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Abstract

This paper investigates the effectiveness of depositor discipline and its relationship with various bank regulations and supervisions using a panel of about 17,000 bank-year data during 1992-2002 around 60 countries. We first theoretically show that deposit interest rate and its sensitivity to bank risk depend on the bank insolvency risk and the fraction of deposit protection, among others. Then we find evidence that strict regulations on bank activities and powerful supervisory authorities tend to reduce deposit interest rate and its sensitivity to bank risk. We interpret our results as suggesting that strict regulations on bank activities are likely to be associated with generous bailout of an insolvent bank, resulting in weak market discipline and a fragile banking system.

Key words: Market Discipline, Bank Regulation, Supervision, Deposit Insurance

JEL classification: E43, G21, G28

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1. Introduction

A series of banking crises that occurred in the last two decades around the world have shown that banking crises have systematic and disruptive effects on the financial system and the real economy as well. To avoid or lessen the likelihood of a banking crisis and its negative impact on the economy, almost all of the countries in the world have regulated banks by restricting their activities and entry, imposing capital adequacy requirements, and supervising operations and management. Most countries have financial safety net in place as well including explicit or implicit deposit insurance and resolution procedures, including bailouts, of insolvent banks.

Recent banking crises, however, have also shown that these government regulations and safety nets have not successfully controlled bank risk-taking behavior. To maintain the safety and soundness of banking system, the disciplinary role of private agents, *market discipline*, is attracting more and more attention by policy-makers and expected to supplement bank regulations (e.g., Basel, 2003). Market discipline in the banking sector can be described as a situation in which private sector agents including depositors, creditors, and stockholders face costs that are increasing in the risks undertaken by banks and take action on the basis of these costs. For example, uninsured depositors, who are exposed to bank risk taking, may penalize riskier banks by requiring higher interest rates or by withdrawing their deposits (Martinez Peria and Schmukler (2001), p. 1030). Even insured depositors may respond to bank risk if there is some uncertainty or costs involved with recovering deposits in the case of bank failure. A high risk sensitivity of depositors implies that banks will be punished by paying higher deposit interest rate or attracting smaller amounts of deposit if they take excessive risk-taking. Hence, depositors who are highly sensitive to bank risk are likely to restrain banks' excessive risk-taking behavior.

Despite growing emphasis on market discipline among policy makers, its effectiveness has not been well examined empirically. Though there is growing literature on the effectiveness of market discipline in the U.S. and some other countries (see the surveys by Flannery, 1998 and Demirgüç-Kunt and Kane, 2002), it is not yet well understood under what conditions market discipline works well. One important exception is Demirgüç-Kunt and Huizinga (2003). They examined the effects of deposit insurance designs on depositor discipline and found that explicit deposit insurance reduced depositor's sensitivity to bank risk and that the more it did as its coverage was broader. Depositor's sensitivity to bank risk was measured by the magnitude of an increase in the risk premium of interest rates or a change of their deposit amounts responding to a marginal increase in bank risk.

This paper aims at providing new cross-country evidence on the relationship between various bank regulations and depositor discipline. It complements Demirgüç-Kunt and Huizinga (2003) by examining broader conditions for depositor discipline using a larger sample set (a panel of about 17,000 bank-year data during 1992-2002 around 60 countries). We investigate theoretically and empirically the effects of bank regulations and safety nets on depositors' sensitivity to bank risk.

To increase depositors' sensitivity to bank risk and enhance market discipline, the proposed new capital adequacy framework (Basel II) focuses exclusively on disclosure. A well-developed accounting, audit and rating system is arguably a necessary condition for effective market discipline because without them, depositors would not be able to estimate bank risk accurately and be responsive to its changes. Then, how should we understand relationship between other banking regulatory actions and depositors' sensitivity? We theoretically show that depositors' risk sensitivity depends upon the probability of bank insolvency and the extent of deposit protection in the case of bank insolvency. Based on our model, we test some hypotheses concerning how various bank regulations and safety nets affect depositors' risk sensitivity through the possibility of bank failure and the coverage of deposit protection.

This paper focuses on the relationship between bank regulations and market discipline in the following three ways.

First, we focus on the role of depositors and do not examine the roles of other private agents including bond-holders, shareholders, and rating agencies. In many developing countries, depositor discipline is practically important given that capital markets are not well developed.

Second, we investigate the sensitivity of depositors to bank risk and do not examine how bank managers respond to depositors' behavior by counteracting adverse shocks to banks, which is called the issue of market influence by Bliss and Flannery (2000).

Finally, we intend to explore the effects of bank regulations on market discipline, and not to assess bank regulations from the viewpoint of its effects on bank efficiency, performance or stability (See Barth, Caprio and Levine (2004), abbreviated by BCL hereafter, on the latter issue). It may be possible that some regulations successfully control bank risk, contribute to bank stability, and hence reduce depositors' sensitivity to bank risk. We call this mechanism *regulatory discipline* in the sense that regulations substitute for market discipline. Dewatripont and Tirole (1994), among others, point out that each depositor has little incentive or poor ability to monitor a bank due to the informational complexity and free-ride problem. Based on these limitations to depositors' ability to monitor and control bank risk, they assert that regulatory authorities are supposed to act as a representative monitor of banks for the sake of depositors by regulating banks. This "representative hypothesis" is consistent with regulatory discipline view. On the other hand, some regulations and safety nets shield depositors from bank insolvency risk and losses, and thus reduce depositors' sensitivity to bank risk, finally encouraging excessive risk taking on the side of banks. We call this mechanism *regulatory shield*. Regulatory shields may be generated not only from explicit deposit insurance but also from bank regulations. Regulatory authorities may have an incentive to protect and bail out incumbent banks since by giving benefits to them, they can extracts rents from them ("regulatory capture" hypothesis by Stigler (1971) or "tollbooth" hypothesis by Shleifer and Vishny (1998) and Djankov et al.

(2002)). In addition, regulators may not want to lose their reputation as a supervisor ("reputation concern", Boot and Thakor (1993)). When we find that some regulations actually reduce depositors' risk sensitivity, we discuss whether our results suggest "regulatory discipline" or "regulatory shield" based mainly on BCL's results on the effects of bank regulations on bank efficiency, performance and stability.

In section 2, we present our theoretical models and working hypothesis concerning how bank regulations and other institutional factors affect the risk sensitivity of deposit interest rates. Sections 3 and 4 describe our empirical methodology and data set, respectively. Section 5 presents our empirical results on the risk sensitivity of deposit interest rate. Section 6 examines the risk sensitivity of deposit growth. Section 7 concludes.

2. A Model of Depositor Discipline

In this section, we present a simple model to show how the deposit interest rate is affected by bank risk and government policies.

We consider a one-period model in which a bank, risk-neutral depositors and the government exist. The bank has an asset that is normalized to one at the beginning of period. It has initial capital of e and finances the remaining amount of $1-e$ by issuing deposits by promising the gross interest rate of r_D. At the end of the period, the value of asset turns out to be v, whose cumulative distribution, $F(v)$, and its density, $f(v)$, is known to everyone at the beginning of the period. Depositors incur a cost of m if the bank is insolvent. This may be interpreted as a verification cost that depositors incur to verify v as in Townsend (1979) and other costly state verification (CSV) models. It may also be interpreted as restitution cost that depositors incur in the case of bank insolvency due to the time and costs needed to recover deposits as is stressed by Cook and Spellman (1994). If $v < (1-e)r_D$, then the bank is

insolvent without the government's support. The government plays two roles. It affects $F(v)$ by regulating banking activities. The government also protects depositors either by explicit deposit insurance or by implicit bailout policy. Suppose that the government pays $S(v)$ in the case of insolvency after v realizes. Whether the government has to pay a verification cost or not does not matter here. $S(v)$ is known to everyone at the beginning of the period. There is a safe asset whose gross interest rate is r.

We analyze the determination of deposit interest rate assuming that $F(v)$ is predetermined. That is, we analyze the situation after the bank determines its portfolio, (anticipating its effect on the deposit interest rate) to focus on the depositors' response to bank portfolio. We do not take up the free-ride problem associated with the depositors' monitoring, either. This is not because we think that these problems are unimportant but because our purpose here is to derive empirical implications that we can test. If the free-riding problem is so severe that no depositor monitors bank risk, the deposit interest rate would be insensitive to bank risk at all.

The expected return to one unit of deposits is

$$(1)\quad R \equiv r_D\{1-F[(1-e)r_D]\} + \frac{1}{(1-e)}\int_0^{(1-e)r_D} f(v)\{v+S(v)-m\}dv$$

, where the first term is the expected return in the non-default region and the second term is that in the default region. The arbitrage between the deposit and the safe asset implies that

$$(2)\quad R = r$$

The gross interest rate to deposits, r_D, is determined by equation (2). If there are multiple solutions, we assume that the lowest value is chosen.

To make the analysis simple, we specify $F(v)$ and $S(v)$. First we assume that the value of asset is distributed uniformly on $[0, 2\mu]$, so that

(3) $F(v) = \frac{v}{2\mu}$.

A problem of the uniform distribution is that a higher μ implies a higher expected return and a higher variance as well. However, μ affects the deposit interest rate mainly through the probability of insolvency. Note that the probability of insolvency is $\frac{(1-e)r_D}{2\mu}$. A higher value of μ reduces the insolvency risk and thereby the deposit interest rate as we see below. Next we assume that the government repays depositors a fraction of $\alpha \leq 1$ of bank debt in the case of insolvency. That is,

(4) $S(v) = \alpha(1-e)r_D - v$

If the government sets α to be equal to one and m equal to zero, it fully compensates depositors either by an efficient blanket guarantee of deposit insurance or recapitalization to avoid bank failure. In this case, r_D is simply equal to r. If the government sets α less than one, we obtain r_D by substituting equations (3) and (4) into equation (2) as follows,

(5) $R(r_D;\mu,\alpha,e,m) = \left(1-\frac{m}{2\mu}\right)r_D - \frac{(1-\alpha)(1-e)r_D^{\,2}}{2\mu} = r$

In this section we analyze a situation where there is no credit rationing by assuming that there is a real value of r_D that satisfies equation (5). We analyze the credit rationing case in Section 6, where we discuss the possibility that depositors respond to bank risk by adjusting deposit quantity. We obtain the following equilibrium value of r_D:

(6) $r_D(\mu,\alpha,e,m) = \frac{\left(\mu-\frac{m}{2}\right) - \sqrt{\left(\mu-\frac{m}{2}\right)^2 - 2(1-\alpha)(1-e)\mu r}}{(1-\alpha)(1-e)}$

From equation (6), it is straightforward to show that $\frac{\partial r_D}{\partial e} < 0$. Banks with a high initial capital faces a low probability of insolvency and hence a low risk premium.

Now we proceed to analyze the effects of various bank regulations and other institutional factors on the deposit interest rate and its sensitivity to bank capital. We consider that bank regulations affect the parameters (e, μ, α, m) and thereby the deposit interest rate and its sensitivity to bank capital. One institutional factor may affect two or more of these parameters. Deposit insurance, for example, would directly increase the proportion that the government pays to depositors, α, but it may also induce a bank's excessive risk-taking behavior, leading to a high insolvency risk, that is, lower μ. After analyzing the effect of each parameter on the deposit interest rate, we discuss the effect of each institutional factor on the deposit interest rate through the parameters.

Result 1: $\frac{\partial r_D}{\partial e} < 0$, $\frac{\partial^2 r_D}{\partial e^2} > 0$

A policy that tends to increase the capital ratio would not only decrease the deposit interest rate but also its sensitivity to bank capital as is illustrated by Figure 1.

Result 2: $\frac{\partial r_D}{\partial \mu} < 0$ and $\frac{\partial^2 r_D}{\partial \mu \partial e} > 0$.

A policy that lowers the insolvency risk of banks would reduce the deposit interest rate and its sensitivity to bank equity.

Result 3: $\frac{\partial r_D}{\partial \alpha} < 0$ and $\frac{\partial^2 r_D}{\partial \alpha \partial e} > 0$

The higher proportion the government compensates depositors' losses in the case of bank insolvency, the lower the deposit interest rate and its sensitivity to bank equity given the insolvency risk and other parameters held constant.

Result 4: $\frac{\partial r_D}{\partial m} > 0$ and $\frac{\partial^2 r_D}{\partial m \partial e} < 0$

In a country where the verification/restitution cost in the case of insolvency is low, the deposit interest and its sensitivity to bank capital are low.

Two points are noteworthy concerning our theoretical predictions. First, our results on the signs of the second-order derivatives such as $\frac{\partial^2 r_D}{\partial e^2} > 0$ and $\frac{\partial^2 r_D}{\partial \mu \partial e} > 0$ certainly depend upon the distribution of the return, $F(v)$, though we believe that they hold for some distributions other than the uniform distribution. It should be noted, however, that a similar prediction that credit constraints become tighter as net worth becomes smaller ($\frac{\partial^2 r_D}{\partial e^2} > 0$) has been pointed out and tested using non-financial firms' data by preceding studies (e.g., Bernanke, Gertler, and Gilchrist, 1996; Hosono and Watanabe, 2002).

Second, a marginal increase in e, μ, and α and a marginal decrease in m decrease the probability of insolvency, $\frac{(1-e)r_D}{2\mu}$, given the other parameters constant. In practice, however, these parameters may depend upon each other. Especially, the parameter of insolvency risk, μ, represents the bank's choice of asset portfolio, which is likely to be affected by the initial capital ratio, e, the degree of deposit protection, α, and the restitution/verification costs, m. Taking this possibility into consideration, we discuss how various bank regulations affect these parameters and thus deposit interest rate and its risk sensitivity below.

A. Regulations on capital adequacy

Minimum capital requirements tend to increase the average bank capital level and lower the insolvency risk. Given other conditions unchanged, deposit interest rate would be lower and

less sensitive to bank risk as capital regulations become stricter (Result 1).

Capital requirements also affect the probability of insolvency by changing bank risk-taking behavior. The effects of capital adequacy requirements on bank risk-taking behavior is theoretically ambiguous (e.g., Keeley and Furlong, 1990; Kim and Santomero, 1988; Gennotte and Pyle, 1991). If capital requirements reduce bank risk-taking behavior, they reduce the insolvency risk (i.e., increase μ) and vice versa. Therefore, their effect on the level and risk-sensitivity of deposit interest rate are also ambiguous (Result 2).

B. Regulations on bank activities and banking-commerce links

Regulations on bank activities and banking-commerce links affect bank profitability and insolvency risk. Whether they reduce or increase bank profitability and risk is theoretically ambiguous. They may alleviate the conflicts of interest between banking and security underwritings, reduce the opportunities to engage in risky business such as real estate investment, and prevent banks to be as powerful as to capture regulatory bodies. On the other hand, they may deprive banks of the opportunities to diversify asset portfolios or to exploit economies of scope and scale, thus leading to a high probability of bank failure. If regulations on bank activities effectively lower the probability of bank failure, i.e, increase μ, deposit interest rate would be lower and less sensitive to bank risk, and vice versa (Result 2).

Moreover, regulations on bank activities are often implemented arbitrarily by regulatory bodies and hence likely to lead to a forbearance policy. In that case, depositors are insensitive to bank risk since a forbearance policy or a bailout policy will decrease the costs that depositors incur in the case of bank insolvency, leading to a higher α and reducing deposit interest rate and its risk sensitivity (Result 3).

Therefore, if we find that regulations on bank activities tend to reduce deposit interest rate and its sensitivity to bank equity, we cannot judge whether they effectively control bank risk or they are associated with a forbearance policy, i.e. they affect the sensitivity from the route of μ

or α. We take up this issue when we interpret our empirical results in details.

C. Regulations on bank entry

Restrictions on bank entry tend to increase the monopolistic rents of the incumbent banks, leading to a higher μ. If banks respond to a large franchise value by prudent behavior, restrictions on bank entry will further lower the probability of bank failure. On the other hand, a small number of large banks may be easier to induce the government to implement a forbearance policy, leading to a higher α. In any case, deposit interest rate would be lower and less sensitive to bank risk under strong regulations on bank entry (Results 2 and 3).

D. Deposit Insurance

Explicit deposit insurance reduces the losses that depositors incur in the case of bank insolvency, leading to a higher α and thus lowering deposit interest rate and its sensitivity to bank risk (Result 3). On the other hand, deposit insurance may induce a bank's excessive risk-taking behavior, leading to a lower μ and hence increasing deposit interest rate and its sensitivity to bank risk (Result 2).

Consequently, it is theoretically ambiguous whether explicit deposit insurance reduces or increases the level and sensitivity of deposit interest rate to bank risk. Demirguc-Kunt and Huizinga (2003) found that explicit deposit insurance decreased the level and sensitivity of deposit interest rate to bank risk measures and that this tendency was stronger for more generous deposit insurance, using a panel of about 6500 bank-year data during 1990-97 around 52 countries. We extend sample countries and periods to reexamine their results.

E. Supervision

Supervisory bodies have the authority to take specific actions to prevent and correct its risk taking behavior and the related undesirable outcome on the ground that outside private

agents do not have information or power necessary to control bank risk. In particular, prompt corrective action, i.e. a rule establishing pre-determined levels of bank solvency deterioration that forces automatic intervention, limits excessive risk-taking and thus lower the probability of insolvency, leading to a higher μ. At the same time, prompt corrective action also tends to reduce the problem of regulatory forbearance by inducing supervisors to be more proactive early on, leading to a lower α. Thus, the effect of supervisory actions on deposit interest rate and its risk sensitivity are theoretically ambiguous (Results 2 and 3).

Some supervisory actions are not taken under a pre-determined rule. To extract rents from the banking industry, strong supervisors may use their discretional power to benefit the banking sector and are more likely to bail out an insolvent bank and protect the depositors consequently, leading to a higher α. This effect, given other conditions unchanged, will make deposit interest rate lower and less sensitive to bank risk (Result 3).

F. Accounting, disclosure, audit and ratings

In this subsection, we slightly change the above model to consider imperfect accounting and disclosure. So far we have assumed that depositors exactly know the bank's net worth, e. However, in many countries, accounting is far from complete. Depositors do not know precisely the bank's net worth at least for some time. Now we assume that depositors receive an imprecise signal of bank net worth and update their prior beliefs based on the signal.

Depositors have a prior that a bank is a good bank that has a net worth of e_G with the probability of β and it is a bad bank that has a net worth of e_B with the probability of $(1-\beta)$. Without a loss of generality, we assume that $e_G > e_B$. Depositors receive a correct signal with the probability of π and a wrong signal with the probability of $(1-\pi)$ for each type. If, for example, depositors receive a good signal, the probability that the bank is really good is given by

(7) $\Pr ob[Bank = G | Signal = G] = \dfrac{\beta\pi}{\beta\pi + (1-\beta)(1-\pi)}$

The probability that the bank is bad though depositors receive a good signal is

(8) $\Pr ob[Bank = B | Signal = G] = \dfrac{(1-\beta)(1-\pi)}{\beta\pi + (1-\beta)(1-\pi)}$

The deposit interest rate for a bank with a good signal, denoted by $\hat{r}_G$, is determined by

(9) $\Pr ob[Bank = G | signal = G] R(\hat{r}_G; e_G) + \Pr ob[Bank = B | Signal = G] R(\hat{r}_G; e_B) = r$

, where $R(\cdot)$ is given by equation (5).

Substituting equations (7) and (8) into equation (9), we get

(10) $\hat{r}_G = \dfrac{\left(\mu - \dfrac{m}{2}\right) - \sqrt{\left(\mu - \dfrac{m}{2}\right)^2 - 2(1-\alpha)(1-\hat{e}_G)\mu r}}{(1-\alpha)(1-\hat{e}_G)}$

, where $\hat{e}_G$ is the expected value of e given the good signal:

(11) $\hat{e}_G = \dfrac{\beta\pi e_G + (1-\beta)(1-\pi)e_B}{\beta\pi + (1-\beta)(1-\pi)}$

Similarly, the deposit interest rate for a bank with a bad signal, denoted by $\hat{r}_B$ is determined by equation (6), where e is replaced by

(12) $\hat{e}_B = \dfrac{\beta(1-\pi)e_G + (1-\beta)\pi e_B}{\beta(1-\pi) + (1-\beta)\pi}$

Here we have assumed that the asymmetric information problem caused by the imperfect signal is *not* so serious that it induces an adverse selection problem in the sense that good banks exit from the market. For $\pi > \dfrac{1}{2}$, $\hat{e}_G > \hat{e}_B$ and hence $\hat{r}_G < \hat{r}_B$. In addition, we can show that the absolute value of $(\hat{r}_G - \hat{r}_B)$ is an increasing function of π. As the signal becomes accurate, the deposit interest rates determined based on the signal approach to those determined based on the true value of capitals. Therefore, the sensitivity of the deposit interest rate to the true value

of bank equity, $\frac{-(\hat{r}_G - \hat{r}_B)}{e_g - e_b}$, increases as the accounting and disclosure develops and the signal becomes accurate (Figure 2). This is the route through which we expect disclosure to enhance market discipline. The difference in deposit interest rates between good and bad banks may be unlikely to be detected, however, if only imprecise signals are available to researchers as well.

G. Government ownerships of banks

Whether banks owned by government are more or less likely to engage in prudential management is not theoretically clear. They may be more effectively controlled by regulatory bodies than privately-owned banks, leading to a higher μ. On the other hand, they may be subject to a soft budget constraint and hence tend to take excessive risk-taking, leading to a lower μ. Therefore, their impact on deposit interest rate and its risk-sensitivity are also ambiguous (Result 2).

When government-owned banks become insolvent, they are more likely to be bailed out, leading to a higher α. In such a case, greater government ownership is associated with the lower value of deposit interest rate and its lower risk sensitivity (Result 3).

H. Contract enforcement and protection of property rights

Strong enforcement of contracts and powerful protection of property rights are likely to reduce various transaction costs associated with law enforcement for the protection of properties. In our theoretical model, improvements in legal system tend to decrease the verification or restitution costs, m, in the case of bank insolvency. Such legal environment may also enable regulatory authorities to effectively control banks, leading to a higher μ. As a result, deposit interest rate would be lower and less sensitive to bank risk in a country with a high legal quality (Results 2 and 4).

3. Empirical Methodology

We examine how institutional differences across countries affect depositors' sensitivity to bank risk. Pooling all the bank-year data across countries, we estimate the following equation using OLS, following Demirguc-Kunt and Huizinga (2003):

$$\begin{aligned} Interest\,Rate_{i,j,t} = {} & \beta' Bank\,Fundamentals_{i,j.t-1} \\ & + \alpha' Institutions_{j,t} \\ & + \gamma' Bank\,Fundamentals_{i,j,t-1} * Institutions_{j,t} \\ & + \delta Macroeconomic\,Variables_{j,t-1} + \varepsilon_{i,j,t} \end{aligned} \tag{13}$$

, where the subscripts i , j , t denote bank, country, and year index respectively. $Interest\,Rate$ is the average interest rate on deposits adjusted by inflation rate. $Bank\,Fundamentals$ is a vector of the measures of bank risk and other bank characteristics described below. We use one-period lagged values of $Bank\,Fundamentals$ to take into account that depositors know bank characteristics with a certain delay. We measure the average interest rates by dividing total interests paid on deposits by deposits outstanding. If depositors respond to bank risk, the coefficients on the inverse measures of bank risk characteristics in equation (13) are negative.

Bank fundamentals include a bank risk measure and other control variables. Bank risk is (inversely) measured either by liquid assets (Liquidity), operating income (Profit), or equity (Equity), as a proportion of total assets. Though our theoretical analysis developed in Section 2 focuses on bank equity as a risk measure, we empirically examine a broader set of risk measures. These three accounting measures are commonly used in preceding cross-country studies (e.g, Martinez-Peria and Schmukler, 2001; Demirguc-Kunt and Huizinga, 2003). Considering poor accounting practices of most developing countries, these preceding studies regard Liquidity as the best risk measure among the three. Demirguc-Kunt and Huizinga (2003) points out that Equity and Profit are subject to manipulation and tend to be overstated at weak banks. Controlling variables are overhead costs (Overhead) as a proportion of total assets, the

logarithm of total assets to GDP (Asset Size), and the ratio of customer and short-term funding to total interest bearing liability (Maturity). Matrurity is added to the interest rate equation to controll for the difference in interest rates across deposits with different maturities.

$Institutions_{j,t}$ denotes bank regulation and other institutional indexes that may affect deposit interest rate and its risk sensitivity as is discussed in section 2. The interaction terms of $Bank\ Fundamentals$ and $Institutions$ represent how institutional variables affect depositors' sensitivity to bank risk. The following partial derivatives reveal this point,

(14) $$\frac{\partial Interest\ Rates_{i,j,t}}{\partial Bank\ Fundamentals_{i,j,t-1}} = \beta + \gamma Institutions_{j,t}$$

$MacroeconomicVariables_{j,t}$ include inflation rate, growth rate of real per capita GDP, and, government bill rate.

There are two potential pitfalls or biases when we estimate equation (13) with OLS as is suggested by Demirguc-Kunt and Huizinga (2003). First, Liquidity may be endogenous. If a risky bank holds more liquid assets to avoid higher interest rates, the absolute value of the coefficient on Liquidity is biased downwards. In addition, the deposit interest rate may be correlated with Liquidity simply due to reserve requirements even without market discipline. Following Demirguc-Kunt and Huizinga, we deal with these problems by instrumenting for Liquidity using exogenous influences on bank operations such as macro shocks and the Reserve rate defined by total bank reserves (at the macro level) divided by total bank deposits (at the macro level). Specifically, we perform a two-stage regression where the first regression is as follows,

(15)

$$\begin{aligned} Liquidity_{i,j,t} = {} & \alpha + \beta_1 OVERHEAD_{i,j,t} + \beta_2 Short\ Term\ Debt / Total\ Debt_{i,j,t} \\ & + \beta_3 Inflation_{j,t} + \beta_4 Growth_{j,t} + \beta_5 GDP / cap_{j,t} + \beta_6 Government\ Rate_{j,t} \\ & + \beta_7 Reserve\ Rate_{j,t} + \varepsilon_{i,j,t} \end{aligned}$$

Then, we replace Liquidity by its predicted value as a regressor in equation (13).

The second problem is that we do not control for deposit growth in the deposit interest rate equation (13), though market discipline works through both interest rate and deposit quantity adjustment. We estimate the following equation for the growth rate of deposits outstanding, $\Delta Deposits$, and add its predicted value to the regressors in equation (13):

(16)

$$\Delta Deposit_{i,j,t} = \alpha + \beta_1 OVERHEAD_{i,j,t} + \beta_2 Inflation_{j,t} + \beta_3 Growth_{j,t} + \beta_4 GDP/cap_{j,t} + \beta_5 AssetSizei_{i,j,t} + \varepsilon_{i,j,t}$$

In sum, as a robustness check, we estimate equation (13) with $Liquidity$ replaced by the predicted value of $Liquidity$ and the predicted value of $\Delta Deposit$ added as a regressor.

One may be concerned about a possibility that a riskier bank may be willing to offer a higher deposit interest rate and to increase its deposit and thus asset in order to undertake a gamble for resuscitation. If this is the case, a positive correlation between deposit interest rates and bank risk measures does not necessarily imply market discipline. However, there is another possibility that a riskier bank may be willing to offer a lower interest rate and to decrease its deposit and thus assets in order to maintain its capital ratio above the minimum requirement level. In this case, a positive correlation between deposit interest rates and bank risk measures strongly suggests market discipline. Though we do not completely deal with this kind of identification problem and its associated bias, like most of the preceding studies, we will see later that there is no systemic correlation between deposit growth rates and bank risk measures, suggesting that there seems to be no significant problem in estimating equation (13).

Another potential problem is that if deposit interest rates are regulated either explicitly or implicitly, the coefficient on bank risk measures in equation (13) is likely to be underestimated, because depositors who cannot require a sufficiently high risk premium are likely to withdraw deposits from a risky bank. To take this possibility into consideration, we estimate the growth rate of deposits in Section6.

4. Data

4.1 Sample Selection and Bank-Level Variables

Our main data source of bank financial statements is BankScope compiled by Fitch IBCA. We select countries that contain 20 banks or more. We exclude the bank-year samples that displayed 50% or more growth rate of deposits because they are likely to have been involved with mergers or acquisitions. We also exclude obvious data errors, including the samples that displayed -50 or less growth rate of deposits, that displayed no loan outstanding, and that displayed 100% or more absolute values of real deposit interest rate. We do not restrict sample banks to commercial banks but include savings banks, cooperative banks, real estate mortgage banks, medium and long-term credit banks, non-banking credit institutions, specialized governmental credit institutions, and multi-lateral governmental banks. We are left with 6222 banks across 60 countries. The sample covers the period of 1992-2002. The longest period in a country is 11 years. The number of bank-year samples that we can use for our basic estimation is 26397, though the actual sample size that we use for estimation is smaller due to the limited availability of institutional variables. The definitions of bank-level variables are given by Table 1. Descriptive sample statistics of bank-level variables are given by Table 2 by country.

4.2 Institutional Variables

Bank regulation indexes are basically the same as those in BCL (2001, 2004), which is based on the survey as of 1999 conducted by World Bank. These cover major fields of bank regulations: regulations on capital adequacy index (CAPREG)[1], regulations on bank activities and bank-commerce link index (ACTREG), entry into banking requirements index (ENTRYREQ), official supervisory power index (SPOWER), and private monitoring index (PMONITOR). We have excluded deposit insurance variables from PMONITOR, which is the only difference from BCL (2001, 2004). Unfortunately, these regulatory indexes are available

only at 1999. We apply these values as of 1999 for all the sample period. We also use the component variables of CAPREG, ACTREG and SPOWER to examine the relationship between these regulations and market discipline in details.

Deposit insurance generosity is measured by MORALHZARD, which is constructed using the principal component analysis of deposit insurance design features following Dmirguc-Kunt and Derragiache (2002). Information on deposit insurance schemes is available only as of 1997, though information on the foundation year of explicit deposit insurance is available. We also use the components of MORALHAZARD.

In addition to the above regulatory variables, we use the share of government-owned banks (GOVBANK), contract enforcement index (CONTRACT), and property right index (FPROP). GOVBANK is again the value at 1999. Among many institutional quality measures, we choose CONTRACT and FPROP because they are most suitable to capture the restitution or verification costs in our model, though the results do not seem to depend on the choice of specific variables.

The definitions of institutional variables and their descriptive sample statistics are shown by Tables 3 and 4, respectively.

5. Estimation Results of Deposit Interest Rate

Table 5 shows the estimation results of deposit interest rate (Equation 13). First stage regression results (Equations 15 and 16) in the two-step regressions are shown by Table A2. We organize the discussion below for each institutional variable by focusing on the interaction terms of bank risk measures and institutional variables. Before discussing the effects of bank regulations on market discipline, however, we briefly look at the control variables based mainly on the results for Liquidity as a risk measure.

The coefficients on Liquidity are negative and significant for all the specifications except for the cases of ENTRY and PMONITOR. This result suggests that market discipline works to

some degree in many countries.[2] Most of the coefficients on Profit and Equity are also negative, but the significance levels are somewhat lower especially in the case of Equity, probably reflecting its poor accuracy.

Among the bank characteristics variables, most of the coefficients on OVERHEAD are not significant, though they are significantly negative when CONTRACT is used as an institutional variable. A negative coefficient on OVERHEAD may suggest that banks with lower overhead costs provide depositors with less convenient service and have to pay higher interest rates (Demirguc-Kunt and Huizinga, 2003), though such a relationship is not robust. MATURITY, i.e., the ratio of short-term debt to total debt, has a significantly negative coefficient in all the specifications, suggesting that the interest rate of short-term debt is lower than that of long-term debt. Asset Size has a significantly positive coefficient, suggesting that a relatively large bank has to pay a high deposit interest rate.

Looking at macroeconomic variables, INFLATION has a significantly negative coefficient in all the specifications, suggesting that nominal deposit interest rate does not change one to one to the inflation rate, because the dependent variable is the real deposit interest rate. RATE has significantly positive coefficients with less than one. Deposit interest rate partially reflects the government rate. The signs of the coefficients on GROWTH are mixed.

Now we turn to the effects of bank regulations and other institutional factors on the risk sensitivity of deposit interest rate by focusing on our variables of interest: the interaction terms of institutional variables and bank risk measures.

A. Regulations on capital adequacy

The evidence on the relationship between capital adequacy regulations and the risk sensitivity of deposit interest is mixed (Panel A of Table 5). Though the interaction terms of CAPREG with Liquidity and Equity are both significantly positive, suggesting a dampening effect on the risk sensitivity of deposit interest rate, the interaction term of CAPREG with Profit

is not significant and its interaction term with the predicted value of Liquidity is significantly negative. The latte result suggests an enhancing effect on the risk sensitivity of deposit interest rate.

The mixed evidence on CAPREG may reflect the two conflicting theoretical hypotheses concerning the effects of capital regulations on bank risk-taking. BCL (2004) investigated the effects of bank regulations on bank efficiency and fragility. They obtained mixed results on the relationship between capital regulations and the likelihood of a systemic bank crisis, suggesting that strict capital regulations do not necessarily reduce the probability of bank insolvency. Their results are consistent with our findings.

We decompose CAPREG into the overall capital stringency index (OCAPREG) and the initial capital stringency index (ICAPREG) and examine their effects on the risk sensitivity of deposit interest rate. We find that the results for ICAPREG are consistent, suggesting that stringent initial capital regulations tend to lower deposit interest rate and its risk sensitivity, while the results for OCAPREG are mixed (Table A3).

B. Regulations on bank activities and banking-commerce links

Panel B of Table 5 indicates that the interaction terms of ACTREG and bank risk measures are significantly positive, except for the case when EQUITY is used as a risk measure, suggesting that strict regulations on bank activities tend to reduce the risk sensitivity of deposit interest rate. In addition, the coefficients of ACTREG are significantly negative regardless of the risk measures. Strict restrictions on bank activities tend to reduce the deposit interest rate. Our theoretical analysis suggests that restricting bank regulations reduces either bank insolvency risk (regulatory discipline) or depositors' losses in the case of bank insolvency (regulatory shield).

BCL (2004) found that restricting bank activities is associated negatively with bank development and positively with the likelihood of suffering a major crisis.[3] They stressed there

were diversification benefits from allowing banks to engage in non-traditional activities. Their results suggest that strict regulations on bank activities are likely to increase the probability of bank insolvency, which would result in a high risk sensitivity of depositors if depositors' losses in the case of bank insolvency were constant. To reconcile their results and ours, we conjecture that strict regulations on bank activities is associated with generous bailout of insolvent banks and tends to reduce depositors' costs in the case of bank insolvency, resulting in a weak risk sensitivity of depositors and thus promoting excessive risk-taking on the side of banks. In other words, BCL (2004)'s results and our findings together suggest that the regulatory shield hypothesis holds as far as regulations on bank activities are concerned.

We decompose ACTREG into 4 components and find strong evidence that restricting securities activities and real estate activities, in particular, reduce deposit interest rate and its risk sensitivity (Table A4).

C. Regulations on bank entry

We do not find a robust relationship between strict entry requirements and the risk sensitivity of deposit interest rate (Panel C of Table 5). Strict entry requirements do not seem to systematically affect the risk sensitivity of deposit interest rate through bank insolvency risk or depositors' losses in the case of insolvency. BCL (2004) did not find a significant relationship between the overall regulations on bank entry and the likelihood of a crisis [4], which is consistent with our results.

D. Deposit insurance designs

Though generous deposit insurance is often asserted to reduce the risk sensitivity of deposit interest rate, the results for MORALHAZARD are somewhat mixed (Panel D of Table 5). While the simple OLS regression results suggest that generous deposit insurance tends to weaken the risk sensitivity of deposit interest rate, the two-step regression result indicates that

such a dampening effect is insignificant once we consider the endogeneity of Liquidity and include the predicted value of deposit growth.

We replace MORALHAZARD by a simple explicit/implicit deposit insurance dummy (TYPE) and obtain an even weaker result: The interaction term of TYPE and Liquidity is significantly positive but its interaction terms with the other bank risk measures are not significant. Our results based on a large sample set are not consistent with Demirguc-Kunt and Huizinga (2003), who obtained robust results, using bank data across 30 countries, that explicit deposit insurance tended to reduce the risk sensitivity of deposit interest rate even when they controlled for the endogeneity problems of Liquidity and deposit growth. Our mixed results, derived from expanded bank data across 60 countries, may reflect the two opposing effects of generous deposit insurance on the risk sensitivity of deposit interest rate through small losses that depositors incur in the case of bank insolvency and large insolvency risk that banks are induced to take under generous deposit insurance. The latter effect is consistent with the evidence found by Demirguc-Kunt and Detragiache (2003) and BCL (2004) that generous deposit insurance tends to increase the likelihood of a major banking crisis.

We investigate the relationship between each deposit insurance design features that are components of the MORALHAZARD index and the risk sensitivity of deposit interest rate (Table A5). Though OLS results show that the interaction terms of Liquidity with 7 out of 9 components are significantly positive, the two-step regression results suggest that only 2 components, i.e., funded insurance (FUNDTYPE) and voluntary membership (MEMBER) tend to reduce the risk sensitivity of deposit interest rate. Our OLS regression results are roughly consistent with Demirguc-Kunt and Huizinga (2003), who conducted only OLS for deposit insurance design features. [5]

E. Supervision

We find a strong association between official supervisory power and the risk sensitivity of

deposit interest rate, irrespectively of the bank risk measures or the regression methods (Panel E of Table 5). A strong supervisory power tends to reduce the risk sensitivity of deposit insurance. We also find that powerful supervision tends to reduce deposit interest rate. It seems to be difficult, however, to distinguish whether a power supervisory power reduces the risk sensitivity of deposit interest rate through regulatory discipline or regulatory shield. BCL found no significant association between banking crises and supervisory power.[6]

The supervisory power index, SPOWER, is composed of prompt corrective power index (PCACT), restructuring power index (RPOWER), and declaring insolvency power index (DINSOL). We find that the results for RPOWER and DINSOL strongly suggest that they tend to reduce the risk sensitivity of deposit interest rate, while the results for PCACT are mixed (Table A6).

F. Accounting, disclosure, audit and ratings

We do not find a robust effect of superior disclosure and accounting on the risk sensitivity of deposit interest rate (Panel F of Table 5). This is possibly because accurate data of bank risk is difficult to obtain especially in a country with poor accounting and disclosure practices. It should be noted that our results do not necessarily imply that improvement in accounting or disclosure is not important to enhance depositor discipline, because our results may depend on the limited availability of accurate data.

G. Government ownership of banks

The relationship between the size of government-owned banks and the risk sensitivity of deposit interest rate is not robust (Panel G of Table 5). Concerning the relationship between government ownership of banks and bank insolvency risk, Caprio and Marinez (2000) and BCL (2004) obtained inconsistent results. Caprio and Marinez (2000), using panel data, found that government ownership is significantly and positively associated with increases in bank fragility,

while BCL (2004), using cross-country data, did not find a positive relationship between government ownership and the likelihood of a crisis. Given these preceding studies, it is unlikely that government-owned banks are relatively safe as compared to privately owned banks. Therefore, our results suggest two possibilities. One possibility is that government ownership of banks does not affect bank insolvency risk. The other is that government-ownership of banks increases insolvency risk and reduces depositors' losses in the case of insolvency through implicit deposit protection.

H. Contract Enforcement and Protection of Property Rights

We find strong evidence that strong enforcement of contract (CONTRACT), and protection of property rights (FPROP) tend to reduce the risk sensitivity of deposit interest rate (Panels H and I of Table 5). The interaction terms of these legal quality variables and bank risk measures are significantly positive. We also find that a high legal quality tends to reduce the deposit interest rate level. These results are consistent with our hypotheses that in a country with well developed legal environment, regulatory authorities can control bank risk effectively and that depositors incur low restitution or verification costs in the case of bank insolvency, though our results are inconsistent with Demirguc-Kunt and Huizinga (2003), who found, using a smaller sample set than ours, found evidence suggesting that market discipline is stronger in countries with greater institutional development.

6. Deposit growth

6.1 A Model of Depositor Discipline in Terms of Deposit Growth

Deposit interest rate may not fully adjust to reflect the expected loss of depositors for several reasons. Park and Peristiani (1998), for example, insist that the risk premium of a risky bank does not fully reflect its risk either because a risky bank with some market power is willing to charge a relatively low interest rate to decrease the amount of deposits or because the

regulatory authorities prohibit a risky bank from charging an absolutely high interest rate. If deposit interest rate is not fully flexible and depositors increase the supply of deposits with higher interest rates, riskier banks can attract fewer amounts of deposits.

In this subsection, we go back to the model in Section 2 and consider the situation where the adjustment of deposit quantity occurs in response to the change in bank capital and other exogenous parameters. Suppose, for example, that bank capital suddenly drops to such a low level that the bank cannot provide depositors with a sufficiently high expected return by any deposit interest rate because raising deposit interest rate would increase an insolvency risk and decrease expected return to deposits. If the quantity of deposit remains constant, the deposit market would collapse. We assume that the amount of deposits adjust to a sufficiently low level that deposit market recovers the equilibrium (Figure 3). We formalize this adjustment process and test its empirical implications in the following subsection.

First, we obtain the adjusted or equilibrium amount of deposits. The maximized depositors' expected return is

$$(17) \quad \max_{r_D} R(r_D;\mu,\alpha,e,m)=\left(1-\frac{m}{2\mu}\right)r_D-\frac{(1-\alpha)(1-e)r_D^{\ 2}}{2\mu}$$

Solving for (17), we obtain

$$(18) \quad r_D^{*}=\frac{(\mu-\frac{m}{2})}{(1-\alpha)(1-e)}$$

Substituting (18) into (17) and imposing the condition that the maximized depositors' expected profit is equal to the safe asset return, we get

$$(19) \quad R(r_D^{*};\mu,\alpha,e,m)=\frac{(\mu-\frac{m}{2})^2}{2\mu(1-\alpha)(1-e)}=r$$

, which implies that the adjusted equity ratio can be given by

(20) $e^* = 1 - \dfrac{(\mu - \frac{m}{2})^2}{2\mu(1-\alpha)r}$

We can easily show that e^* is higher for lower μ, lower α, or higher m.

The amount of deposits adjusts so that the capital ratio becomes e^*, given the amount of initial capital, e. The adjusted amount of deposit, denoted by d^*, is given by

(21) $d^* = \dfrac{e}{e^*} - e$

d^* is higher for higher e, suggesting that a bank with a smaller initial capital ratio can attract a smaller amount of deposits and hence is forced to shrink its assets more in order to recover its capital ratio.

We simply assume that the amount of deposits adjusts to d^* from the initial level of $(1-e)$ in one period. Under this simple assumption, the growth rate of deposit is

(22) $\dot{d} = \dfrac{d^* - (1-e)}{(1-e)} = \dfrac{\frac{1}{e^*} - 1}{(1-e)}$

The following results are straightforward.

Result 5 $\dfrac{\partial \dot{d}}{\partial e} > 0$ and $\dfrac{\partial^2 \dot{d}}{\partial e^2} > 0$

A policy that tends to increase the capital ratio would increase the growth rate of deposit and its sensitivity to bank capital.

Result 6 $\dfrac{\partial \dot{d}}{\partial \mu} > 0$ and $\dfrac{\partial^2 \dot{d}}{\partial \mu \partial e} < 0$

A policy that lowers the insolvency risk of banks would increase the growth rate of deposit and reduce its sensitivity to bank capital.

Result 7 $\dfrac{\partial \dot{d}}{\partial \alpha} > 0$ and $\dfrac{\partial^2 \dot{d}}{\partial \alpha \partial e} < 0$

If the government compensates a higher proportion of depositors' losses in the case of bank insolvency, the growth rate of deposits becomes larger and its sensitivity to bank equity becomes lower given the insolvency risk and other parameters held constant.

Result 8 $\frac{\partial \dot{d}}{\partial m} < 0$ and $\frac{\partial^2 \dot{d}}{\partial m \partial e} > 0$

In a country where the verification or restitution cost in the case of insolvency is low, the growth rate of deposit is high and its sensitivity to bank capital is low.

Results 5 to 8 suggest that the effects of bank regulations and other institutional factors on the risk sensitivity of deposit growth is similar to their effects of the risk sensitivity of deposit interest rate, except for the case when regulations affect bank capital ratio. While the regulations that enhance the capital ratio tend to reduce the risk sensitivity of deposit interest rate, it tends to enhance the risk sensitivity of deposit growth.

6.2 Estimation Methodology

We estimate the following equation applying OLS to pooled data, which is similar to the deposit interest rate equation (17).

$$\begin{aligned} \Delta Deposits_{i,j,t} &= \beta' \, Bank\ Fundamentals_{i,j.t-1} \\ &+ \alpha' \, Institutions_{j,t} \\ &+ \gamma' \, Bank\ Fundamentals_{i,j,t-1} * Institutions_{j,t} \\ &+ \delta Macroeconomic Variables_{j,t-1} + \varepsilon_{i,j,t} \end{aligned} \tag{23}$$

We exclude the ratio of customer and short-term funding to total interest bearing liability (Maturity) from the bank fundamental variables and government bill rate (Rate) from the macroeconomic variables.

To check the robustness, we control for the endogeneity problem of Liquidity and omitted variable problem of Inerest Rate. Specifically, we estimate equation (23) with

$Liquidity$ replaced by the predicted value of $Liquidity$ from equation (15) and the predicted value of $Interest\,Rate$ from following regression added:

(24)

$$Interest\,Rate_{i,j,t} = \alpha + \beta_1 OVERHEAD_{i,j,t-1} + \beta_2 Short\,Term\,Debt / Total\,Debt_{i,j,t-1} \\ \beta_3 Inflation_{j,t} + \beta_4 Growth_{j,t} + \beta_5 GDP / cap_{j,t} + \varepsilon_{i,j,t}$$

6.3 Estimation Results

Table 6 shows the estimation results of deposit growth.[7] Several points are notable. First, the explanatory powers of the regressors, measured by adjusted R-squares are much lower than that of deposit interest rate regression. Second, the coefficient of Liquidity is not necessarily significantly positive. As Demirguc-Kunt and Huizinga (2003) stresses, these inconclusive results may come from the opposing managerial incentives: Managers of a risky bank may be willing to attract additional deposits to make a gamble on one hand, while they may be willing to shrink deposits and assets to avoid failure or be forced to decrease assets to meet capital adequacy requirements.

Looking at the coefficients of the interaction terms between bank risk measures and regulation variables, we find no robust evidence except for SPOWER. The interaction terms of SPOWER and the bank risk measures are significantly negative, except for the case of Equity, suggesting that SPOWER tends to reduce the risk sensitivity of deposit growth. This is consistent with the estimation results of the deposit interest rate. Most of the interaction terms of bank risk measures and the other bank regulation variables are either insignificant or mixed depending on risk measures.

We also find strong evidence that strong contract enforcement (CONTRACT) and protection of property right (FPROP) are likely to reduce the risk sensitivity of deposit growth rate, which is again consistent with the results for deposit interest rate.

7. Conclusion

We find strong evidence that strict regulations on bank activities and powerful supervisory power tend to decrease the deposit interest rate and its sensitivity to bank risk. These regulations seem to affect depositors' monitoring intensity either through a bank insolvency risk (regulatory discipline) or a fraction of losses that depositors incur in the case of bank insolvency (regulatory shield). Considering BCL (2004)'s finding that strict regulations on bank activities tend to increase the likelihood of a systematic banking crisis, we conjecture that strict regulations tend to be associated with generous bank bailouts and hence to reduce depositors' losses in the case of bank insolvency, even though they may increase bank insolvency risk. On the other hand, we cannot distinguish whether powerful supervisory power effectively controls bank risk or leads to bailout policy. We also find that explicit deposit insurance that is funded or whose membership is voluntary tend to reduce market discipline. The evidence on the effects of a strict capital regulation, a severe entry requirement and a large presence of government-owned banks on the risk sensitivity of the deposit interest rate are mixed, depending on the measure of bank risk and the estimation method. In addition to these bank regulation indexes, we investigated general legal quality and found that a higher legal quality tends to reduce deposit interest rate and its risk sensitivity, suggesting that countries in a well developed legal system tends to effectively control bank risk or to reduce depositors' restitution or verification costs.

Our results on the risk sensitivity of deposit growth are relatively poor in the sense that the explanatory powers of the regressors are much lower than that of the deposit interest rate regression. We find evidence that strong supervisory power and higher legal quality tend to reduce the risk sensitivity of deposit growth, which is consistent with the results for deposit interest rate.

This paper bears important policy implications concerning the effects of regulations on bank activities. They lead to lower required interest rates with a cost of reduction in market discipline.

Regulations on bank activities seem to shield depositors from bank insolvency risk, which is likely to result in weak market discipline and an unstable banking system.

[1] BCL (2004) and BCL (2001) are different in that the former assigns a value of one to "no" and zero to "yes," while the latter assigns one to "yes" and zero to "no" to the following questions: 1) Can assets other than cash or government securities be used to increase capital?, and 2) Can borrowing funds be used? We follow BCL (2004).

[2] In Table A1, we report regression results for individual countries using within estimatior. These results are consistent with the cross-country ones reported in the main tables.

[3] BCL (2004) found that the relationship between restricting bank activities and the likelihood of a crisis is strong particularly among the countries for which the World Bank could collect data on stock market transactions, suggesting that the ability of banks to stabilize income flows by diversifying activities worked in countries with sufficient securities market development.

[4] BCL (2004) found a positive relationship between limitations on foreign bank entry/ownership and the likelihood of a major banking crisis

[5] Our OLS results show that explicit deposit insurance (TYPE), blanket guarantee (LIMIT), funded insurance (FUNDTYPE), protection of interbank deposit (INTERBANK), government-funded insurance (FUNDSOURCE), publicly managed insurance (MANAGE), and voluntary membership (MEMBER) tended to reduce the risk sensitivity of deposit interest rate, while coinsurance (COINSURE) and protection of foreign currency deposit (FOERIGN) has no significant impact. On the other hand, Demirguc-Kunt and Huizinga (2003) also found that TYPE, LIMIT, FUNDTYPE, INTERBANK, FUNDSOURCE, and MANAGE tended to reduce the risk sensitivity of deposit interest rate, while COINSURE and FOERIGN tended to enhance it.

[6] BCL (2004) found that among the components of the supervisory power index, only the diversification index that measures diversification guidelines and the absence of restrictions on making loans abroad is negatively associated with the likelihood of a crisis.

[7] First step deposit interest rate results are shown in Table A7.

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1. Definitions of Bank Data

dependent variables	Definition
Deposit Growth	Rate of Change in Total Deposits (6080) / GDP Deflators
Deposit Interest Rate	Interest Expense (6250) / (Customer & Short Term Funding (2030) + Other Funding (2035))- Rate of change in GDP deflators

Bank risk variable	Definition
Liquidity	Liquid Assets (2075) / Total Assets (2025)
Profit	Operating Income (2190) / Total Assets (2025)
Equity	Equity (2055) / Total Assets (2025)

Others	Definition
Overhead	Overheads (2090) / Total Assets (2025)
Shrot term debt / total debt	Customer & Short Term Funding (2030) / (Total Liability (6290) - Non-Interest-Bearing Liability (2040)
Asset size	Logarithm of Total Assets(2075)/Nominal GDP
Scale(country by county	Logarithm of Total Assets (2025) / GDP Deflator

Note
1. Numbers in parentheses denote code numbers from BankScope
2. GDP deflators are from International Financial Statistics by IMF.
3. GDP deflators are replaced with CPI for Bahamas, Bulgaria, Kenya and Luxenburg due to data avaialbility.
4. Nominal GDP is from World Bank's World Development Indicators.

2. Bank Characteristics by Country

	Deposit growth	Interest rate	Equity	Liquidity	Profit	Overhead	Shrot term debt / total debt	Assetsize
AUSTRALIA	0.03	0.05	0.07	0.07	0.03	0.02	0.86	0.03
AUSTRIA	0.05	0.02	0.06	0.15	0.04	0.02	0.88	0.00
BAHAMAS	0.04	0.05	0.16	0.44	0.07	0.04	0.97	0.14
BANGLADESH	0.11	0.03	0.04	0.21	0.03	0.02	1.00	0.02
BELGIUM	0.04	0.03	0.07	0.16	0.03	0.02	0.92	0.00
BULGARIA	0.02	−0.13	0.17	0.46	0.10	0.08	0.98	1.02
CANADA	0.03	0.03	0.08	0.05	0.03	0.02	0.98	0.01
CHILE	0.04	0.02	0.18	0.26	0.07	0.04	0.90	0.04
CHINA-PEOPLE'S REP.	0.15	0.02	0.10	0.30	0.03	0.01	0.87	0.04
COLOMBIA	0.01	−0.01	0.13	0.14	0.11	0.09	0.91	0.01
COSTA RICA	0.09	0.01	0.20	0.29	0.08	0.06	1.00	0.01
CROATIA	0.08	−0.02	0.19	0.24	0.08	0.05	0.87	0.02
CZECH REPUBLIC	0.07	0.01	0.07	0.22	0.06	0.05	0.95	0.04
DENMARK	0.05	0.01	0.13	0.23	0.05	0.04	0.95	0.02
DOMINICAN REPUBLIC	0.12	0.02	0.10	0.27	0.09	0.07	0.86	0.03
EGYPT	0.07	0.02	0.07	0.16	0.04	0.01	0.96	0.04
FRANCE	0.03	0.05	0.06	0.11	0.04	0.03	0.89	0.00
GERMANY	0.04	0.03	0.09	0.32	0.04	0.03	0.95	0.00
GREECE	0.06	0.02	0.09	0.34	0.05	0.03	0.99	0.00
GUATEMALA	0.07	0.01	0.07	0.17	0.07	0.06	0.80	0.01
HONDURAS	0.08	−0.02	0.13	0.23	0.08	0.06	0.88	0.03
HONG KONG	0.01	0.06	0.19	0.34	0.04	0.02	0.90	0.04
HUNGARY	0.09	−0.05	0.11	0.08	0.08	0.05	0.92	0.02
INDIA	0.11	0.02	0.06	0.35	0.04	0.03	0.97	0.01
INDONESIA	0.07	−0.06	0.07	0.14	0.05	0.03	0.81	0.01
IRELAND	0.12	0.00	0.09	0.22	0.02	0.01	0.97	0.12
ITALY	0.04	0.01	0.12	0.34	0.04	0.03	0.80	0.00
JAPAN	0.02	0.02	0.05	0.20	0.02	0.02	0.97	0.01
KENYA	0.03	0.04	0.13	0.35	0.10	0.06	0.97	0.02
KOREA REP. OF	0.09	0.04	0.05	0.12	0.03	0.02	0.84	0.06
LATVIA	0.11	−0.04	0.10	0.10	0.08	0.08	0.98	0.02
LUXEMBOURG	0.02	0.04	0.06	0.45	0.02	0.01	0.92	0.01
MALAYSIA	0.08	0.02	0.08	0.21	0.04	0.02	0.99	0.05
MEXICO	0.04	0.10	0.13	0.24	0.06	0.05	0.95	0.01
NETHERLANDS	0.05	0.04	0.08	0.31	0.03	0.02	0.87	0.03
NIGERIA	0.10	−0.12	0.12	0.53	0.14	0.09	0.99	0.01
NORWAY	0.05	0.01	0.08	0.06	0.04	0.02	0.82	0.03
PAKISTAN	0.09	0.00	0.07	0.38	0.04	0.03	0.98	0.02
PANAMA	0.07	0.05	0.09	0.26	0.03	0.02	0.96	0.07
PARAGUAY	0.03	0.13	0.17	0.42	0.10	0.10	0.96	0.02
PERU	0.10	0.01	0.12	0.19	0.09	0.08	0.98	0.01
PHILIPPINES	0.07	−0.01	0.16	0.28	0.06	0.04	0.97	0.03
POLAND	0.14	0.00	0.12	0.11	0.06	0.04	0.99	0.01
PORTUGAL	0.06	0.00	0.06	0.11	0.03	0.02	0.85	0.00
ROMANIA	−0.09	−0.31	0.21	0.19	0.14	0.07	0.99	0.02
RUSSIAN FEDERATION	0.02	−0.32	0.17	0.39	0.09	0.06	0.97	0.04
SINGAPORE	0.11	0.04	0.13	0.19	0.03	0.01	0.99	0.11
SLOVAKIA	0.04	0.04	0.05	0.39	0.07	0.04	0.97	0.06
SLOVENIA	0.12	−0.04	0.13	0.15	0.06	0.04	0.95	0.03
SOUTH AFRICA	0.08	0.02	0.11	0.17	0.08	0.05	0.91	0.05
SPAIN	0.05	0.00	0.10	0.16	0.04	0.03	0.94	0.00
SWEDEN	0.00	0.00	0.05	0.17	0.03	0.02	0.64	0.13
SWITZERLAND	0.03	0.02	0.14	0.22	0.05	0.03	0.84	1.42
THAILAND	0.06	0.04	0.08	0.15	0.02	0.02	0.88	0.06
TUNISIA	0.08	0.05	0.15	0.12	0.05	0.02	0.81	0.05
TURKEY	−0.17	−0.35	0.12	0.45	0.10	0.07	0.95	0.03
UNITED KINGDOM	0.05	0.03	0.11	0.28	0.04	0.02	0.96	0.01
URUGUAY	0.09	0.18	0.10	0.23	0.10	0.08	0.98	0.04
USA	0.05	0.02	0.09	0.08	0.05	0.03	0.89	0.00
VENEZUELA	0.07	−0.12	0.15	0.34	0.14	0.10	0.99	0.01

Table 3. Definitions and Sources of Institutional and Macroeconomic Variables
A. Bank Regulation Variables

Variable	Definition	Value
1. Capital regulatory variables		
(a) Overall capital stringency (OCAPREG)	Whether the capital requierement reflects certain risk elements and duducts certain market value losses from capital before minimum capital adequacy is determined.	Ranges from 0 to 6 Higher values indicate greater stringency
(b) Initial capital stringency (ICAPREG)	Whether certain funds may be used to initially capitalize a bank and whether they are officiallly verified.	Ranges from 0 to 3 Higher values indicate greater stringency
(c) Capiral regulatory index (CAPREG)	The sum of (a) and (b).	Ranges from 0 to 9 Higher values indicate greater stringency
2. Bank activity regulatory variables and mixing banking/commerce regulatory variables		
(a) Securities activities (SECURITY)	The extent to which banks may engage in underwriting, brokering, and dealing in securities, and all aspects of the mutual fund industry.	Ranges from 1 to 4 Higher values, more restrictive
(b) Insurance activities (INSURANCE)	The extent to which banks may engage in insurance underwriting and selling.	Ranges from 1 to 4 Higher values, more restrictive
(c) Real estate activities (REAL ESTATE)	The extent to which banks may engage in real estate investment, development and management.	Ranges from 1 to 4 Higher values, more restrictive
(d) Banks owning nonfinancial firms (NONFINANIAL)	The extent to which banks may own and control nonfinancial firms	Ranges from 1 to 4 Higher values, more restrictive
(e) Bank activity regulation index (ACTREG)	The sum of (a) to (d).	Ranges from 1 to 16 Higher values, more restrictive
3. Compentition regulatory variables		
(a) Entry into banking requirements (ENTRYRE	Whether various types of legal submission are required to obtain a banking license.	Ranges from 0 to 8 Higher values indicate greater stringency

Table 3. Definitions and Sources of Institutional and Macroeconomic Variables (Continued)
A. Bank Regulation Variables (Continued)

Variable	Definition	Value
4. Official supervisory action varaiables		
(a) Official supervisory power (SPOWER)	Whether the supervisory authorities have the authority to take specific actions to prevent and correct problems.	Ranges from 0 to 14 Higher value indicate greater power.
(1) Prompt corrective power (PCACT)	Whether the law establishes predetermined levels of bank solvency deterioration that force automatic actions, such as intervention.	Ranges from 0 to 6 Higher value indicate greater power. corrective power.
(2) Restructuring power (RPOWER)	Whether the supevisory authorities have the power to restructure and reorganize a troubled bank.	Ranges from 0 to 6 Higher value indicate greater power.
(3) Declaring insolvency power (DINSOL)	Whether the supevisory authorities have the power to declare a deeply troubled bank insolvent.	Ranges from 0 to 2 Higher value indicate greater power.
5. Private monitoring variables		
(a) Certified audit required	Whether ther is a compuslry external audit by a licensed or certified auditor.	Ranges from 0 to 1
(b) Percent of 10 biggest banks rated internationally	The percentage of the top ten banks that are rated by international credit rating agencies is 100% or less.	(percentage)
(c) Bank accounting	Whether the income statement includes accrued or unpaid interest or principal on nonperforming loans and whether banks are required to produce consolidated financial statements.	Ranges from 0 to 3 HIgher value indicate more informative bank accounts.

Table 3. Definitions and Sources of Institutional and Macroeconomic Variables (Continued)
A. Bank Regulation Variables (Continued)

Variable	Definition	Value
(d) Private monitoring index (PMONITOR)	Whether (a) occurs, (b) equals 100%, (c) occcurs, off-balance sheet items are disclosed to the public, banks must disclose risk management procedures to the public, and subordinated debt is allowable (required) as a part of regulatory capital	Ranges from 0 to 6 Higher values indicate more private supervision.

Notes: Definition and quantification are identical to BCL (2004) with the exception of private monitoring index.
We exclude "no explicit deposit insurance scheme" from private monitoring index.
The above egulation variables are as of 1999. .
Data source is the World Bank questionare described by BCL (2001)

Table 3. Definitions and Sources of Institutional and Macroeconomic Variables (Continued)
B. Deposit insurance features

Variable	Definition
(a) Insurace type (TYPE)	Implicit=0, Explicit=1
(b) No cocinsurance (COINSURE)	Implicit=0, Insurance with coinsurance=1, Insurance without coinsurance=2
(c)Unlimited explicit coverage (LIMIT)	Implicit=0, Insurance with coverage limit=1, Insurance without coverage limit=2
(d) Foreign currency deposits (FOREIGN)	Implicit=0, Insurance without coverage=1, Insurance with coverage=2
(e) Interbank deposits (INTER)	Implicit=0, Insurance without coverage=1, Insurance with coverage=2
(f) Type of funding (FUNDTYPE)	Implciit=0, Unfunded=1, Funded=2
(g) Source of funding (FUNDSOURCE)	Implicit=0, Bank=1, Both=2, Government=3
(h) Management (MANAGE)	Implicit=0, Private=1, Joint=2, Government=3
(i) Membership (MEMBER)	Implicit=0, Compulsory=1, Voluntary=2
(j) Moral hazard (MORALHAZARD)	First principle derived from pricinpal component analysis using (a) to (i).

Definition are identical to Demirguc-Kunt and Detragiache (2002). Data source is Demirguc-Kunt and Detragiache (2002).

C. Bank concentration and legal quality variables

Variable	Definition and Source
Government bank share (GOVBANK)	The percentage of banking system's assets in banks that are 50% or more government owned of 1999. Source: BCL (2001)
Contract enforcability (CONTRACT)	The relative degree to which contractual agreements are honored and complications present by language and mentality differences. Scored 0-4, with higher scores for superior quality; average over 1980-95. Source: Knack and Keefer (1995), using data from Business Environmental Risk Intelligence (BERI).
Property rights (FPROP)	Rating of property rights on a scale from 1 to 5. The more protection private property receiv the higher the score. Source: LLSV (1998), using data from 1997 Index of Economic Freed

D. Macroeconomic variables

Variable	Definition
Inflation Rate (Inflation)	Rate of chage in GDP deflators
Real Percapita GDP Growth Rate (Growth)	Rate ofchange in real percapita GDP
Real Percapita GDP(GDP/cap)	Per capita GDP at constant US dollar
Short-Term Government Bond Rate (Government Ra	T-bill rate, discounr rate or bank rate

Source: International Monetary Fund, *International Financial Statistics* and the World Bank, *World Development Indicatiors* .

4. Institutional Characteristics by Country

	Actreg	Entryreg	Capreg	Spower	Pmonitor	Moralhazard	Govbank
AUSTRALIA	8.00	8.00	6.00	12.00	8.00	-3.99	0.00
AUSTRIA	5.00	8.00	.	14.00	.	0.57	4.10
BAHAMAS	.	.	.	.	.	.	.
BANGLADESH	12.00	6.00	3.00	11.00	.	1.58	69.86
BELGIUM	9.00	8.00	8.00	13.00	5.00	1.69	.
BULGARIA	10.00	8.00	4.00	.	6.00	1.62	17.60
CANADA	7.00	8.00	.	7.00	7.00	2.14	0.00
CHILE	11.00	3.00	5.00	11.00	.	1.55	11.70
CHINA-PEOPLE'S REP.	14.00	6.00	.	10.00	5.00	-3.99	.
COLOMBIA	.	.	.	.	.	1.86	.
COSTA RICA	.	.	.	.	.	-3.99	.
CROATIA	7.00	7.00	4.00	12.00	.	0.50	36.99
CZECH REPUBLIC	8.00	8.00	4.00	13.00	.	1.17	19.00
DENMARK	8.00	8.00	7.00	9.00	6.00	1.69	0.00
DOMINICAN REPUBLIC	.	.	.	.	.	1.96	.
EGYPT	13.00	6.00	5.00	13.00	6.00	.	66.60
FRANCE	6.00	6.00	.	8.00	.	0.58	.
GERMANY	5.00	4.00	.	11.00	.	0.59	42.00
GREECE	9.00	8.00	4.00	10.00	5.00	1.21	13.00
GUATEMALA	13.00	8.00	4.00	8.00	4.00	.	7.61
HONDURAS	9.00	8.00	5.00	13.00	.	.	1.10
HONG KONG	.	.	.	.	.	-3.99	.
HUNGARY	9.00	7.00	7.00	16.00	.	1.69	2.50
INDIA	10.00	6.00	7.00	9.00	.	1.98	80.00
INDONESIA	14.00	7.00	5.00	14.00	.	-3.99	44.00
IRELAND	8.00	7.00	.	11.00	6.00	1.16	.
ITALY	10.00	8.00	.	6.00	.	1.27	17.00
JAPAN	13.00	6.00	7.00	13.00	7.00	1.89	1.15
KENYA	10.00	8.00	6.00	15.00	3.00	2.53	.
KOREA REP. OF	9.00	7.00	6.00	10.00	.	1.01	29.70
LATVIA	8.00	.	.	6.00	.	-0.05	.
LUXEMBOURG	6.00	8.00	7.00	14.00	6.00	0.17	5.03
MALAYSIA	10.00	7.00	3.00	11.00	7.00	-3.99	0.00
MEXICO	12.00	8.00	7.00	10.00	.	3.15	25.00
NETHERLANDS	6.00	8.00	5.00	8.00	6.00	1.56	5.90
NIGERIA	9.00	8.00	8.00	13.00	5.00	2.14	13.00
NORWAY	.	.	.	.	.	1.40	.
PAKISTAN	.	.	.	.	.	-3.99	.
PANAMA	8.00	8.00	4.00	13.00	.	-3.99	11.56
PARAGUAY	.	.	.	.	.	.	.
PERU	8.00	8.00	6.00	14.00	6.00	1.69	2.50
PHILIPPINES	7.00	7.00	4.00	12.00	6.00	2.53	12.12
POLAND	10.00	7.00	6.00	12.00	6.00	1.31	43.70
PORTUGAL	9.00	7.00	5.00	13.00	7.00	1.56	20.80
ROMANIA	13.00	8.00	.	9.00	5.00	1.69	70.00
RUSSIAN FEDERATION	8.00	8.00	.	8.00	.	-3.99	68.00
SINGAPORE	8.00	.	.	3.00	.	-3.99	0.00
SLOVAKIA	9.00	8.00	6.00	.	4.00	1.54	25.80
SLOVENIA	9.00	8.00	8.00	16.00	5.00	.	39.60
SOUTH AFRICA	8.00	8.00	8.00	4.00	.	-3.99	0.00
SPAIN	7.00	8.00	9.00	10.00	7.00	1.69	0.00
SWEDEN	9.00	8.00	2.00	6.00	.	1.83	0.00
SWITZERLAND	5.00	8.00	.	13.00	7.00	0.88	15.00
THAILAND	9.00	8.00	5.00	11.00	5.00	-3.99	30.67
TUNISIA	.	.	.	.	.	.	.
TURKEY	12.00	7.00	.	11.00	5.00	2.60	35.00
UNITED KINGDOM	5.00	8.00	6.00	12.00	.	0.17	0.00
URUGUAY	.	.	.	.	.	.	.
USA	12.00	7.00	6.00	14.00	7.00	2.53	0.00
VENEZUELA	10.00	8.00	3.00	14.00	5.00	1.58	4.87

4. Institutional Characteristics by Country(Continued)

	Contract	Fprop	Rpower	Dinsol	Pcact	Icap	Ocap
AUSTRALIA	3.04	5.00	3.00	1.00	0.00	1.00	5.00
AUSTRIA	3.30	5.00	3.00	1.00	6.00	3.00	.
BAHAMAS	.	5.00	.	.	.	.	.
BANGLADESH	.	2.00	3.00	0.00	0.00	2.00	1.00
BELGIUM	3.27	5.00	3.00	.	.	2.00	6.00
BULGARIA	.	.	3.00	2.00	.	3.00	1.00
CANADA	3.27	5.00	1.00	1.00	0.00	2.00	.
CHILE	2.42	5.00	3.00	2.00	3.00	2.00	3.00
CHINA-PEOPLE'S REP.	.	.	3.00	.	0.00	3.00	.
COLOMBIA	1.93	3.00	.	.	.	.	.
COSTA RICA	.	3.00	.	.	.	.	.
CROATIA	.	.	2.00	2.00	4.00	2.00	2.00
CZECH REPUBLIC	.	.	3.00	2.00	5.00	3.00	1.00
DENMARK	3.27	5.00	1.00	2.00	2.00	1.00	6.00
DOMINICAN REPUBLIC	.	2.00	.	.	.	.	.
EGYPT	2.08	3.00	2.00	1.00	6.00	2.00	3.00
FRANCE	2.46	4.00	1.00	0.00	0.00	1.00	.
GERMANY	3.39	5.00	2.00	2.00	0.00	1.00	.
GREECE	2.33	4.00	3.00	2.00	0.00	2.00	2.00
GUATEMALA	.	3.00	3.00	1.00	3.00	2.00	2.00
HONDURAS	.	3.00	3.00	2.00	5.00	3.00	2.00
HONG KONG	.	5.00	.	.	.	.	.
HUNGARY	.	.	3.00	2.00	6.00	3.00	4.00
INDIA	1.94	3.00	2.00	0.00	0.00	2.00	5.00
INDONESIA	1.73	3.00	2.00	2.00	6.00	3.00	2.00
IRELAND	3.16	5.00	3.00	1.00	0.00	1.00	.
ITALY	2.06	4.00	2.00	1.00	0.00	2.00	.
JAPAN	3.12	5.00	3.00	2.00	6.00	3.00	4.00
KENYA	2.14	3.00	3.00	2.00	6.00	3.00	3.00
KOREA REP. OF	2.20	5.00	3.00	2.00	4.00	1.00	5.00
LATVIA	.	.	.	.	0.00	.	.
LUXEMBOURG	.	5.00	3.00	1.00	0.00	2.00	5.00
MALAYSIA	2.28	4.00	3.00	2.00	2.00	2.00	1.00
MEXICO	1.83	3.00	3.00	2.00	3.00	2.00	5.00
NETHERLANDS	3.27	5.00	3.00	1.00	0.00	2.00	3.00
NIGERIA	1.66	3.00	3.00	2.00	5.00	3.00	5.00
NORWAY	3.44	5.00	.	.	.	.	.
PAKISTAN	1.66	4.00	.	.	.	.	.
PANAMA	.	3.00	3.00	2.00	0.00	2.00	2.00
PARAGUAY	.	3.00	.	.	.	.	.
PERU	1.73	3.00	3.00	2.00	4.00	1.00	5.00
PHILIPPINES	1.81	4.00	3.00	2.00	6.00	1.00	3.00
POLAND	.	.	3.00	2.00	0.00	2.00	4.00
PORTUGAL	1.91	4.00	3.00	2.00	0.00	1.00	4.00
ROMANIA	.	.	3.00	2.00	0.00	3.00	.
RUSSIAN FEDERATION	.	.	3.00	1.00	2.00	.	4.00
SINGAPORE	3.17	5.00	.	.	0.00	.	5.00
SLOVAKIA	.	.	0.00	2.00	.	3.00	3.00
SLOVENIA	.	.	3.00	2.00	6.00	3.00	5.00
SOUTH AFRICA	2.70	3.00	0.00	1.00	0.00	3.00	5.00
SPAIN	2.56	4.00	3.00	1.00	3.00	3.00	6.00
SWEDEN	3.31	4.00	2.00	0.00	0.00	1.00	1.00
SWITZERLAND	3.59	5.00	3.00	1.00	0.00	1.00	.
THAILAND	2.23	5.00	3.00	2.00	0.00	2.00	3.00
TUNISIA	.	3.00	.	.	.	.	.
TURKEY	1.99	4.00	3.00	2.00	0.00	1.00	.
UNITED KINGDOM	3.42	5.00	3.00	1.00	0.00	1.00	5.00
URUGUAY	.	4.00	.	.	.	.	.
USA	3.54	5.00	3.00	2.00	5.00	2.00	4.00
VENEZUELA	1.69	3.00	3.00	2.00	5.00	1.00	2.00

4. Institutional Characteristics by Country(Continued)

	Type	Coinsure	Limit	Foreign	Inter	Fundt	Funds	Manage	Member
AUSTRALIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AUSTRIA	1.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00
BAHAMAS	.	.	.	.	.	.	.	.	.
BANGLADESH	1.00	2.00	1.00	1.00	1.00	2.00	2.00	3.00	1.00
BELGIUM	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00
BULGARIA	0.99	1.98	0.99	1.98	0.99	1.98	1.98	1.98	0.99
CANADA	1.00	2.00	1.00	1.00	2.00	2.00	2.00	3.00	1.00
CHILE	1.00	1.00	1.00	2.00	1.00	1.00	3.00	3.00	1.00
CHINA-PEOPLE'S REP.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLOMBIA	1.00	1.00	1.86	1.00	2.00	2.00	1.00	3.00	1.00
COSTA RICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CROATIA	0.79	1.58	0.79	1.58	0.79	1.58	1.58	1.58	0.79
CZECH REPUBLIC	1.00	1.00	1.00	1.00	1.00	2.00	2.00	3.00	1.00
DENMARK	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00
DOMINICAN REPUBLIC	1.00	1.00	1.00	2.00	1.00	2.00	2.00	2.00	2.00
EGYPT	.	.	.	.	.	.	.	.	.
FRANCE	1.00	2.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00
GERMANY	1.00	1.00	1.00	2.00	1.00	2.00	1.00	1.00	1.00
GREECE	0.99	1.97	0.99	1.97	0.99	1.97	0.99	1.97	0.99
GUATEMALA	.	.	.	.	.	.	.	.	.
HONDURAS	.	.	.	.	.	.	.	.	.
HONG KONG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HUNGARY	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00
INDIA	1.00	2.00	1.00	2.00	1.00	2.00	2.00	3.00	1.00
INDONESIA	0.45	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00
IRELAND	1.00	1.00	1.00	2.00	1.00	2.00	1.00	3.00	1.00
ITALY	1.00	2.00	1.00	2.00	1.00	1.00	2.00	2.00	1.00
JAPAN	1.00	2.00	1.96	1.00	1.00	2.00	2.00	2.00	1.00
KENYA	1.00	2.00	1.00	2.00	2.00	2.00	2.00	3.00	1.00
KOREA REP. OF	0.83	1.65	1.47	0.83	0.83	1.65	1.65	2.48	0.83
LATVIA	0.66	1.32	0.66	1.32	0.66	1.32	1.32	1.98	0.66
LUXEMBOURG	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00
MALAYSIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEXICO	1.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	1.00
NETHERLANDS	1.00	2.00	1.00	2.00	1.00	1.00	2.00	3.00	1.00
NIGERIA	1.00	2.00	1.00	1.00	2.00	2.00	2.00	3.00	1.00
NORWAY	1.00	2.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00
PAKISTAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANAMA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PARAGUAY	.	.	.	.	.	.	.	.	.
PERU	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00
PHILIPPINES	1.00	2.00	1.00	2.00	2.00	2.00	2.00	3.00	1.00
POLAND	0.95	0.95	0.95	1.91	0.95	1.91	1.91	2.86	0.95
PORTUGAL	1.00	1.00	1.00	2.00	1.00	2.00	2.00	3.00	1.00
ROMANIA	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00
RUSSIAN FEDERATION	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SINGAPORE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SLOVAKIA	0.97	1.95	0.97	1.95	0.97	1.95	1.95	1.95	0.97
SLOVENIA	.	.	.	.	.	.	.	.	.
SOUTH AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPAIN	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00
SWEDEN	0.98	1.95	0.98	1.95	0.98	1.95	1.95	2.93	0.98
SWITZERLAND	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00
THAILAND	0.71	0.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00
TUNISIA	.	.	.	.	.	.	.	.	.
TURKEY	1.00	2.00	2.00	2.00	1.00	2.00	2.00	3.00	1.00
UNITED KINGDOM	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00
URUGUAY	.	.	.	.	.	.	.	.	.
USA	1.00	2.00	1.00	2.00	2.00	2.00	2.00	3.00	1.00
VENEZUELA	1.00	2.00	1.00	1.00	1.00	2.00	2.00	3.00	1.00

5 Deposit Interest Rate, Market Discipline, and Institutions
A. CAPREG

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.046 ***	0.049 ***	0.044 ***	−0.023 *
	(.000)	(.000)	(.000)	(.056)
Bank risk	−0.038 ***	−0.264	−0.066 *	0.083 ***
	(.007)	(.185)	(.093)	(.009)
Overhead	0.000	0.092	−0.006	−0.199 ***
	(.955)	(.291)	(.705)	(.000)
Shrot term debt / total debt	−0.021 ***	−0.023 ***	−0.020 ***	0.000
	(.000)	(.000)	(.000)	(.984)
Asset size	0.001 ***	0.001 ***	0.001 ***	−0.002 ***
	(.000)	(.000)	(.000)	(.000)
Government rate	0.567 ***	0.532 ***	0.532 ***	0.365 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−1.008 ***	−1.000 ***	−0.998 ***	−0.807 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.074 ***	0.100 ***	0.098 ***	−0.809 ***
	(.010)	(.000)	(.001)	(.000)
Deposit growth (Predicted value)				0.754 ***
				(.000)
CAPREG	−0.001 **	−0.001	−0.001	0.006 ***
	(.047)	(.409)	(.262)	(.000)
Bank risk x	0.006 **	0.040	0.015 **	−0.030 ***
CAPREG	(.012)	(.255)	(.014)	(.000)
No. of obs.	9988	10035	10035	3580
Adj. R-square	0.74	0.73	0.73	0.85
F value	1102.1 ***	875.1 ***	950.5 ***	281.5 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
B. ACTREG

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.072 ***	0.075 ***	0.068 ***	0.056 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk	−0.043 ***	−0.296 ***	−0.012	−0.225 ***
	(.000)	(.000)	(.558)	(.000)
Overhead	−0.008	0.078 *	−0.018	−0.323 ***
	(.575)	(.081)	(.487)	(.000)
Shrot term debt / total debt	−0.020 ***	−0.022 ***	−0.023 ***	0.007 *
	(.000)	(.000)	(.000)	(.074)
Asset size	0.001 ***	0.001 ***	0.001 ***	−0.001 ***
	(.000)	(.000)	(.000)	(.000)
Government rate	0.362 ***	0.358 ***	0.357 ***	0.275 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.925 ***	−0.929 ***	−0.930 ***	−0.791 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.061 **	0.064 **	0.062 **	−0.952 ***
	(.028)	(.015)	(.016)	(.000)
Deposit growth (Predicted value)				0.851 ***
				(.000)
ACTREG	−0.002 ***	−0.003 ***	−0.002 ***	−0.003 ***
	(.000)	(.000)	(.000)	(.001)
Bank risk x ACTREG	0.003 ***	0.023 ***	0.003	0.012 **
	(.001)	(.000)	(.339)	(.020)
No. of obs.	16617	17124	17123	6598
Adj. R-square	0.67	0.67	0.67	0.73
F value	331.2 ***	371.9 ***	329.2 ***	290.6

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
C. ENTRYREQ

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.064 ***	0.056 ***	0.057 ***	0.129 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk	−0.004	0.192	0.104	−0.472 ***
	(.719)	(.215)	(.243)	(.000)
Overhead	−0.002	0.057	−0.009	−0.329 ***
	(.825)	(.533)	(.538)	(.000)
Shrot term debt / total debt	−0.023 ***	−0.025 ***	−0.025 ***	0.002
	(.000)	(.000)	(.000)	(.603)
Asset size	0.001 ***	0.001 ***	0.001 ***	0.000 ***
	(.000)	(.000)	(.000)	(.005)
Government rate	0.359 ***	0.357 ***	0.356 ***	0.238 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.927 ***	−0.931 ***	−0.931 ***	−0.784 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.040	0.043	0.044	−0.923 ***
	(.171)	(.125)	(.116)	(.000)
Deposit growth (Predicted value)				0.828 ***
				(.000)
ENTRYREQ	−0.001 **	−0.0001	−0.0001	−0.013 ***
	(.012)	(.860)	(.908)	(.000)
Bank risk x ENTRYREQ	−0.001	−0.032 **	−0.014	0.052 ***
	(.529)	(.017)	(.181)	(.000)
No. of obs.	16490	16997	16997	6542
Adj. R-square	0.67	0.66	0.66	0.73
F value	324.3 ***	328.9 ***	340.3	272.2 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
D. MORALHAZARD

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.060 ***	0.061 ***	0.059 ***	0.031 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk	−0.022 ***	−0.127 ***	0.005	−0.096 ***
	(.000)	(.000)	(.696)	(.000)
Overhead	−0.002	0.065 *	−0.011	−0.324 ***
	(.859)	(.097)	(.547)	(.000)
Shrot term debt / total debt	−0.022 ***	−0.024 ***	−0.024 ***	0.002
	(.000)	(.000)	(.000)	(.541)
Asset size	0.001 ***	0.001 ***	0.001 ***	−0.001 ***
	(.000)	(.000)	(.000)	(.000)
Government rate	0.338 ***	0.340 ***	0.334 ***	0.236 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.944 ***	−0.945 ***	−0.948 ***	−0.849 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.017	0.026	0.027	−0.903 ***
	(.446)	(.221)	(.214)	(.000)
Deposit growth (Predicted value)				0.886 ***
				(.000)
MORALHAZARD	−0.004 ***	−0.004 ***	−0.004 ***	−0.002 **
	(.000)	(.000)	(.000)	(.041)
Bank risk x MORALHAZARD	0.009 ***	0.043 ***	0.014 ***	0.001
	(.000)	(.000)	(.002)	(.817)
No. of obs.	17240	17743	17741	6813
Adj. R-square	0.61	0.61	0.61	0.62
F value	295.6 ***	314.3 ***	304.8 ***	528.1 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
E. SPOWER

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.097 ***	0.099 ***	0.088 ***	0.093 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk	−0.086 ***	−0.485 ***	−0.041 *	−0.380 ***
	(.000)	(.000)	(.095)	(.000)
Overhead	−0.013	0.067	−0.040 *	−0.329 ***
	(.512)	(.164)	(.077)	(.000)
Shrot term debt / total debt	−0.018 ***	−0.019 ***	−0.020 ***	0.005
	(.000)	(.000)	(.000)	(.171)
Asset size	0.001 ***	0.002 ***	0.002 ***	0.000
	(.000)	(.000)	(.000)	(.320)
Government rate	0.356 ***	0.358 ***	0.350 ***	0.247 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.924 ***	−0.926 ***	−0.929 ***	−0.796 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.021	0.026	0.024	−0.878 ***
	(.466)	(.340)	(.370)	(.000)
Deposit growth (Predicted value)				0.780 ***
				(.000)
SPOWER	−0.004 ***	−0.004 ***	−0.003 ***	−0.005 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk x SPOWER	0.006 ***	0.033 ***	0.006 **	0.024 ***
	(.000)	(.000)	(.021)	(.000)
No. of obs.	16561	17068	17067	6598
Adj. R-square	0.66	0.66	0.66	0.73
F value	359.7 ***	381.4 ***	379.9 ***	253.2 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
F. PMONITOR

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.093 ***	0.117 ***	0.107 ***	0.026
	(.000)	(.000)	(.000)	(.178)
Bank risk	0.008	−0.511 ***	−0.141	0.079
	(.717)	(.002)	(.175)	(.357)
Overhead	0.005	0.078	−0.012	−0.232 ***
	(.247)	(.203)	(.756)	(.000)
Shrot term debt / total debt	−0.019 ***	−0.024 ***	−0.025 ***	−0.006
	(.000)	(.000)	(.000)	(.135)
Asset size	0.001 ***	0.001 ***	0.0004 ***	−0.001 ***
	(.000)	(.000)	(.000)	(.000)
Government rate	0.336 ***	0.349 ***	0.339 ***	0.261 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−1.009 ***	−1.010 ***	−1.016 ***	−0.942 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.038 *	0.040	0.060 ***	−0.578 ***
	(.081)	(.107)	(.006)	(.000)
Deposit growth (Predicted value)				0.511 ***
				(.000)
PMONITOR	−0.007 ***	−0.010 ***	−0.009 ***	0.0002
	(.000)	(.000)	(.000)	(.931)
Bank risk x	−0.004	0.071 ***	0.026 *	−0.016
PMONITOR	(.205)	(.005)	(.096)	(.254)
No. of obs.	9223	9261	9261	3710
Adj. R-square	0.87	0.87	0.87	0.89
F value	1017.5 ***	853.8 ***	889.7 ***	465.9 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
G. GOVBANK

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.040 ***	0.038 ***	0.038 ***	0.027 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk	−0.009 ***	−0.021	0.037 ***	−0.084 ***
	(.000)	(.142)	(.004)	(.000)
Overhead	0.009	0.107 ***	−0.004	−0.231 ***
	(.554)	(.003)	(.668)	(.000)
Shrot term debt / total debt	−0.012 ***	−0.014 ***	−0.015 ***	0.007 *
	(.000)	(.000)	(.000)	(.079)
Asset size	0.001 ***	0.001 ***	0.001 ***	0.000
	(.000)	(.000)	(.000)	(.904)
Government rate	0.325 ***	0.336 ***	0.325 ***	0.298 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.924 ***	−0.919 ***	−0.925 ***	−0.827 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.083 **	0.095 ***	0.088 ***	−0.701 ***
	(.011)	(.002)	(.004)	(.000)
Deposit growth (Predicted value)				0.612 ***
				(.000)
GOVBANK	0.0004 ***	0.0005 ***	0.0004 ***	0.000
	(.000)	(.000)	(.000)	(.211)
Bank risk x GOVBANK	−0.0002	−0.005 ***	−0.001	0.002 **
	(.179)	(.000)	(.102)	(.041)
No. of obs.	14294	14788	14787	5757
Adj. R-square	0.73	0.73	0.73	0.82
F value	341.6 ***	324.9 ***	347.0 ***	271.4 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
H. CONTRACT

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.095 ***	0.095 ***	0.087 ***	0.087 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk	−0.103 ***	−0.527 ***	−0.095 **	−0.307 ***
	(.000)	(.000)	(.018)	(.000)
Overhead	−0.057 **	−0.005	−0.110 ***	−0.302 ***
	(.017)	(.913)	(.002)	(.000)
Shrot term debt / total debt	−0.016 ***	−0.018 ***	−0.020 ***	0.003
	(.000)	(.000)	(.000)	(.492)
Asset size	0.001 ***	0.001 ***	0.001 ***	0.000
	(.000)	(.000)	(.000)	(.546)
Government rate	0.481 ***	0.513 ***	0.485 ***	0.298 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.988 ***	−0.995 ***	−1.001 ***	−0.825 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.024	0.024	0.041 *	−0.747 ***
	(.299)	(.311)	(.089)	(.000)
Deposit growth (Predicted value)				0.692 ***
				(.000)
CONTRACT	−0.016 ***	−0.015 ***	−0.012 ***	−0.018 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk x	0.029 ***	0.149 ***	0.043 ***	0.078 ***
CONTRACT	(.000)	(.000)	(.001)	(.000)
No. of obs.	16113	16620	16619	6486
Adj. R-square	0.62	0.62	0.61	0.74
F value	751.8 ***	778.8 ***	732.3 ***	298.3 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

5 Deposit Interest Rate, Market Discipline, and Institutions
I. FPROP

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.127 ***	0.128 ***	0.112 ***	0.092 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk	−0.120 ***	−0.604 ***	−0.076	−0.287 ***
	(.000)	(.000)	(.242)	(.000)
Overhead	−0.020	0.029	−0.061 **	−0.256 ***
	(.374)	(.485)	(.027)	(.000)
Shrot term debt / total debt	−0.016 ***	−0.018 ***	−0.020 ***	0.003
	(.000)	(.000)	(.000)	(.435)
Asset size	0.001 ***	0.001 ***	0.001 ***	0.000
	(.000)	(.000)	(.000)	(.919)
Government rate	0.403 ***	0.428 ***	0.405 ***	0.246 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.979 ***	−0.987 ***	−0.990 ***	−0.805 ***
	(.000)	(.000)	(.000)	(.000)
Growth	−0.045 *	−0.051 **	−0.036	−0.792 ***
	(.059)	(.035)	(.138)	(.000)
Deposit growth (Predicted value)				0.737 ***
				(.000)
FPROP	−0.016 ***	−0.016 ***	−0.012 ***	−0.013 ***
	(.000)	(.000)	(.000)	(.000)
Bank risk x FPROP	0.024 ***	0.120 ***	0.023 *	0.044 ***
	(.000)	(.000)	(.069)	(.000)
No. of obs.	16787	17294	17292	6723
Adj. R-square	0.59	0.59	0.59	0.73
F value	724.2 ***	735.6 ***	702.6 ***	292.5 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
A. CAPREG

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.068 ***	0.087 ***	0.065 ***	0.096 **
	(.000)	(.000)	(.000)	(.032)
Bank risk	−0.063	−0.828 ***	−0.104	−0.640 ***
	(.248)	(.004)	(.321)	(.000)
Overhead	0.088	0.345	0.080	0.118
	(.638)	(.278)	(.660)	(.372)
Asset size	0.001	0.001	0.001 *	0.000
	(.125)	(.223)	(.055)	(.966)
Inflation	−0.033	−0.049	−0.040	0.990 ***
	(.340)	(.175)	(.248)	(.000)
Growth	0.885 ***	0.872 ***	0.864 ***	1.057 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				1.350 ***
				(.000)
CAPREG	−0.004 ***	−0.009 ***	−0.005 ***	−0.022 ***
	(.068)	(.000)	(.010)	(.003)
Bank risk x	0.006	0.130 ***	0.026	0.107 ***
CAPREG	(.446)	(.002)	(.106)	(.000)
No. of obs.	12009	12068	12068	3580
Adj. R-square	0.02	0.02	0.02	0.05
F value	21.0 ***	26.0 ***	22.4 ***	16.2 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
B. ACTREG

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.040 ***	0.011	0.040 ***	−0.004
	(.000)	(.130)	(.000)	(.885)
Bank risk	−0.034	0.621 ***	−0.064 *	−0.057
	(.126)	(.001)	(.075)	(.731)
Overhead	0.132	−0.001	0.129	0.392 ***
	(.478)	(.996)	(.484)	(.002)
Asset size	0.002 ***	0.002 ***	0.002 ***	0.002 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.138 ***	−0.135 ***	−0.145 ***	0.581 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.891 ***	0.903 ***	0.871 ***	1.110 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				0.821 ***
				(.000)
ACTREG	0.001	0.003 ***	0.0003	0.0005
	(.308)	(.000)	(.480)	(.875)
Bank risk x	0.003	−0.053 ***	0.012 **	0.003
ACTREG	(.196)	(.010)	(.017)	(.872)
No. of obs.	18986	19506	19505	6662
Adj. R-square	0.03	0.03	0.03	0.03
F value	40.0 ***	45.3 ***	43.7 ***	19.6 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
C. ENTRYREQ

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.020	0.028	0.038 ***	−0.058
	(.132)	(.241)	(.001)	(.387)
Bank risk	0.035	0.106	−0.036	0.185
	(.423)	(.883)	(.669)	(.572)
Overhead	0.133	0.135	0.127	0.402 ***
	(.479)	(.675)	(.496)	(.001)
Asset size	0.002 ***	0.002 ***	0.002 ***	0.002 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.135 ***	−0.137 ***	−0.138 ***	0.632 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.884 ***	0.884 ***	0.888 ***	1.124 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				0.880 ***
				(.000)
ENTRYREQ	0.003 *	0.002	0.0004	0.008
	(.057)	(.594)	(.792)	(.406)
Bank risk x ENTRYREQ	−0.007	−0.014	0.008	−0.031
	(.279)	(.856)	(.548)	(.495)
No. of obs.	18859	19379	19379	6606
Adj. R-square	0.03	0.03	0.03	0.03
F value	37.1 ***	40.0 ***	39.3 ***	19.3 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
D. MORALHAZARD

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.044 ***	0.032 ***	0.042 ***	0.000
	(.000)	(.000)	(.000)	(.995)
Bank risk	−0.020 **	0.261 **	−0.010	−0.050
	(.015)	(.034)	(.521)	(.225)
Overhead	0.140	0.040	0.141	0.356 ***
	(.457)	(.887)	(.466)	(.004)
Asset size	0.001 ***	0.002 ***	0.002 ***	0.003 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.152 ***	−0.162 ***	−0.154 ***	0.552 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.973 ***	0.981 ***	0.966 ***	1.220 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				1.020 ***
				(.000)
MORALHAZARD	−0.004 ***	0.003	−0.004 ***	−0.009 **
	(.002)	(.131)	(.002)	(.012)
Bank risk x	0.009 *	−0.108 **	0.023 **	0.045 ***
MORALHAZARD	(.064)	(.011)	(.040)	(.003)
No. of obs.	19406	19921	19919	6894
Adj. R-square	0.03	0.03	0.03	0.04
F value	42.6 ***	46.1 ***	45.5 ***	26.6 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
E. SPOWER

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.021 **	−0.009	0.027 ***	−0.162 ***
	(.020)	(.583)	(.005)	(.000)
Bank risk	0.076 ***	0.979 ***	0.045	0.552 ***
	(.010)	(.001)	(.547)	(.009)
Overhead	0.349 ***	0.277	0.347 ***	0.405 ***
	(.001)	(.118)	(.001)	(.001)
Asset size	0.002 ***	0.002 ***	0.002 ***	0.002 ***
	(.000)	(.000)	(.000)	(.001)
Inflation	−0.148 ***	−0.156 ***	−0.149 ***	0.787 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.922 ***	0.928 ***	0.918 ***	1.086 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				1.092 ***
				(.000)
SPOWER	0.002 ***	0.004 **	0.001	0.012 ***
	(.009)	(.022)	(.242)	(.000)
Bank risk x SPOWER	−0.008 ***	−0.073 **	−0.004	−0.050 ***
	(.003)	(.034)	(.563)	(.005)
No. of obs.	18872	19392	19391	6662
Adj. R-square	0.03	0.03	0.03	0.04
F value	42.4 ***	49.5 ***	44.9 ***	22.5 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
F. PMONITOR

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.109 ***	0.067	0.071 ***	−0.018
	(.000)	(.201)	(.007)	(.829)
Bank risk	0.073	0.851	0.422 **	0.348
	(.415)	(.241)	(.034)	(.346)
Overhead	0.081	−0.022	0.074	0.564 ***
	(.667)	(.951)	(.704)	(.001)
Asset size	0.001	0.000	0.001	0.001 *
	(.127)	(.455)	(.266)	(.084)
Inflation	−0.150 ***	−0.165 ***	−0.155 ***	0.400 *
	(.000)	(.005)	(.000)	(.095)
Growth	0.868 ***	0.892 ***	0.858 ***	1.337 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				0.818 ***
				(.006)
PMONITOR	−0.010 ***	−0.005	−0.006	0.002
	(.005)	(.479)	(.124)	(.882)
Bank risk x	−0.017	−0.123	−0.061 *	−0.062
PMONITOR	(.213)	(.308)	(.056)	(.278)
No. of obs.	11105	11155	11155	3723
Adj. R-square	0.02	0.02	0.02	0.04
F value	22.0 ***	20.3 ***	21.1 ***	15.0 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
G. GOVBANK

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.042 ***	0.038 ***	0.036 ***	0.003
	(.000)	(.000)	(.000)	(.764)
Bank risk	−0.033 ***	−0.004	0.039	−0.105 **
	(.000)	(.992)	(.254)	(.050)
Overhead	0.118	0.153	0.110	0.415 ***
	(.505)	(.659)	(.542)	(.002)
Asset size	0.001 ***	0.001 ***	0.001 ***	0.002 ***
	(.003)	(.000)	(.000)	(.000)
Inflation	−0.164 ***	−0.162 ***	−0.162 ***	0.646 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.770 ***	0.775 ***	0.771 ***	1.001 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)			***	0.942 ***
				(.000)
CAPREG	0.001 ***	0.001 *	0.001	0.0003
	0.000	0.100	0.000	0.602
Bank risk x	−0.00001	−0.002	−0.001	0.0003
CAPREG	0.990	0.791	0.191	0.896
No. of obs.	16613	17120	17119	5808
No. of countries				
F value	38.7 ***	39.4 ***	39.5 ***	20.5 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P−values are in parentheses under the estimated coefficients, using heteroskedasticity−consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
H. CONTRACT

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.044 ***	0.021	0.053 ***	−0.121 ***
	(.001)	(.252)	(.000)	(.003)
Bank risk	0.161 ***	1.099 ***	0.218 ***	0.333 *
	(.000)	(.000)	(.010)	(.060)
Overhead	0.293 ***	0.202	0.334 ***	0.441 ***
	(.008)	(.291)	(.006)	(.000)
Asset size	0.003 ***	0.002 ***	0.002 ***	0.002 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.138 ***	−0.169 ***	−0.131 ***	0.870 ***
	(.000)	(.000)	(.000)	(.000)
Growth	0.922 ***	0.981 ***	0.943 ***	1.127 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				1.144 ***
				(.000)
CAPREG	−0.0002	0.005	−0.004	0.036 ***
	(.958)	(.470)	(.291)	(.006)
Bank risk x CAPREG	−0.056 ***	−0.323 ***	−0.079 ***	−0.139 **
	(.000)	(.005)	(.007)	(.038)
No. of obs.	17436	17956	17955	6567
Adj. R-square	0.02	0.03	0.02	0.03
F value	34.5 ***	39.5 ***	34.8 ***	18.3 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

6 Deposit Growth Rate, Market Discipline, and Institutions
I. FPROP

	Liquidity	Profit	Equity	Predicted value of Liquidity
Constant	0.066 ***	0.059 ***	0.088 ***	−0.113 **
	(.000)	(.005)	(.000)	(.036)
Bank risk	0.259 ***	1.198 ***	0.348 ***	0.485 ***
	(.000)	(.000)	(.000)	(.010)
Overhead	0.298 ***	0.251	0.349 ***	0.476 ***
	(.001)	(.227)	(.001)	(.000)
Asset size	0.002 ***	0.002 ***	0.002 ***	0.002 ***
	(.000)	(.000)	(.000)	(.000)
Inflation	−0.176 ***	−0.200 ***	−0.175 ***	0.660 ***
	(.000)	(.000)	(.000)	(.002)
Growth	0.798 ***	0.840 ***	0.810 ***	1.030 ***
	(.000)	(.000)	(.000)	(.000)
Interest (Predicted value)				0.940 ***
				(.000)
CAPREG	−0.004	−0.004	−0.010 ***	0.026 **
	(.169)	(.361)	(.001)	(.016)
Bank risk x CAPREG	−0.059 ***	−0.247 ***	−0.083 ***	−0.128 ***
	(.000)	(.005)	(.000)	(.004)
No. of obs.	19166	19686	19684	6809
Adj. R-square	0.03	0.03	0.03	0.04
F value	47.2 ***	49.8 ***	45.5 ***	21.3 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the deposit growth rate , deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

A1. Deposit Interest Rate and Market Discipline by Country

The following fixed-effect model is estimated for each country.

$$Interest\ Rates_{i,t} = \mu_i + d_t + \beta' Bank\ Fundamentals_{i,t-1} + \omega_{i,t}$$

, where μ_i is a bank-fixed effect, d_t is a time-fixed effect, and *Bank Fundamentals* include Liquidity, Profit, Equity, Overhead, Maturity and the logarithm of total assets (Size). R-sq difference is the difference in R-squared from the regression with the three bank risk measures, i.e., Liquidity, Profit and Equity and from the regression without them.

country name	Equity	Liquidity	Profit	Overhead	Shrot term debt / total debt	Scale	Adj R-sq	Number of Banks	Number of observations	R-sq Difference	Sample period
AUSTRALIA	−0.11	−0.02	0.24	−0.40	−0.02	0.01 **	0.68	55	255	0.005	1992 − 2002
AUSTRIA	−0.03	0.02 ***	0.10	−0.27 *	−0.03 **	0.01 ***	0.75	190	725	0.005	1992 − 2001
BAHAMAS	0.17 *	−0.04 *	−0.26	0.42 *	−0.02	0.02	0.72	31	85	0.020	1993 − 2002
BANGLADESH	0.07 **	0.00	−0.01	0.14	0.14 ***	0.03 ***	1.00	26	108	0.000	1994 − 2002
BELGIUM	−0.04	0.01 **	0.09	−0.29 ***	0.01	0.00	0.68	104	489	0.005	1992 − 2001
BULGARIA	1.37 **	0.13	−0.25	0.32	−0.36	−0.10	0.51	24	72	0.036	1992 − 2002
CANADA	−0.02	−0.01	−0.29	−0.18	0.11	0.00	0.74	59	291	0.009	1992 − 2002
CHILE	−0.11 ***	−0.04 *	−0.05	−0.43	0.02	−0.01	0.89	32	143	0.016	1993 − 2002
CHINA-PEOPLE'S REP.	−0.24 ***	0.02	0.21	0.43	−0.02	−0.02 **	0.97	36	120	0.005	1994 − 2000
COLOMBIA	−0.08	0.01	0.06	−0.10	−0.05 *	0.01	0.84	48	209	0.001	1992 − 2002
COSTA RICA	−0.31 ***	−0.01	−0.98 ***	1.28 ***	1.35 *	−0.02	0.82	40	140	0.026	1992 − 2002
CROATIA	−0.04 ***	−0.02 **	−0.04	0.05 **	−0.01	0.00	1.00	45	167	0.000	1994 − 2001
CZECH REPUBLIC	−0.32 **	−0.04	−0.09	−0.04	−0.02	0.00	0.55	35	133	0.024	1994 − 2002
DENMARK	0.00	0.00	−0.07 *	−0.13 ***	0.00	0.00 **	0.89	106	624	0.001	1994 − 2002
DOMINICAN REPUBLIC	0.17 ***	0.02	−0.30 *	0.03	0.04	0.00	0.90	26	95	0.042	1993 − 2002
ECUADOR	0.01	0.11	0.18	0.15	0.71	0.03	0.89	37	82	0.003	1992 − 2001
FRANCE	0.03 ***	0.03 ***	−0.07	−0.27 *	0.00	−0.03 ***	0.80	448	1929	0.002	1992 − 2002
GERMANY	0.10 ***	0.01	−0.04	−0.05	−0.02	0.01 ***	0.58	251	1309	0.016	1992 − 2002
GREECE	−0.11	0.08 ***	−0.47	0.18	0.08	−0.01	0.69	22	70	0.054	1992 − 2001
GUATEMALA	−0.04	0.00	−0.25	0.01	0.02	0.01	0.81	35	167	0.004	1993 − 2001
HONDURAS	0.10	0.08 *	−0.52 *	0.46	0.08 *	0.08 ***	0.85	21	85	0.013	1993 − 2002
HONG KONG	−0.01	−0.04	0.45	−0.74	−0.01	0.02	0.61	86	356	0.003	1993 − 2002
HUNGARY	−0.11	0.11 *	−0.10	0.19	0.01	0.01	0.75	36	130	0.042	1993 − 2001
INDIA	−0.03	−0.01	−0.13 **	−0.33 **	−0.03 **	0.01 **	0.94	74	418	0.002	1993 − 2001
INDONESIA	−0.02	−0.01	−0.03	0.15	−0.04 *	0.01	0.96	100	381	0.000	1992 − 2001

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.

A1(Continued)

country name	Equity	Liquidity	Profit	Cost	Shrot term debt / total debt	Scale	Adj R-sq	Number of Banks	Number of observations	R-sq Difference	Sample period
IRELAND	0.00	−0.07 ***	−0.09	0.11	−0.05	0.01 **	0.90	41	155	0.014	1992 − 2002
ITALY	0.02 **	0.00	−0.22 ***	0.62 ***	−0.01 ***	0.01 ***	0.95	689	2305	0.018	1992 − 2002
JAPAN	0.00	0.00 **	0.00	0.00	−0.03 ***	0.00 ***	0.83	829	2527	0.000	1992 − 2002
KENYA	−0.40	0.36 **	−0.09	−0.66	−0.39	0.03	0.56	22	63	0.263	1992 − 2002
KOREA REP. OF	0.01	−0.03 *	−0.03	0.07	−0.01	0.00	0.95	37	172	0.001	1992 − 2002
LATVIA	0.09	−0.05	−0.11	0.15	0.08	0.01	0.85	23	59	0.002	1995 − 2002
LUXEMBOURG	−0.06 *	−0.02 ***	−0.07 ***	−0.32 **	−0.02	0.00	0.70	137	689	0.010	1992 − 2002
MALAYSIA	0.00	0.01	0.02	0.35	0.05	0.00	0.82	53	208	0.000	1993 − 2001
MEXICO	−0.35	0.27 ***	0.01	−1.42 **	0.08	−0.10 *	0.67	44	154	0.019	1992 − 2002
NETHERLANDS	−0.11 **	−0.01	0.68 ***	−0.90 **	0.00	0.00	0.69	61	313	0.012	1992 − 2002
NIGERIA	−0.15 **	−0.10 ***	0.14	−0.54 ***	0.32 *	0.00	0.99	52	170	0.001	1993 − 2001
NORWAY	0.19 ***	0.05 **	−0.09	0.12	−0.01	0.02 ***	0.99	59	270	0.001	1992 − 2002
PAKISTAN	−0.17 **	0.02	0.03	0.04	0.01	0.01	0.91	24	137	0.005	1993 − 2002
PANAMA	0.05	0.01	−0.14	−0.44	0.01	0.01 ***	0.82	68	185	0.003	1992 − 2001
PARAGUAY	−1.17	−0.10	−2.73	−0.33	1.31	−0.27	−0.64	21	43	0.116	1995 − 2001
PERU	0.02	−0.05	0.33 ***	−0.14	−0.01	0.01 *	0.97	28	115	0.005	1993 − 2002
PHILIPPINES	−0.09 ***	0.00	−0.02	−0.02	0.14 **	0.02 ***	0.85	40	170	0.008	1992 − 2001
POLAND	−0.10 ***	−0.03	−0.09	0.03	0.20	0.00	0.95	48	172	0.003	1993 − 2001
ROMANIA	−0.45	0.01	−0.92 ***	0.38	0.14	0.01	0.66	26	62	0.090	1996 − 2001
RUSSIAN FEDERATION	−0.14	−0.03	0.33	−0.52	0.98	0.05	1.00	73	92	0.000	1995 − 2002
SINGAPORE	0.08	−0.02	−0.62 ***	−0.80 ***	−0.12	−0.01	0.96	25	89	0.010	1992 − 2001
SLOVAKIA	0.02	−0.01	0.18	0.19	−0.01	−0.02	0.86	21	75	0.003	1995 − 2002
SLOVENIA	0.01	−0.03 *	0.11	−0.08	−0.04 *	0.00	0.91	23	110	0.006	1994 − 2002
SOUTH AFRICA	−0.25 **	−0.08	0.25	−0.31	0.05	0.02	0.71	26	90	0.025	1992 − 2002
SPAIN	−0.02	0.00	0.14 ***	0.03	−0.01	0.01 ***	0.87	171	863	0.002	1992 − 2002
SWEDEN	0.22	−0.02	0.39 *	−0.74 *	0.04	0.02	0.99	22	66	0.055	1992 − 2001
SWITZERLAND	−0.04 ***	0.00	−0.05 ***	0.02	−0.01 ***	0.00 ***	0.95	347	1635	0.001	1992 − 2002
THAILAND	−0.01	−0.02	0.08	−0.19	−0.05 **	0.00	0.83	23	92	0.007	1992 − 2001
TUNISIA	0.03	0.05 *	−0.03	0.30	0.03	0.01	0.99	22	96	0.000	1993 − 2002
UNITED KINGDOM	0.00	−0.02 ***	0.01	−0.02	0.01	0.00	0.83	229	1167	0.001	1992 − 2002
URUGUAY	−1.48	−0.51 *	1.78	−1.85	0.33	0.02	0.86	33	82	0.008	1993 − 2001
USA	−0.01	−0.02 ***	0.01 ***	−0.04 ***	−0.01 ***	0.00 ***	0.86	833	4645	0.003	1994 − 2002
VENEZUELA	0.40	0.13	0.72	−1.40	0.17	0.01	0.63	32	50	−0.004	1992 − 2001

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.

A1(Continued)

country name	Equity	Liquidity	Profit	Cost	Shrot term debt / total debt	Scale	Adj R-sq	Number of Banks	Number of observations	R-sq Difference	Sample period
IRELAND	0.00	-0.07 ***	-0.09	0.11	-0.05	0.01 **	0.90	41	155	0.014	1992 - 2002
ITALY	0.02 **	0.00	-0.22 ***	0.62 ***	-0.01 ***	0.01 ***	0.95	689	2305	0.018	1992 - 2002
JAPAN	0.00	0.00 **	0.00	0.00	-0.03 ***	0.00 ***	0.83	829	2527	0.000	1992 - 2002
KENYA	-0.40	0.36 **	-0.09	-0.66	-0.39	0.03	0.56	22	63	0.263	1992 - 2002
KOREA REP. OF	0.01	-0.03 *	-0.03	0.07	-0.01	0.00	0.95	37	172	0.001	1992 - 2002
LATVIA	0.09	-0.05	-0.11	0.15	0.08	0.01	0.85	23	59	0.002	1995 - 2002
LUXEMBOURG	-0.06 *	-0.02 ***	-0.07 ***	-0.32 **	-0.02	0.00	0.70	137	689	0.010	1992 - 2002
MALAYSIA	0.00	0.01	0.02	0.35	0.05	0.00	0.82	53	208	0.000	1993 - 2001
MEXICO	-0.35	0.27 ***	0.01	-1.42 **	0.08	-0.10 *	0.67	44	154	0.019	1992 - 2002
NETHERLANDS	-0.11 **	-0.01	0.68 ***	-0.90 **	0.00	0.00	0.69	61	313	0.012	1992 - 2002
NIGERIA	-0.15 **	-0.10 ***	0.14	-0.54 ***	0.32 *	0.00	0.99	52	170	0.001	1993 - 2001
NORWAY	0.19 ***	0.05 **	-0.09	0.12	-0.01	0.02 ***	0.99	59	270	0.001	1992 - 2002
PAKISTAN	-0.17 **	0.02	0.03	0.04	0.01	0.01	0.91	24	137	0.005	1993 - 2002
PANAMA	0.05	0.01	-0.14	-0.44	0.01	0.01 ***	0.82	68	185	0.003	1992 - 2001
PARAGUAY	-1.17	-0.10	-2.73	-0.33	1.31	-0.27	-0.64	21	43	0.116	1995 - 2001
PERU	0.02	-0.05	0.33 ***	-0.14	-0.01	0.01 *	0.97	28	115	0.005	1993 - 2002
PHILIPPINES	-0.09 ***	0.00	-0.02	-0.02	0.14 **	0.02 ***	0.85	40	170	0.008	1992 - 2001
POLAND	-0.10 ***	-0.03	-0.09	0.03	0.20	0.00	0.95	48	172	0.003	1993 - 2001
ROMANIA	-0.45	0.01	-0.92 ***	0.38	0.14	0.01	0.66	26	62	0.090	1996 - 2001
RUSSIAN FEDERATION	-0.14	-0.03	0.33	-0.52	0.98	0.05	1.00	73	92	0.000	1995 - 2002
SINGAPORE	0.08	-0.02	-0.62 ***	-0.80 ***	-0.12	-0.01	0.96	25	89	0.010	1992 - 2001
SLOVAKIA	0.02	-0.01	0.18	0.19	-0.01	-0.02	0.86	21	75	0.003	1995 - 2002
SLOVENIA	0.01	-0.03 *	0.11	-0.08	-0.04 *	0.00	0.91	23	110	0.006	1994 - 2002
SOUTH AFRICA	-0.25 **	-0.08	0.25	-0.31	0.05	0.02	0.71	26	90	0.025	1992 - 2002
SPAIN	-0.02	0.00	0.14 ***	0.03	-0.01	0.01 ***	0.87	171	863	0.002	1992 - 2002
SWEDEN	0.22	-0.02	0.39 *	-0.74 *	0.04	0.02	0.99	22	66	0.055	1992 - 2001
SWITZERLAND	-0.04 ***	0.00	-0.05 ***	0.02	-0.01 ***	0.00 ***	0.95	347	1635	0.001	1992 - 2002
THAILAND	-0.01	-0.02	0.08	-0.19	-0.05 **	0.00	0.83	23	92	0.007	1992 - 2001
TUNISIA	0.03	0.05 *	-0.03	0.30	0.03	0.01	0.99	22	96	0.000	1993 - 2002
UNITED KINGDOM	0.00	-0.02 ***	0.01	-0.02	0.01	0.00	0.83	229	1167	0.001	1992 - 2002
URUGUAY	-1.48	-0.51 *	1.78	-1.85	0.33	0.02	0.86	33	82	0.008	1993 - 2001
USA	-0.01	-0.02 ***	0.01 ***	-0.04 ***	-0.01 ***	0.00 ***	0.86	833	4645	0.003	1994 - 2002
VENEZUELA	0.40	0.13	0.72	-1.40	0.17	0.01	0.63	32	50	-0.004	1992 - 2001

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.

A2. First step estimation results in the two-step regression

Equation	(15) Liquidity	(16) Depgro
Constant	0.112 ***	0.073 ***
	(.000)	(.000)
Overhead	0.396 ***	0.334 ***
	(.001)	(.000)
Shrot term debt / total debt	0.176 ***	
	(.000)	
Inflation	0.061	-0.202 ***
	(.158)	(.000)
Growth	-1.293 ***	0.879 ***
	(.000)	(.000)
GDP/cap	0.000 ***	0.000 ***
	(.000)	(.000)
Government rate	-0.937 ***	
	(.000)	
Reserve rate	0.763 ***	
	(.000)	
Asset size		0.002 ***
		(.000)
No. of obs.	10240	14156
No. of countries		
Adj. R-square	0.14	0.04
F value	176.4 ***	76.2 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.

P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

A3. Deposit Interest Rate, Market Discipline, and Capital Regulations

A. OLS

	OCAPREG	ICAPREG
Constant	0.045 ***	0.068 ***
	(.000)	(.000)
Liquidity	−0.028 **	−0.038 ***
	(.020)	(.000)
Overhead	0.011	−0.012
	(.584)	(.599)
Shrot term debt / total debt	−0.019 ***	−0.019 ***
	(.000)	(.000)
Asset size	0.002 ***	0.000 ***
	(.000)	(.000)
Government rate	0.387 ***	0.462 ***
	(.000)	(.000)
Inflation	−0.897 ***	−0.990 ***
	(.000)	(.000)
Growth	0.123 ***	0.029
	(.000)	(.211)
OCAPREG	0.001 *	
ICAPREG	(.078)	−0.011 ***
		(.000)
Liquidity x	0.005 *	
OCAPREG	(.081)	
Liquidity x		0.014 ***
ICAPREG		(.000)
No. of obs.	10074	16483
Adj. R-square	0.73	0.67
F value	231.7 ***	727.0 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

B. Two-Step Regression

	OCAPREG	ICAPREG
Constant	−0.012	0.054 ***
	(.209)	(.000)
Liquidity (Predicted value)	0.028 ***	−0.208 ***
	(.265)	(.000)
Overhead	−0.200 ***	−0.376 ***
	(.000)	(.000)
Shrot term debt / total debt	0.000	0.007 *
	(.932)	(.065)
Asset size	−0.001 ***	−0.001 ***
	(.000)	(.000)
Government rate	0.381 ***	0.256 ***
	(.000)	(.000)
Inflation	−0.817 ***	−0.752 ***
	(.000)	(.000)
Growth	−0.767 ***	−1.040 ***
	(.000)	(.000)
Deposit growth (Predicted value)	0.712 ***	0.969 ***
	(.000)	(.000)
OCAPREG	0.007 ***	
ICAPREG	(.000)	−0.017 ***
		(.000)
Liquidity x	−0.031 ***	
OCAPREG	(.000)	
Liquidity x		0.047 ***
ICAPREG		(.002)
No. of obs.	3623	6542
Adj. R-square	0.84	0.74
F value	249.3 ***	269.0 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

A4. Deposit Interest Rate, Market Discipline, and Regulations on Bank Activities

A. OLS

	SECURITIES		INSURANCE		REALESTATE		NONFINANCIAL	
Constant	0.068	***	0.067	***	0.066	***	0.073	***
	(.000)		(.000)		(.000)		(.000)	
Liquidity	−0.050	***	−0.047	***	−0.036	***	−0.017	***
	(.000)		(.000)		(.000)		(.002)	
Overhead	−0.006		−0.009		−0.008		−0.005	
	(.620)		(.527)		(.577)		(.663)	
Shrot term debt / total debt	−0.018	***	−0.019	***	−0.022	***	−0.024	***
	(.000)		(.000)		(.000)		(.000)	
Asset size	0.001	***	0.001	***	0.000	***	0.000	***
	(.000)		(.000)		(.001)		(.000)	
Government rate	0.357	***	0.359	***	0.366	***	0.354	***
	(.000)		(.000)		(.000)		(.000)	
Inflation	−0.934	***	−0.928	***	−0.920	***	−0.925	***
	(.000)		(.000)		(.000)		(.000)	
Growth	0.049	*	0.040		0.077	***	0.017	
	(.077)		(.143)		(.005)		(.541)	
SECURITIES	−0.009	***						
INSURANCE	(.000)		−0.006	***				
REALESTATE			(.000)		−0.007	***		
NONFINANCIAL					(.000)		−0.007	***
							(.000)	
Liquidity x	0.019	***						
SECURITIES	(.000)							
Liquidity x			0.015	***				
INSURANCE			(.000)					
Liquidity x					0.010	***		
REALESTATE					(.000)			
Liquidity x							0.000	
NONFINANCIAL							(.933)	
No. of obs.	16617		16617		16617		16617	
No. of countries								
Adj. R-square	0.67		0.67		0.67		0.67	
F value	375.9	***	369.3	***	332.9	***	406.2	***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

A4.(Continued)

B. Two-Step Regression

	SECURITIES		INSURANCE		REALESTATE		NONFINANCIAL	
Constant	0.051	***	0.041	***	0.049	***	0.064	***
	(.000)		(.000)		(.000)		(.000)	
Liquidity(Predicted value)	−0.218	***	−0.158	***	−0.181	***	−0.264	***
	(.000)		(.000)		(.000)		(.000)	
Overhead	−0.328	***	−0.325	***	−0.382	***	−0.330	***
	(.000)		(.000)		(.000)		(.000)	
Shrot term debt / total debt	0.007		0.006		0.002		0.007	
	(.102)		(.153)		(.687)		(.115)	
Asset size	−0.001	***	−0.001	***	−0.002	***	−0.001	***
	(.000)		(.001)		(.000)		(.000)	
Government rate	0.250	***	0.253	***	0.280	***	0.261	***
	(.000)		(.000)		(.000)		(.000)	
Inflation	−0.792	***	−0.791	***	−0.762	***	−0.788	***
	(.000)		(.000)		(.000)		(.000)	
Growth	−0.971	***	−0.959	***	−1.051	***	−0.969	***
	(.000)		(.000)		(.000)		(.000)	
Deposit growth (Predicted value)	0.862	***	0.843	***	0.979	***	0.852	***
	(.000)		(.000)		(.000)		(.000)	
SECURITIES	−0.012	***						
INSURANCE	(.000)		−0.005	*				
REALESTATE			(.085)		−0.012	***		
NONFINANCIAL					(.000)		−0.014	***
							(.000)	
Liquidity x	0.059	***						
SECURITIES	(.002)							
Liquidity x			0.021					
INSURANCE			(.179)					
Liquidity x					0.030	***		
REALESTATE					(.007)			
Liquidity x							0.058	***
NONFINANCIAL							(.000)	
No. of obs.	6598		6598		6598		6598	
No. of countries								
Adj. R-square	0.73		0.73		0.74		0.73	
F value	294.7	***	301.9	***	291.3	***	270.1	***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

A5. Deposit Interest Rate, Market Discipline, and Deposit Insurance Design Features

A. OLS

	TYPE	COINSURE	LIMIT	FOREIGN	INTERBANK	FUNDTYPE	FUNDSOURCE	MANAGE	MEMBER
Constant	0.071 ***	0.072 ***	0.074 ***	0.053 ***	0.065 ***	0.073 ***	0.073 ***	0.065 ***	0.076 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Liquidity	−0.033 ***	−0.019 ***	−0.051 ***	−0.010	−0.041 ***	−0.062 ***	−0.043 ***	−0.036 ***	−0.024 ***
	(.005)	(.010)	(.000)	(.204)	(.000)	(.000)	(.000)	(.000)	(.001)
Overhead	−0.002	0.000	−0.005	−0.006	−0.004	−0.003	−0.001	−0.001	−0.001
	(.852)	(.995)	(.616)	(.558)	(.709)	(.751)	(.875)	(.873)	(.890)
Shrot term debt / total debt	−0.021 ***	−0.024 ***	−0.020 ***	−0.023 ***	−0.023 ***	−0.018 ***	−0.021 ***	−0.021 ***	−0.026 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Asset size	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.001 ***	0.000 ***	0.001 ***	0.001 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Government rate	0.333 ***	0.327 ***	0.334 ***	0.345 ***	0.347 ***	0.343 ***	0.335 ***	0.348 ***	0.328 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Inflation	−0.933 ***	−0.938 ***	−0.935 ***	−0.946 ***	−0.950 ***	−0.945 ***	−0.937 ***	−0.946 ***	−0.942 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Growth	−0.024	−0.003	−0.056 **	0.026	0.042 *	0.035	0.039 *	0.053 **	−0.017
	(.325)	(.897)	(.031)	(.262)	(.081)	(.122)	(.082)	(.020)	(.453)
TYPE	−0.016 ***								
COINSURE	(.000)	−0.008 ***							
LIMIT		(.000)	−0.017 ***						
FOREIGN			(.000)	0.004 ***					
INTERBANK				(.000)	−0.008 ***				
FUNDTYPE					(.000)	−0.014 ***			
FDUNDSOURCE						(.000)	−0.013 ***		
MANAGE							(.000)	−0.006 ***	
MEMBER								(.000)	−0.013 ***
									(.000)
Liquidity x	0.023 *								
TYPE	(.053)								
Liquidity x		0.003							
COINSURE		(.442)							
Liquidity x			0.041 ***						
LIMIT			(.003)						
Liquidity x				0.002					
FOREIGN				(.642)					
Liquidity x					0.026 ***				
INTERBANK					(.002)				
Liquidity x						0.033 ***			
FUNDTYPE						(.000)			
Liquidity x							0.019 ***		
FDUNDSOURCE							(.000)		
Liquidity x								0.014 ***	
MANAGE								(.000)	
Liquidity x									0.015 **
MEMBER									(.009)
No. of obs.	17419	17240	17419	17240	17240	17240	17240	17240	17240
No. of countries									
Adj. R-square	0.66	0.61	0.67	0.61	0.61	0.62	0.62	0.61	0.61
F value	383.5 ***	292.6 ***	418.5 ***	311.5 ***	303.2 ***	293.4 ***	290.5 ***	284.2 ***	288.8 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

B. Two-Step Regression

	TYPE	COINSURE	LIMIT	FOREIGN	INTERBANK	FUNDTYPE	FUNDSOURCE	MANAGE	MEMBER
Constant	0.029 ***	0.026 ***	0.025 ***	0.021 ***	0.024 ***	0.041 ***	0.041 ***	0.032 ***	0.045 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Liquidity (Predicted value)	−0.081 ***	−0.062 ***	−0.086 ***	−0.064 ***	−0.066 ***	−0.139 ***	−0.116 ***	−0.105 ***	−0.118 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Overhead	−0.321 ***	−0.326 ***	−0.337 ***	−0.347 ***	−0.321 ***	−0.343 ***	−0.347 ***	−0.345 ***	−0.327 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Shrot term debt / total debt	0.004	0.003	0.004	0.002	0.005	0.004	0.001	0.004	−0.002
	(.279)	(.385)	(.257)	(.555)	(.247)	(.289)	(.763)	(.226)	(.623)
Asset size	−0.001 ***	−0.001 ***	−0.001 ***	−0.001 ***	−0.001 ***	−0.001 ***	−0.001 ***	−0.001 ***	0.000
	(.000)	(.000)	(.000)	(.001)	(.000)	(.000)	(.000)	(.000)	(.121)
Government rate	0.214 ***	0.223 ***	0.216 ***	0.236 ***	0.236 ***	0.245 ***	0.226 ***	0.239 ***	0.241 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Inflation	−0.779 ***	−0.837 ***	−0.780 ***	−0.849 ***	−0.843 ***	−0.855 ***	−0.830 ***	−0.839 ***	−0.863 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Growth	−0.955 ***	−0.939 ***	−0.969 ***	−0.962 ***	−0.921 ***	−0.905 ***	−0.938 ***	−0.956 ***	−0.872 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Deposit growth (Predicted value)	0.869 ***	0.919 ***	0.890 ***	0.934 ***	0.897 ***	0.889 ***	0.944 ***	0.959 ***	0.834 ***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
TYPE	0.001								
COINSURE	(.792)	0.002							
LIMIT		(.495)	0.005						
FOREIGN			(.329)	0.005 **					
INTERBANK				(.011)	0.003				
FUNDTYPE					(.160)	−0.009 ***			
FDUNDSOURCE						(.000)	−0.010 ***		
MANAGE							(.000)	−0.004 ***	
MEMBER								(.006)	−0.011 ***
									(.000)
Liquidity x TYPE	−0.021								
	(.289)								
Liquidity x COINSURE		−0.028 **							
		(.021)							
Liquidity x LIMIT			−0.012						
			(.607)						
Liquidity x FOREIGN				−0.021 **					
				(.040)					
Liquidity x INTERBANK					−0.033 **				
					(.021)				
Liquidity x FUNDTYPE						0.032 ***			
						(.001)			
Liquidity x FDUNDSOURCE							0.014		
							(.159)		
Liquidity x MANAGE								0.001	
								(.857)	
Liquidity x MEMBER									0.042 ***
									(.002)
No. of obs.	6908	6813	6908	6813	6813	6813	6813	6813	6813
No. of countries									
Adj. R-square	0.73	0.62	0.73	0.62	0.62	0.62	0.63	0.63	0.62
F value	300.0 ***	550.4 ***	297.2 ***	503.0 ***	444.3 ***	528.3 ***	613.9 ***	465.7 ***	552.7 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

A6. Deposit Interest Rate, Market Discipline, and Supervisory Power

A. OLS

	RPOWER	DINSOL	PCACT
Constant	0.091 ***	0.071 ***	0.060 ***
	(.000)	(.000)	(.000)
Liquidity	−0.062 ***	−0.057 ***	−0.027 ***
	(.000)	(.000)	(.000)
Overhead	−0.006	0.000	−0.005
	(.586)	(.988)	(.781)
Shrot term debt / total debt	−0.018 ***	−0.017 ***	−0.017 ***
	(.000)	(.000)	(.000)
Asset size	0.001 ***	0.001 ***	0.001 ***
	(.000)	(.000)	(.000)
Government rate	0.353 ***	0.363 ***	0.355 ***
	(.000)	(.000)	(.000)
Inflation	−0.929 ***	−0.924 ***	−0.919 ***
	(.000)	(.000)	(.000)
Growth	0.070 **	0.078 **	0.032
	(.019)	(.015)	(.280)
RPOWER	−0.015 ***		
DINSOL	(.000)	−0.015 ***	
PCACT		(.000)	−0.003 ***
			(.000)
Liquidity x	0.019 ***		
RPOWER	(.000)		
Liquidity x		0.031 ***	
DINSOL		(.000)	
Liquidity x			0.003 ***
PCACT			(.002)
No. of obs.	16490	15928	16119
Adj. R-square	0.68	0.68	0.66
F value	345.2 ***	332.1 ***	368.8 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

B. Two-Step Regression

	RPOWER	DINSOL	PCACT
Constant	0.131 ***	0.074 ***	0.032 ***
	(.000)	(.000)	(.000)
Liquidity (Predicted value)	−0.532 ***	−0.397	−0.107 ***
	(.000)	(.000)	(.000)
Overhead	−0.272 ***	−0.349 ***	−0.314 ***
	(.000)	(.000)	(.000)
Shrot term debt / total debt	0.008 **	0.018 ***	0.006
	(.041)	(.000)	(.122)
Asset size	0.000	−0.001 ***	0.000 **
	(.868)	(.000)	(.033)
Government rate	0.276 ***	0.261 ***	0.254 ***
	(.000)	(.000)	(.000)
Inflation	−0.831 ***	−0.775 ***	−0.794 ***
	(.000)	(.000)	(.000)
Growth	−0.733 ***	−0.993 ***	−0.934 ***
	(.000)	(.000)	(.000)
Deposit growth (Predicted value	0.659 ***	0.917 ***	0.826 ***
	(.000)	(.000)	(.000)
RPOWER	−0.037 ***		
DINSOL	(.000)	−0.035 ***	
PCACT		(.000)	−0.001
			(.329)
Liquidity x	0.163 ***		
RPOWER	(.000)		
Liquidity x		0.161 ***	
DINSOL		(.000)	
Liquidity x			0.000
PCACT			(.938)
No. of obs.	6542	6366	6422
Adj. R-square	0.74	0.74	0.73
F value	286.0 ***	267.0 ***	301.6 ***

***,**,* indicate statistical significance levels of 1,5 and 10 percent,respectively.
Dependent variable is the ratio of interest expense to interest-paying debt, deflated by GDP deflator.
P-values are in parentheses under the estimated coefficients, using heteroskedasticity-consistent standard errors from an OLS regression.

Figure 1. Bank equity and deposit interest rate

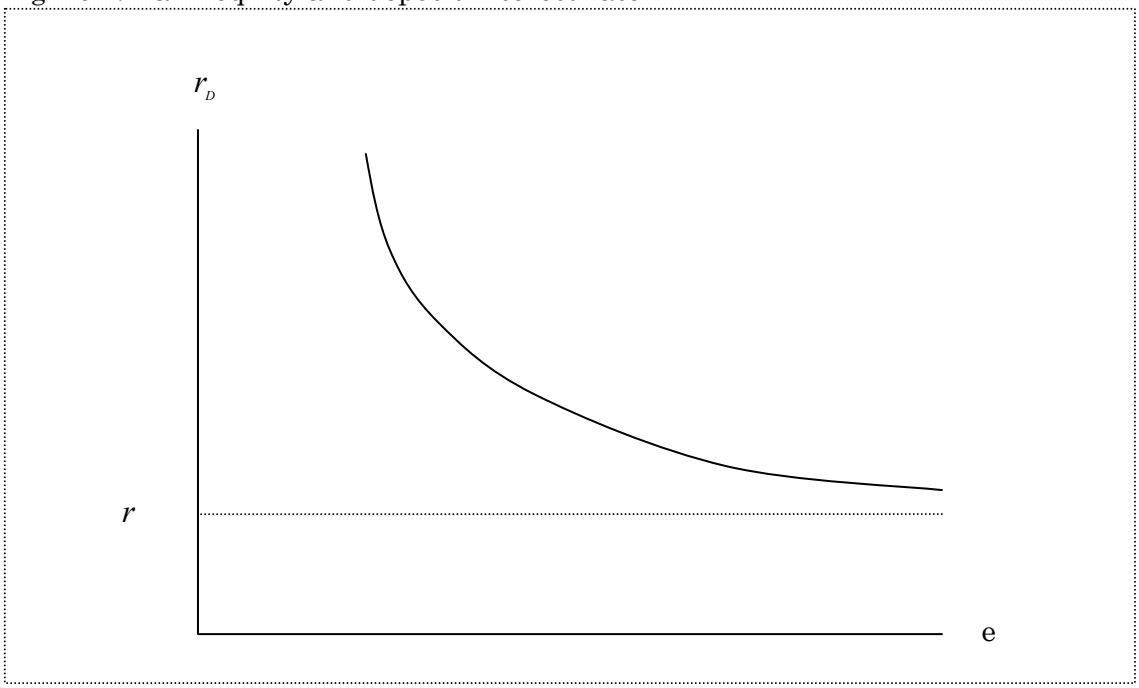


Figure 2. Accounting accuracy and deposit interest rate

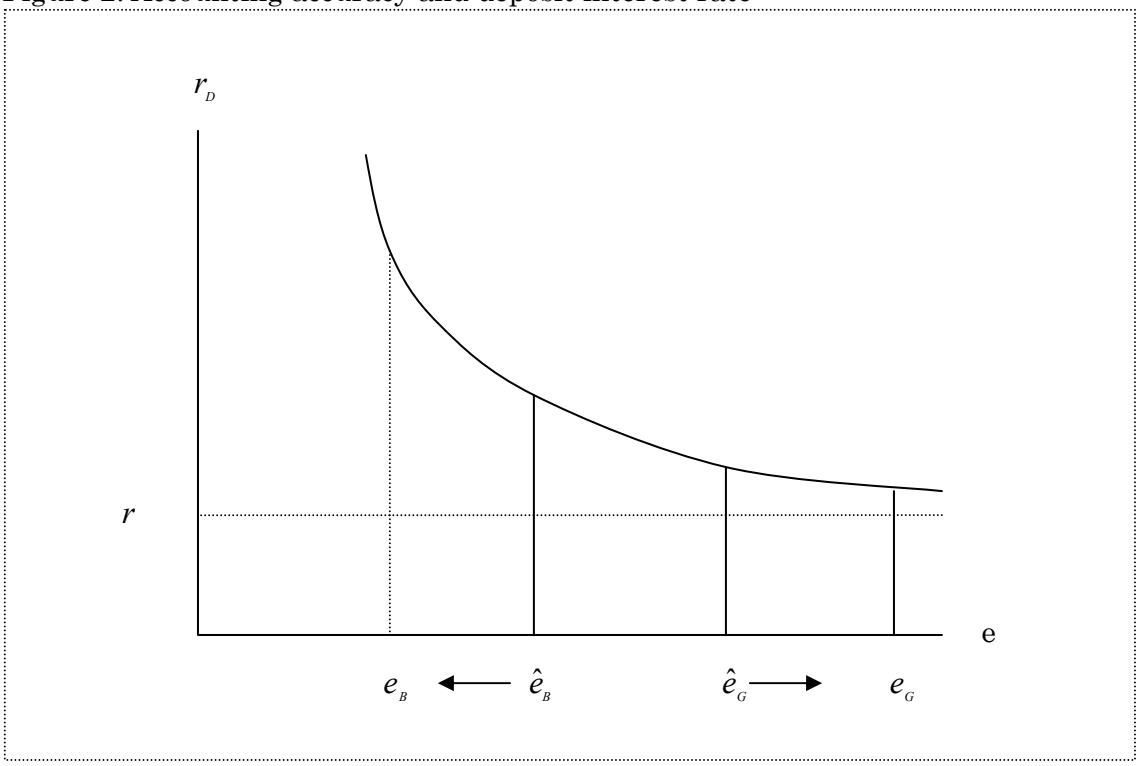
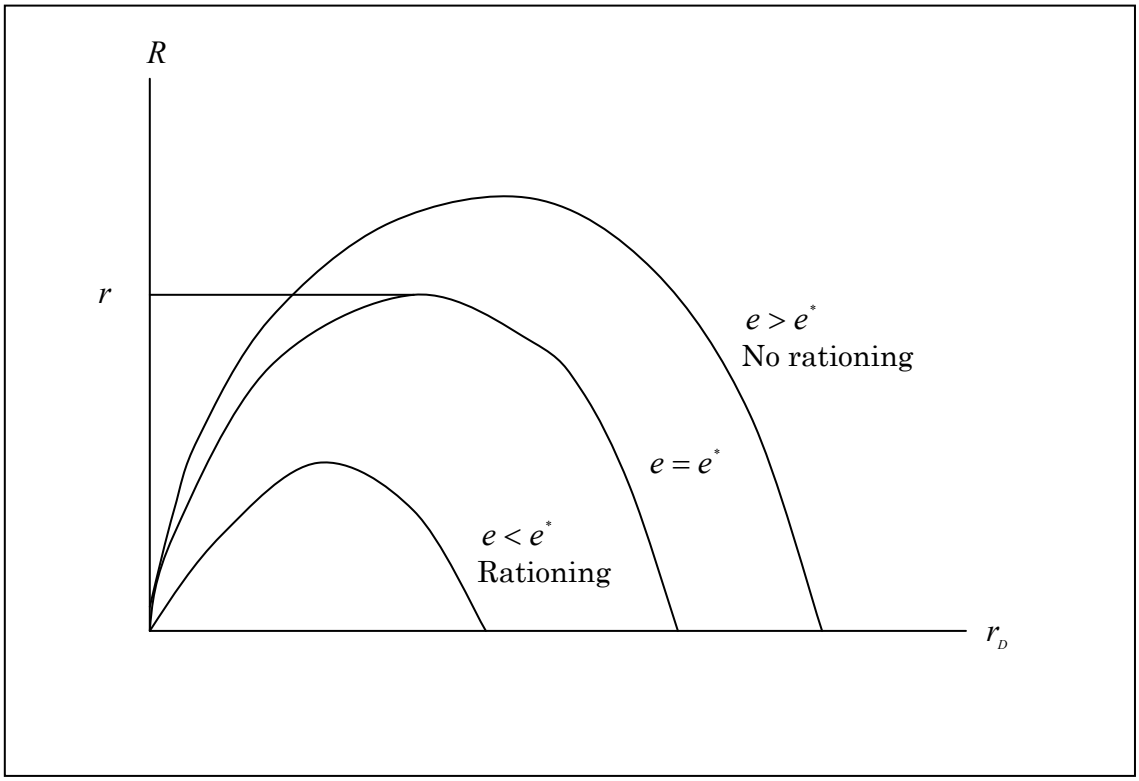


Figure 3. Bank equity and credit rationing


R
r
$e > e^*$
No rationing
$e = e^*$
$e < e^*$
Rationing
r_D