

# The Political Economy of Distress in East Asian Financial Institutions

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In the East Asian crisis, "connections" — with industrial groups or influential families — increased the probability of distress for financial institutions. Connections also made closure more, not less, likely, suggesting that the closure processes themselves were transparent. But larger institutions, although more likely to be distressed, were less likely to be closed, suggesting a "too big to fail" policy.



## Summary findings

Politics and regulatory capture can play an important role in financial institutions' distress. East Asia's financial crisis featured many distressed and closed financial intermediaries in an environment with many links between government, politicians, supervisors, and financial institutions. This makes the East Asian financial crisis a good event for studying how such connections affect the resolution of financial institutions' distress.

Bongini, Claessens, and Ferri investigate distress and closure decisions for 186 banks and 97 nonbank financial institutions in Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand. They find that after July 1997, 42 percent of the institutions experienced distress (were closed, merged, or recapitalized, or had their operations temporarily suspended). By July 1999, 13 percent of all institutions in existence in July 1997 had been closed.

Using financial data for 1996, the authors find that:

- Traditional CAMEL-type variables — returns on assets, loan growth, and the ratio of loan loss reserves to capital, of net interest income to total income, and of

loans to borrowings — help predict subsequent distress and closure.

- None of the foreign-controlled institutions was closed, and foreign portfolio ownership lowered an institution's probability of distress.
- "Connections" — with industrial groups or influential families — increased the probability of distress, suggesting that supervisors had granted forbearance from regulations. Connections also made closure more, not less, likely — suggesting that the closure processes themselves were transparent.
- But larger institutions, although more likely to be distressed, were less likely to be closed, while (smaller) nonbank financial institutions were more likely to be closed. This suggests a "too big to fail" policy.
- These policies, together with the fact that resolution processes were late and not necessarily comprehensive, may have added to the overall uncertainty and loss of confidence in the East Asian countries, aggravating the financial crisis.

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This paper — a product of the Financial Sector Strategy and Policy Group, Financial Sector Vice Presidency — is part of a larger effort in the group to study the causes and resolution of financial distress. Copies of the paper are available free from the World Bank, 1818 H Street, NW, Washington, DC 20433. Please contact Rose Vo, room MC9-624, telephone 202-473-3722, fax 202-522-2031, email address [hvo1@worldbank.org](mailto:hvo1@worldbank.org). Policy Research Working Papers are also posted on the Web at [www.worldbank.org/research/workingpapers](http://www.worldbank.org/research/workingpapers). The authors may be contacted at [pbongini@mi.unicatt.it](mailto:pbongini@mi.unicatt.it), [cclaessens@worldbank.org](mailto:cclaessens@worldbank.org), or [gferri@worldbank.org](mailto:gferri@worldbank.org). January 2000. (22 pages)

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# **The Political Economy of Distress In East Asian Financial Institutions**

by

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## 1. Introduction

It has long been acknowledged that extensive relationships between financial institutions and corporations can add to financial risks. It is also known that politics and regulatory capture can play an important role in dealing with financial distress. The East Asia financial crisis meant a large number of distressed and closed intermediaries clustered within a short span of time in an environment with many links between government, supervisors, politicians, corporations and financial institutions. This makes the East Asia financial crisis a good event to investigate the role of these connections in causing and resolving financial institutions' distress. Furthermore, the general causes of the East Asian financial crisis have been the subject of intense debate, with proponents of a sudden shift of views of (foreign) investors as the main cause on one side and proponents of weak fundamentals as the major cause on the other side. To date, little empirical evidence exists as to the role of individual financial institutions' weaknesses in contributing to the crisis: were institutions hit by an exogenous shock and became distressed or were there many weak institutions before the crisis which then led to the systemic financial distress? And, if the latter, did the resolution processes resolve these distressed financial institutions in a transparent way or did they add to the overall uncertainty and loss of confidence?

To explore these questions, we investigate the occurrence of distress and closure decisions for a sample of 186 banks and 97 nonbank financial institutions from five crisis-affected East Asian countries: Indonesia, Korea, Malaysia, the Philippines and Thailand. Coverage of the national financial sector in terms of total assets is high for all five countries. In terms of banking system assets, the sample covers between 80% and 100%; and in terms of number of banks between 36% and 100%. In terms of assets of nonbank financial institutions, the coverage of our sample is between 47% and 90%. Almost 42% of these institutions experienced distress after July 1997, i.e., were either closed, merged, recapitalized or had their operations temporarily suspended. By July 1999, 13% of all institutions in existence in July 1997 had been closed. This illustrates the systemic proportions of the East Asian financial crisis.

We document various financial data (balance sheet and income data for end-1996) for distressed, non-distressed and closed financial institutions and analyze their ownership structures to explore whether these characteristics help explain distress and closure. Using the end-1996 financial data, we find that traditional, CAMEL-type variables—loan loss reserves to capital, loan growth, net interest income to total income, return on assets, and loans to borrowings—predict subsequent distress and closure well. Ownership data also help predict financial distress and closure. Foreign portfolio ownership decreases the probability of financial distress and none of the foreign-controlled institutions was closed, while privately owned institutions were more likely distressed. "Connections"—with industrial groups or influential families—increases the probability of distress, suggesting that supervisors had granted selective prior forbearance from prudential regulations. Connections also make closure more, not less likely, suggesting that the closure processes themselves were transparent. Larger-sized intermediaries were more likely to become distressed, but less likely to be closed, suggesting a "TBTF" policy. The significant forbearance of already weak financial

institutions granted prior to the crisis together with the late and not necessarily comprehensive resolution processes, may have added to the overall uncertainty and loss of confidence in the East Asian countries, aggravating the financial crisis.

The rest of the paper is organized as follows: section 2 provides the motivation and reviews the literature on financial institutions' distress and closure. Section 3 describes the data we use, provides a characterization of our sample of financial institutions, documents various financial data (balance sheet and income data for end-1996), and gives an overview of the degree of financial distress among our sample. The next section analyzes the contribution of various factors in explaining financial distress and closure through logit models. Section 5 concludes.

## **2. Motivation and review of the empirical literature**

The East Asia financial crisis has spawned a large literature on explaining its causes, onset and evolution.<sup>1</sup> Whether sudden shifts in market expectations and confidence were the primary source of the financial turmoil has been hotly debated. Proponents of the "sudden shift" view argue that, while perhaps macroeconomic and other fundamentals had worsened in the mid-1990s, the extent and depth of the crisis cannot be attributed to a deterioration in fundamentals, but rather to the panic reaction of domestic and foreign investors (Radelet and Sachs 1998; Stiglitz 1999). Others argue that the crisis reflected structural and policy distortions in the region—including weak macroeconomic and micro-economic policies—and that fundamental imbalances triggered the crisis (Corsetti, Pesenti, and Roubini 1998).

Studies attempting to empirically identify the causes and origins of the East Asian financial crisis (and other crises) have mainly focused on the macro-economic factors that can help predict banking and currency crises.<sup>2</sup> Such early warning systems based on macro variables are important tools for timely detection of systemic crises; however, they do not allow one to analyze the importance of micro-economic weaknesses contributing to the occurrence of the crisis. In particular, they are unlikely to be able to discriminate between the view that distressed financial institutions were hit by exogenous shocks, or the view there were many weaknesses before the crisis which may have led to the systemic financial distress.

Macro-economic studies also leave policymakers with insufficient information as to which specific financial institutions are the most fragile and vulnerable within the system. This could lead policymakers to deal with financial sector problems at the aggregate level, with policies that might affect both weak and healthy financial institutions in less than optimal ways. So far, few studies have investigated in detail

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<sup>1</sup> Nouriel Roubini's website, <http://www.stern.nyu.edu/~nroubini/asia/AsiaHomepage.html>, tracks the literature on this debate.

<sup>2</sup> See, among others, Demirgüç-Kunt and Detragiache (1999), Kaminsky and Reinhart (1999), Radelet and Sachs (1998), Furman and Stiglitz (1998).

individual financial institutions in East Asia (one study is Laeven, 1999). Using individual institution data, one can investigate, for example, why, despite the fact that all financial intermediaries faced similar macroeconomic shocks, not all experienced distress and/or eventually failed. One can thus identify the specific characteristics of distressed (or failed) institutions compared to non-distressed (or non-failed) institutions; these characteristics can be used in developing systems to monitor the risk of distress of financial institutions in the future. By studying the resolution and closure processes, one can try to identify what type of processes used to resolve distressed financial institutions are most adequate and lead to the least loss of confidence.

Our work also relates to the literature on predicting individual financial institutions' distress and closures. Models trying to predict the failure of individual financial institution ("early warning systems") have been developed since the '70s. Mainly applied to developed countries' banking systems,<sup>3</sup> these studies focus on the early identification of financial institutions, which are developing financial difficulties. From a banking regulator and supervisory agency's viewpoint, early warning systems can help minimize the use of relatively scarce examination resources while at the same time achieving as much failure-prevention as possible. Indeed, failure prediction models and early warning systems have proven important tools for supervisory agencies to schedule individual on-site bank examinations and initiate remedial actions.

The first generation of financial early warning systems aimed to build screening devices to help in scheduling bank examinations by flagging as early as possible those institutions in (or approaching) financial distress. These studies share a similar approach (Meyer and Pifer 1970; Sinkey 1975; Altman 1977; Martin 1977; Pettaway and Sinkey 1980; see Altman 1981 for a comprehensive survey of the early wave of the literature): on the basis of a set of financial ratios, reflecting the different dimensions of a CAMEL rating system,<sup>4</sup> the statistically best subset of variables is chosen to distinguish between potentially financially-troubled and sound financial institutions, within a certain prediction horizon. As their goal is early warning, these models aim to predict the economic insolvency of a bank rather than the narrow notion of *de jure* failure. In other words, these studies aim to identify situations in which a bank might become unable to meet its contractual liabilities out of its own resources—due to the negative value of its net worth at market-value—even if it is not followed by a formal declaration of insolvency (and subsequent closure) by the chartering authority. In fact, the closure of the financial institution is only one among the various options available to deal with its distress. Financial distress will, for example, often be resolved via supervisory-encouraged and supported mergers.

A separate, though related, strand of literature has focused on what exactly triggers the decision to close a distressed bank. Kane (1988) suggests casting such decisions within the framework of public choice theory. In this context, the closure

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<sup>3</sup> The US banking system has been particularly investigated.

<sup>4</sup> CAMEL stands for Capital adequacy, Asset and Management quality, Earnings, Liquidity.

decision is seen as an administrative option that regulatory authorities may or may not choose to exercise, even when the bank is economically insolvent. The tradeoffs involved will, among others, be of a public choice nature and include the importance of the particular financial institution to the local economy and its potential systemic impact on the rest of the financial system. In such a case, in order to avoid closure, government support may be deployed either directly, e.g., through recapitalization, or indirectly, e.g., the regulatory authorities may convince a sound bank to acquire the distressed bank on terms favorable to the acquiring bank. Or regulatory forbearance, accounting or tax preferences may be granted to the particular financial institution. Other factors may also play an important role in the closure decision. Even in institutional settings with clear processes for dealing with weak financial institutions, the fate of a banking institution is typically not determined by its solvency status or public choice criteria only, as was observed in the US Savings and Loan crisis. Other factors that may play a role include regulatory capture and political considerations regarding which institutions are to be accorded a preferential treatment.

Arguably, the decision to leave distressed financial institutions open rather than close them, is more likely necessary and can make for good public policy during a systemic crisis. After all, it will be difficult to close down a large part of the financial system, even if many financial institutions are technically insolvent. But, the decisions, which distressed financial institutions to leave open, are likely also more discretionary in time of a systemic crisis. At such time, not only will it be difficult to distinguish problems of illiquidity from problems of insolvency, but the government is likely also more constrained in its ability, both financially and institutionally, to take on a large number of insolvent financial institutions. The occurrence of financial distress and the decision to close can thus be quite independent events in a systemic crisis.<sup>5</sup>

Empirical papers on financial institutions' distress and closure generally follow a two-step approach. First, groups of financial institutions are classified in closed vs. non-closed, de facto-failed vs. non-failed, problem vs. non-problem, etc. Second, on the basis of accounting (balance sheet and income statement data) and/or market information, statistical techniques are applied to identify the ex-post determinants of the event. Techniques include multiple discriminant analysis, logit or probit regression models, two-step logit regression procedures and, more recently, proportional hazard models, where both the probability of failure-event occurring and the timing of that event are estimated (Lane, Looney and Wansley 1986; Whalen 1991; Cole and Gunther 1995; Gonzales-Hermosillo 1999).

We take advantage of and build on this literature in several ways. First, we investigate both the occurrence of distressed versus non-distressed financial institutions as well as the closure decisions for distressed financial institutions. We do so as, on one hand, the broader concept of economic failure rather than the more restrictive concept of

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<sup>5</sup> There are some empirical studies, which treat closure and insolvency as two separate events and modeling the regulator's decision to close banking institutions. These include Demirgüç-Kunt (1989, 1991), Gajewsky (1990) and Thomson (1991 and 1992).



*de jure* failure is more relevant in a systemic financial crisis. On the other hand, investigating which distressed intermediaries were closed and which were kept open allows us to gain insights on the political economy of dealing with financial intermediary distress. This also provides some insights on the causes of the East Asian financial crisis as well as on the appropriateness of policy responses during the evolution of the crisis. As an additional insight, the performance of early warning systems based on financial ratios in developing countries can be compared with that for developed countries. It is often argued that traditional bank financial ratios and market-based indicators used in industrial countries are not effective in developing countries as these countries' accounting and reporting practices are often less reliable than those in developed countries.<sup>6</sup> At the same time, the degree of risk-taking in emerging markets is often higher than in developed countries, which may also mean that risk can more easily be detected using financial ratios. Since we use for our analysis the same data items as typically used in a CAMEL rating system—the most often used early warning system employed in developed countries to identify financial institutions in trouble—directly insight on this claim is obtained.

### 3. Data Sources

We investigate the distress and closure decisions for 186 banks and 97 nonbank financial institutions—which include finance companies, investment banks, merchant banks and specialized banks—from five crisis-affected East Asian countries: Indonesia, Korea, Malaysia, the Philippines and Thailand. The breakdown of the data by country is as follows: (i) 78 commercial banks and 9 nonbank financial institutions in Indonesia; (ii) 28 commercial banks and 30 nonbank financial institutions in Korea; (iii) 36 commercial banks and 28 nonbank financial institutions in Malaysia; (iv) 31 commercial banks and 5 nonbank financial institutions in the Philippines; and (v) 13 commercial banks and 25 nonbank financial institutions in Thailand (see Table I).

We gathered financial statements for these 283 intermediaries from BANKSTAT, a comprehensive database of balance sheet and income statement data for individual financial institutions across the world. BANKSTAT collects annual reports and financial statements from individual financial institutions, which are prepared according to the various national accounting standards. BANKSTAT makes some adjustments to the reported data to make them comparable across countries and conform as much as possible to international accounting standards. Coverage of the national financial sector in terms of total assets is high for all five countries and substantial in terms of number of institutions for Korea, Malaysia and Thailand. In terms of number of local commercial banks and of both local and foreign commercial banks, the coverage of our sample is

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<sup>6</sup> For instance, Rojàs-Suarez (1998) argues that this is the case particularly in Latin America, and develops an alternative set of indicators of bank problems which takes into account the specific characteristics of these countries' banking systems.

respectively 35.7% and 36.3% in Indonesia, 100.0% and 35.9% in Korea, 100.0% and 100.0% in Malaysia, 44.9% and 40.8% in the Philippines, and 86% in Thailand.<sup>7</sup> In terms of total assets, the coverage of the total commercial banking system by our sample varies between 80% and 100%. In terms of number of nonbank financial institutions, our coverage is 4.0% in Indonesia, 81% in Korea, 54.9% in Malaysia, 27.5% in Thailand and 5.3% in the Philippines. In terms of total assets, the coverage of the total nonbank financial system is between 47.0% and 90%.

We use various sources to obtain information on financial institutions' ownership structure, their corporate and family connections, and their fate in the aftermath of the crisis. Information on ownership is obtained from BANKSTAT, BANKSCOPE and Claessens, Djankov and Lang (1999). A financial intermediary is defined as state-owned if at least the government or a state-owned institution holds 50% of the equity. The BANKSTAT database includes the ownership structure of private financial intermediaries (top 10 shareholders), which allows us to discriminate between widely held institutions and institutions belonging to either a family or an industrial conglomerate. Following Claessens et al. (1999), we define an intermediary as "connected" when the largest owner has a stake of more than 20% and it is either a family or an industrial conglomerate.<sup>8</sup> Table II shows the distribution of our sample with respect to ownership structure and connections with industrial groups or influential families.

We consider distress and closure during the two years following the onset of the East Asian financial crisis, i.e., from July 1997 up to July 1999, and treat financial distress and closure separately. To identify distressed and closed financial institutions we rely on publicly available sources, including Central Bank's web sites and newspapers articles.<sup>9</sup> We define distress as all those instances in which a financial institution has received external support as well as when it was directly closed. Distress is identified as one of the following: i) the financial institution was closed; ii) the financial institution was merged with another financial institution;<sup>10</sup> iii) the financial institution was recapitalized by either the Central Bank, the Deposit Insurance Corporation, or an agency specifically created to tackle the crisis;<sup>11</sup> iv) the financial institution's operations were temporarily suspended. Closure is a subset of distress and includes only the *de jure* failures.

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<sup>7</sup> No foreign commercial bank is included in the BANKSTAT sample for Thailand.

<sup>8</sup> The 20% cutoff-level has been used by several papers, including La Porta et al. (1999), and appears a robust threshold for a single shareholder to establish the effective control over an institution.

<sup>9</sup> Using public information only usually underestimates the number of truly distressed cases. We conjecture that this was less so for our sample of countries during this period. Intervention by the IMF, the World Bank and other agencies and the general scrutiny of international markets meant that weak financial institutions were more likely identified as such during this period. Regardless, underreporting of distressed financial institutions would create a bias against finding significant results on our logit estimations.

<sup>10</sup> Banks merged under distressed conditions are treated as failed and added to the failed group.

<sup>11</sup> These include the Financial Restructuring Authority (FRA) in Thailand, the Indonesian Banking Restructuring Agency (IBRA), and Danaharta in Malaysia.

Table III provides the frequency distribution of our sample with respect to distress and closure. Almost 42 percent of the institutions in our sample experienced distress, while by July 1999 only 82 of the 120 distressed institutions survived with some type of assistance. Of the whole sample, 38 out of 283 institutions in existence in July 1997, or 13 percent, were closed over this period. Indonesia is the country with the most financial system distress, in terms of absolute numbers of distressed and closed institutions, followed by Korea and Thailand, but the rank is the opposite in terms of the percentage of institutions in distress (Table IV). Malaysia has fewer distressed institutions and did not close any financial institution. The Philippines has the least distressed institutions, four, but did close two nonbank institutions.

We use only financial information as of the end of 1996—the year preceding the crisis—thus avoiding any risk of contaminating our estimations with the occurrence of distress and closure processes themselves.<sup>12</sup> We collect end-1996 financial data for the different dimensions of a CAMEL-type risk analysis, as used by supervisors in many countries. Table V lists the independent variables, their corresponding CAMEL-categories and their definition. Some CAMEL variables were not available for all countries. For instance, two indicators of financial institution risk, the ratio of non-performing loans to total loans and the capital risk-adjusted adequacy ratio, were not available in a consistent manner for all the five countries under study.<sup>13</sup> We end up using the following variables: equity to gross loans, loan loss reserves to capital, loan growth, operational expenses to revenues, return on assets, net interest revenues as a share of total revenues, and loans to borrowings. Although not strictly a CAMEL variable, size has usually been added in early warning studies as a proxy for “too big to fail” situations.<sup>14</sup> In the specific case of the East Asian countries, following Kane (1998), we hypothesize that larger institutions are more likely to be subject to political intervention and links,

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<sup>12</sup> In particular, by using 1996-only data we avoid our estimations describing the behavior of supervisors, rather than the possibilities of impending distress. If we would have used later data, the estimations might have captured, for example, the fact that supervisors consider those financial institutions distressed which have low capitalization. At the same time, using 1996-only data is a strict criteria as for several countries the financial crisis was worse in 1998 than in 1997, and distress for some financial institutions only occurred in 1998. For that reasons, we could have used in some case also 1997 data. Also, the decision to close distressed financial institutions occurred largely in 1998, meaning we could have used 1997 data to analyze the importance of the financial condition of individual financial institutions at end-1997 in 1998 closure decisions. Furthermore, to account for differences across countries and periods, we could have added macroeconomic variables, such as GDP-declines, to explain the relative occurrence of distress. More generally, we could have estimated a cumulative distress (hazard) model, as is often done by bank supervisors in developed countries. On all these accounts, the use of 1996-only data biases our analysis against finding strong results.

<sup>13</sup> Definitions of non-performing loans varied widely across countries, and banks were given considerably leeway before the crisis in classifying loans. While all countries had capital adequacy requirements, the definitions of allowable sources of capital differed across countries.

<sup>14</sup> We would have like to use as well data on financial institutions' exposures to risky sectors (e.g., real estate or lending for securities markets) and possible maturity mismatches (foreign exchange, interest), but these data were not available for all countries on a comparable basis.

which in turn might have distortionary effects on their lending and/or staffing policies, adding to financial risk.

In addition to the traditional CAMEL variables, we include variables to account for differences in governance structures. Among privately owned intermediaries, wholly foreign-owned institutions are typically deemed to be more efficient and less risky than local institutions, because of their corporate governance and operational structures. Financial institutions with relatively more foreign portfolio ownership are likely also better governed. State-owned financial institutions are usually considered less efficient than privately owned institutions and, if government-directed lending is extensive, they may also have riskier portfolios. Finally, we want to account for the possibility of extensive relationships between financial intermediaries and corporations or influential families, which can add to financial risk. This can be because the company or the family might be tempted to influence, for its own purposes, the intermediary's loan policy. The existence of links between the government, politicians, corporations, influential families and financial institutions may also allow regulatory leeway and avoid a closure of a distressed institution.

Altogether, we employ three variables that distinguish the ownership of the financial institutions (state vs. non-state; domestic vs. foreign) and between "connected" and "independent" intermediaries. We also include the share of foreign portfolio ownership. We further distinguish commercial banks from nonbank financial institutions, since difference in business specialization and degree to which intermediaries are allowed to take deposits could imply a different impact on the probability of suffering distress and of being closed. We also consider the role of connections separately for nonbank financial institutions (by including an interactive variable). In most of the model specifications we also use dummies for each country.

## **4. The Empirical Analysis**

### *4.1. Methodology*

We use a qualitative response model to estimate the probability of the occurrence of an event (distress or closure) as a function of a vector of independent variables,  $X$ , and a vector of unknown parameters,  $\theta$ . The specific model we use is:

$$\Pr(Y_i=1) = F[H(X_i, \theta)]$$

where:

$Y_i$  is the dependent variable which takes the value of one if the financial institution has experienced distress (or closure) and zero otherwise;

$F$  is the probability function, which has a logistic functional form, giving rise to the logit model;

$$H_i = \theta_0 + \sum_{j=1}^M \theta_j x_{ij}$$

$X_i$  is the vector of independent variables for the  $i$ -th individual financial institution; and  $\theta$  is the vector of parameters to be estimated.

The basic equation of the logit model to be estimated can be written as:

$$\Pr(Y_i = 1) = F(H(X_i, \theta)) = \frac{1}{1 + e^{-H_i}}$$

We estimate three different logit models using maximum likelihood techniques. In the first model, the dependent variable takes the value of one when a financial intermediary experiences distress, as defined in Section 3, and zero otherwise. Here, we have 278 observations,<sup>15</sup> of which 120 distressed and 158 non-distressed institutions. In the second model, the dependent variable takes the value of one if the institution is closed (i.e., declared failed by the chartering authority and closed down) and zero otherwise. Here, we have 215 observations,<sup>16</sup> of which 38 closed and 177 non-closed institutions. In the third model, we only study the closure decision of distressed institutions. Here we have 104 observations,<sup>17</sup> of which 38 closed and 66 non-closed. This model thus estimates the probability of closure conditional on distress, i.e., it investigates which characteristics made a financial institution “more valuable” than others in the eyes of the authorities and was consequently left open (and possibly granted government support).<sup>18</sup> We use various specifications for each model, but report only one specification (to conserve space). We do report, however, also other variables which were statistically significant, although not necessarily jointly with all the other variables.

#### 4.2. *The rationale of the explanatory variables*

Table VI summarizes each variable’s rationale, along with the expected sign of their impact on the probability of a financial institution’s distress and closure. Among the CAMEL-type variables, higher capitalization is expected to have a negative impact on the probability of both distress and closure, as the financial institution will be better able to absorb losses. A larger share of capitalization due to loan loss reserves is likely associated with more risky assets and can therefore be expected to increase the probability of distress. Conditional on the occurrence of distress, however, an

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<sup>15</sup> From the initial sample of 283 observations, five observation are discarded due to missing values.

<sup>16</sup> Four observations were discarded due to missing values and 64 observations were not used due to no closure-event in Malaysia.

<sup>17</sup> 104 observations are the 120 distressed institutions less the 16 Malaysian institutions that are not included due to no closure-event in Malaysia.

<sup>18</sup> Note that we continue to use 1996-only data to analyze the closure and the closures conditional on distress decisions. As such, we are predicting in a sense which institutions were candidates for closure already in 1996.

intermediary having made relatively larger loss reserves might less likely be closed.<sup>19</sup> This could be for example, because its management might be considered more prudent. Higher loan growth is expected to increase the likelihood of both distress and closure, as it entails more risk exposure.

We consider several financial variables related to the efficiency of management and profitability. The first one is the ratio of operating expenses to total revenue, often called the “inefficiency ratio,” and should have a positive impact on both distress and closure. In terms of profitability variables, higher return on assets (ROA) can be expected to decrease the probability of distress and closure. The impact of a higher ratio of net interest income to total income is uncertain. On one hand, it might increase the volatility of income if service income is more stable. On the other hand, it might make a financial institution less prone to distress and closure if focusing on the core business leads them to a better allocation or if service income is actually more, not less, volatile in the face of a systemic shock. Finally, a less liquid institution is expected to be more likely distressed and to be closed.

Among the non-CAMEL-type explanatory variables we consider size. In terms of probability of distress, a larger financial institution might have a lower chance of becoming distressed if it is more diversified and less exposed to liquidity shocks. On the contrary, the probability of distress might increase if the financial institution has been more subject to distortionary effects, including political intervention. As regards closure, we expect that authorities may consider large intermediaries “too big to fail”. Finally, nonbanks might on the one hand be less prone to distress—as they rely on non-deposit liabilities and might thus be less subject to liquidity runs. At the same time, nonbank financial institutions might be more subject to closure, conditional on distress, as their closure involves less systemic consequences.

Our ownership variables refer to both management quality, corporate governance, and possibly access to financing. The relationship of ownership structures with distress or closure is not always obvious. State-owned financial institutions might be less efficient than private financial institutions, take more risks and suffer more from political motivated lending.<sup>20</sup> At the same time, state-owned financial institutions may benefit from depositors' flight to safety—domestic deposits shifting from non-state-owned to state-owned financial institutions—and may have had easier access to financing during the crisis as they were perceived to more likely receive support in case of trouble (Ding, Domaç and Ferri 1999). Distress may thus have been easier to overcome in the case of state-owned banks. Foreign-owned financial institutions might have been able to weather the crisis better, either because they were better managed or because they were more diversified. In either case, better management of foreign financial institutions was likely the cause. Alternatively, to the extent that depositors' flight to safety meant a flight to foreign financial institutions—as in the case of state-owned financial institutions—or if

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<sup>19</sup> We also tried other specifications for the capitalization variables, such as the ratio of capital to assets, and cut-off levels for capitalization, but we found these generally of less significance.

<sup>20</sup> Laeven (1999) finds some support for this hypothesis.

foreign financial institutions had better access to financing, foreign banks might have been less prone to financial distress. Arguably, this is also a case of better management. Finally, “connected” intermediaries should be more prone to distress, because of the likely higher degree of prior misallocation of resources and risky lending behavior. At the same time, these financial institutions might be able to mobilize political support and thus avoid closure, unless the closure processes were very transparent and were able to avoid political interference.

Table VII reports summary statistics for the explanatory variables over the year immediately prior to the crisis, 1996. It presents data for the whole sample of financial institutions (column 1) and various breakdowns (columns 2-12) by different types of financial institutions. It then conducts z-statistics for these pair-wise splits of the data. Reading down columns at median values for the various dichotomous partitions of the sample, some preliminary conclusions emerge. Distressed institutions have lower capitalization than non-distressed institutions, have a larger share of capital coming from loan loss reserves, a higher inefficiency ratio, a lower profitability, are larger and are more likely to have connections. However, in contrast with our hypotheses, distressed intermediaries show lower loan growth and no statistically significant difference with respect to non-distressed institutions in terms of liquidity position, ownership and business specialization. Most of the features distinguishing distressed from non-distressed intermediaries carry over to those distinguishing closed from non-closed intermediaries. Closed institutions have statistically significant lower capitalization, are less efficient and less profitable than their non-closed counterparts. Nevertheless, a few statistically significant differences emerge. Specifically, closed institutions do not have a higher share of capital coming from loan loss reserves, but do have a lower liquidity position and are more likely privately-owned and nonbanks.

The other three dichotomous partitions of the sample that we consider refer to size, state-ownership, and connections. Large intermediaries are less capitalized, and have more of their overall capitalization coming from loan loss reserves; their loan growth is lower; their inefficiency ratio is higher; they are less likely foreign-owned and more likely state-owned; and they are more liquid. Non-state-owned intermediaries are better capitalized, with less of their overall capitalization coming from loan loss reserves. Foreign-owned institutions are found to have a higher ROA and be smaller in size. Connected intermediaries have a smaller share of their overall capitalization coming from loan loss reserves; they are less likely state-owned; their ROA and size are smaller; and they are more liquid. These results do not control, however, for the relationships among the various variables, for which we turn to our qualitative response (logit) models.

#### *4.3 Results from the logit models*

The logit models show a good predictive power (Table VIII): between 78% and 87% of financial institutions were correctly classified, with Type I classification errors less than 16% for the distress and closure conditional on distress and Type II classification errors less than 28%. The closure model shows the highest Type I error,

almost 35%, i.e., many financial institutions were predicted not to be closed when they were actually closed. The Type II error for this model is low, however, 8%.

The main results from the logit models are as follows.<sup>21</sup> Most of the financial ratios identified by previous studies as useful predictors of intermediaries' distress and closure are confirmed for our sample of East Asian financial institutions. We find that traditional, CAMEL-type variables—loan loss reserves to equity plus loan loss reserves, net interest income to total revenue, loan growth, ROA—predict subsequent distress and closure relatively well. Specifically, a higher share of loan loss reserves in overall capitalization has a positive impact on distress. This suggests that, as financial institutions made (albeit inadequate) provisions for loan-losses in response to the riskiness of their loans, the share is a useful predictor of institutions which may run into distress. The probability of distress is lower when the share of net interest income in total income is larger, confirming the volatility hypothesis. Both Indonesia and Thailand have relatively more distressed financial institutions, in part a reflection of the large number of financial institutions in these countries at the start of the crisis.

Regarding the unconditional probability of closure, higher loan growth tends to increase it, while a higher ROA and a higher share of net interest income in total income tends to reduce it. These variables, however, do not have a significant impact on the probability of closure conditional on distress. The coefficient on the share of loan loss reserves in overall capitalization is negative, in contrast to the distress model. It may be that for distressed institutions, relatively higher provisioning indicated better management and gave authorities more reason not to close the institution. Thailand has closed relatively more financial institutions, in part as it closed almost two-thirds of its finance companies.

Larger-sized intermediaries are more likely to become distressed, but less likely to be closed, both in the unconditional and conditional on distress models, suggesting a "Too Big To Fail" policy in the closure decision. This is further confirmed in the statistically significant positive coefficient for the nonbank financial institution dummy in the conditional-on-distress model (and the positive, but not statistically significant coefficient in the unconditional closure equation), suggesting that nonbank financial institutions, which tend to be smaller, are more likely closed conditional on being in distress. At the same time, nonbank financial institutions are less likely to become distressed but more likely to be closed (in the conditional model).

Regarding the role of ownership and connections the following results obtain. None of the foreign controlled institutions are closed and foreign portfolio ownership decreases the probability of distress. Controlling for other factors, privately owned financial institutions are more likely to become distressed, suggesting that flight to safety and access to financing by state-owned financial institutions were mitigating factors. Connections of a financial institution with industrial groups or influential families

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<sup>21</sup> Since we used alternative specifications, we report on both the full results as reported in Table 7 as well as other results we found, which are only reported in summary form in Table 7.



substantially increase its probability of distress, suggesting favorite, prior forbearance. The probability of final closure, unconditional and conditional on distress, increases with connections, however, suggesting that the closure process itself was relatively transparent (as one otherwise would have expected a negative sign). Finally, connected nonbank financial institutions were more likely to become distressed, but not more likely closed (however, the latter lack statistical significance). This again suggests relative transparent closure processes.

## **5. Conclusions**

This study provides a test of failure prediction models in emerging markets' context. The results show that many of the indicators typically used in developed countries to predict financial institutions' distress also apply to these economies. This maybe somewhat surprising as the performance of these models for developed countries is limited and the data quality is generally considered poorer in emerging markets. The explanation may be that the degree of risk-taking is so much greater and discipline exercised by markets (and supervisors) so much less in emerging markets that early warning systems can have good predictive power, and could thus be efficient tools to complement supervisory resources.

The paper also sheds light on the general causes of the East Asian financial crisis. It suggests that there were significant prior weaknesses, which contributed to individual intermediary distress. The findings also suggest, that conditional on the overall financial distress in the crisis-affected East Asian countries, the resolution processes used were relatively transparent. However, in some respects, the closure process may have amplified the crisis. To the extent that large financial institutions tend to associate with large business, policies of Too Big Too Fail may have diverted scarce credit away from other segments of the economy—like the small and medium-sized enterprises—at the time of the systemic crisis. This, coupled with the fact that significant forbearance of already weak financial institutions was granted prior to the crisis suggests that the late, and not necessarily comprehensive, resolution processes used may have added to the overall uncertainty and loss of confidence in the countries, thus aggravating the financial crisis.

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**Table I: Overview of the financial system by country and by sector (as of end 1996)**

	Indonesia	Korea	Malaysia	Philippines	Thailand
Commercial banks	78 (16)	28 (2)	36 (14)	31 (7)	13 (0)
Nonbank financial institutions	9 (2)	30 (14)	28 (3)	5 (1)	25 (4)
Total	87 (18)	58 (16)	64 (17)	36 (8)	38 (4)
<i>Numbers in parentheses indicate the number of foreign institutions.</i>					
<i>Source: BANKSTAT</i>					

**Table II: Ownership structure of financial institutions in the sample**

	Indonesia	Korea	Malaysia	Philippines	Thailand
State-owned	10	11	13	4	5
Non-state-owned	77	47	51	32	33
<i>Of which:</i>					
<i>Connected</i>	52	18	36	23	1*
<i>Foreign-owned</i>	18	16	17	8	4
Total institutions	87	58	64	36	38
<i>Source: BANKSTAT</i>					
<p>* The figure for Thailand does not include one bank owned by the government and one bank connected to the Royal family. The number for Thailand underestimates the number of connected institutions as connections are difficult to trace in Thailand given the habit of local and foreign investors to maintain their share holdings in the Securities Depository Company (which guarantees complete anonymity) and through nominee accounts.</p>					

**Table III: Sample frequency distribution**  
***Distressed versus non-distressed institutions***

	Freq.	Percent
Non-distressed	163	57.6
Distressed	120	42.4
Total	283	100

***Closed versus non-closed institutions***

	Freq.	Percent
Non-closed	245	86.6
Closed	38	13.4
Total	283	100

**Table IV: Distress and closure among the five crisis countries**

	Indonesia	Korea	Malaysia	Philippines	Thailand
Distressed (*)	44 (50.57%)	31 (53.45%)	16 (24.24%)	4 (11.11%)	25 (65.79%)
<i>Commercial banks</i>	42	18	8	2	11
<i>Nonbank institutions</i>	2	13	8	2	14
Closed (*)	17 (19.54%)	10 (17.24%)	0 (0.00%)	2 (5.56%)	9 (23.68%)
<i>Commercial banks</i>	17	1	0	0	0
<i>Nonbank institutions</i>	0	9	0	2	9

(\*) Percentage of distressed (closed) institutions in the population.

**Table V: Variable Definition**

Variable	CAMEL category	Definition
EQLLR_GL	Capital	(Equity (book value) + Loan loss reserves)/Gross loans
LR_EQLLR	Asset quality (risk)	Loan Loss Reserve/(Equity + Loan Loss Reserve)
LOANGROWTH	Asset quality (risk)	Growth rate of loans between 1995 and 1996 (March 1997 on March 1996 for those institutions for which the fiscal year closes in March, December 1996 on December 1995 for the others)
INEFFRATIO	Management	Total operating expenses/Total revenues
FOREIGN	Management	Dummy variable which takes the value of 1 if the intermediary is foreign owned and 0 otherwise
CORGOV	Management	Dummy variable which takes the value of 1 if the intermediary is private-owned, and 0 otherwise (i.e., if it is state-owned)
ROA	Earnings	Net income/Total average assets
NINI_REV	Earnings	Net interest income/Total revenues (Total revenues = Net interest income + Non interest income (before deducting non interest costs))
LOANS_BORROWING	Liquidity	Total loans/Total borrowings (deposits and other sources of borrowing)
SIZE	-	Logarithm of total assets
CONNECT	-	Dummy variable which takes the value of 1 if the intermediary is owned by a family or belongs to an industrial conglomerate, and 0 otherwise
INDO	-	Dummy variable which takes the value of 1 for Indonesian institutions, and 0 otherwise
KOREA	-	Dummy variable which takes the value of 1 for Korean institutions, and 0 otherwise
MALAYSIA	-	Dummy variable which takes the value of 1 for Malaysian institutions, and 0 otherwise
THE PHILIPPINES	-	Dummy variable which takes the value of 1 for Philippine institutions, and 0 otherwise
THAILAND	-	Dummy variable which takes the value of 1 for Thai institutions, and 0 otherwise
NB	-	Dummy variable which takes the value of 1 for a nonbank financial institutions, and 0 otherwise
CONNB	-	Interaction variable of NB multiplied by CONNECT.

**Table VI: Regression Specifications and Expected Results**

Variable	CAMEL definition	Expected impact on DISTRESS	Expected impact on CLOSURE
SIZE	-	<i>(-/+) Diversification or Credit Channel Effects/ distortionary effect from political intervention (Kane, 1998)</i>	<i>(-) Too Big To Fail</i>
(Equity + Loan Loss Reserve)/Loans	Capital	<i>(-) cushion to absorb shocks</i>	<i>(-) cushion to absorb shocks</i>
Loan Loss Reserve/ (Equity + Loan Loss Reserve)	Asset quality/ Risk	<i>(+) aggressive provisioning policy as signal of high credit risk</i>	<i>(+/-) aggressive provisioning policy as signal of high credit risk or of build up of an appropriate stock of general provisions</i>
Loan growth	Asset quality/Risk	<i>(+) Risk, Misallocation</i>	<i>(-) Political connections</i>
Expenses/Total Revenues	Management	<i>(+) Inefficiency</i>	<i>(+) Inefficiency</i>
Corporate governance (dummy variable which is 1 if the FI is privately owned, 0 otherwise)	Management	<i>(-/+) Inefficiency/Safety</i>	<i>(+) Private banks are less likely to receive state capital injection (than state-owned banks)</i>
Connected (dummy variable which is 1 if a FI is connected to industrial groups/families, 0 otherwise)	Management	<i>(+) Misallocation</i>	<i>(-/+) Political connection/ enforcement of a transparent resolution process</i>
Foreign (dummy variable which is 1 if a FI is foreign owned, 0 otherwise)	Management	<i>(-) Better management</i>	<i>Not specified, since no closure has taken place among foreign intermediaries, which are taken as a control group for closure.</i>
Return on assets	Earnings	<i>(-) Profitability</i>	<i>(-) Profitability</i>
Net Interest Income/ Total revenue	Earnings	<i>(+/-) Less volatility/More volatility of income</i>	<i>(+/-) Less volatility/More volatility of income</i>
Loans/Borrowings	Liquidity	<i>(+) liquidity risk</i>	<i>(+) liquidity risk</i>
Nonbank (dummy variable which is 1 if a FI is a nonbank financial institution, 0 otherwise)		<i>(-) less subject to liquidity runs</i>	<i>(+) less concern on the negative externalities associated with the exit of nonbanks financial institutions</i>

**Table VII: Summary statistics of all banks and classes of banks**  
(Median values, except where noted)

	All institutions	Large-size	Small-size	Private institutions	State institutions	Connected institutions	Not connected institutions	Distressed institutions	Non-distressed institutions	Closed institutions	Not-closed institutions
<b>EQLLR_GL</b>	0.16	0.14***	0.18	0.16***	0.13	0.16	0.16	0.13***	0.18	0.13**	0.16
<b>LR_EQLLR</b>	0.11	0.12***	0.08	0.10***	0.14	0.10*	0.11	0.12**	0.10	0.08***	0.11
<b>LOANGROWTH</b>	0.22	0.18***	0.28	0.22	0.18	0.27***	0.16	0.19**	0.24	0.20	0.22
<b>INEFFRATIO</b>	0.56	0.56***	0.54	0.55	0.56	0.57	0.54	0.61***	0.51	0.68***	0.54
<b>FOREIGN (1)</b>	0.17	0.09***	0.25	0.21***	0	0.04***	0.28	0.03***	0.28	0***	0.19
<b>CORGOV (1)</b>	0.84	0.76***	0.92	-	-	0.97***	0.72	0.83	0.84	0.97**	0.82
<b>ROA</b>	0.02	0.01	0.01	0.01**	0.008	0.009*	0.01	0.008***	0.01	0.007***	0.01
<b>NINI_REV</b>	0.26	0.26	0.26	0.26	0.25	0.26	0.26	0.22***	0.31	0.19***	0.27
<b>LOANS_BORROWING</b>	0.77	0.73**	0.80	0.77	0.79	0.75***	0.81	0.78	0.77	0.83**	0.77
<b>SIZE (log tot assets)</b>	14.02	15.30	13.08	13.83***	15.63	13.83**	14.38	14.61***	13.74	13.47**	14.33
<b>CONNECT(1)</b>	0.47	0.42	0.52	0.54	0.08	-	-	0.54**	0.42	0.48**	0.44
<b>NB(1)</b>	0.35	0.32	0.39	0.34	0.50	0.26	0.44	0.33	0.38	0.52**	0.33

Whereas column 2 refers to the whole sample, columns 3-10 present medians (means) for five different bi-partition of the whole sample. Specifically in columns 3 and 4 intermediaries are grouped within "large-size" and "small-size" according to whether their size (log of total assets) is greater than the median. Columns 5 and 6 partition the sample according to whether intermediaries are private or state-owned. Columns 7 and 8 divide the sample among connected and non-connected institutions. Columns 9 to 12 divide the sample according to whether an intermediary went under distress and/or it was closed.

(1): mean values

A Mann-Whitney (t-test) test for differences in medians (means) is applied across relevant bi-partitions, and applies of course to both groups of the partitions:

\*\*\* indicates that the difference in medians (means) is significantly different from zero at the 1% level or less

\*\* indicates that the difference in medians (means) is significantly different from zero at the 5% level or less

\* indicates that the difference in medians (means) is significantly different from zero at the 10% level or less



**Table VIII: Logit Robust Results for Distress, Closure and Conditional Closure**

	Distress	Closure	Conditional
Loan loss reserves to total equity	7.01 (0.01)	-7.22 (0.06)	-5.07 (0.33)
Net interest income to total income	-6.19 (0.00)	-12.67 (0.00)	-11.44 (0.26)
Size	0.32 (0.06)	-0.53 (0.05)	-0.84 (0.01)
Foreign	-1.92 (0.02)	-	-
Nonbank financial institutions	-1.19 (0.05)	1.07 (0.20)	2.35 (0.01)
Connected nonbank financial institutions	1.43 (0.08)	-0.45 (0.76)	-0.46 (0.81)
Indonesia	1.47 (0.03)	0.97 (0.25)	-0.62 (0.66)
Thailand	2.78 (0.00)	2.80 (0.01)	13.79 (0.02)
Number of Observations	278(1)	215(2)	104(3)
Chi2	63.56	43.61	35.21
Prob > chi2	0.00	0.00	0.00
Overall predictive power	78.06%	86.98%	81.73%
Type I Error	14.17%	34.21%	15.79%
Type II Error	27.85%	8.47%	19.70%
<i>Memorandum: Other significant variables</i>			
Loan growth		+***	
Return on Assets		-*	
Privately-owned	+**		
Connections	+**	+**	+ *

\*\*\*, \*\*, \* indicate, respectively, statistically significant at the 1%, at the 5% and at the 10% levels

1. From the initial sample of 283 observations, five observation are discarded due to missing values.
2. Four observations were discarded due to missing values and 64 observations were not used due to no closure-event in Malaysia.
3. 104 observations are derived from the 120 distressed institutions less the Malaysian institutions that are discarded due to no closure-event in Malaysia.



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