + \eta \qquad (5)$$

In equation (5), φ is the constant, ς and κ_3 are the vectors of coefficients of variables X and I, and η is white noise.

To instrument *Audit* in addition to *Lender Diversity* and *Collateral*, the vector I includes a few more variables. They are binary dummy variables indicating whether a firm has independent directors on board and whether a firm has a board of directors. Firms may conduct independent audits in response to the request by their board of directors or independent directors. In Thailand, these variables are not available and hence we used the firms' expectation of capacity utilization in first half of 1999 and a dummy variable indicating whether the firm imports raw material. Plausibly, such

variables signal the firm's default risk which can lead bank to require more transparent financial statements.

6.2 Empirical Results

Table 7 reports a probit regression of external audit on explanatory variables as specified in equation (5). Firms in the Philippines are routinely required to maintain externally audited financial statements independently of firm-specific characteristics. Hence, we do not model the determinants of external audit for the Philippines.

The likelihood ratio statistics indicate that the external audit model has significant explanatory power for all three countries. The leverage ratio is significant and positive for Korea and Thailand showing that firms with high default risk are more likely to have external audit. Plausibly, firms with higher default risk are more likely to be required to provide externally audited financial statements when applying for loans. Another variable with significant explanatory power is the log transformation of the firm's asset size. Its significant and positive coefficients show that larger firms that are more likely to be complex are more likely to have their financial statements independently audited.

Table 8 reports the multivariate probit results explaining the determinants of the credit constraint with $Lender\ Diversity^{R}$, $Collateral^{H}$, $Audit^{H}$, and X as explanatory variables. We observe that firms with externally audited financial statements do not benefit from increased credit availability likelihood. The coefficient of $Audit^{H}$ is insignificant for Indonesia and Thailand. In fact, external audit hurts firms in Korea with higher likelihood of credit constraint. Moreover, inclusion of $Audit^{H}$ does not materially change the findings reported in Table 6. The firms with weak lending relationships continue to experience greater likelihood of credit constraint in Korea and Thailand.

The finding that external audit has no or adverse effect on credit availability differs from what is observed in German firms in Leuz and Verrecchia (2000). One interpretation is that accounting disclosure can be less effective in enhancing credit availability because the informational content of the audit report is low in Asian countries. The weak legal environment and disciplinary mechanisms in some Asian countries may be conducive for external auditors to bias the financial audits more favorably (Fischer and Verrecchia [2002]). In addition, DeFond, Wong, and Li (2000) find that a lack of demand for quality audits may render it difficult for external auditors to be effective monitors. Auditing is culturally less appropriate in some Asian countries where business transactions tend to be more relationship based. The results suggests that external audit is not informational substitutes for building strong relationships with banks but rather complements (at best) what is known about the firm in Asian countries.

7. Conclusion

By using firm-level survey data covering four crisis-struck Asian countries (Indonesia, Korea, the Philippines, and Thailand), this paper tests the effects of lending relationship and financial transparency and disclosure on the credit availability across countries. In particular, we test whether during tough times a lending relationship is more likely to enable firms to obtain bank loans. We perform similar tests to evaluate the benefits of financial transparency and disclosure to firms seeking access to loans.

We find that in countries like Korea and Thailand firms benefit from establishing business relationship with fewer banks. In contrast, in Philippines credit availability increases with the number of bank relationships. Finally, in Indonesia we observe no correlation between relationship banking and credit availability. We conjecture that these

results are consistent with the structure and the health of the banking system in each country during the crisis. While Korea and Thailand, the banking systems are caught being less capitalized during the Crisis, Philippines' banks were much healthier during the same period. Thus, in Korea and Thailand banks went with their prime customers and extended credit to them first in times of credit crunch. Hence, having established a banking relationship did indeed pay off in these countries. In Indonesia, we attribute the lack of correlation to the dominance of state-owned banks in the economy. In such a system we observe that any possible benefits from establishing a bank relationship are easily destroyed during tough times.

Contrary to the existing literature, we find that external audit do not benefit borrowers with greater credit availability. In both Indonesia and Thailand, banks ignore whether or not a borrowing firm's financial statements are externally audited when making credit decisions. Such a result can arise when the audited financial statements contain little valuable information. Interestingly, the Korean firms with external audit actually experienced increased credit constraints. This finding suggests that external audit is not informational substitutes for building strong relationships with banks but rather complements what is known about the borrower.

We realize that these observations come from only four countries and could not easily be generalized. However, this paper shows for the first time the need to focus on the possible benefits of relationship banking other than the loan rate. In addition, we provide the first evidence of how the healthiness of the banking system affects the value of relationship banking.

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Table 1
Summary Statistics

Credit Constraint measures whether or not a firm experienced credit constrain since the onset of the financial crisis. Lender Diversity measures the number of financial institutions a firm borrows from. Collateral indicates whether or not a firm is required to post collateral. External Audit indicates whether or not the firm had its financial statements independently audited at time of loan application. R&D measures whether or not a firm performs R&D. Outside Credit and Government Incentives indicate whether or not a firm has outstanding credit, and participates in government incentive programs. FDI denotes foreign direct investment and shows whether the firm has a joint venture with a foreign firm. No. of employees is the firm' actual number of workers. Interest Rate Coverage Ratio is the ratio of net income to interest expense. Leverage ratio is the ratio of debt to total asset. Percentages may not add up to 100% for No. of employees because there are firms with missing information on number of employees. For Lender Diversity, Asset Size, No. of emplyoees, Interest Rate Coverage, and Leverage Ratios, the mean, median, and standard deviation values are reported. All the other variables reflect the percentage of institutions.

Variables		**Indonesia**	**Korea**	**Philippines**	**Thailand**
Panel A: Dummy Variables (in %)					
Credit Constraint		67.26	52.97	55.96	55.61
Collateral		63.3	84.2	54.7	---
External Audit		49.1	65.1	88.9	---
R&D		19.43	96.1	37.89	---
FDI		15.8	16.7	36.5	30.5
Outside Credit		87.23	42.96	67.72	73.14
Government Incentive		32.2	46.04	38.42	---
Industry	Auto parts	---	13.8	---	19.4
	Chemicals	29.4	28.3	18.7	---
	Electronics	14.1	17.1	20.2	16.0
	Food	30.4	---	23.6	10.4
	Textiles	26.1	23.2	37.5	54.2
	Machinery	---	17.7	---	---
Panel B: Balance Sheets Variables					
Lender Diversity	Mean	2.1	6.2	3.5	2.8
	Median	2.0	4.0	2.0	2.0
	SD	1.7	8.2	3.8	2.9
Asset Size (in log)					
Year 1996	Mean	6.31	3.96	4.62	7.48
	Median	6.15	3.8	4.55	7.7
	SD	0.84	0.63	0.88	2.26
Year 1997	Mean	6.33	4.01	4.61	7.6
	Median	6.1	3.85	4.56	7.65
	SD	0.89	0.63	0.86	2.21
Year 1998	Mean	6.23	4.00	4.61	7.27
	Median	6.1	3.8	4.6	7.7
	SD	0.84	0.64	0.93	3.0
No. of employees (in %)	< 50	5.7	2.4	2.9	2.5
	50 – 99	44.2	68.9	34.7	38.7
	>=100	37.9	24.1	37.3	49.4
Interest Rate Coverage ratio					
Year 1996	Mean	9.5	1.56	4.72	4.03

	Median	3.13	0.5	0.6	1.25
	SD	20.7	3.48	14.6	9.22
Year 1997	Mean	8.05	1.99	2.67	4.26
	Median	2.3	0.4	0.4	1.13
	SD	18.1	6.69	8.61	8.65
Year 1998	Mean	10.34	1.85	2.43	5.91
	Median	2.7	0.31	0.5	1.33
	SD	20.37	7.2	19.15	13.37
Leverage Ratio (in %)					
Year 1996	Mean	44.0	66.0	60.6	58.6
	Median	43.5	63.1	67.5	61.3
	SD	28.8	24.8	29.3	30.1
Year 1997	Mean	44.0	66.8	59.3	59.1
	Median	47.0	79.4	67.5	61.3
	SD	28.6	25.0	29.6	29.4
Year 1998	Mean	39.8	61.3	57.2	60.2
	Median	38.1	63.1	62.9	61.3
	SD	29.5	26.0	30.7	27.5
Number of firms		697	849	550	633

Table 2
Distribution of Lender Diversity

Lender Diversity measures the number of financial institutions a firm borrows from.

Lender Diversity	Number of Firms	Percent	Cumulative Frequency	Cumulative Percent
Indonesia				
1	336	48.2%	336	48.2%
2	197	28.3%	533	76.5%
3	76	10.9%	609	87.4%
4	39	5.6%	648	93.0%
5	22	3.2%	670	96.1%
6 to 14	27	3.9%	697	100.0%
Mean	2.07			
(Median)	(2.00)			
Korea				
1	72	8.5%	72	8.5%
2	162	19.1%	234	27.6%
3	166	19.6%	400	47.1%
4	98	11.5%	498	58.7%
5	91	10.7%	589	69.4%
6 to 10	167	19.7%	756	89.1%
11 to 20	57	6.7%	813	95.8%
21 to 91	36	4.3%	849	100.0%
Mean	6.20			
(Median)	(4.00)			
Philippines				
1	119	21.6%	119	21.6%
2	163	29.6%	282	51.3%
3	102	18.6%	384	69.8%
4	54	9.8%	438	79.6%
5	38	6.9%	476	86.6%
6 to 10	52	9.5%	528	96.0%
11 to 50	22	4.0%	550	100.0%
Mean	3.51			
(Median)	(2.00)			
Thailand				
1	222	35.1%	222	35.1%
2	191	30.2%	413	65.2%
3	99	15.6%	512	80.9%
4	33	5.2%	545	86.1%
5	30	4.7%	575	90.8%
6 to 10	46	7.3%	621	98.1%
11 to 28	12	1.9%	633	100.0%
Mean	2.76			
(Median)	(2.00)			

Table 3
Determinants of Lender Diversity

The table provides estimates of OLS models using the individual country data from Indonesia, Korea, the Philippines, and Thailand in which the dependent variable is a natural log of the number of financial institutions a firm borrows from. FDI indicates whether the firm has a joint venture with a foreign firm. Export indicates whether the firm exports its goods. Log employees is the natural log number of employees. Interest Rate Coverage Ratio is the ratio of net income to interest expense. Leverage ratio is the ratio of debt to total asset. R&D measures whether or not a firm performs R&D. Outside Credit and Government Incentives indicate whether or not a firm has outstanding credit, and participates in government incentive programs. Industry dummies are included but not reported. Values in parenthesis are p-values.

Variables	**Coefficients**			
	Indonesia	Korea	Philippines	Thailand
Constant	-0.858 (0.280)	-2.456*** (0.000)	-2.577** (0.046)	0.985*** (0.000)
FDI	0.386 (0.102)	0.044 (0.533)	0.213 (0.154)	-0.348*** (0.005)
Export				0.228*** (0.003)
Log Employees	-0.002 (0.987)	0.027 (0.800)	0.406 (0.128)	0.050*** (0.003)
Interest Coverage Ratio	0.001 (0.336)	-0.010*** (0.001)	-0.010*** (0.000)	0.003 (0.43)
Leverage Ratio	0.003** (0.025)	0.001 (0.174)	-0.004** (0.043)	-0.124 (0.418)
R&D	0.263** (0.028)	0.097 (0.200)	0.130 (0.271)	
Log Total Assets	0.127* (0.072)	0.853*** (0.000)	0.369*** (0.000)	-0.001 (0.369)
Outside Credit	0.168 (0.154)	-0.022 (0.583)		
Government Incentives		0.021 (0.586)	-0.314** (0.021)	
Fixed assets/Total assets	0.002 (0.288)		0.002 (0.475)	
No. of observations	164	955	107	206
R-squared	0.2205	0.4478	0.3587	0.2081
F(11, 152) Prob > F	3.26*** (0.001)	51.3*** (0.00)	10.03*** (0.000)	6.09*** (0.00)

*** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and * indicates statistical significance at the 10% level.

Table 4
Determinants of Collateral Choice

The table provides estimates of probit models using the individual country data from Indonesia, Korea, and the Philippines in which the dependent variable is Collateral which indicates whether or not a firm is required to post collateral. FDI denotes foreign direct investment and shows whether the firm has a joint venture with a foreign firm. Log employees is the natural log number of employees. Interest Rate Coverage Ratio is the ratio of net income to interest expense. Leverage ratio is the ratio of debt to total asset. R&D measures whether or not a firm performs R&D. Outside Credit and Government Incentives indicate whether or not a firm has outstanding credit, and participates in government incentive programs. Industry dummies are included but not reported. Values in parenthesis are p-values.

Variables	**Coefficients**		
	Indonesia	Korea	Philippines
Constants	-2.652 (0.214)	-0.157 (0.919)	5.772 (0.249)
FDI	0.117 (0.851)	-0.524*** (0.001)	-0.531 (0.221)
Log Employees	0.373 (0.392)	-0.159 (0.617)	-0.907 (0.385)
Interest Coverage Ratio	-0.010** (0.024)	-0.012* (0.065)	-0.063* (0.077)
Leverage Ratio	0.003 (0.472)	0.003 (0.175)	0.009 (0.131)
R&D	-0.335 (0.228)	0.427* (0.066)	-0.351 (0.289)
Log Total Assets	-0.009 (0.949)	0.379*** (0.001)	-0.378* (0.071)
Outside Credit	1.375*** (0.001)	0.405*** (0.001)	
Government Incentives		0.389*** (0.001)	0.933** (0.023)
Fixed assets/Total assets	0.008* (0.067)		0.009 (0.279)
No. of observations	164	955	107
LR chi2(11) Pro b > chi2	23.16** (0.017)	81.7*** (0.001)	27.52*** (0.004)

*** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and * indicates statistical significance at the 10% level.

Table 5
Determinants of Credit Availability (Without instruments)

The table provides estimates of probit models using the individual country data from Indonesia, Korea, the Philippines and Thailand in which the dependent variable is a binary variable that takes the value of one if the firm experienced credit constraint since the onset of the financial crisis and zero otherwise. Collateral indicates whether or not a firm is required to post collateral. Lender Diversity measures the number of financial institutions a firm borrows from. FDI denotes foreign direct investment and shows whether the firm has a joint venture with a foreign firm. Log employees is the natural log number of employees. Interest Rate Coverage Ratio is the ratio of net income to interest expense. Leverage ratio is the ratio of debt to total asset. R&D indicates whether or not the firm performs research and development. Industry dummies are included but not reported. Values in parenthesis are p-values.

Variables	**Coefficients**			
	Indonesia	Korea	Philippines	Thailand
Constants	1.994 (0.293)	2.842* (0.010)	-6.728* (0.073)	-1.914*** (0.001)
Collateral	0.650*** (0.007)	0.607*** (0.000)	1.173*** (0.001)	
Lender Diversity	-0.051 (0.812)	0.177*** (0.002)	-0.776*** (0.003)	0.677*** (0.000)
FDI	-0.679 (0.296)	-0.136 (0.281)	-0.635* (0.098)	0.890*** (0.000)
Log Employees	-0.504 (0.223)	-0.783*** (0.001)	1.501* (0.064)	-0.042 (0.302)
Interest Coverage Ratio	0.004 (0.292)	-0.002 (0.800)	-0.029 (0.197)	-0.016 (0.126)
Leverage Ratio	0.0005 (0.901)	0.005** (0.010)	-0.005 (0.381)	0.352 (0.345)
R&D	-0.504* (0.072)	-0.162 (0.420)	0.340 (0.266)	
No. of observations	164	955	109	206
LR chi2(11) Pro b > chi2	21.14** (0.020)	74.95*** (0.000)	33.43*** (0.000)	30.96*** (0.000)

*** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and * indicates statistical significance at the 10% level.

Table 6
Determinants of Credit Availability-Instrumental Variable Approach

The table provides estimates of probit models using the individual country data from Indonesia, Korea, the Philippines and Thailand in which the dependent variable is a binary variable that takes the value of one if the firm experienced credit constraint since the onset of the financial crisis and zero otherwise. Collateral indicates whether or not a firm is required to post collateral. Lender Diversity measures the number of financial institutions a firm borrows from. FDI denotes foreign direct investment and shows whether the firm has a joint venture with a foreign firm. Log employees is the natural log number of employees. Interest Rate Coverage Ratio is the ratio of net income to interest expense. Leverage ratio is the ratio of debt to total asset. R&D indicates whether or not the firm performs research and development. Industry dummies are included but not reported. Values in parenthesis are p-values.

Variables	**Coefficients**			
	Indonesia	Korea	Philippines	Thailand
Constant	2.114 (0.271)	2.440** (0.046)	-13.579*** (0.008)	-1.136** (0.034)
Collateral^{H}	0.465 (0.513)	1.235** (0.041)	3.785*** (0.001)	
Lender Diversity^{R}	0.114 (0.587)	0.131* (0.062)	-0.547** (0.048)	0.662*** (0)
FDI	-0.644 (0.309)	0.003 (0.985)	-0.818** (0.033)	0.633*** (0.009)
Log Employees	-0.503 (0.235)	-0.773*** (0.001)	2.489** (0.015)	-0.002 (0.955)
Interest Coverage Ratio	0.004 (0.399)	-0.001 (0.917)	0.006 (0.727)	-0.015 (0.188)
Leverage Ratio	0.0004 (0.912)	0.005*** (0.009)	-0.007 (0.199)	0.246 (0.559)
R&D	-0.518** (0.063)	-0.189 (0.385)	0.413 (0.188)	
No. of observations	164	955	107	206
LR chi2(11) Pro b > chi2	14.14 (0.167)	48.32*** (0.000)	30.43*** (0.001)	30.1*** (0.000)

*** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and * indicates statistical significance at the 10% level.

Table 7
Determinants of Audit

The table provides estimates of probit models using the individual country data from Indonesia, Korea, the Philippines and Thailand in which the dependent variable is a binary variable that takes the value of one if the firm had its financial statements independently audited at time of loan application and zero otherwise. FDI denotes foreign direct investment and shows whether the firm has a joint venture with a foreign firm. Leverage ratio is the ratio of debt to total asset. Interest Coverage Ratio is the ratio of net income to interest expense. R&D indicates whether or not the firm performs research and development. Log employees is log transformation of number of employees. Outside Credit and Government Incentives indicate whether or not a firm has outstanding credit, and participates in government incentive programs. Independent Directors on Board and Board of Directors indicate whether or not the firm has independent directors on board, and whether or not the firm has board of directors, respectively. Industry dummies are included but not reported. Values in parenthesis are p-values.

Variables	**Coefficients**		
	Indonesia	**Korea**	**Thailand**
Constant	-4.583* (0.058)	-9.451*** (0.000)	-5.172*** (0.000)
FDI		0.518 (0.009)	1.386 (0.000)
Leverage Ratio	-0.001 (0.748)	0.004* (0.083)	1.903** (0.015)
Interest Coverage Ratio	0.003 (0.575)	-0.006 (0.312)	0.009 (0.606)
R & D	-0.054 (0.855)	0.003 (0.991)	
Log Employees	-0.065 (0.897)	0.007 (0.980)	0.042 (0.513)
Log Total Assets	0.558*** (0.001)	2.393*** (0.000)	0.022*** (0.001)
Outstanding Credit	0.646 (0.187)	0.007 (0.949)	
Fixed Assets/Total Assets	0.002 (0.699)		
Government Incentive		0.083 (0.430)	
Independent Directors on Board		0.143 (0.290)	
Board of Directors	0.810*** (0.003)		
Expectation on capacity utilization in 1st half of 1999			0.687*** (0.002)
Import raw materials			0.673* (0.079)
No. of Observations	157	955	107
Chi2 P value	47.07*** (0.000)	482.86*** (0.000)	43.700*** (0.000)

*** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and * indicates statistical significance at the 10% level.

Table 8
Determinants of Credit Availability with Inclusion of External Audit
Instrumental Variable Approach

The table provides estimates of probit models using the individual country data from Indonesia, Korea, the Philippines and Thailand in which the dependent variable is a binary variable that takes the value of one if the firm experienced credit constraint since the onset of the financial crisis and zero otherwise. Collateral indicates whether or not a firm is required to post collateral. Lender Diversity measures the number of financial institutions a firm borrows from. External Audit indicates whether or not the firm had its financial statements independently audited at time of loan application. FDI denotes foreign direct investment and shows whether the firm has a joint venture with a foreign firm. Interest Coverage Ratio is the ratio of net income to interest expense. Leverage ratio is the ratio of debt to total asset. R&D measures whether or not a firm performs research and development. Firm size is the log transformation of number of employees. Industry dummies are included but not reported. Values in parenthesis are p-values.

Variables	**Coefficients**		
	Indonesia	**Korea**	**Thailand**
Constant	2.079	2.714**	-0.893
	(0.288)	(0.025)	(0.170)
Lender Diversity^{R}	0.172	0.144**	0.785***
	(0.434)	(0.045)	(0.000)
Collateral^{H}	1.120	0.611	
	(0.139)	(0.317)	
Audit^{H}	-0.809	0.428**	0.103
	(0.102)	(0.010)	(0.823)
FDI		-0.174	0.556*
		(0.242)	(0.085)
Interest Coverage Ratio	0.005	-0.002	-0.013
	(0.228)	(0.754)	(0.238)
Leverage ratio	0.002	0.004**	0.405
	(0.599)	(0.020)	(0.280)
R & D	-0.456	-0.148	
	(0.123)	(0.490)	
Log Employees	-0.563	-0.761***	-0.002
	(0.196)	(0.001)	(0.960)
No. of Observations	157	955	201
Chi2	16.83*	55.790***	33.580***
P value	(0.078)	(0.000)	(0.000)

*** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and * indicates statistical significance at the 10% level.