Regulatory Forbearance and Depositor's Market Discipline: Evidence from Savings Banks in Korea

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ABSTRACT

This paper examines whether regulatory forbearance affects the market discipline of depositors using savings banks in Korea from 2000 to 2005. We measure the strength of depositor's market discipline by the sensitivity of the deposit growth rate to savings banks' non-sound asset ratio. We find that depositor's sensitivity to the savings banks' non-sound assets decreases when there is a regulatory forbearance for failing savings banks. This forbearance effect is observed in the behavior of depositors not only of the subject savings banks but also of the neighboring savings banks in the same business area. These results suggest that regulatory actions may mislead depositors' perceptions on the bank risks, increasing the expected costs of bank failure, and thus regulators should pay extra caution when they postpone appropriate actions for failing savings banks.

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1. Introduction

Market discipline constrains the risk-taking behavior of banks, and hence has the potential to contribute to reducing the probability of bank failures and minimizing the costs of those failures that do occur. Bank regulators' forbearance practices and generous deposit insurance have been criticized for causing market discipline to fail in more than a few cases. For example, since the late 1980s the unprecedented losses from bank failures have provoked in the United States serious criticism against regulatory forbearance, which allows insolvent banks to continue their operations. This criticism is based largely on the proposition that banks have a greater incentive to gamble with deposit insurance funds when there is a greater possibility of forbearance (Nagarajan and Sealey, 1995). Some studies analyzing financial crises designate the lack of market discipline or poor regulatory environment as one of the causes of the crises and emphasize the enhancement of market discipline to prevent financial crises (Kaufman, 2000; Yoon and Miller, 2004).[1]

Even though market discipline has been considered as a supplement to direct regulation in the control of bank risks, research dealing with the direct interaction between regulatory forbearance and market discipline is sparse.[2] This study attempts to fill this gap by examining the effect of forbearance on depositors' behavior. To find

[1] Allen and Saunders (1993), Dreyfus et al. (1994) and Nagarajan and Sealey (1995) introduce regulatory forbearance to their theoretical models for valuation of deposit insurance. However, their focuses are not given to the effects of regulatory forbearance on market participants' behavior. Hanweck and Spellman (2002) and Schellhorn and Spellman (2000) examine the effect of forbearance on subordinated debt yields and shareholders' behavior.

[2] The Pillar 3 of the Basel II Accord of the Basel Committee on Bank Supervision views market discipline as a complement to minimum capital requirements or supervisory processes.

evidence for regulatory forbearance diminishing market discipline, we empirically test whether the sensitivity of deposit growth and deposit interest rates to bank risks are affected by regulatory forbearance. We examine not only the depositors of banks subject to forbearance, but also those of neighboring banks.

If depositors believe that a regulator does not intend to close down a bank in the foreseeable future, they will not withdraw their deposit even though the bank risks are at a substantially high level. In other words, depositors prefer enjoying the high interest income provided by failing banks to withdrawing their funds from those banks, as long as they think there remains enough time to withdraw their deposits before the bank is closed by the regulator's order. This behavior by depositors should be more evident in circumstances where bank failures are triggered mainly by regulators' closure actions, not by depositors' runs. In this situation, depositors may rely more on bank regulators' intentions than on the bank risk information available for their deposit decisions. Moreover, if regulators' forbearance is combined with deposit insurers' generous deposit protection, the impairment of market discipline will be more serious and evident.[3] This situation is more likely to be observable in emerging countries where mandatory information disclosures are less frequent and bank regulations are more prone to be influenced by politics than in advanced countries.

Considering the regulatory environment, a strong deposit protection and characteristics of savings banks, we believe that Korea's savings bank industry provides a

[3] Deposit insurance induces utility-maximizing insured individuals to maintain deposits at technically insolvent banking institutions, allowing these institutions to continue operations so as to earn quasi-rents on deposits until the regulator intervenes to resolve the insolvency (Goldberg and Hudgins, 1996).

good opportunity to test our hypotheses. The laboratory of our study is savings banks in Korea from 2000 to 2005, during which it was in the process of restructuring under the reform plan of the regulatory authority, and protected by generous deposit insurance.

This study is differentiated from previous studies in some senses. First, we identify regulatory forbearance using the cases where the regulator postpones Prompt Corrective Actions (PCAs) or does not take any action for failing banks.[4] Second, we test the spillover effect of forbearance by analyzing the behavior of depositors of other banks in the same operating region as the banks subject to regulatory forbearance. Finally, we scrutinize depositors' behavior under country-specific circumstances where there is a high possibility of regulatory forbearance.[5]

We expect *a priori* that the sensitivity of deposit growth and interest rates to banks' non-sound asset ratios significantly decreases when regulatory forbearance is apparent. These forbearance effects may be observed not only in the banks subject to forbearance but also in neighboring banks in the same business region. This study sheds light on a perspective of a desirable relationship between market participants and bank regulators on the point of enhancing market discipline, and the extent to which banks' risk information, especially regulatory information on failing banks, should be disclosed.

This paper is organized as follows. Section 2 describes the meaning of regulatory forbearance and its relationship with market discipline. Section 3 explains the

[4] PCAs have been brought about from the lesson that deterring regulatory forbearance can reduce the expected losses in the event of default through the more timely prevention of failure and resolution at a lower cost.

[5] Variations in the extent of market discipline across countries should in part reflect international differences in the operation of the financial safety net to limit depositor losses in case of a bank failure.

characteristics of Korean savings banks. In Section 4 we develop our hypotheses and empirical models to test them. Empirical results are provided in Section 5. Section 6 concludes.

2. Regulatory forbearance and market discipline

Regulatory forbearance can be defined as a discretionary delay in enforcing appropriate actions that are supposed to be taken for reducing the cost of bank failure. Previous studies used the term 'forbearance' in various contexts, such as the delay of a PCA, delay of receivership (Schellhorn and Spellman, 2000), and no enforcement rules in bailouts (Osterberg and Thomson, 1992).

Why does regulatory forbearance occur? One explanation is a breakdown in incentives that cause the regulator to protect and defend the regulated banks (Kane, 1986, 1990; Boot and Thakor, 1993). In particular, Boot and Thakor (1993) formalize the notion that a bank regulator may pursue self interest rather than social welfare. According to this model, the regulator's desire to acquire a reputation as a capable bank monitor can distort bank closure policy and increase the liability of deposit insurance. Schellhorn and Spellman (2000) suggest that regulators may delay receiverships for banks they believe are insolvent when the banks' stockholders may appeal to the courts to reverse the receivership and assess monetary damages. Allen and Saunders (2003) argue that the response of regulators has often been characterized by delay due to budgetary and political considerations. In this paper, regulatory forbearance is defined as the postponement of a PCA or no PCA for failing banks.

The U.S. bank regulators have been criticized for their slow and inadequate response to the thrift crisis as well as for the forbearance granted to many failing savings and loan associations in the late 1980s. However, the empirical evidence on the cost of forbearance is largely inconclusive. Mailath and Mester (1994) suggest that forbearance might sometimes be optimal, whereas Acharya and Drefus (1989) argue that forbearance would be always be suboptimal. The question of whether the operations of regulations have to be restricted to explicit pre-announced, credible rules, or whether the discretionary room for the intervention of regulators should be continued is yet unanswered (Sijben, 2002). Benston and Carhill (1992) argue that forbearance may actually have saved the Federal Savings and Loan Insurance Corporation (FSLIC) a significant amount of costs ex post in the 1980s. In contrast to Benston and Carhill, DeGennaro and Thompson (2003) argue that regulatory forbearance of the early 1980s was costly to regulators and it was a bad bet for taxpayers. However, all of these papers focus on ex post costs, and do not shed light on ex ante costs, or the benefits of forbearance (Nagarajan and Sealey, 1995). Unlike them, we try to test empirically whether the regulatory forbearance decreases depositors' market discipline.

The term market discipline is commonly used with two different meanings. Bliss and Flannery (2000) argue that the concept of market discipline incorporates two distinct components: market monitoring and market influence. Market monitoring refers to the hypothesis that investors accurately understand changes in a firm's condition and incorporate their assessment promptly into the firm's security prices. Monitoring generates the market signals to which managers are thought to respond. Market influence is the process by which a security price change engenders firm managers to counteract

adverse changes in firm conditions. Since the mid-1980s, a number of studies have examined whether uninsured (or partially insured) depositors respond to bank risks by withdrawing their deposits and/or requiring higher interest rates. Although not unanimous, these studies find evidence consistent with the hypothesis that market discipline is at work (Ioannidou and de Dreu, 2005).

The interaction between bank regulation and market discipline has also been proven to be different according to the situations. Jordan et al. (1999) find that the announcement of a formal enforcement action results in a large negative abnormal stock return for the bank, suggesting that the announcement reveals new, adverse information about the bank's financial condition. Yet, Gilbert and Vaughan (2000) find no evidence of unusual deposit withdrawals or spread increases around Federal Reserve announcements of enforcement actions. They conclude that the public announcement does not spark bank runs or enhance depositor discipline.[6]

In regard to the effect of regulatory forbearance on market discipline, which is more closely related to this study, previous studies do not make consistent conclusions. Nagarajan and Sealey (1995) argue that the rational forbearance policy can induce banks to improve ex ante quality of assets, while some recent empirical studies (Hosono et al, 2004; Covitz et al, 2004) show that stricter regulation may diminish market discipline.

[6] Empirical tests on market discipline have been executed in various contexts. Factors affecting market discipline are the deposit insurance system (Cook and Spellman, 1991; Demirguc-Kunt and Huizinga, 2003; Ioannidou and de Dreu, 2005), bank failure (Goldberg and Hudgins, 1996; Jordan, 2000; Jagtiani and Lemieux, 2000), banking crises (Martinez Peria and Schmukler, 2001), ownership structure (Mondschean and Opiela, 1999) and country-specific factors.

These studies examine the effect of different forbearance levels resulting from the different regulatory regimes across the country (Hosono et al, 2004) or over the period (Covitz et al, 2004). This paper is different from these two studies in that it identifies the forbearance from the regulatory action enforced for a specific bank, not from the overall regulatory regime of a nation.

3. Savings banks in Korea

Savings banks in Korea are depository institutions that are licensed and supervised by the Financial Supervisory Commission (FSC). As depository institutions, they issue demand and savings deposits to individuals, corporations, and other types of organization, but they are not allowed to issue checking accounts, which commercial banks do. Their deposits are insured by the Korea Deposit Insurance Corporation (KDIC).

The savings bank industry of Korea in the early 2000s constitutes an interesting case for analyzing the impact of regulatory actions on depositors' market discipline. During the period of this study (January 2000-March 2005), Korea was in the later stage of its banking sector restructuring, which started shortly after the financial crisis of 1997. The restructuring of the commercial banking sector was coming to an end in 2000. Yet, the restructuring of the savings banks started only later in 1999. The reasons for such a delay in restructuring savings banks are two-fold: the deteriorated credit of small and medium sized enterprises and individuals, who were the main customers of savings banks, was disclosed later than that of big corporations; and the regulatory authority did not place a priority on the restructuring of savings banks due to their relatively small scale

and low systemic risk.

Among the 186 savings banks as of the end of 1999, 74 savings banks were restructured by license revocations, mergers and acquisitions (M&As) or purchase and assumptions (P&As) up until March 2005 (Table 1). The restructuring generally started with PCAs for financially weak savings banks. The enforcement criteria of PCAs are basically based on both the risk weighted capital ratio and the management status evaluated by the FSS. Even though the main purpose of PCAs is to preclude regulatory forbearance, the law however, allows a regulator's discretionary action such as postponement of a PCA measure.[7]

Characteristics of Korean savings banks can be summarized as follows. First, their business sizes are small relative to other depository institutions. So the possibility of one savings bank's failure threatening the stability of the financial system of the nation is very low. This means that there is no consideration of the 'too big to fail' doctrine when the regulatory authority makes the closure decisions for failing banks. Second, there is little reliable risk information publicly available because the capital is small and shareholders are not diversified. In May 2002, the FSS reinforced a disclosure policy that made savings banks disclose their management conditions, including their BIS capital ratio. However, the large number of savings banks made it difficult for the regulator to carry out frequent field examinations, which probably decreases the reliability of risk information being disclosed. Due to the shortage of reliable information on the risk

[7] According to the Regulation of Supervision of Mutual Savings Bank Business enacted by the FSC, the supervisor may postpone a PCA enforcement for a specified period of time under PCA criteria, when it is recognized that a savings bank will probably satisfy the standards within a short period of time through the increase in its capital or sale of its assets (Article #50).

profile of savings banks, depositors are much more likely to depend on regulatory actions for their decisions. Third, historically in Korea, bank failures have been triggered mostly by regulatory action, not by bank runs. This fact could be another reason that depositors pay more attention to the regulator's intention than to the bank's financial condition. Fourth, savings bank businesses are operated within a small restricted region because of their small size of capital and low number of branches. This makes savings banks' competition and performance specific to the restricted operating region. Under this circumstance depositors have good reasons to believe that their bank's probability of failure is closely correlated with those of neighboring banks. Fifth, in the early 2000s there were too many financially weak savings banks for the regulator to close them all at once. Approximately 30% of the savings banks were under negative equity by book value and the regulator may have had to consider the potential impacts of such actions on the economy.

4. Hypotheses and empirical models

4.1. Hypotheses

It has been well recognized that depositors' reactions to bank's financial weakness could occur through a decrease in deposits and/or through an increase in interest rates. If bank failures are mainly triggered not by a stream of deposit withdrawals but by regulatory action, bank regulator's intentions would become one of the determinants of depositors' probability functions of bank failures. Under circumstance in which the

regulator postpones a PCA for a failing bank or does not take any regulatory action, depositors may believe that the bank has the ability to recover. Even though depositors expect the failing bank will eventually fail, they would believe that there remained time to enjoy high interest income before the regulator closed the failing bank. As for depositors of neighboring banks, there is no reason to hurry and withdraw their deposits, in spite of the weak financial condition of their banks, because they may think the regulator will apply the same lack of strictness to their banks. In other words, regulatory forbearance for some banks might create expectations in neighboring banks' depositors of regulatory forbearance. Based on this reasoning, we make our hypotheses as follows:

(H1) Regulatory forbearance for some failing banks diminishes the depositor's risk sensitivity of the banks' deposit growth rate and interest rates.

(H2) Regulatory forbearance for some failing banks diminishes the depositor's risk sensitivity of the neighboring banks' deposit growth rate and interest rates.

4.2. Empirical models

Identifying the existence of regulatory forbearance is not an easy task because many aspects are reflected in regulatory outcomes. Because the regulatory information on the possibility of bank's failure is not disclosed, we identify regulatory forbearance using the PCA decisions that the FSC announces and the accounting data that savings banks disclose. First, among the FSS's PCA decisions, a postponement of a PCA is classified as

forbearance. The second type of forbearance is detected using savings banks' accounting information. If some savings bank approaches failure in default by book value, that is, its liabilities exceed its assets, and no regulatory action is taken against the savings bank, we assume that regulatory forbearance occurs.

Before testing forbearance's effect on depositors' market discipline, we need to examine whether depositors' market discipline exists in Korean savings banks. Because a depositor's response to savings bank risk might be reflected in the amount and price of deposits, we run regressions of deposit growth and interest rates on savings bank risk variables as follows.

$$DepoGrowth_{it} = \alpha_0 + \alpha_1 NSA_{it-1} + \alpha_2 DepoInterest_{it} + \alpha_3 Capital_{it-1} + \alpha_4 Size_{it-1} + \alpha_5 ROA_{it} + \alpha_6 Liquidity_{it} + \alpha_7 CD_t + \alpha_8 GDP_t + \sum_j \alpha_{9j} YR_j + \varepsilon_{1it} \quad (1)$$

where *DepoGrowth* is the change in the log of the total deposits of savings bank *i* during a quarter *t*, *NSA* is the non-sound asset ratio, *DepoInterest* is interest payment/total deposits, *Capital* is equity/total assets, *Size* is the log of total assets, *ROA* is net income/total assets, *Liquidity* is total deposits/total loans, *CD* is 91-day Certificate of Deposit yields, *GDP* is GDP growth rate during the quarter, and $\sum YR$ are year dummies indicating 2000 through 2005.[8] The variables *NSA, Capital* and *Size* are measured by their values at the end of previous quarter. We have chosen to use the variables that the regulator uses in monitoring and empirical studies have shown to be important explanatory variables in the deposit models.

[8] Non-sound asset ratio (*NSA*) is calculated as (substandard loan + non-operating real estates) / (total loan + non-operating real estates).

The regression model for deposit interest rates is the same as the above regression model except that the dependent variable is *DepoInterest* instead of *DepoGrowth* which is included as an explanatory variable in turn. The relationship between deposit growth rate and deposit interest rate is important in a deposit model because a change in one can bring about a change in the other. In dealing with the possible endogeneity problem, we employ a two-stage least squares (2SLS) model that measures *DepoInterest* and *DepoGrowth* in predicted terms.[9] All of these regression models are run for the full sample period.

After examining the existence of depositors' market discipline, we test whether the market discipline is weakened by regulatory forbearance. We expect that depositors' perception of forbearance makes them less sensitive to proxy variables indicating the possibility of failure of a savings bank. In this study, regulatory forbearance is identified by whether the regulatory authority takes an appropriate supervisory measure. The regulatory authority may enforce a PCA on a savings bank which is under-capitalized or below some grade in the management evaluation. There are three types of PCA: 'recommend', 'demand' and 'order' of management improvement. When the authority enforces a PCA, it reveals the decision to the public. The regulator sometimes determines not to enforce a PCA for a particular savings bank for some period when it believes that there are reasons to hold off; such information is also released to the public. We name this type of forbearance 'postpone.' Another type of forbearance, that is, the case of no regulatory action for savings banks whose equity becomes negative, we call 'delay.' We

[9] In the first stage, the *NSA* is regressed on the lag of *DepoGrowth (DepoInterest),* one-year time deposits interest rates of all savings banks in the nation and a set of exogenous regressors in the OLS.

use a dummy variable *D* to introduce regulatory forbearance into the regression model as follows.

$$DepoGrowth_{it} = \beta_0 + \beta_1 RNSA_{it} + \beta_2 D*RNSA_{it} + \beta_3 D + \beta_4 DepoInterest_{it} + \beta_5 RCapital_{it} + \beta_6 Size_{it} + \beta_7 ROA_{it} + \beta_8 Liquidity_{it} + \beta_9 CD_t + \beta_{10} GDP_t + \varepsilon_{2it} \quad (2)$$

where *RNSA* and *RCapital* are the *NSA* and *Capital,* respectively, relative to the mean of 'healthy' savings banks in the same operating region during the same quarter.[10] Among the savings banks in the sample, the savings banks that ran their business with no record of forbearance or restructuring during this research period are classified as 'healthy' to measure the relative risks of 'unhealthy' savings banks. For this reason, the regression is run only for the subsample of 'unhealthy' savings banks which consists of savings banks against which PCAs were enforced, savings banks subject to forbearance ('postpone' or 'delay'), and savings banks restructured without being subject to PCAs or forbearance (we call this kind of savings banks 'sudden').

The dummy variable *D* is defined differently when we test the two hypotheses. In testing (H1), *D* in regression model (2) is one if the regulatory action enforced is 'postpone' or 'delay,' and zero otherwise (that is, 'PCA' or 'sudden'). In the meantime, in testing whether regulatory forbearance for a particular savings bank impacts the neighboring savings banks' depositors (H2), the existence of regulatory forbearance is

[10] Fifteen operating regions are based on the administrative regions of the nation as follows: Seoul, Pusan, Incheon, Taegu, Daecheon, Kwangju, Kyeongki, Kangwon, Chungbuk, Chungnam, Cheonbuk, Cheonnam, Kyeongbuk, Kyeongnam and Jeju.

determined by the actions enforced or the events that occurred with savings banks in the same business area. So *D* is one if the number of cases of 'postpone' and 'delay' exceeds that of PCAs and 'sudden' within the operating region of each savings bank, and zero otherwise.[11] We run the regression using a pooled observation of t = -1 and t = 0, where t = 0 means the quarter when regulatory actions or forbearance occurred. The models for deposit interest rates are constructed similarly by replacing the dependent variable by deposit interest rate in regression model (2).

Variables representing savings bank risks are drawn from balance sheet and income statement data of savings banks. The other sources of data consist of Quarterly Business Reports and Monthly Deposit Reports filed with the KDIC. Data are collected during the period from January 2000 to March 2005.

5. Empirical evidence

5.1. Regulatory measures taken to savings banks

Table 1 shows that there has been a dramatic change in the savings banks in Korea since the restructuring of the savings bank industry. As of the end of 1999, 186 savings banks were in operation and the number was reduced to 112 through revocations, M&As or P&As until the end of March 2005. Despite the decrease in the number of savings

[11] For instance, in the region of Pusan in the fourth quarter of 2000, there were three 'enforcements' (one 'PCA order' and two 'sudden' revocations) and one 'forbearance' ('PCA postpone'). In this case, the number of enforcement cases (3) is greater than the forbearance cases (1). Therefore, we define that there was no forbearance in the Pusan region at that quarter.

banks however, the industry scale grew about 50% by both assets and deposits during that period. This high growth rate is attributed to the fact that assets and liabilities of insolvent savings banks were transferred to other acquiring savings banks, and deposits in the revoked savings banks were protected by deposit insurance and absorbed into other savings banks.

As shown in Table 1, deposit insurance protects 77.4% to 88.3% of the total amount of deposits and 97.5% to 98.2% of the total number of depositors. Such a level of deposit protection can weaken the depositors' incentives to market discipline, although depositors must take risks in the case of their bank's bankruptcy such as loss of interest income over a payment limit and the waiting of deposit payment by the Deposit Insurance Funds.

Savings banks that survived restructuring made efforts to observe the capital requirements strengthened by the forward looking criteria of the FSS. As a result, the overall financial situation of savings banks improved: the substandard credit ratio decreased substantially from 26.2% to 14.9% and return on asset (ROA) turned from minus to plus. As for the BIS capital ratio, however, there was not much improvement, mainly due to the strengthened criteria of the calculation of the ratio. Meanwhile, as is obvious by the average number of branches per savings bank (2.2) as of March 2005, the business of a savings bank is conducted mostly in the operating region of its head office.

Table 2 summarizes the supervisory measures taken to savings banks and the status of the savings banks during January 2000 to March 2005. As of the end of 1999, PCAs

were taken in the 41 savings banks in the form of 'recommend', 'demand' or 'order'.[12] After tracing the restructuring of savings banks, we find that some savings banks were consolidated without previously being subject to PCAs or falling into negative equity book value, which are classified as 'sudden' (28 savings banks). Depositors in this type of savings bank would not have been aware of their banks' upcoming restructuring because the regulatory authority was not able to take any measure based on the sound financial structure. Considering the fact that most M&As and P&As in the savings bank industry were initiated by the regulator, we classify the 'sudden' to the category of the 'enforcement' group. So, the 'enforcement' group consists of 41 PCA-enforced savings banks and 39 savings banks of 'sudden' closure.

In the category of regulatory forbearance there are 13 'PCA-postponed' savings banks and 23 savings banks of 'delay' of any supervisory measure (hereafter, we name these 36 savings banks the 'forbearance' group). The 'delay' is assumed to have occurred 3 months after banks' equity capital became negative, considering this a sufficient time for banks to report and the regulators to take actions. Finally, 81 savings banks are classified as 'healthy', since they ran their business without any record of 'enforcement' or 'forbearance' and their equity values remained positive during the entire period of this study.

Analyzing the results of restructuring according to the types of supervisory measures, 19 savings banks, or 46.3% of the 41 PCA-enforced savings banks, were closed. On the

[12] Seven savings banks are excluded due to incomplete data on restructuring. Though not specified in Table 2, there are some savings banks which have been subject to PCAs more than once. In this case, the type of PCA is recorded according to the first PCA type.

other hand, out of 36 savings banks in the ‘forbearance’ group, 27 savings banks were restructured, accounting for 75%, which is surprisingly higher than that of the PCA-enforced savings banks.

5.2. Summary statistics of variables of interest

Table 3 presents summary statistics of major variables of interest during the period from March 2000 to March 2005. The largest mean value of deposit growth rates (*DepoGrowth*) is that of ‘healthy’ savings banks (3.8%), followed by savings banks subject to ‘enforcement’ (1.5%) and ‘forbearance’ (0.7%). As for deposit interest rates (*DepoInterest*), the order is reversed (7.0%, 7.6% and 8.0% for ‘healthy,’ ‘enforcement’ and ‘forbearance’ groups, respectively). The t statistics on the mean differences between ‘healthy’ and ‘unhealthy’ (‘enforcement’ and ‘forbearance’ altogether) are 4.94 for *DepoGrowth* and -7.46 for *DepoInterest.* Comparing the financial variables between ‘healthy’ and ‘unhealthy’ (‘enforcement’ and ‘forbearance’), we find that the asset quality, capital adequacy and profitability of ‘healthy’ savings banks are superior to those of ‘unhealthy’ savings banks. These results are consistent with the conjecture that market discipline is properly functioning.

Judging by the non-sound asset ratio (*NSA*), capital ratio and ROA, the ‘forbearance’ group turns out to be more significantly deteriorated in asset quality than the ‘enforcement’ group. This result suggests that market participants, who have limited access to the risk information of individual savings banks, are at risk of misjudgment in evaluating their banks’ safety by supervisory measures rather than financial ratios. In

terms of size and liquidity, the ‘forbearance’ group is bigger in size and more liquid than the ‘enforcement’ group and the differences are statistically significant.

In Table 4, the deposit growth rates and interest rates of the ‘enforcement’ and ‘forbearance’ groups are summarized during the previous quarter (t = -1) and the quarter (t = 0) when regulatory actions or forbearance occurred, by the types of supervisory measures (in Panels A and B, respectively), and the difference between the two quarters is reported in panel C. The deposit growth rate and interest rates are reported using the mean of each category and the mean of differences from the ‘healthy’ savings banks in the same region (noted as ‘absolute’ and ‘relative’, respectively). For example, the deposit growth rate of 13 savings banks enforced to ‘PCA recommend’ is 0.92% on average in the prior quarter (t = -1) of the supervisory measures and the mean of their differences from those of ‘healthy’ savings banks in the same region is -2.51% points. On the other hand, the mean of interest rates of these 13 savings banks is 7.22%, which is 0.49 % points higher, compared to ‘healthy’ savings banks.

In Table 4, the deposit growth rates during the period of t = -1 and t = 0 are mostly negative. The magnitude of negative growth rate in the ‘relative’ term is greater than those of the ‘absolute’ term. This finding implies that the deposits of unhealthy savings banks diminished while those of healthy savings banks increased, which proves that market disciplines are working. It is very evident that savings banks enforced to ‘PCA orders,’ the strongest explicit supervisory measure, recorded a consistent large decrease in deposits (-5.19% during t = -1, and -5.49% during t = 0). Yet, the savings banks classified as ‘sudden’ recorded a positive growth rate of deposit during the period of t = 0, which seems to be attributable to the fact that market participants were not able to predict

the abrupt restructuring. Test statistic suggests that the deposit growth rate of the 'forbearance' group is greater than that of the 'enforcement' group at t = -1 but the difference becomes reversed at t = 0.

Although deposit interest rates decline in the t = 0 period compared to the t = -1 period, most 'unhealthy' savings banks maintained a higher level of interest rates than 'healthy' savings banks during both periods, showing that market disciplines were also properly functioning. According to the t-test, the higher interest rates of the 'forbearance' group became significant at t = 0 which may imply that high interest rates of the 'enforcement' group are interrupted by the regulatory action, or that the 'forbearance' group offers higher interest rates as depositors require high interest rates for this kind of savings bank.

5.3. Regression results

Table 5 presents the correlations of the major variables. As for the deposit growth rate, the sounder the assets, the better the profitability and the bigger the size, the higher the deposit growth rate (their correlation coefficients are -0.227, 0.112 and 0.166, respectively). Because all of these three variables are related to depositors' reliability on savings banks, the signs of these correlations are consistent with the existence of depositors' discipline. High liquidity means that there are enough deposits compared to demands for loans and thus the negative correlation (-0.219) between liquidity and deposit growth rate reflects less incentive for savings banks with sufficient liquidity to increase the deposit. The negative correlation between financial soundness and interest

rates is expected when insolvent savings banks offer higher interest rates while solvent savings banks maintain low interest rates. In Table 5, the correlations of the deposit interest rate with *NSA* and *ROA* are positive (0.382) and negative (-0.092), respectively, which means depositors require higher interest rates as asset quality and profitability deteriorate.

Table 6 presents the results of regressions to see whether there are market disciplines in the savings banks in Korea. Whether there are market disciplines can be determined by how sensitive deposit growth and interest rates are to the risk variables of savings banks. In this study, the non-sound asset ratio (*NSA*) is selected as the major risk variable. The result shows that the estimated coefficients of *NSA* are -0.070 and 0.004 for regressions of *DepoGrowth* and *DepoInterest*, respectively, and both are statistically significant. The low ratio of *NSA* means that the financial soundness is good, increasing depositors' trust level in savings banks. As for the interest rate, it increases as *NSA* gets higher, which suggests that depositors require higher interest rate as the savings bank's risks increase.

The estimated coefficient of the capital ratio (*Capital*) for *DepoGrowth* is 0.091, which is consistent with the previous result that the sounder the financial structure, the higher the depositors' trust level in savings banks. Yet, the estimated coefficient of *Capital* for interest rates is 0.009. This result seems to be contradictory to the expectation that the higher capital ratio will lower the interest rates by enhancing the trust level of depositors. This result may come from the characteristics of a buyers' market where low capitalized savings banks offer high interest rates to maintain or absorb more deposits and high capitalized savings banks can not lower interest rates due to concerns over deposit flight in the case of lowering interest rates. We run regression for the interest rates

excluding savings banks in the lowest quartile of capital ratio at the beginning of the period.[13] The estimated coefficient of capital ratio for the interest rates turns out to be negative (-0.020), which confirms the explanation we made.

In dealing with the possible endogeneity problem, we conduct a 2SLS model that measures *DepoInterest* and *DepoGrowth* in predicted terms. The results remain the same qualitatively, and statistically significant, although the magnitudes of the estimated coefficients are slightly different. In short, we find empirical evidence supporting the existence of depositors' market discipline in the savings bank industry in Korea. But as for interest rates, the market discipline seems distorted due to the low capitalized savings banks' strategy of buying deposits for high prices.

Table 7 shows how regulatory forbearance affects the sensitivity of both deposit growth rate and interest rates to savings bank risks. The major risk variable *RNSA*, measured by the difference from the mean of 'healthy' savings banks in the same region, is interacted with *D*, a dummy variable for the savings banks subject to regulatory forbearance.

For our hypothesis that forbearance weakens the market discipline to be supported, the sign of the estimated coefficient of *RNSA* should be negative, whereas that of *RNSA* interacted with *D* should be positive. As shown in Table 7, the coefficient of *RNSA* is -0.149 and that of *RNSA*D* is 0.086 for the regression of *DepoGrowth*, which implies that the sensitivity of the deposit growth rate against the non-sound asset ratio is

[13] The positive correlation between capital ratio and the deposit interest rate is mainly driven by low capitalized savings banks. The correlation coefficient for low capitalized savings banks is positive, whereas that for high capitalized savings banks is negative.

significantly low for the savings banks subject to forbearance. This result proves that regulatory forbearance weakens depositors' market discipline, supporting our first hypothesis (H1). As for the regression of *DepoInterest*, the coefficients of *RNSA* and *RNSA*D* are -0.019 and 0.036, respectively. This result suggests that the savings banks subject to regulatory forbearance offer significantly higher deposit interest rates to their customers.

Table 7 (the third and fifth columns) also shows the existence of a forbearance effect when the forbearance is identified by operating regions. That is, if more savings banks are subject to 'forbearance' measures than to 'enforcement,' all savings banks in the same region are considered subject to forbearance. The purpose is to verify the impact of forbearance on the market disciplines of depositors in the vicinity. The coefficient of *RNSA* is -0.184 and that of *RNSA*D* is 0.225 for the regression of *DepoGrowth*, which implies that regulatory forbearance hurts market discipline not only by depositors of savings banks subject to forbearance but also depositors of the neighboring savings banks. This finding supports our hypothesis (H2).

6. Conclusion

This paper examines whether regulatory forbearance practices affect the market discipline of bank depositors using savings banks in Korea from 2000 to March 2005. Regulatory forbearance is assumed to exist when the bank regulator postpones a PCA or does not take any explicit action for savings banks whose book value of equity is negative. We measure the strength of depositors' market discipline by the sensitivity of deposit

growth and deposit interest rate to savings banks' non-sound asset ratio. The results show that depositors' sensitivity to the savings banks' non-sound asset ratio decreases when there is a regulatory forbearance for failing savings banks. This forbearance effect is observed in the behavior of depositors not only of the subject savings bank but also of the neighboring savings banks in the same business area.

This study sheds light on a perspective for establishing a desirable relationship between market participants and bank regulators from the perspective of enhancing market discipline. Based on the findings of this study we suggest savings banks' risk information should be more accurately disclosed, especially through the regulator's supervisory measures. Regulatory actions may mislead bank depositors' perceptions on the bank risks and thus should work as trustful signals of the state of savings banks' risks. This leads us to conclude that regulators should pay extra caution when they postpone PCAs or delay appropriate actions for failing savings banks, which otherwise may cause an increase in the expected costs of bank failure through depositors' insensitivity to bank risks.

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Table 1. Savings banks in Korea

	Dec 1999 (A)	Mar 2005 (B)	(B/A)-1(%) or B-A(%p)
Number of savings banks	186	112	-39.8
Number of branches	277	249	-10.1
Number of employees	4,574	6,352	38.9
Total asset (bil. Korean won)	25,704	37,964	47.7
Total deposit (bil. Korean won)	21,327	34,103	59.9
Insurance-covered deposit/ Eligible deposit (%)[a]	77.4[b]	88.3	10.9
#Covered depositors / #Total depositors (%)	98.2[b]	97.5	-0.7
Savings banks deposit / Commercial banks deposit (%)	4.1[b]	5.0	0.9
Substandard credit ratio (%)	26.2	14.9	-11.3
BIS capital ratio (%)	6.57	7.18[c]	0.61
Return on asset (%)	-1.71	5.22	6.93
#Savings banks with negative equity/ #Total savings banks (%)	29.5	39.3	9.8

a Deposits from the government and other insured financial institutions are not eligible for deposit insurance.
b at the end of June 2000
c at the end of June 2005

Table 2. Regulatory actions and the status of savings banks

Regulatory Actions	No. of Savings banks (at end-1999)	Closed (during Jan 2000-Mar 2005)			Survived (till Mar 2005)
		Revoked	P&A	M&A	
(Enforcement)					
PCA Recommend	14	1	-	-	13
PCA Demand	6	-	-	-	6
PCA Order	21	13	5	-	3
Sudden[a]	28	7	6	15	-
(Forbearance)					
PCA Postpone[b]	13	7	1	2	3
Delay[c]	23	15	2	-	6
Sub-total	105	43	14	17	31
Healthy[d]	81				81
Total	186				112

a ‘Sudden’ is a savings bank restructured without being subject to any regulatory action or financial default prior to the restructuring.

b ‘Postpone’ is based on the regulator’s announcement of PCA postponement.

c ‘Delay’ is a case where there is no regulatory action even though those savings banks are financially defaulted.

d ‘Healthy’ is a surviving bank as of the end of March 2005 without being subject to any regulatory action or financial default during January 2000-March 2005.

Table 3. Summary statistics[a]

	Mean	Std.dev.	Min	Max	Median	t-test[c]
Total (n=2632)						
DepoGrowth	0.029	0.130	-1.46	1.47	0.021	
DepoInterest	0.073	0.024	0.00	0.28	0.066	
NSA	0.222	0.160	0.00	0.91	0.177	
Capital	0.081	0.082	-0.89	0.73	0.077	
ROA	-0.007	0.218	-2.75	2.22	0.029	
Size	11.833	0.907	9.43	14.70	11.733	
Liquidity	0.861	0.675	0.35	26.36	0.845	
A. Enforcement[b] (n=642)						
DepoGrowth	0.015	0.135	-1.46	1.47	0.005	0.75
DepoInterest	0.076	0.027	0.00	0.21	0.073	-1.82*
NSA	0.303	0.169	0.05	0.89	0.260	-1.35
Capital	0.064	0.104	-0.67	0.73	0.056	5.79***
ROA	-0.027	0.268	-2.10	2.22	0.023	1.86*
Size	11.767	0.873	9.43	13.89	11.728	-1.79*
Liquidity	0.826	0.212	0.35	2.79	0.819	-2.23**
B. Forbearance[b] (n=311)						
DepoGrowth	0.007	0.200	-1.35	1.24	0.007	
DepoInterest	0.080	0.032	0.00	0.28	0.077	
NSA	0.320	0.193	0.03	0.91	0.293	
Capital	0.021	0.109	-0.89	0.28	0.035	
ROA	-0.066	0.356	-2.75	0.72	0.035	
Size	11.878	0.921	9.85	13.83	11.946	
Liquidity	0.996	1.905	0.48	26.36	0.824	
C. Healthy(n=1679)						
DepoGrowth	0.038	0.109	-0.46	1.26	0.027	4.94***
DepoInterest	0.070	0.022	0.01	0.18	0.064	-7.46***
NSA	0.174	0.125	0.04	0.88	0.137	-22.7***
Capital	0.099	0.056	-0.02	0.45	0.090	15.17***
ROA	0.010	0.151	-0.93	0.72	0.032	5.74***
Size	11.851	0.908	9.82	14.70	11.708	1.29
Liquidity	0.849	0.151	0.35	1.64	0.859	-1.17

a The number of observations (n) is based on quarterly data during the period from March 2000 to March 2005.

b Enforcement (Panel A) consists of PCA ‘recommend’, ‘order’, ‘demand’ and ‘sudden’ and Forbearance (Panel B) consists of ‘PCA postpone’ and ‘delay’.

c Test statistic on the mean differences between ‘Enforcement’ and ‘Forbearance’ (reported in the last column of Panel A) and between ‘Healthy’ and combination of ‘Enforcement’ and ‘Forbearance’ (reported in the last column of Panel C).

d *DepoGrowth* is the change in the log of the total deposits of savings bank *i* during *t*, *DepoInterest* is interest payment/total deposits, *NSA* is the non-sound asset ratio, *Capital* is equity/total assets, *ROA* is net income/total assets, *Size* is the log of total assets, and *Liquidity* is total deposits/total loans.

e ***, ** and * denote the significance levels of 1%, 5% and 10%, respectively.

Table 4. Deposit growth rates and interest rates

		n[a]	*DepoGrowth*[d]		*DepoInterest*[d]	
			absolute	relative[e]	absolute	relative[e]
t = -1 (A)						
Enforcement	PCA Recommend	13	.0092	-.0251	.0722	.0049
	PCA Demand	6	-.0035	-.0394	.0784	.0082
	PCA Order	17	-.0519	-.0879	.0956	.0080
	Sudden	14	-.0451	-.0533	.0984	-.0002
Forbearance	PCA Postpone	12	-.0324	-.0536	.0877	.0029
	Delay	19	.0586	.0300	.0890	.0032
Total		81	-.0085	-.0343	.0889	.0041
t-test[c]			-2.467**	-2.507**	0.103	0.463
t = 0[b] (B)						
Enforcement	PCA Recommend	13	.0069	.0010	.0679	.0031
	PCA Demand	6	-.0825	-.1292	.0665	.0051
	PCA Order	17	-.0549	-.0766	.0637	-.0204
	Sudden	15	.0034	-.0377	.0905	-.0041
Forbearance	PCA Postpone	11	-.0531	-.0676	.0832	.0058
	Delay	19	-.0661	-.0324	.0934	.0050
Total		81	-.0386	-.0495	.0801	-.0020
t-test[c]			2.060**	-0.386	-3.116***	-2.546**
B - A						
Enforcement	PCA Recommend	13	-.0023	.0261	-.0043	-.0017
	PCA Demand	6	-.0790	-.0898	-.0119	-.0030
	PCA Order	16	-.0029	.0036	-.0329	-.0289
	Sudden	11	.0565	.0313	-.0051	-.0052
Forbearance	PCA Postpone	11	-.0219	-.0190	-.0010	.0036
	Delay	19	-.1247	-.0624	.0088	.0019
Total		81	-.0334	-.0165	-.0067	-.0062
t-test[c]			3.169***	2.003**	-3.230***	-2.577**

a The number of observations is different from that of Table 2 because of data availability.

b *t* = 0 means the end of quarter when initial regulatory actions were enforced or forbearance occurred. In case of 'delay,' we assume that the 'delay' occurred at the end of quarter when the bank's equity becomes negative by book value reported to the regulator. In case of 'sudden,' we assume that the event occurred at the beginning of the quarter when the restructuring happened.

c Test statistic on the mean difference between 'Enforcement' and 'Forbearance'.

d *DepoGrowth* is the change in the log of the total deposits of savings bank *i* during *t* and *DepoInterest* is interest payment/total deposits.

e *DepoGrowth* and *DepoInterest* are measured as relative terms to the mean of healthy savings banks in the same operating region.

f ***, ** and * denote the significance levels of 1%, 5% and 10%, respectively.

Table 5. Pearson correlations

	Depo Growth	*Depo Interest*	*NSA*	*ROA*	*Capital*	*Size*	*Liquidity*	*CD*
DepoGrowth								
DepoInterest	-.153**							
NSA	-.227**	.382**						
ROA	.112**	-.092**	-.174**					
Capital	-.056**	.042*	-.193**	.486**				
Size	.166**	-.122**	-.188**	.078**	-.258**			
Liquidity	-.219**	.137**	.101**	.003	.138**	0.017		
CD	-.145**	.715**	.460**	-.131**	.007	-.246**	-.034	
GDP	-.069**	.519**	.246**	.042*	.077**	-.135**	-.044*	.639**

a *DepoGrowth* is the change in the log of the total deposits of savings bank *i* during *t*, *DepoInterest* is interest payment/total deposits, *NSA* is the non-sound asset ratio, *Capital* is equity/total assets, *ROA* is net income/total assets, *Size* is the log of total assets, *Liquidity* is total deposits/total loans. *CD* is 91-day Certificate of Deposit yields, *GDP* is GDP growth rate during the quarter, and year dummy variables are included as regressors, although their estimates are not reported.

b ***, ** and * denote the significance levels of 1%, 5% and 10%, respectively.

Table 6. Depositors' risk sensitivity of depositors for the entire period

	DepoGrowth		*DepoInterest*	
	OLS	2SLS	OLS	2SLS
Constant	-0.071**	0.143***	-0.056***	-0.094***
	(-2.439)	(2.723)	(-6.430)	(-6.516)
NSA$_{-1}$	-0.070***	-0.253**	0.004*	0.256***
	(-3.806)	(-2.215)	(1.689)	(8.230)
DepoInterest[a]	-0.566***	0.144		
	(-3.635)	(0.800)		
DepoGrowth[a]			-0.009***	0.013**
			(-3.635)	(2.215)
Capital$_{-1}$	0.091**	-0.003	0.009*	0.122***
	(2.448)	(-0.047)	(1.888)	(6.836)
Size$_{-1}$	0.007**	-0.002	0.002***	0.008***
	(2.222)	(-0.522)	(6.219)	(7.021)
ROA	0.045***	0.057***	-0.006***	0.011***
	(3.659)	(4.145)	(-3.831)	(2.873)
Liquidity	-0.040***	-0.038***	0.005***	-0.002
	(-10.529)	(-7.465)	(11.412)	(-1.214)
CD	1.806**	-1.195	1.293***	-1.172
	(2.103)	(-0.291)	(12.347)	(-0.878)
GDP	0.668***	0.075	0.324***	0.188***
	(4.120)	(0.480)	(16.748)	(5.332)
n	2,631	2,460	2,631	2,630
Adj. R^2	0.106	0.084	0.615	0.218
F	24.991***	29.034***	324.41***	92.369***

a The explanatory variables *DepoGrowth* and *DepoInterest* are predicted values in the 2SLS model, where instrument variables are each variables of one quarter before and mean of one-year time deposit interest rates of all savings banks in the nation.

b *DepoGrowth* is the change in the log of the total deposits of savings bank *i* during *t*, *DepoInterest* interest payment/total deposits, *NSA* is the non-sound asset ratio, *Capital* is equity/total assets, *ROA* is net income/total assets, *Size* is the log of total assets, *Liquidity* is total deposits/total loans. *CD* is 91-day Certificate of Deposit yields, *GDP* is GDP's growth rate during the quarter, and year dummy variables are included as regressors, although their estimates are not reported.

c The number in parentheses is the t-statistic.

d ***, ** and * denote the significance levels of 1%, 5% and 10%, respectively.

Table 7. The estimated effects of regulatory forbearance on depositor's risk sensitivity for the pooled subsample of t = -1 and t = 0[a]

	DepoGrowth		*DepoInterest*	
	Individual[b]	Area[c]	Individual[b]	Area[c]
Constant	0.020	0.044	0.027	0.021
	(0.200)	(0.433)	(1.114)	(0.815)
RNSA	-0.149***	-0.184***	-0.019*	-0.014
	(-3.644)	(-4.872)	(-1.841)	(-1.340)
*D*RNSA*	0.086	0.225***	0.036**	0.043**
	(1.348)	(2.862)	(2.271)	(2.155)
D	0.024*	-0.037**	0.003	0.002
	(1.623)	(-2.067)	(0.809)	(0.391)
DepoInterest	-0.377	-0.301		
	(-1.134)	(-0.924)		
DepoGrowth			-0.023	-0.019
			(-1.134)	(-0.924)
RCapital	-0.064	-0.090	0.042*	0.038*
	(-0.693)	(-0.988)	(1.866)	(1.653)
Size	0.011	0.007	0.000	0.001
	(1.478)	(1.008)	(0.255)	(0.366)
ROA	0.039	0.034	-0.025***	-0.027***
	(1.370)	(1.220)	(-3.783)	(-3.946)
Liquidity	-0.016	-0.005	-0.001	-0.000
	(-0.404)	(-0.128)	(-0.105)	(-0.002)
CD	-2.850***	-2.194***	0.083	0.233
	(-3.964)	(-3.195)	(0.442)	(1.304)
GDP	0.827**	0.574*	0.572***	0.512***
	(2.220)	(1.639)	(7.068)	(6.501)
n	157	157	157	157
Adj. R^2	0.258	0.274	0.509	0.498
F	6.431***	6.890***	17.19***	16.50***

a t = 0 means the end of quarter when initial regulatory actions were enforced or forbearance occurred.

b The existence of regulatory forbearance is determined by the actions enforced or events occurred for individual banks. So, *D* is one if the regulatory action enforced is 'postpone' or 'delay,' and zero otherwise (that is, 'PCA' or 'sudden').

c The existence of regulatory forbearance is determined by the actions enforced or events occurred for banks within the same business area. So, *D* is one if the number of cases of 'postpone' and 'delay' exceeds those of 'PCA' and 'sudden' within the operating region of each bank, and zero otherwise.

d *DepoGrowth* is the change in the log of the total deposits of savings bank *i* during *t*, *DepoInterest* is interest payment/total deposits, *RNSA* and *RCapital* are non-sound asset ratio and equity/total assets, respectively, relative to the mean of 'healthy' banks in the same operating region during the same quarter, *ROA* is net income/total assets, *Size* is the log of total assets, *Liquidity* is total deposits/total loans. *CD* is 91-day Certificate of Deposit yields, and *GDP* is GDP's growth rate during the quarter.

e The number in parentheses is the t-statistic.

f ***, ** and * denote the significance levels of 1%, 5% and 10%, respectively.