

## **Market Discipline to Banks in Indonesia, the Republic of Korea, Malaysia and Thailand\***

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### **Abstract**

I analyze the effectiveness of market discipline to banks in Indonesia, the Republic of Korea, Malaysia and Thailand based on the survey on disclosure, deposit protection, and some other institutional factors. Empirical evidences show that the deposit interest rate was negatively correlated with bank equity capital, suggesting that depositors could understand bank risk and identify a problem bank. This tendency was particularly evident in Indonesia and the Republic of Korea. The sensitivity of the deposit interest rate to bank capital was higher before the crisis, probably reflecting the fact that deposit guarantee was less generous before the crisis than during and after the crisis.

Market-valued capital was positively correlated with equity capital, suggesting that stock market incorporated bank risk and accounting standards were reliable to some degree. This tendency was stronger for Malaysia and the Republic of Korea and for the banks that had international ratings. The sensitivity of market-valued capital to equity capital has improved after the crisis, possibly reflecting improved disclosure and accounting standards. On the other hand, we do not find evidence for stock market discipline to family-owned banks.

Our results suggest that adequate disclosure and limited deposit protection are of particular importance to enhance market discipline.

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## **1. Introduction**

Frequent banking crises over the last two decades around the world reminded us how important it was to promote safe management of banks. Among various disciplining devices, the ability of private agents to control bank risk-taking, i.e. market discipline, is attracting more and more attention by both policy-makers and economists. Depositors may withdraw deposits from, or require high deposit interests to risky banks. Bond-holders and shareholders may also require a risk premium. If banks recognize that deposit withdrawal or high funding costs reduce their value or even endanger their survival, they will avoid excessive risk-taking and engage in prudential management. In addition, bank supervisors can make use of security prices to identify problem institutions and shorten the time lag to take corrective actions (Flannery, 1988). Market discipline is expected to complement the government's regulation and supervision. Basel (2003) designates market discipline as one of the three pillars on which future financial regulation should be based (The other two pillars are minimum capital standards and supervisory review of capital adequacy).

Growing complexity of banking activities and resulting limitations of government supervision partly account for why policy-makers are trying to rely more on market discipline than before. In addition, the fact that traditional government regulations, including capital requirements, do not seem to have performed as well as they were expected, has also contributed to the growing emphasis on market discipline (See, e.g., Calomiris, 1999).

Despite its growing importance, there is still scarce literature on the effectiveness of market discipline outside the U.S. This paper aims at investigating the effectiveness of market discipline in the four Asian countries: Indonesia, the Republic of Korea, Malaysia, and Thailand. These countries adopted either an explicit or implicit blanket guarantee to deposits during the crisis. After the crisis, foreign-investors-owned banks appeared as a consequence of deregulation and the asset share of state-owned banks increased due to public recapitalization of banks. Disclosed financial information was enlarged after the crisis for these countries. All these changes are likely to affect the effectiveness of market discipline. Thorough examination of these countries will help us understand how to enhance the effectiveness of market discipline and thereby ensure financial stability.

Section 2 provides an overview of the institutional factors, including disclosure and deposit protection, that are likely to influence the effectiveness of market discipline based on the surveys conducted by Asian Development Bank Institute. Section 3 presents estimation results on market monitoring. Section 4 concludes.

## **2. Institutional Background**

Investors and depositors tend to monitor banks intensively if they are provided with adequate information on bank financial conditions and little protection from the government or deposit insurance (See, e.g., Demircuc-Kunt and Huizinga, 2004 and Hosono, Tsuru, and Iwaki, 2004). In this section, I briefly describe institutional backgrounds that may influence market discipline in the four Asian countries. This section owes much to country papers written by Kameyama et al. (2004) for Indonesia, Park (2004) for the Republic of Korea, Lum and Koh (2005) for Malaysia, and Polsiri (2004) for Thailand. Based on survey responses by country paper authors, I together with Sang-Woo Nam construct private monitoring index and some other institutional

variables. The details of these indexes and variables are described in the Appendix.

### **Disclosure and Availability of Market Signals**

Disclosure of financial conditions and the availability of market signals including share prices and bond yields are essential for depositors and investors to identify a risky bank.

In Indonesia, banks have gradually improved the extent and quality of disclosure since the crisis. For example, no banks disclosed risk management policy to the public before 1997, some banks did so during the period 1998-99, and most banks have disclosed it since 2000. In addition, publication of bank financial statement has been more strongly scrutinized since the crisis than the pre-crisis period. The availability of market signals also improved to some extent after the crisis. For example, the number of banks among the top 10 banks whose shares were actively traded in the stock exchange increased from 8 banks in 1997 to 10 banks in 2003.

In the Republic of Korea, bank disclosure improved in the middle of the 1990s. Consolidated financial statement and risk management policy have been disclosed since 1994. On the other hand, the availability of market signals have been limited after the crisis partly because the number of listed banks has decreased and also because the trading volume of subordinated bonds have been insignificant. It is notable, however, that all of the top 10 banks have been rated by international credit rating agencies since 2002.

In Malaysia, bank disclosure improved after the crisis. In particular, Bank Negara Malaysia revised the guidelines on the specimen financial statements for the banking industry (GP8) in 2001 that had been first introduced in 1988. GP8 is a set of regulatory guidelines pertaining to disclosure requirements. The recent revisions reflect the improvements in the accounting standards including the fair value based on the criteria used by the International Accounting Standard (IAS). Risk management policy has also been disclosed by some banks since 1998.

In Thailand, bank disclosure improved after the crisis. For example, risk management policy has been disclosed since 1998. On the other hand, the availability of market signal of bank financial conditions seems to be still limited. The turnover ratio of bank stocks has been lower than other industries' stocks in the Thai Stock market, reflecting a high concentration of control and ownership stakes in the banking sector.

Table 1 depicts two kinds of private monitoring indexes, both of which indicate the degree of disclosure and availability of market signals (See Appendix A for details).

- *Private Monitoring Index 1* is constructed according to the definition of Barth et al. (2004). Average of all of the four Asian countries take the value of 5 for this index in 1999, while that of the 68 countries around the world is 4.8 and that of the OECD countries is 5.3 (the authors' estimates based on the database of Barth et al., 2001).
- Depicted in Figure 1 is *Private Monitoring Index 2*, which adds some information on subordinated debt and stock markets to *Private Monitoring Index 1*. Both indexes improved in the middle of the 1990s for the Republic of Korea and Thailand and at the end of the 1990s for Indonesia and Malaysia. Notably, the Republic of Korea displayed an increase in these indexes again in 2002. Comparing across countries, we see that the Republic of Korea and Indonesia have recently outperformed Malaysia and Thailand

in the potential of private monitoring.

### **Deposit Protection and Forbearance Policy**

The degree of deposit protection influences depositors' monitoring incentive. It should be noted, however, that a blanket guarantee may not necessarily eliminate the monitoring incentives of depositors and other investors, because there is a time lag between the claim and the payment of deposits when a bank is closed. In addition, the government protection policy may not be trusted fully if there is no sufficient fund. To what extent deposit protection reduces depositors' monitoring incentive is a non-trivial empirical issue.

In Indonesia, a limited deposit guarantee was applied when a bank failed at the beginning of 1990 but since then there were no bank closures until 1997. When the banking crisis occurred, a blanket guarantee that covered both depositors and creditors was issued in January 1998 and has been continued until now. In addition, Bank of Indonesia provided abundant liquidity support to problem banks in the face of the banking crisis. Explicit deposit insurance is planned but not has been established yet.

In the Republic of Korea, depositors were implicitly guaranteed by the government until 1995. Explicit deposit insurance was first introduced in 1996 and the Korean Deposit Insurance Corporation (KDIC) was established in 1996. At that time, the insurance coverage was limited to 20 million won per individual depositor. When the crisis occurred in 1997, the coverage was extended to blanket coverage in December. As financial market stabilized, the partial protection system was reinstated with the limit to 50 million won per individual financial institution in 2001.

In Malaysia, the government has always provided some form of implicit deposit insurance. The Central Bank has acted as the lender of last resort in a crisis. In addition, depositors are given the priority payments in the event of bank insolvency. An explicit deposit insurance system was proposed by Bank Negara Malaysia in 2003 but has not been established yet.

In Thailand, the government had often rescued and provided financial support to troubled banks and always reimbursed depositors and sometimes creditors as well up to the crisis of 1997. When the crisis occurred, the government introduced a blanket guarantee for all depositors and non-subordinated creditors of domestic and foreign financial institutions operating in Thailand. In November 2003, creditors were excluded from the blanket guarantee while bank depositors are still fully protected. The introduction of explicit, limited deposit insurance system is discussed now.

To compare the degree of deposit protection across the countries and time, I construct *Deposit Protection Index* based on the survey concerning types and extent of deposit protection and information on the most recent major bank failures (see Appendix B.1 for details). Panel A of Table 2 shows that though both Thailand and the Republic of Korea had the most generous deposit protection scheme during the crisis among the four countries, now Thailand has the most generous one.

In addition to deposit protection schemes, government forbearance policy and bailout policy are also likely to influence market discipline. I construct *Supervisory Forbearance Policy Index* according to Barth et al. (2004) (See Appendix B.2 for details). Panel B of Table 2 shows that Thailand has a weaker commitment to the prudential regulation than

the other three countries. Panel C of Table 2 shows some variables pertaining to bank bailout policy. Looking at these variables, we see that public money injections to recapitalize banks were sizable in all the countries. Accumulated amounts of public money injected as a proportion of GDP range from about 5 to 7 % for the Republic of Korea, Malaysia and Thailand. In Indonesia, accumulated amounts of bond issued to recapitalize banks amounted to about 58% of GDP. As a consequence, in Indonesia, assets of banks that were recapitalized by the government and survived represented more than half of the assets of all banks in 2000, though assets of failed banks were as large as 12% of the assets of all banks in 1999.

### **Ownership Structure and Concentration**

Ownership structure and concentration in the banking sector have changed significantly among the four Asian countries through the restructuring of banks. How these industrial organizational factors influence market discipline has not yet been made clear theoretically or empirically. It is conceivable, though, that industrial structure affects the stability of the industry and thereby influences depositors' and other investors' monitoring incentives.

Government-owned banks in Asian countries were often under strong government pressure to lend money to high-risk or politically-related firms at low interest rates, especially before the crisis. This was the case for the pre-crisis Indonesian state-owned banks, in particular. After the crisis, however, many private banks in the Asian countries were nationalized as part of the government recapitalization and restructuring process. Panel A of Table 3 shows that a large proportion of the big banks were owned by the government after the crisis, though recently the number of state-owned banks has begun to decrease. Most of these new state-owned banks seem to operate under strict prudential regulations.

Foreign-owned banks began to operate in Indonesia, the Republic of Korea, and Thailand after the crisis. They are often subject to regulations by home country's government and tend to lend to large companies with good credit ratings. Panel B of Table 3 shows that the number of foreign-owned banks displayed a sharp increase after the crisis except in Malaysia.

Other domestic private banks include various types of banks, such as business group banks that tend to lend to companies within the same group and small independent banks.

Panel C of Table 3 shows that there is a clear trend towards concentration in the Republic of Korea after the crisis, while there is no such a clear trend in the other three countries.

## **3. Empirical Analyses**

### **Hypotheses and Estimation Method**

To investigate whether depositors and stockholders monitor banks and respond to the change in bank risk, I estimate the following three equations:

$$\begin{aligned} Depo Rate_{i,j,t} = & \beta_1 ROA_{i,t} + \beta_2 Overhead_{i,t} + \beta_3 Equity_{i,t} + \beta_4 Log(Asset_{i,t}) \\ & + \beta_5 Disc Rate_{j,t} + Year_t + f_i + \varepsilon_{i,t} \end{aligned} \quad (1)$$

$$\begin{aligned} Depo Growth_{i,j,t} = & \beta_1 ROA_{i,t} + \beta_2 Overhead_{i,t} + \beta_3 Equity_{i,t} + \beta_4 Log(Asset_{i,t}) \\ & + \beta_5 Inflation_{j,t} + \beta_6 GDP Growth_{j,t} + Year_t + f_i + \varepsilon_{i,t} \end{aligned} \quad (2)$$

$$\begin{aligned} Market Capital_{i,j,t} = & \beta_1 ROA_{i,t} + \beta_2 Overhead_{i,t} + \beta_3 Equity + \beta_4 Log(Asset_{i,t}) \\ & + Year_t + f_i + \varepsilon_{i,t} \end{aligned} \quad (3)$$

Subscripts  $i, j, t$  denote bank, country and year, respectively. In Equation (1), the dependent variable is the average interest rate on domestic currency deposits (*Depo Rate*). The explanatory variables are bank fundamental variable, macroeconomic variables of the country where a bank is located, year dummies, and bank-fixed effect dummies. As bank risk measures, I choose operating income (*ROA*) and equity capital (*Equity*), both as a proportion to total assets. If depositors monitor bank risk intensively, they require high interest rates on deposits to risky banks. If this is the case, we expect that the coefficients of *ROA* and *Equity* are both negative. To control for other bank characteristics, I include overhead costs as a proportion to total costs (*Overhead*) and the logarithm of total assets in terms of the U.S. million dollars (*Log(Asset)*). If depositors regard high overhead costs as representing inefficient management and signals of high bank risk, they may require high interest rates on deposits. On the other hand, if banks provide depositors with various financial services at high overhead costs, depositors may require low interest rates on deposits. *Log(Asset)* is negatively correlated with *Depo Rate* if depositors regard a large bank as a safe one due to its ability to diversify loan portfolios or if depositors anticipate the government's too-big-to-fail policy. If, on the other hand, an expansion of total assets is involved with riskier loan portfolios including loans for real asset investment, bank size is expected to be positively correlated with the deposit interest rates. To control for a macroeconomic shock of each country, I include the central bank discount rate (*Disc Rate*) in the explanatory variables. Year dummies are also included to control for common macroeconomics shocks across the countries in the sample.

In Equation (2), the dependent variable is the growth rate of total deposits. Bank characteristics variables are the same as in Equation (1). The expected signs of the coefficients are opposite to those in Equation (1). For example, the coefficients of *ROA* and *Equity* are expected to be positive, because depositors are expected to withdraw deposits from risky banks. As for macroeconomic variables, I include the inflation rate (*Inflation*) and GDP growth rate (*GDP*).

In Equation (3), the dependent variable is the market-valued capital ratio (*Market Capital*). Market-valued capital is the share prices as of year-end multiplied by the number of stocks outstanding. Market-valued capital ratio is the ratio of market-valued capital to the sum of book-valued debt and market-valued capital. Bank characteristics variables are the same as in Equation (1). As long as equity capital is adequately reported and stock market incorporates bank financial conditions accurately, *Market Capital* and *Equity* will be strongly and positively correlated. If their correlations are found to be weak, there are some possible explanations. One possibility is that stock market may not incorporate bank financial conditions, while another possibility is that equity is not accurately reported due to inadequate accounting practices. In addition,

due to limited liability, stock prices may increase when poorly-capitalized banks take excessive risk.

I estimate fixed bank effect models, Equations (1)-(3), first using all the bank data for the 4 countries, then dividing the sample by period, bank ownership, and country.

## Data

Data on bank financial variables and macroeconomic variables are collected by Kameyama et al. (2004), Park (2004), Lum and Koh (2005), and Polsiri (2004). Sample banks consist of 26 Indonesian banks, 14 Korean banks, 10 Malaysian banks, and 18 Thai banks. Sample period covers the period 1990-2003. For Malaysian banks, average deposit interest rate data are available only for 1998-2003. In the case of mergers, we regard a new bank different from the old ones that were merged. We define the deposit growth rate of a new bank by the change of deposits from the total deposits of old banks that were merged except for Indonesian banks. In the case of Indonesian bank mergers, I simply omit the bank-year observations from the sample because I cannot obtain the data of deposits of old banks that were merged. When I estimate the deposit growth rate equation, I exclude the bank-year observations that display more than 100% deposit growth rate to avoid outliers. Data is an unbalanced panel. Descriptive sample statistics are shown in Table 4.

## Estimation Results

### ***Average interest rate on domestic currency deposits***

#### Baseline estimation

First, I estimate Equation (1) using pooled data of all the four Asian countries (Table 5, Panel A). Given a relatively small number of sample banks, using pooled data seems to be a reasonable way to obtain precise estimates despite differences in safety nets and disclosure across the countries. Column 1 shows that the coefficient on *Equity* is significantly negative, suggesting that depositors require a high interest rate on deposits to a poorly-capitalized bank. On the other hand, *ROA* is not significant. Among the control bank variables, *Overhead* is significantly negative while *Log(Asset)* is not significant. *Disc Rate* is significantly positive. In Column 2, I replace *Equity* with the BIS capital adequacy ratio and again obtain a significantly negative coefficient on it. In Column 3, I add the ratio of liquidity assets to total assets (*Liquidity*) to the bank risk variables. The coefficient on *Liquidity* is negative but insignificant, while the coefficient on *Equity* is again negative and significant. In Column 4, I add *Credit Rating*, which ranges from 1 for AAA to 16 for B3 or B-, increasing as the rating becomes worse. The coefficient on *Credit Rating* is positive and significant, suggesting that depositors require high interest rates to deposits if the bank is low-rated, while the coefficient on *Equity* becomes significantly positive and the coefficient on *ROA* becomes significantly negative in this case.

In Columns 5 and 6, I add *NPL Ratio* and *Net NPL Ratio*, respectively, to bank risk characteristics variables. *NPL Ratio* is non-performing loans as a proportion of total loans, and *Net NPL Ratio* is the difference between non-performing loans and loan loss provisions as a proportion of total loans. Though the coefficients of *NPL Ratio* and *Net NPL Ratio* are expected to be positive, the estimates show that both coefficients are negative and significant. The reason may be that banks have a room to manipulate the

true value of non-performing loans. In this case, a financially weak bank may underreport non-performing loans. The coefficient on *ROA* as well as *Equity* is significantly negative in Column 5.

#### Estimation by period

Second, I estimate Equation (1) by dividing the sample period into the pre-crisis (1989-96), crisis (1997-99), and post-crisis (2000-03) periods. Banks' financial conditions worsened during the crisis period and improved during the post-crisis period. While deposit protection became more generous during the crisis period than the pre-crisis period, disclosure and accounting standards improved during the post-crisis period. These changes might influence depositors' monitoring incentive and ability. Estimation results (Table 5, Panel B) show that the coefficient on *Equity* is negative and significant for the pre-crisis period, while it is negative but insignificant for the crisis period, and significantly positive for the post-crisis period. A significantly negative coefficient on *Equity* during the pre-crisis period may suggest that depositors' monitoring incentive was strong when deposit guarantee was not as generous as during the crisis and the post-crisis periods. On the other hand, the coefficient on *ROA* is significantly negative during the post-crisis period.

#### Estimation by ownership

Third, we estimate Equation (1) by dividing the sample banks by four types of the largest shareholders: state or public agency, foreign investors, family, and others. Other shareholders include widely-held financial institutions, and widely-held non-financial firms and other miscellaneous private agents. Because ownership has changed significantly among the Asian countries after the crisis, I use year-by-year ownership data. (Table 5, Panel C).

For state-owned or public-agency-owned banks and family-owned banks, neither the coefficient on *Equity* nor *ROA* is significant. Depositors seem to be indifferent to the risk of these banks. On the other hand, for foreign investor-owned banks, the coefficient on *ROA* is significantly negative, suggesting that depositors monitor foreign-investor-owned banks. For other banks, the result is mixed: the coefficient on *Equity* is significantly negative while that on *ROA* is significantly positive.

#### Estimation by country

Finally, I estimate Equation (1) by dividing the sample banks by country (Table 5, Panel D). The estimation results show that the coefficients on *Equity* is negative and significant for Indonesian and Korean banks with the absolute value higher for Indonesian banks. The coefficient on *ROA* is significantly negative only in the Republic of Korea. On the other hand, the coefficients on *Equity* are negative but insignificant for Malaysian and Thai banks, though it should be noted that the numbers of sample banks are small for these two countries.

I also analyze whether the coefficients on *Equity* changed across the pre-crisis, crisis, and post-crisis periods for Indonesia, the Republic of Korea and Thailand. The lower panel of Panel D shows that in Indonesia, the sensitivity of deposit interest rate to *Equity* was highest during the crisis period, while in the Republic of Korea, it was highest during the pre-crisis period.

## **Growth rate of total deposits**

### Baseline estimation

I estimate Equation (2) using the sample banks from the four Asian countries. The results (Table 6, Panel A) show that the coefficients of bank risk measures, i.e. *Equity*, *ROA*, *Liquidity*, *Credit Rating* and *NPL* are not significant. It might be difficult to extract depositors' responses to bank risk from the deposit growth rate that are influenced by many other factors including the restructuring of the banking industry. Among the control bank variables, the coefficient on *Overhead* is significantly negative while the coefficient on *Log(Asset)* is significantly positive. Larger banks tended to attract more deposits than smaller banks. Among the macroeconomic variables, the coefficients on *Inflation* and *GDP Growth* are significantly positive as expected.

### Estimation by period

Sub-period estimation results (Table 6, Panel B) show that the coefficients on *ROA* are positive and significant during the pre-crisis and the post-crisis periods but significantly negative during the crisis period. The results for the pre-crisis and the post-crisis periods are consistent with the hypothesis of depositor monitoring but the result for the crisis period is not. On the other hand, the coefficient on *Equity* is negative and marginally significant during the post-crisis period, which is again inconsistent with the hypothesis of depositor monitoring.

### Estimation by ownership

Estimation results by bank ownership (Table 6, Panel C) show that the coefficient on *ROA* is significantly positive only for family-owned banks. On the other hand, the coefficients on *Equity* are not significant for any types of ownership.

### Estimation by country

Estimation results by country (Table 6, Panel D) show that neither the coefficients on the *ROA* nor those on *Equity* are significant for any countries. The coefficients on *Log(Asset)* are significantly positive for Indonesian and Malaysian banks.

## **Market-valued capital ratio**

### Baseline estimation

I estimate Equation (3) using all the sample banks for which stock price data are available (Table 7, Panel A). Column 1 shows that *Market Capital* is significantly correlated with *Equity*, suggesting that stock market incorporates bank financial conditions and that equity capital is adequately reported. Column 2 shows that *Market Capital* is positively correlated also with the BIS capital adequacy ratio. Hosono and Sakuragawa (2003) reports that among Japanese major banks, the BIS capital adequacy ratios were hardly correlated with market-valued capital ratios in 1997, suggesting that the BIS capital adequacy ratios were subject to managerial discretion and could be inflated by underreporting NPLs and double-gearing of subordinated debts within the same business group. The accounting practices of Asian banks might be better than the Japanese banks in the late 1990s.

Column 3 shows the estimation results when *Liquidity* is added to the explanatory variables. *Equity* is still significantly positive, while *Liquidity* is insignificant.

Furthermore, I estimate Equation (3) by adding *Credit Rating* to the explanatory variables and using the sample banks that has credit ratings. The estimation result shows that the coefficient on *Credit Rating* is not significant. It should be noted, however, that the coefficient on *Equity* is much higher than the coefficient on it for the whole sample (Column 1). Using all the sample banks, I check whether the correlation between *Market Capital* and *Equity* is different between the banks that have international ratings and the banks that do not have ratings. I construct *Credit Rating Dummy* that takes the value of one if a bank is rated and zero otherwise and add the interaction term of this dummy and *Equity* to the explanatory variables. Column 5 shows that the interaction term of *Credit Rating Dummy* and *Equity* is significantly positive, suggesting that the correlation between *Market Capital* and *Equity* is actually higher for the banks with ratings than for the bank without them. Banks that are rated are likely to disclose financial conditions adequately and hence to be subject to stock market discipline to a greater degree than banks that are not rated.

In Column 6, I add *NPL* to the explanatory variables, finding that *NPL* is significantly positive. There are two possible reasons for this result. One is that the amounts of non-performing loans are not truly reported, as is suggested by the deposit interest rate estimation. The other is that because shareholders are protected by limited liability, they are likely to prefer excessive risk-taking and hence put high values on risky, high *NPL* banks. The result for *Net NPL* (Column 7) is similar to that for *NPL*.

#### Estimation by period

Panel B of Table 7 shows the estimation results for the sub-periods. I find that the coefficients on *Equity* are significantly positive for all the sub-periods, with the largest value for the post-crisis period, followed by the pre-crisis period and the crisis-period. Improved disclosure and accounting standards seem to have contributed to enhancing the effectiveness of stock market discipline after the crisis.

#### Estimation by ownership

Panel C of Table 7 shows the estimation results for each ownership type of banks. The coefficients on *Equity* are significantly positive for state-owned or public-agency –owned banks and other banks, while the coefficient on *Equity* is significantly negative for family-owned banks. Stock market does not seem to play a disciplinary role to family-owned banks. The coefficient on *Equity* is positive but not significant for foreign-investor-owned banks.

#### Estimation by country

Panel D of Table 7 shows the estimation results for each country. The coefficients on *Equity* are significant for Malaysia and the Republic of Korea, while they are not significant for Indonesia and Thailand. There are several possible reasons why *Market Capital* and *Equity* are not correlated in Indonesia and Thailand. One possibility is that stock market may not have incorporated bank financial conditions due to limited liquidity of the stock market or poor disclosure. Another possibility is that even though stock market adequately incorporated bank risk, equity was not accurately reported due to inadequate accounting practices. Yet another possibility is that stock prices tended to

increase when poorly-capitalized banks took excessive risk because shareholders prefer risky portfolios under limited liability.

I add *NPL* to the explanatory variables and obtain similar coefficients on *Equity* (the lower panel of Panel D). The coefficient on *NPL* is significantly positive in Indonesia, suggesting either that non-performing loans were underreported for risky banks or that shareholders preferred risky portfolios in Indonesia.

#### **4. Conclusion**

I analyzed the effectiveness of market discipline to banks in Indonesia, the Republic of Korea, Malaysia and Thailand for the period 1990-2003. First I overviewed the institutional backgrounds of these countries against which market discipline could work. Disclosure, accounting standards and the availability of market signals have improved in these countries especially after the crisis. Though the degree of deposit protection differed across the countries before the crisis, all these countries adopted blanket guarantee, either explicitly or implicitly, to deposits and some other bank liabilities during the crisis. Only the Republic of Korea reintroduced a partial deposit protection after the crisis. Faced with the banking crises, governments injected huge amounts of public money to recapitalize banks, ranging from about 5 to 7% of GDP for the Republic of Korea, Malaysia and Thailand to about 58% of GDP for Indonesia. As a consequence of the restructuring in banking industries triggered by the crisis and government recapitalization, ownership structure drastically changed after the crisis. In particular, the number of foreign-owned banks increased after the crisis except for Malaysia.

Based on the overview of the institutional backgrounds, I analyzed market discipline to banks in three aspects: the deposit interest rate, the deposit growth rate and the market value of capital.

First, I estimated the deposit interest rate to analyze whether depositors adequately demand risk premium on deposits at risky banks. The estimation results show that the deposit interest rate was negatively correlated with bank equity capital and ROA, though the results for ROA are not as robust as those for equity capital. These results suggest that depositors could understand bank risk and identify a problem bank. The sensitivity of the deposit interest rate to bank capital was higher before the crisis, probably reflecting the fact that blanket guarantee was in effect during the crisis and bank health was restored after the crisis. By dividing sample banks by bank ownership, we found that the deposit interest rate was not correlated with bank equity capital or ROA for state-owned or public-agency-owned banks and family-owned banks. In addition, by dividing sample banks by country, we found that the deposit interest rate was significantly correlated with bank equity capital for Indonesian and Korean banks.

Next, I estimated the deposit growth rate to examine whether depositors shifted deposits from risky banks to safer banks or other financial instruments. I could not find such a “flight-to-quality” phenomenon possibly because the deposit growth rate depended upon various factors other than depositors’ behavior especially when large-scale restructuring of banking sectors were underway.

Finally, I analyzed stock market monitoring by estimating the market-valued capital ratio. The estimation results show that the market-valued capital ratio was positively correlated with the equity capital ratio, suggesting that stock market incorporated bank risk and that accounting practices were reliable to some degree. This tendency was

stronger for Malaysia and the Republic of Korea, for state-owned or public-agency-owned banks and for the banks that had international ratings. The sensitivity of market-valued capital to equity capital has improved after the crisis, possibly due to improved disclosure and accounting standards. Though these results generally suggest that stock market participants monitor bank risk, there seems to be some exceptions. In particular, we find that the correlation between the market-valued capital ratio and the equity capital ratio is significantly negative for family-owned banks. This result suggests that stock market does not play a disciplinary role to family-owned banks.

I may summarize the estimation results that market discipline to banks generally worked to some degree either through the deposit interest rate, the stock price or both, though there are some exceptions as described above. Though we have not formally analyzed the effect of institutional arrangements on market discipline given a relatively small number of sample countries, disclosure and deposit protection seem to be of particular importance. For example, we cannot find significant evidence of market discipline in Thailand either through the deposit interest rate or stock prices. Thailand displays low values of both the *Private Monitoring Indexes* and the *Deposit Protection Index*, suggesting that disclosure and availability of market signal is poor and deposit protection is generous in Thailand as compared with the other three Asian countries.

There are some limitations to this paper. First, I analyzed depositor monitoring and stock market monitoring but could not analyze monitoring by bond-holders because bond price data were not available. Though markets for bank bonds, including subordinated bonds and debentures, have not yet developed well in Asian countries, bond markets are expected to monitor banks because bond-holders are concerned with down-side risk just as depositors and regulators are. Second, I focused on market monitoring and could not analyze the responses of banks to the market warning. It is a great matter of concern whether and how bank managers respond to the increases in the deposit interest rate and the bond yield or the decrease in the stock prices in order to counteract adverse changes in bank condition. These are all left for future works.

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## **Appendix: Private Monitoring Indexes and Other Institutional Indexes Based on the Survey**

This appendix describes the survey that the author designed jointly with Sang-Woo Nam and conducted by Kameyama et al., Park, Lum and Koh, and Polsiri and how to construct private monitoring index and other institutional indexes based on the survey.

### **A. Private Monitoring Indexes**

Private monitoring indexes are slightly modified from the Index used by Barth, Capiro and Levine (2001). Private Monitoring Index 1 is defined as the sum of 1-a, 1-b, 1-c, 2-a, 2-b, 2-c, and 3-a described below. Private Monitoring Index 2 is the sum of Private Index 1, 3-b, and 3-c.

#### **1. Adequacy of disclosed financial information**

- a. Accrued, but unpaid interest enters the income statement while the loan is still non-performing (0: all or most banks; 0.5: some banks; 1: virtually none).
- b. Off-balance sheet items disclosed to the public (1: all/most; 0.5: some; 0: none)
- c. Consolidated financial statements (if they have non-bank affiliates or subsidiaries) available to the public (1: all/most; 0.5: some; 0: none)

#### **2. Mechanisms ensuring the accuracy of information and sound risk management**

- a. A licensed/certified external audit required to certify the accuracy of the financial statements of a bank (1: yes; 0: no)
- b. Bank directors legally liable in cases of disclosure of erroneous or misleading information (1: yes; 0: no)
- c. Risk management policy and procedures disclosed to the public (1: all/most; 0.5: some; 0: none)

#### **3. Availability of market signals**

- a. Number of banks (among the top 10 banks in terms of total assets) rated by international credit rating agencies (1: all; 0 otherwise)
- b. Subordinated debt issued by the top 10 banks: 1 (issued and traded actively by all or most of them); 0.7 (issued and traded by some of them, or issued by most of them but rarely traded); 0.3 (issued by some of them and rarely traded); 0 (not issued by most of them)
- c. Number of banks (among the top 10 banks) whose shares are actively traded in the stock exchange; number of banks /10
- d. Stock market capitalization as a proportion of GDP

### **B. Depositor Protection and Forbearance Policy Indexes**

#### **1. Depositor Protection Index**

Deposit Protection Index is defined by the following scoring scheme table.

- a. Types and extent of deposit protection
  - (A1) Explicit partial (e.g., ceiling) deposit insurance
  - (A2) Implicit full depositor protection
  - (A3) Explicit blanket guarantee
  
- b. Credibility of the scheme: information on the most recent major bank failure
  - Extent of depositor protection:
    - (B1) substantial loss for some (large) depositors, (B2) almost full, (B3) full
  
  - How many months average delay in compensating the depositors?:
    - (C1) longer than 6 months, (C2) 3-6 months, (C3) within 3 months

Scoring Scheme: Degree of Depositor Protection

	A1	A2	A3
B1	3.00	2.00 (unlikely)	0.50 (C1) 0.25 (C2) 0.00 (C3)
B2	2.50 (C1) 2.25 (C2-3)	1.50 (C1) 1.25 (C2-3)	
B3	2.25 (C1) 2.00 (C2-3)	1.25 (C1) 1.00 (C2-3)	

## 2. Forbearance Policy Indexes

**(1) Supervisory Forbearance Policy Index:** sum of a to d below (refer to Barth et al., 2001)

- a. Regarding bank restructuring and reorganization, can the supervisory authorities or any other government agency forbear certain prudential regulations? (1 for yes, and 0 for no)
- b. Are there pre-determined levels of solvency deterioration that force automatic actions, such as intervention? (1 for no, and 0 for yes)
- c. Must infractions of any prudential regulations be reported? (1 for no, and 0 for yes)
- d. With respect to c), are there any mandatory actions to be taken in these cases? (1 for no, and 0 for yes)

**(2) Bank Bailout Policy Variables**

- a. Amounts of public money injected to recapitalize banks as a proportion of GDP (%).
- b. Accumulated amounts of public money injected to recapitalize banks as a proportion of accumulated non-performing loans (NPLs) (%).

Accumulated NPLs are estimated as follows. Let “New NPL(t)” denote newly-emerged NPL at year t. Then, the following accounting identity holds:

$$\text{New NPL}(t) = \text{NPL outstanding}(t) - \text{NPL outstanding}(t-1) + \text{Write-off}(t)$$

Let 0 denote a benchmark year. Then,

$$\begin{aligned} \text{Accumulated NPL}(t) &= \text{NPL outstanding}(0) + \sum_{s=1}^t \text{New NPL}(s) \\ &= \text{NPL}(t) + \sum_{s=1}^t \text{Write-off}(s) \end{aligned}$$

For Korean banks, accumulated NPLs are calculated assuming that there was no write-offs until the end of 1996. For Korean banks, NPLs are based on the Forward Looking Criteria (FLC) from 1999. Also, there has been a strengthening of loan classification standard following the adoption of the FLC since 1999. According to the previous loan classification standard, the amount of NPLs as of the end of 1999 was 14.5 trillion won rather than 27.4 trillion won based on the new standard.

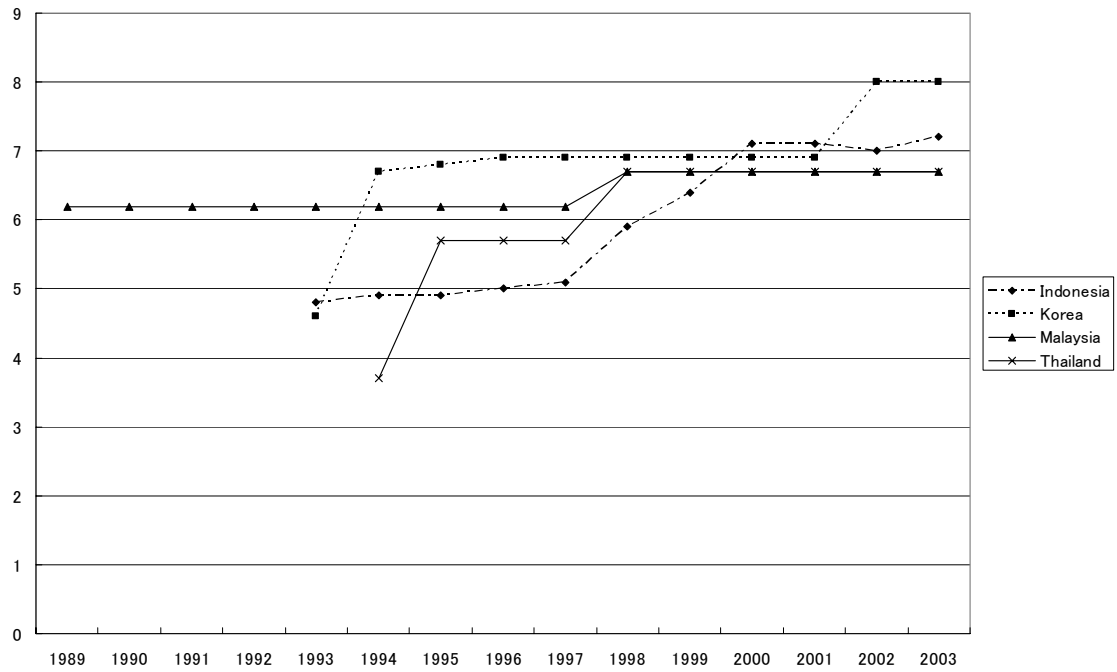
For Thai banks, there were no write-offs until Q3 of 1999s because there was no write-offs data available before then.

- c. Assets of failed banks as a proportion of total bank assets (%)
- d. Assets of banks that were recapitalized by the government and survived (as a proportion of assets of all banks, %)
- e. Assets of banks that were merged or acquired for rescuing them under government guidance (as a proportion of assets of all banks, %)

### **C. Ownership and Concentration**

- a. Number of banks (among the top 10 banks) whose largest shareholders are the government (including public enterprises)
- b. Number of banks (among the top 10 banks) whose largest shareholders are foreign financial institutions
- c. Asset share (%) of the top three banks among the top 10 banks

Figure 1  
**Private Monitoring Index 2**



Note: Higher values indicate superior disclosure and better availability of market signals. See Appendix A for details.

Table 1  
**Private Monitoring Indexes**

	The Indonesia	Republic of Korea	Malaysia	Thailand
<b>Panel A: Private Monitoring Index 1</b>				
1989	4.0	3.0	4.5	2.0
1990	4.0	3.0	4.5	2.0
1991	4.0	3.0	4.5	2.0
1992	4.0	3.0	4.5	2.0
1993	4.0	3.0	4.5	2.0
1994	4.0	5.0	4.5	2.0
1995	4.0	5.0	4.5	4.0
1996	4.0	5.0	4.5	4.0
1997	4.0	5.0	4.5	4.0
1998	4.5	5.0	5.0	5.0
1999	5.0	5.0	5.0	5.0
2000	5.5	5.0	5.0	5.0
2001	5.5	5.0	5.0	5.0
2002	5.5	6.0	5.0	5.0
2003	5.5	6.0	5.0	5.0
<b>Panel B: Private Monitoring Index 2</b>				
1989-92			6.2	
1993	4.8	4.6	6.2	
1994	4.9	6.7	6.2	3.7
1995	4.9	6.8	6.2	5.7
1996	5.0	6.9	6.2	5.7
1997	5.1	6.9	6.2	5.7
1998	5.9	6.9	6.7	6.7
1999	6.4	6.9	6.7	6.7
2000	7.1	6.9	6.7	6.7
2001	7.1	6.9	6.7	6.7
2002	7.0	8.0	6.7	6.7
2003	7.2	8.0	6.7	6.7

Note: Higher values indicate superior disclosure and availability of market signals. See Appendix A for details. The average of Private Index 1 across 68 countries whose data are available is 4.8, while the average across the 19 OECD countries whose data are available is 5.3.

Table 2

**Deposit Protection and Forbearance Policy**

	Indonesia	The Republic of Korea	Malaysia	Thailand
<b>Panel A: Deposit Protection Index</b>				
1989-96			2	1
1997	1	0	2	0
1998	1	0	2	0
1999	1	0	2	0
2000	1	0	2	0
2001	1	2	2	0
2002	1	2	2	0
2003	1	2	2	0

Note: Lower values indicate more generous deposit protection. See Appendix for details.

<b>Panel B: Supervisory Forbearance Policy Index</b>				
1989			1	2
1990-98	1		1	2
1999	1	1	1	2
2000	1	1	1	2
2001	1	1	1	2
2002	1	1	1	2
2003	1	1	1	2

Note: Higher value – more discretion – means a weaker commitment to the prudential regulation. See Appendix for details. The average for 50 sample countries is 1.6, while the average for 24 OECD countries is 1.9.

<b>Panel C: Bank Bailout Policy Variables</b>				
a. Amounts of public money injected to recapitalize banks (as % of GDP)				
1998	N/A	2.6	2.2	6.3
1999	45.2	3.2	2.4	0.0
2000	12.4	0.9	0.0	0.0
2001	0.4	0.6	0.0	0.0
2002	0.0	0.0	0.0	0.0
2003	0.0	0.0	0.0	0.0

Note: For Indonesia, amounts of bond issued for recapitalization program.

b. Accumulated amounts of public money injected to recapitalize banks (as % of accumulated NPLs)				
1998	N/A	43.0	N/A	N/A
1999	N/A	86.0	N/A	11.5
2000	N/A	77.0	N/A	9.7
2001	N/A	67.5	N/A	8.6
2002	N/A	61.0	N/A	7.1

2003	N/A	52.3	N/A	6.6
Note: See Appendix B.2 for the estimation of accumulated NPLs.				
c. Assets of failed banks (as % of assets of all banks)				
1997	8.9	7.3	0.0	0.0
1998	9.3	0.0	13.9	2.5
1999	12.3	0.0	0.0	0.0
2000	N/A	0.0	0.0	0.0
2001	N/A	0.0	0.0	0.0
2002	N/A	0.0	0.0	0.0
2003	N/A	0.0	0.0	0.0
d. Assets of banks that were recapitalized by the government and survived. (as % of assets of all banks)				
1997	N/A	0.0	0.0	0.0
1998	N/A	32.7	76.2	8.3
1999	N/A	32.7	0.0	7.9
2000	57.7	29.8	0.0	7.6
2001	56.3	29.5	0.0	8.6
2002	54.9	30.5	0.0	0.0
2003	53.8	30.8	0.0	0.0
e. Assets of banks that were merged or acquired for rescuing them under government guidance (as % of assets of all banks)				
1997	N/A	0.0	0.0	0.0
1998	N/A	28.7	23.8	6.9
1999	30.7	32.1	0.0	0.0
2000	32.9	31.3	0.0	0.0
2001	28.9	31.0	0.0	0.0
2002	29.6	35.1	0.0	8.4
2003	28.2	34.3	0.0	7.7

Table 3  
Ownership Structure and Concentration

	Indonesia	The Republic of Korea	Malaysia	Thailand
<b>Panel A: Number of state-owned banks among the top 10 banks</b>				
1989		0	4	
1990	3	0	4	
1991	3	0	4	
1992	4	0	4	2
1993	5	0	4	2
1994	5	0	4	2
1995	4	0	4	3
1996	4	0	4	2
1997	4	0	4	2
1998	5	7	4	3
1999	7	4	3	4
2000	9	4	3	4
2001	9	4	3	4
2002	7	4	3	3
2003	5	2	3	3
<b>Panel B: Number of foreign-owned banks among the top 10 banks</b>				
1992-97	0	0	0	0
1998	0	1	0	1
1999	1	4	0	4
2000	0	5	0	4
2001	0	4	0	5
2002	3	3	0	6
2003	5	3	0	6
<b>Panel C: Asset share of the top three banks (among the top 10 banks, %)</b>				
1989		43.4		
1990	77.1	44.8		60.2
1991	75.8	44.5		59.7
1992	74.5	44.1		57.7
1993	69.2	42.8		57.2
1994	65.6	41.4		56.7
1995	64.4	38.3		54.7
1996	61.1	38.2		54.2
1997	62.4	37.0	60.9	54.6
1998	62.3	46.9	62.0	57.4
1999	75.3	43.2	67.6	55.9
2000	67.3	45.0	63.5	56.6
2001	68.2	55.3	60.6	55.1
2002	65.3	56.2	59.2	54.6
2003	65.0	55.0	59.0	55.6

Table 4  
**Descriptive Sample Statistics**

Variable	Obs.	Mean	Std. Dev
Average Interest Rate on Domestic Currency Deposits (%)	648	10.214	7.111
Growth Rate of Total Deposits (%)	659	22.736	51.506
Market-Valued Capital Ratio	538	0.108	0.111
Operating Income (net) / Total Assets (%)	666	-0.311	8.028
Overhead Costs /Total Costs (%)	538	13.264	13.387
Equity Capital / Total assets (%)	725	6.357	10.736
BIS Capital Adequacy Ratio (%)	528	12.535	15.371
Liquidity Assets / Total Assets (%)	393	23.902	18.217
Credit Rating	122	9.012	3.402
Credit Rating Dummy	852	0.143	0.350
NPL Ratio (to total Loans) (%)	404	12.778	16.887
Net NPL Ratio	399	4.765	13.880
Log (Asset in USD million)	727	8.283	1.697
Discount Rate (%)	852	9.454	6.231
GDP Growth Rate (%)	828	5.107	5.157
Inflation Rate (%)	828	7.025	11.171

Notes: 1. Market-value capital is the multiple of the share price and the number of shares outstanding. Market-valued capital ratio is the ratio of market-valued capital to the sum of book-value debt and market-valued capital.

2. Net NPL Ratio is the difference between NPL ratio and loan loss reserve ratio.

3. Credit rating dummy takes the value of one if the bank has a rating and zero otherwise.

4. Inflation rate is the rate of change in GDP deflator.

Table 5  
Average Interest Rate on Domestic Currency Deposits

**Panel A: Whole Sample Estimates**

Equation Number	1	2	3	4
Operating Income / Total Assets	0.025 (0.030)	-0.026 (0.029)	0.032 (0.039)	-0.214 ** (0.070)
Overhead Costs / Total Costs	-0.067 ** (0.026)	-0.075 ** (0.028)	-0.051 (0.032)	0.048 (0.046)
Equity Capital / Total Assets	-0.080 ** (0.021)		-0.080 ** (0.027)	0.263 ** (0.109)
BIS Capital Adequacy Ratio		-0.049 ** (0.015)		
Liquidity Assets / Total Assets			-0.006 (0.020)	
Credit Rating				0.213 ** (0.107)
Log (Asset)	0.729 (0.495)	0.982 * (0.568)	0.638 (0.677)	0.586 (0.778)
Discount Rate	0.566 ** (0.042)	0.609 ** (0.047)	0.604 ** (0.097)	0.500 ** (0.123)
No. of Observation	506	418	317	111
No. of Banks	61	61	47	30
Adjusted R-squared	0.732	0.768	0.754	0.834
Equation Number	5	6		
Operating Income / Total Assets	-0.074 * (0.040)	-0.025 (0.038)		
Overhead Costs / Total Costs	-0.116 ** (0.038)	-0.120 ** (0.037)		
Equity Capital / Total Assets	-0.073 ** (0.024)	-0.070 ** (0.024)		
NPL Ratio	-0.105 ** (0.017)			
Net NPL Ratio		-0.111 ** (0.016)		
Log (Asset)	-0.682 (0.764)	1.004 (0.761)		
Discount Rate	0.666 ** (0.060)	0.647 ** (0.057)		
No. of Observation	332	332		
No. of Banks	61	61		
Adjusted R-squared	0.758	0.767		

Table 5  
Average Interest Rate on Domestic Currency Deposits  
Panel B: Sub-Sample Estimates by Period

Period	1989-1996	1997-1999	2000-2003
Operating Income / Total Assets	0.027 (0.081)	-0.010 (0.076)	-0.177 ** (0.070)
Overhead Costs / Total Costs	0.001 (0.031)	-0.187 * (0.101)	-0.032 (0.035)
Equity Capital / Total Assets	-0.081 * (0.046)	-0.077 (0.051)	0.179 ** (0.084)
Log (Asset)	0.765 (1.192)	4.312 (2.820)	1.647 * (0.989)
Discount Rate	0.693 ** (0.119)	0.542 ** (0.107)	0.321 ** (0.080)
No. of Observation	162	113	231
No. of Banks	29	42	61
Adjusted R-squared	0.510	0.652	0.411

**Panel C: Sub-Sample Estimates by Bank Ownership**

The Largest Shareholder	State or Public Agency	Foreign Investor	Family	Others
Operating Income / Total Assets	0.034 (0.043)	-0.446 * (0.226)	-0.090 (0.204)	0.308 ** (0.050)
Overhead Costs / Total Costs	-0.048 (0.039)	0.179 (0.111)	-0.327 ** (0.131)	-0.009 (0.055)
Equity Capital / Total Assets	-0.020 (0.032)	0.462 (0.315)	-0.166 (0.207)	-0.238 ** (0.031)
Log (Asset)	-0.330 (1.130)	4.521 (3.911)	-1.286 (3.824)	-0.319 (0.822)
Discount Rate	0.822 ** (0.104)	1.097 ** (0.170)	0.319 (0.211)	0.523 ** (0.065)
No. of Observation	118	38	84	157
No. of Banks	28	14	18	33
Adjusted R-squared	0.862	0.978	0.647	0.850

Table 5  
Average Interest Rate on Domestic Currency Deposits  
Panel D: Sub-Sample Estimates by Country

Country	Indonesia	The Republic of Korea	Malaysia	Thailand
Operating Income / Total Assets	0.039 (0.045)	-0.130 ** (0.036)	-0.157 (0.106)	0.033 (0.064)
Overhead Costs / Total Costs	-0.041 (0.039)	0.012 (0.080)	-0.064 * (0.034)	-0.641 ** (0.236)
Equity Capital / Total Assets	-0.075 ** (0.031)	-0.032 * (0.018)	-0.010 (0.073)	-0.058 (0.076)
Log (Asset)	0.750 (0.794)	0.115 (0.389)	-1.298 * (0.677)	-1.540 (1.667)
Discount Rate	0.723 ** (0.067)	0.592 ** (0.099)		1.220 ** (0.085)
No. of Observation	217	187	33	69
No. of Banks	25	14	9	13
Adjusted R-squared	0.759	0.872	0.644	0.947
Operating Income / Total Assets	0.044 (0.046)	-0.142 ** (0.037)		0.069 (0.083)
Overhead Costs / Total Costs	-0.043 (0.039)	0.036 (0.081)		-0.688 ** (0.254)
Equity Capital / Total Assets	0.111 (0.181)	-0.033 * (0.018)		0.075 (0.846)
Crisis Period * Equity Capital / Total Assets	-0.189 (0.181)	0.115 (0.082)		-0.180 (0.840)
Postcrisis Period* Equity Capital / Total Assets	-0.157 (0.210)	0.142 (0.128)		-0.073 (0.857)
Log (Asset)	0.776 (0.823)	0.242 (0.398)		-1.542 (1.696)
Discount Rate	0.869 ** (0.071)	0.725 ** (0.152)		1.100 ** (0.127)
(Equity Capital / Total Assets) x (1 + Crisis Period)	-0.078 ** [6.19]	0.082 [0.97]		-0.105 [1.04]
(Equity Capital / Total Assets) x (1 + Postcrisis Period)	-0.046 [0.13]	0.109 [0.71]		0.003 [0.00]

No. of Observation	217	187	69
No. of Banks	25	14	13
Adjusted R-squared	0.761	0.874	0.948

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- Notes: 1. Year dummies are included in explanatory variables.  
2. Numbers in the parentheses are standard errors, while numbers in the squared brackets are F-values.  
3. Fixed-effect model is estimated.  
4. Net NPL Ratio is the difference between NPL ratio and loan loss reserve ratio.  
5. Precrisis, crisis, and post crisis periods represent 199-1996, 1997-1999, 2000-2003, respectively.

Table 6

**Growth Rate of Total Deposits**  
**Panel A: Whole Sample Estimates**

Equation Number	1	2	3	4
Operating Income / Total Assets	0.250 (0.198)	0.152 (0.203)	0.130 (0.174)	0.616 (1.242)
Overhead Costs / Total Costs	-0.396 ** (0.171)	-0.403 ** (0.193)	-0.443 ** (0.216)	0.490 (0.844)
Equity Capital / Total Assets	-0.081 (0.123)			
BIS Capital Adequacy Ratio		0.025 (0.094)		
Liquidity Assets / Total Assets			-0.076 (0.121)	
Credit Rating				0.618 (1.874)
Log (Asset)	13.026 ** (3.291)	13.807 ** (3.749)	10.848 ** (4.601)	25.532 * (13.658)
Inflation Rate	0.359 ** (0.119)	0.304 ** (0.136)	0.340 (0.210)	-0.585 (0.930)
GDP Growth Rate	2.352 ** (0.444)	2.265 ** (0.501)	1.531 * (0.804)	1.046 (0.693)
No. of Observation	473	402	295	108
No. of Banks	62	62	48	30
Adjusted R-squared	0.236	0.223	0.215	0.253
Equation Number	5	6		
Operating Income / Total Assets	0.406 (0.254)	0.348 (0.248)		
Overhead Costs / Total Costs	-0.284 (0.239)	-0.259 (0.238)		
Equity Capital / Total Assets	0.012 (0.153)	0.005 (0.154)		
NPL Ratio	0.118 (0.113)			
Net NPL Ratio		0.040 (0.102)		
Log (Asset)	22.624 ** (5.041)	21.826 ** (5.175)		
Inflation Rate	0.286 (0.175)	0.318 * (0.175)		
GDP Growth Rate	2.326 ** (0.524)	2.292 ** (0.526)		
No. of Observation	317	316		

No. of Banks	62	62
Adjusted R-squared	0.322	0.320

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Table 6  
**Growth Rate of Total Deposits**  
**Panel B: Sub-Sample Estimates by Period**

Period	1989-1996	1997-1999	2000-2003
Operating Income / Total Assets	2.265 ** (0.671)	-0.644 ** (0.302)	2.108 ** (0.709)
Overhead Costs / Total Costs	-1.040 ** (0.265)	2.016 (1.439)	-0.386 (0.310)
Equity Capital / Total Assets	-0.250 (0.370)	0.095 (0.181)	-1.601 * (0.941)
Log (Asset)	16.843 (10.422)	56.413 ** (13.815)	29.326 ** (10.078)
Inflation Rate	1.891 * (1.078)	0.609 ** (0.213)	0.901 (0.621)
GDP Growth Rate	2.852 (1.823)	0.384 (1.513)	1.558 ** (0.564)
No. of Observation	148	102	223
No. of Banks	28	40	62
Adjusted R-squared	0.351	0.528	0.311

**Panel C: Sub-Sample Estimates by Bank Ownership**

The Largest Shareholder	State or Public Agency	Foreign Investor	Family	Others
Operating Income / Total Assets	0.556 (0.411)	-2.150 (2.352)	1.808 ** (0.697)	-0.658 (0.428)
Overhead Costs / Total Costs	-0.273 (0.423)	0.925 (1.182)	-0.473 (0.358)	-0.472 (0.546)
Equity Capital / Total Assets	-0.251 (0.278)	8.427 (4.812)	-1.024 (0.729)	0.375 (0.256)
Log (Asset)	15.852 (11.546)	121.974 ** (43.826)	22.303 ** (10.926)	17.052 (10.801)
Inflation Rate	0.980 ** (0.416)	3.236 * (1.679)	0.130 (0.237)	0.339 (0.279)
GDP Growth Rate	2.007 * (1.205)	-1.306 (3.353)	-0.025 (1.009)	2.861 ** (1.136)
No. of Observation	114	38	85	139
No. of Banks	28	14	19	33
Adjusted R-squared	0.313	0.663	0.469	0.235

Table 6  
**Growth Rate of Total Deposits**  
**Panel D: Sub-Sample Estimates by Country**

Country	Indonesia	The Republic of Korea	Malaysia	Thailand
Operating Income / Total Assets	0.164 (0.279)	0.906 (0.549)	-2.037 (8.622)	0.584 (0.684)
Overhead Costs / Total Costs	-0.414* (0.248)	-0.816 (1.220)	2.636 (2.813)	-6.179** (2.457)
Equity Capital / Total Assets	-0.045 (0.170)	-0.138 (0.279)	-3.618 (5.924)	-0.578 (0.819)
Log (Asset)	10.815** (5.214)	8.534 (6.288)	109.002* (55.117)	22.960 (17.567)
No. of Observation	199	175	31	67
No. of Banks	26	14	9	13
Adjusted R-squared	0.219	0.476	0.372	0.460

Notes: 1. Year dummies are included in explanatory variables.

2. Numbers in the parentheses are standard errors.

3. Fixed-effect model is estimated.

4. Banks that saw more than 100% growth rate of total deposits are excluded from the sample.

5. Net NPL Ratio is the difference between NPL ratio and loan loss reserve ratio.

Table 7  
**Market-Valued Capital Ratio**  
**Panel A: Whole Sample Estimates**

Equation Number	1	2	3	4
Operating Income / Total Assets	-0.001 (0.001)	-0.004 ** (0.001)	0.000 (0.002)	-0.004 (0.003)
Overhead Costs / Total Costs	0.002 (0.001)	0.001 (0.001)	0.003 ** (0.001)	-0.001 (0.002)
Equity Capital / Total Assets	0.002 ** (0.001)		0.002 * (0.001)	0.016 ** (0.004)
BIS Capital Adequacy Ratio		0.005 ** (0.001)		
Liquidity Assets / Total Assets			0.000 (0.001)	
Credit Rating				0.000 (0.004)
Log (Asset)	-0.120 ** (0.020)	-0.124 ** (0.022)	-0.121 ** (0.033)	0.042 (0.026)
No. of Observation	407	355	242	109
No. of Banks	62	62	48	30
Adjusted R-squared	0.238	0.347	0.245	0.372
Equation Number	5	6	7	
Operating Income / Total Assets	-0.001 (0.001)	0.001 (0.002)	-0.001 (0.002)	
Overhead Costs / Total Costs	0.002 * (0.001)	0.002 (0.001)	0.002 * (0.001)	
Equity Capital / Total Assets	0.002 ** (0.001)	0.002 ** (0.001)	0.002 * (0.001)	
Credit Rating Dummy * Equity Capital / Total Assets	0.005 ** (0.002)			
NPL Ratio		0.003 ** (0.001)		
Net NPL Ratio			0.003 ** (0.001)	
Log (Asset)	-0.121 ** (0.019)	-0.079 ** (0.027)	-0.125 ** (0.028)	
No. of Observation	407	303	302	
No. of Banks	62	62	62	
Adjusted R-squared	0.247	0.331	0.317	

Table 7

**Market-Valued Capital Ratio****Panel B: Sub-Sample Estimates by Period**

Period	1989-1996	1997-1999	2000-2003
Operating Income / Total Assets	0.006 ** (0.003)	-0.001 (0.002)	-0.003 (0.002)
Overhead Costs / Total Costs	-0.001 * (0.001)	-0.011 ** (0.004)	0.000 (0.001)
Equity Capital / Total Assets	0.006 ** (0.001)	0.003 ** (0.001)	0.012 ** (0.003)
Log (Asset)	-0.016 (0.048)	-0.117 (0.075)	-0.016 (0.032)
No. of Observation	98	90	219
No. of Banks	22	34	62
Adjusted R-squared	0.762	0.203	0.193

**Panel C: Sub-Sample Estimates by Bank Ownership**

The Largest Shareholder	State or Public Agency	Foreign Investor	Family	Others
Operating Income / Total Assets	-0.008 ** (0.004)	0.003 (0.003)	0.026 ** (0.009)	0.000 (0.001)
Overhead Costs / Total Costs	0.001 (0.002)	-0.001 (0.001)	0.004 (0.003)	-0.002 (0.001)
Equity Capital / Total Assets	0.010 ** (0.004)	0.001 (0.003)	-0.034 ** (0.006)	0.001 ** (0.001)
Log (Asset)	-0.080 (0.078)	-0.067 (0.049)	-0.135 (0.118)	-0.063 * (0.033)
No. of Observation	100	36	61	120
No. of Banks	29	13	16	32
Adjusted R-squared	0.601	0.721	0.653	0.405

Table 7

**Market-Valued Capital Ratio****Panel D: Sub-Sample Estimates by Country**

Country	Indonesia	The Republic of Korea	Malaysia	Thailand
Operating Income / Total Assets	0.001 (0.002)	0.000 (0.001)	-0.019 (0.014)	0.000 (0.001)
Overhead Costs / Total Costs	0.004 ** (0.002)	0.005 ** (0.002)	-0.010 ** (0.005)	-0.003 (0.009)
Equity Capital / Total Assets	0.002 (0.001)	0.007 ** (0.000)	0.031 ** (0.010)	0.000 (0.002)
Log (Asset)	-0.128 ** (0.050)	0.018 ** (0.009)	-0.105 (0.092)	0.015 (0.053)
No. of Observation.	140	163	33	71
No. of Banks	26	14	9	13
Adjusted R-squared	0.289	0.939	0.547	0.381

Country	Indonesia	The Republic of Korea	Malaysia	Thailand
Operating Income / Total Assets	0.003 (0.004)	-0.001 (0.001)	-0.013 (0.015)	-0.001 (0.002)
Overhead Costs / Total Costs	0.002 (0.002)	0.005 (0.004)	-0.004 (0.006)	0.000 (0.010)
Equity Capital / Total Assets	0.002 (0.002)	0.009 ** (0.001)	0.028 * (0.013)	0.001 (0.002)
Log (Asset)	-0.094 (0.061)	0.027 * (0.015)	-0.100 (0.095)	0.014 (0.054)
NPL ratio	0.005 ** (0.001)	0.000 (0.001)	-0.004 (0.004)	-0.001 (0.001)
No. of Observation	105	99	30	69
No. of Banks	26	14	9	13
Adjusted R-squared	0.532	0.805	0.480	0.291

Notes: 1. Market-value capital is the multiple of the share price and the number of shares outstanding. Market-valued Equity Capital / Total Assets is the ratio of market-valued capital to the sum of book-value debt and market-valued capital.

2. Year dummies are included in explanatory variables.

3. Numbers in the parentheses are standard errors.

4. Fixed-effect model is estimated.

5. Net NPL Ratio is the difference between NPL ratio and loan loss reserve ratio.

6. Credit rating dummy takes the value of one if the bank has a rating and zero otherwise.