Deposit Insurance Reform and Market Discipline in Japan*

Abstract

This paper examines the relationship between deposit insurance coverage and market monitoring by using unique data on bank-level weekly deposit rates in Japan. I find that when the government provided an unlimited coverage for all bank deposits, the risk profile of banks had no effect on interest rates of deposits or the quantity of deposits. That is, depositors failed to monitor and punish risky banks. On the other hand, when the government imposed insurance limit on time deposits, 10 million yen (approximately $100,000) per depositor per bank, risky banks started offering higher interest rates on time deposits than financially strong banks. Moreover, risky banks experienced a rapid outflow of time deposits when the government put a limit to deposit amount that was to be guaranteed. In other words, depositors correctly understood that they bear the cost of bank insolvency, which strengthened market monitoring. Nevertheless, I also find the evidence that weak banks substituted away from expensive uninsured time deposits to cheap insured ordinary deposits, thereby reducing the adverse effects of the rise in the risk premium of time posits on overall funding costs. Because of this substitution, overall effects of deposit insurance reform on market discipline are likely to be small.

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The real pre-safety-net discipline was from the market, and we need to adopt policies that promote private counterparty supervision as the first line of defense for a safe and sound banking system. Uninsured counterparties must price higher or simply not deal with banking organizations that take on excessive risk. Alan Greenspan, remarks at the 37th Annual Conference on Bank Structure and Competition of the Federal Reserve Bank of Chicago, Chicago, Illinois, May 10, 2001

1. Introduction

Deposit insurance is one of the most controversial issues in economics. In theory, deposit insurance can have either stabilizing or destabilizing effects on the banking system. On the positive side, it can reduce the likelihood of liquidity crises and bank runs because it provides assurance to depositors that their assets are safe and secure.[1] On the negative side, deposit insurance can distort incentives of both banks and depositors. In particular, insured depositors lose the incentive to select and monitor the banks into which they put their deposits because their deposits are safe no matter how risky the bank is. Consequently, unmonitored banks have ample opportunity and the incentives to increase leverage and take excessive risk, which in turn destabilizes the banking sector in the long run.[2]

Many researchers put these two opposing views to empirical tests in which they examine the relationship between deposit insurance structures and banking sector stability.[3] These studies present two important findings. First, the adoption of deposit

[1] Diamond and Dybvig (1983) show that even a healthy bank can be susceptible to bank runs, and that deposit insurance offers a superior contract to any that banks can privately offer in order to avoid bank runs.
[2] Using the standard option-pricing model, Merton (1977) shows that the value of bank equity is maximized by increasing leverage and asset risk. Furlong and Keeley (1989) later show that incentives to increase asset risk decline as its capital increases, illustrating the importance of capital adequacy regulation.
[3] These empirical studies can be divided into two types. One, several of them make use of variation in deposit insurance scheme across different states and/or banks in the United States before 1934 (e.g. Calomiris (1990), Gunther, Hooks, and Robinson (2000) and Hooks and Robinson (2002), Grossman (1992), Alston, Grove and Wheelock, (1994), Wheelock and Kumbhakar (1994), Wheelock and Wilson (1995), and Wheelock and Kumbhakar (1995)). Two, more recent studies utilize the variation in deposit

insurance increases the likelihood of banking instability. Moreover, more recent study by Demirguc-Kunt and Detragiache (2002) presents strong evidence that badly designed deposit insurance system magnifies these destabilizing effects. In particular, coverage limits play an extremely important role in keeping the probability of banking crisis low. The theoretical explanation for the importance of coverage limit is straightforward. With a sufficiently low coverage limit, regulators can ensure that some depositors, especially sophisticated large uninsured depositors, will have an incentive to monitor and punish risky banks by charging higher risk premium and withdrawing deposits.

Many financial economists deem this process of market discipline to be a critical component of financial supervision. However, only three papers specifically investigate the effects of the design of deposit insurance on market discipline.[4] First, Mondschean and Opiela (1999) find that the sensitivity of interest rates on time deposits to risk profile of banks declined after the explicit deposit guarantee took effects in Poland. Second, Martinez Peria and Schmukler (2001) compiled a large disaggregated bank-level data on both insured and uninsured deposits in Chile, Mexico, and Argentina. Using this data, they investigate the sensitivity of deposit rates and deposit quantity to risk profile of banks in each of these three countries before and after the adoption of deposit insurance. Surprisingly, they do not find that deposit insurance diminishes the degree of market discipline in these countries. In addition, small deposits that are explicitly covered by deposit insurance do indeed respond to variation in risk in the same manner as uninsured

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insurance design across countries to predict banking crisis (e.g. Demirguc-Kunt and Detragiache (2002), Eichengreen and Arteta (2002), and Hoggarth, Jackson, and Nier (2004)).

[4] It should be noted that there is a large literature that examine and find the *presence* of market discipline in a particular country, mostly the United States. See Flannery (1998) for an excellent literature review. However, a very few of them actually explore the relationship between deposit insurance structure and market discipline.

deposits. Martinez Peria and Schmukler (2002) explain that deposit insurance was not entirely credible in these countries, which in turn makes even insured deposits sensitive to bank risks. Finally, Demirguc-Kunt and Huizinga (2004) examine how the sensitivity of deposit rates and deposit quantity to risk profile of banks varies across countries, depending on the structure of deposit insurance. Their finding is consistent with economic theory in that (1) banks pay lower rates on deposits in countries in which government offer generous deposit insurance coverage, and (2) this benefit is pronounced especially among financially weak banks.

This paper attempts to bring more empirical evidence to this important issue of market discipline and deposit insurance. To do so, it makes use of dramatic change in deposit insurance coverage during 2002 in Japan as a natural experiment in which deposit insurance coverage shifted from blanket guarantee to limited guarantee of 10 million yen (approximately $100,000) per depositor per bank. This deposit insurance reform in Japan makes an ideal natural experiment especially because this blanket guarantee was considered to be credible in Japan during period before the reform. This can be illustrated by the absence of bank runs and/or bank panic despite the severity of financial problem that Japanese banking sector suffered.[5]

This paper is novel in three aspects. First, it uses posted deposits rates as opposed to the implicit interest rate, i.e., ratio of interest rate expense to total deposits, which is used by both Martinez Peria and Schmukler (2001) and Demirguc-Kunt and Huizinga (2004). This implicit rate, although widely used, is a noisy variable and it tends to reflect

[5] Fukao (2002) notes a striking fact that the banking industry in Japan has not shown a profit since fiscal 1993.

many other factors that are unrelated to depositors' perception of bank risk.[6] The use of posted rate will provide more accurate indicator of risk premium that risky bank need to offer to attract deposits. This posted rate should strongly respond to the reduction in insurance coverage if our theory is correct. Second, I use weekly data on posted deposit rates. This high frequency data allows me to more precisely isolate the effects of deposit insurance reform from other disturbances in the economy. In particular, given that the blanket coverage was removed on April 1, 2002, the risk premium on deposits must have risen exactly on that date if market monitoring was active. Third, this is the first study that systematically examines the deposit rates in relation to risk profile of banks in Japan.[7]

The empirical findings are three. First, the risk premium of time deposits emerged and remained persistent after the change in insurance coverage took place, and this effect was the strongest for large time-deposits that became uninsured in 2002 and for financially weak banks. Second, the risk premium of ordinary deposits that remained completely insured went up temporarily and declined to zero within two months. As a result, financially weak banks tended to pay higher rates on uninsured time deposits than financially healthy banks while they paid the same rates on insured ordinary deposits. Third, as expected, financially weak banks substituted away from uninsured time deposits

[6] It is also possible that the use of implicit rate can give biased results. Suppose that a bank had a good long-term lending opportunity in the past, its implicit rate tends to be quite high because it had probably issued a large amount of long-term deposits to finance this lending opportunity. Given that the risk profile of a bank is not unrelated to past lending behavior, fluctuations in demand for loans can generate a spurious positive relation between the observed risk profile and implicit interest costs even without the presence of market discipline.

[7] Existing study on market discipline in Japan typically investigates the effects of risk profile on the share price of banks or interbank loan rates called Japan premium. They indeed find that the risk profile of banks have statistically significant effects on the share price and interbank loan rates. For example, see Peek and Rosengren (1999), Brewer, et al (2003), Brener and Pettway (2002), Spiegel and Yamamori (2004), Genay (1999), Covrig, Low, and Melvin, Michael (2004), Ito and Harada (2000). However, there is no study that investigates the presence of market monitoring in the price of deposits, which makes this paper unique.

to insured ordinary deposits, thereby escaping rapid deposit outflows. While this paper confirmed the notion that uninsured depositors provide some level of market monitoring in Japan after less generous deposit insurance scheme was implemented, the overall effects of deposit insurance reform on market discipline may not be large because ordinary deposits remained fully guaranteed.

The rest of the paper is organized as follows. Section 2 presents an overview of deposit insurance and financial safety net that prevailed in Japan during the sample period, 2001-2003. Section 3 describes the data. Section 4 presents the empirical results. Section 5 concludes.

2. Deposit Insurance and Financial Safety Net in Japan (2001-2003)

2.1 Before April 2002

As mentioned in the previous section, the Japanese government provided a blanket guarantee on all bank deposits until March 31, 2002, and then limited coverage so that large time deposits in excess of 10 million yen per depositor per bank were no longer completely insured. This reform is intended to reduce the taxpayers' burden of bank insolvency and increase the level of private supervision of banking system among large sophisticated depositors. Although this deposit insurance reform was publicly announced and thus widely anticipated, there was widespread uncertainty as to whether the government would actually implement this reform.

For example, this reform was scheduled to be implemented in April 2001, but was postponed for one year. In addition, even at the end of 2001, there was no consensus on whether the blanket coverage should end as scheduled. For instance, on December 5 2001,

Finance Minister Masajuro Shiokawa said Japan should introduce limits on the government's guarantees for bank deposits in April 2002 as scheduled. However, a week later, the ruling Liberal Democratic Party's policy chief said Japan should not rush the introduction of a "payoff" limited bank deposit protection or bad loan disposal. In fact, Prime Minister Junichiro Koizumi did not publicly confirm the introduction of the "payoff" bank deposit protection limits until December 20, 2001. Table 1 summarizes the relevant events on chronological order.

2.2 Deposit Insurance Coverage under New Scheme

In the Japanese banking system, two types of deposits, ordinary deposits and time deposits, dominate in terms of share of total deposits.[8] As illustrated in Figure 1, these two types of deposits make up more than 85 percent of total deposits in the Japanese banking system as of August 2004. Under the new limited coverage that took effects in April 1 2002 time deposits were insured only up to 10 million yen per depositor per bank while ordinary deposits were still completely insured.

Due to this half-done nature of deposit insurance reform, it was expected that depositors would shift their funds from partially insured time deposits to completely insured ordinary deposits and that time deposits would become relatively more expensive than ordinary deposits. In fact, this is exactly what happened as shown in Figure 2-4. Figure 2 displays that the rapid substitution from time deposits to ordinary deposits started in January 2002, coinciding with the official announcement by Prime Minister Junichiro Koizumi that Japan will move ahead with limited deposit insurance coverage.

[8] Ordinary deposits are interest bearing deposits with no required minimum amount. The interest rates on these deposits are typically low because of the superior liquidity relative to other types of deposits.

Furthermore, Figure 3 illustrates that large time deposits that exceed the insured amount, 10 million yen, were most negatively affected by the reform; while small and medium size time deposits remain flat during 2002, large time deposits experienced a rapid fall at the beginning of 2002. Hence, these aggregate data suggest that some depositors started holding less large time deposits that are only partially insured and more ordinary deposits that remained completely insured under the new deposit insurance system. Finally, Figure 4 shows that difference in average interest rate between 1 month large time deposits and ordinary deposits jumped up as of April 1, 2002, indicating that depositors understood the risk associated with uninsured large time deposits and required appropriate amount of risk premium on time deposits.

3. Empirical Methodology and Data

3.1. Risk Profile of Bank

Following the literature, I will estimate how deposit rates and quantity are related to the observable risk profile of banks. For this paper, I use Moody's Bank Financial Strength (MBFS) ratings although many studies use accounting information to measure bank risk. [9] The justifications for the use of MBFS are three. First, since I use very high frequency data, weekly deposit rates, it is critical to use measures of bank risk that are continuously updated in respond to change in risk profile of banks; accounting measures of risk such as capital adequacy ratio and nonperforming loans ratio become obsolete to depositors since it is updated only semiannually. In other words, in order to make a fair comparison in the sensitivity of depositors to variation in risk profile of banks between

[9] Appendix A illustrates the official criterion and the definitions of MBFS ratings.

the two time periods, before and after deposit insurance reform, I must use the measure of risk that does not become obsolete over time.

Second and more importantly, accounting variables are subject to manipulation. This is well-documented especially for Japanese banks in literature. For example, Genay (2002) illustrates that as forbearance policy was implemented in the late 1990s, the accounting measures of risk started losing explanatory power for share price performance among Japanese banks. Indeed, a new study by Peek and Rosengren (2003) documents that financially troubled Japanese banks tend to allocate credit to severely impaired borrowers primarily to avoid the realization of losses on their own balance sheets. Thus, the reported amount of nonperforming loans is a misleading indicator of asset risk in particular for the banks in the worst financial condition. Moreover, Fukao (2002) shows that financially weak banks and insurance companies in Japan have been engaged in what is called "double-gearing" in which banks and insurance companies within the same conglomerate purchase stock and subordinated notes from each other in order to artificially inflate their capital adequacy ratios.[10]

MBFS ratings, on the other hand, unlike banks themselves do not have the incentive to misrepresent the financial conditions because Moody's has strong incentive to maintain valuable reputation as a credit rating agency. In fact, a recent systematic study by Covitz and Harrison (2003) finds no evidence that Moody's and Standard & Poor's actually assign erroneous ratings to satisfy issuers, who are free to choose among different agencies. Hence, MBFS ratings are likely to convey more accurate information

[10] It has been also noted that deferred tax assets were too generously counted toward capital for troubled Japanese banks.

about banks' financial conditions than accounting measure in the case of Japanese banks.[11]

Another unique feature of MBFS ratings that is particularly valuable to this paper is that they focus on banks economic and financial conditions without taking into account any external support from banks' owners, government, or other financial institutions. [12] Thus, relative to other ratings such as Moody's long-term deposit ratings that take into account the potential external support from the government, MBFS ratings contains more accurate information about the true financial and economic condition of banks.[13] Thus, MBSF ratings allow me to put market discipline to more stringent test in which I can examine the relationship between risk premium and true economic and financial conditions of banks.

Table 2 shows the distribution of MBFS ratings among Japanese banks. It should be noted that all Japanese banks receive C+ or worse and that most Japanese banks are below C-. In comparison to the rest of the world where typical banks are rated C in the rest of the world, the financial weakness of Japanese banks are quite apparent.

3.2. Data Source

I gather my data from various sources. First of all, MBFS ratings are obtained from *Lexis-Nexis Academic Universe.* I keep record of every single change in MBFS ratings that took place for each bank in our sample during 2001-2002. Total of 50

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[11] I actually relate the deposit rates to accounting measure of risk such as capital adequacy ratio, nonperforming loans ratio, return on asset. It turned out these measures do not have statistically significant explanatory power as expected even after the elimination of blanket coverage.

[12] Sironi (2002) and Sironi (2003) show that MBFS ratings have strong explanatory power to predict the subordinated notes and debenture yield of banks in the United States and Europe.

[13] I also estimate the same regression model with Moody's long-term deposit ratings, but the results are qualitatively the same because these two ratings were closely correlated.

Japanese banks were given MBFS ratings during this period. Since not all Japanese banks are rated by Moody's, my sample inevitably excludes other banks, about 150 banks. However, since the rated banks tend to be large, they essentially take in more than 80 percent of total bank deposits in Japan.

For deposit quantity data, I rely on *Nikkin Shiryo Nenpo* that contains annual outstanding level of ordinary deposits and time deposits for these banks.[14] For deposit rates data, Japan Financial News Co. collects posted interest rates on various types of deposits. In particular, I obtained interest rates on ordinary deposits that are 100% insured and one-month large time deposits that are insured only up to 10 million yen.

Table 3 and 4 show the distributions of interest rates on ordinary deposits and large time deposits during the sample period. One striking result that emerges from these two tables is that before the implementation of deposit insurance reform, say as of July 16, 2001, virtually every bank in the sample offer the same interest rates on both ordinary deposits and time deposits, indicating the complete lack of market monitoring in Japan's deposit market; i.e. most banks offer 0.02% for ordinary deposits and 0.03% for large time deposits. This condition has gradually changed. By the end of the sample period, although many banks offer similar rates, they are far more spread out relative to the beginning of sample period.

4. Empirical Result

4.2. Risk Premium and Deposit Insurance

To examine the sensitivity of deposit rates to risk profile of banks, I relate the interest rates on two types of deposits, ordinary deposits and large time deposits, to

[14] Unfortunately, I do not have the quantity of large time deposits that are uninsured.

dummy variables associated with each level of MBFS ratings for every week from 2001 to 2002. In other words, I estimate the following equation for every week and each type of deposits in my sample:

$$R_{ijt} = \beta_{jt} + \beta_{C+jt}(C+_i) + \beta_{Cjt}(C_i) + \beta_{D+jt}(D+_i) + \beta_{Djt}(D_i) + \beta_{D-jt}(D-_i) + \beta_{E+jt}(E+_i) + \beta_{Ejt}(E_i) + \varepsilon_{ijt}$$

where i, j and t denote bank, deposit type, and week.[15] Hence, the coefficients on the dummy variables can be interpreted as the risk premium that depositors require from financially distressed banks relative to the banks in the best financial conditions. For instance, β_{Ejt} gives the difference in interest rate between banks with an "E" rating and banks with a "B" rating for deposit of type j during week t. It should be also noted that a large β_{Ejt} is an indication of strong market monitoring. If the application of coverage limit enhanced market monitoring, these risk premia must have risen as April 1, 2002 approached. It is also expected that MBFS ratings' explanatory power in this regression must have also risen as well if deposit insurance reform indeed induced depositors to become sufficiently selective so that financially weak banks were forced to offer higher interest rates for their deposits than financially strong banks in order to attract large time deposits.

First of all, I plot in Figure 5 the R-squares of estimated equations so as to examine how the goodness of fit changed overtime. It is quite remarkable that R-squares for both time deposit equation and ordinary deposit equation are less than 0.03 at the beginning of the sample period. That is, the Moody's evaluations of Japanese banks'

[15] Given that error terms in ordinary deposit equation and time deposit equation are likely to be correlated, I use Zellner's Seemingly Unrelated Regression (SUR) method for the efficient estimation of parameters.

financial condition were virtually unrelated to the interest rates on deposits, and MBFS ratings contained no valuable information in pricing bank deposits.

However, this would quickly change as the scheduled removal of blanket coverage approached. In particular, by the end of 2001, MBFS started showing some explanatory power for both ordinary deposit rates and time deposit rates, which is illustrated by a jump in R-square for both ordinary deposit equation and time deposit equation on October 1, 2001. Furthermore, it should be also noted that R-square for time deposit equation exhibits a large jump one week before April 1, 2002, demonstrating the heightened sensitivity of depositors to banks' risk profile on the eve of deposit insurance reform. In addition, notice that R-square of time deposit equations is consistently higher than that of ordinary deposit equation after the removal of blanket coverage of time deposits. This result is consistent with the notion that the deposit insurance reform in Japan had the intended effects on market monitoring in the sense that depositors started pricing risk in the interest rates of partially insured time deposits, not completely insured ordinary deposits.

Of course, high R-square does not mean that MBFS ratings became statistically significant determinants of risk premia of deposit rates in Japan. To verify this, I test the joint significance of MBFS ratings for each equation and plot the p-value associated with each test on Figure 6. Consistent with the previous figure, the p-value started to decline on October 1, 2001. However, one cannot reject the null hypothesis that MBFS ratings have no effects on deposit rates at 5 percent significance level until year 2002.

Furthermore, the information content of MBFS ratings in determining the interest rates of time deposits and ordinary deposits started to differ after April 1, 2002. On the

one hand, MBFS ratings have statistically significant effects on time deposits rates in a consistent manner after April 1, 2002. On the other hand, MBFS ratings in ordinary deposit equation quickly started becoming insignificant factors, evaluated at 5 percent confidence level. In summary, this evidence is consistent with the view that the coverage limit of deposit insurance plan does indeed have positive effects on market monitoring.

Finally, Figure 7 plots the estimated risk premium associated with different MBFS ratings. The solid line and dotted line represent the risk premium that these banks need to pay relative to banks with a "B" MBFS ratings for time deposits and ordinary deposits, respectively. Large dots mean that the estimated risk premia are statistically discernible from zero at 5 % significance level. There are three noteworthy results that come out this estimation.

First of all, notice that regardless of MBFS ratings, all banks were paying the same rate for both time and ordinary deposits in the early 2001 when all depositors were protected by blanket coverage. In other words, banks with an "E" MBFS rating on average offered the same rate as banks with a "B" MBFS rating. This observation suggests the complete lack of market monitoring in Japan during the pre-deposit insurance reform period.

Second, financially weak banks started paying higher rates on both time deposits and ordinary deposits than banks with a "B" MBFS ratings in the end of 2001 although the estimated risk premia of ordinary deposits are typically lower than that of time deposits. Moreover, these risk premia for time deposits are much higher and statistically significant for banks with exceptionally low MBFS ratings such as "D", "D-", E+, and "E".

Third, while risk premia of ordinary deposits started diminishing as of April 1, 2002, those of time deposits were remarkably persistent. As a result, there is a large difference in interest rate between time deposit and ordinary deposits for financially weak banks. These observations are consistent with the view that financially weak banks were forced to pay higher rates on uninsured time deposits relative to financially strong banks in Japan only after the blanket coverage of all deposits was lifted, that is, market monitoring was strengthened in deposit market in Japan as a result of deposit insurance reform

4.1. Deposit Quantity

To summarize the important results from the data on deposit rates, (1) financially weak banks were forced to pay higher rates for deposits than financially strong banks in 2002, and (2) the emergence of risk premia was restricted to only time deposits given that ordinary deposits remained fully guaranteed. As a result, although market monitoring surely emerged as a result of the removal of blanket deposit guarantee, one cannot be certain whether heightened degree of market monitoring in fact led to higher level of market influencing.[16] In particular, financially weak banks had the option of moving away from expensive time deposits to minimize the adverse effects of market monitoring on their overall funding costs.

In order to examine to what extent financially weak banks shifted away from uninsured time deposits to insured ordinary deposits, I regress the growth rates of time

[16] Bliss and Flannery (2002) emphasize this important difference between "market monitoring" and "market influencing". The former is defined as "security holders' ability to accurately assess the condition of a firm (monitoring)" while the latter is "their ability to cause subsequent managerial actions to reflect those assessments (influence)".

deposits, that of ordinary deposits, and that of total deposits on dummy variables associated with each level of MBFS ratings. Table 5 reports the results. The first three columns show the response of deposit growth to a downgrade from C+ to various levels during Fiscal Year 2000. As indicated by R square, the only deposits that MBFS ratings adequately explained in 2000 are ordinary deposits. Total deposits and time deposits do not show statistically significant sensitivity to any downgrades of MBFS ratings. These results indicate the absence of market monitoring during this time period.

However, the next three columns show that depositors started becoming more sensitive to bank risks when they select banks during the year leading up to the anticipated end of blanket deposit guarantee. First, notice that this simple regression model now explains about 40 percent of variation in deposit growth. It should be also noted that time deposits that became only partially insured under the new limited deposit insurance respond strongly to a downgrade of MBFS ratings. For example, the time deposits of banks with E ratings decline by 16 percentage points relative to those of banks with C+ ratings. Hence, depositors correctly understood the coverage limits and shifted their time deposits away from risky banks. On the other hand, ordinary deposits that remained completely insured moved in the opposite direction. Risky banks tend to attract more ordinary deposits than financially strong banks. Thus, these risky banks aggressively pursued completely insured ordinary deposits in response to the rapid outflow of uninsured time deposits. As a consequence, financially weak banks did not suffer from rapid deposit outflows as indicated in the next column. The next three columns illustrate that depositors became insensitive to bank risk again. Or, it can also be interpreted as depositors being quite satisfied with interest rates that risky banks were

offering. The latter interpretation is more consistent with what our data on interest rates show because risky banks were already paying higher rates on uninsured time deposits during 2002.

In summary, depositors were quite rational in the sense that they shifted uninsured time deposits from financially weak banks as they approached April 2002 when the blanket deposit guarantee was to expire. However, due to the decision by the Japanese government to keep ordinary deposits 100% insured, these risky banks avoided rapid outflow of deposits. It is safe to say that this deposit insurance reform did not improve the degree of market discipline in a substantial way.

5. Conclusion and Policy Implication

This paper uses the deposit insurance reform of April 2002 in Japan as a natural experiment to test whether the introduction of coverage limit enhanced market discipline in Japan. Four important findings are uncovered. First, during the early 2001 when all deposits were explicitly guaranteed, there is no evidence of market monitoring; i.e. financially weak banks were able to pay the same interest rates as financially strong banks without experiencing a rapid withdrawal of deposits. Second, at the onset of the change in deposit insurance coverage, depositors started requiring higher interest rates on time deposits that are scheduled to be only partially insured from financially weak banks. In other words, risk premium emerged, and market monitoring strengthened. Third, as expected, I find that time deposits flew out of financially troubled banks. These three pieces of evidence show that the deposit insurance reform had the intended consequence on the price and the quantity of time deposits. However, the main shortcoming of this

particular reform is that weak banks did not suffer from rapid outflow of deposits as they were able to raise insured ordinary deposits to reduce the adverse effects of enhanced market monitoring on overall funding costs. It is safe to say that, because deposit insurance reform was no comprehensive, it did not enhance market discipline in a substantial manner.[17]

The possible extension of this paper is to compare the effects of change in deposit insurance coverage on market discipline in various countries that went through similar deposit insurance reform. In particular, just like Japan, South Korea, Sweden and Norway also implemented blanket deposit guarantee in the 1990s when they experienced banking sector distress but, unlike Japan, they quickly removed it without delay in more comprehensive manner. Comparing the experience of Japan with those of Sweden, Norway, and South Korea will provide valuable insight to policy makers; moreover, in 2005, three East Asian countries, namely Thailand, Indonesia, and Malaysia are also scheduled to remove blanket deposit guarantee.

[17] On April 2005, ordinary deposits will no longer be completely insured in Japan.

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Appendix A.
Bank Financial Strength Ratings

Moody's Bank Financial Strength Ratings (BFSRs) represent Moody's opinion of a bank's intrinsic safety and soundness and, as such, exclude certain external credit risks and credit support elements that are addressed by Moody's Bank Deposit Ratings. In addition to commercial banks, Moody's BFSRs may also be assigned to other types of financial institutions such as multilateral development banks, government-sponsored financial institutions and national development financial institutions.

Unlike Moody's Bank Deposit Ratings, Bank Financial Strength Ratings do not address the probability of timely payment. Instead, Bank Financial Strength Ratings are a measure of the likelihood that a bank will require assistance from third parties such as its owners, its industry group, or official institutions.

Bank Financial Strength Ratings do not take into account the probability that the bank will receive such external support, nor do they address risks arising from sovereign actions that may interfere with a bank's ability to honor its domestic or foreign currency obligations.

Factors considered in the assignment of Bank Financial Strength Ratings include bank-specific elements such as financial fundamentals, franchise value, and business and asset diversification. Although Bank Financial Strength Ratings exclude the external factors specified above, they do take into account other risk factors in the bank's operating environment, including the strength and prospective performance of the economy, as well as the structure and relative fragility of the financial system, and the quality of banking regulation and supervision.

Bank Financial Strength Rating Definitions

A

Banks rated A possess superior intrinsic financial strength. Typically, they will be institutions with highly valuable and defensible business franchises, strong financial fundamentals, and a very predictable and stable operating environment.

B

Banks rated B possess strong intrinsic financial strength. Typically, they will be institutions with valuable and defensible business franchises, good financial fundamentals, and a predictable and stable operating environment.

C

Banks rated C possess adequate intrinsic financial strength. Typically, they will be institutions with more limited but still valuable business franchises. These banks will display either acceptable financial fundamentals within a predictable and stable operating environment, or good financial fundamentals within a less predictable and stable operating environment.

D

Banks rated D display modest intrinsic financial strength, potentially requiring some outside support at times. Such institutions may be limited by one or more of the following factors: a weak business franchise; financial fundamentals that are deficient in one or more respects; or an unpredictable and unstable operating environment.

E

Banks rated E display very modest intrinsic financial strength, with a higher likelihood of periodic outside support or an eventual need for outside assistance. Such institutions may be limited by one or more of the following factors: a weak and limited business franchise; financial fundamentals that are materially deficient in one or more respects; or a highly unpredictable or unstable operating environment.

Source: www.moodys.com

Table 1: Chronology of Change in Deposit Insurance Scheme in Japan

June 1996	Amendment to the Deposit Insurance Law provided blanket guarantee on all deposits until March 2001
January 20, 1999	Finance Minister Kiichi Miyazawa said he does not support deferring the April 2001 introduction of the so-called payoff system in Japan to limit depositor protection in the case of failure of financial institutions.
January 21, 1999	Kosaku Inaba, chairman of the Japan Chamber of Commerce and Industry, said the government should consider putting off the abolition of full protection of bank deposits scheduled for the end of March 2001 if the economy takes a further downturn.
September 29, 1999	The financial-system commission of the Federation of Economic Organizations (Keidanren), Japan's largest big-business group, urged the government to retain the current official guarantee to fully refund deposits at failed banks if removing the guarantee threatens to trigger a chain reaction of bank failures.
December 28, 1999	Japan's ruling coalition parties decided to put off for one year the introduction of the planned limited deposit protection for banks and other deposit-taking institutions.
November 2, 2001	Financial Services Minister Hakuo Yanagisawa said he has no intention of further delaying Japan's shift from blanket to partial deposit insurance
November 21, 2001	Bank of Japan Governor Masaru Hayami said he hopes that Japan will end blanket deposit protection in April 2002 as scheduled.
November 28, 2001	Bank of Japan Governor Masaru Hayami said he hopes that the government will introduce "payoff" limited bank deposit protection as planned in April 2002 to replace the current full guarantee system.
December 5, 2001	Finance Minister Masajuro Shiokawa said Japan should introduce limits on the government's guarantees for bank deposits in April 2002 as scheduled under a so-called payoff scheme.
December 11, 2001	The ruling Liberal Democratic Party's policy chief said Japan should not rush the introduction of a "payoff" limited bank deposit protection or bad loan disposal.
December 12, 2001	Liberal Democratic Party Secretary-General Taku Yamasaki said Japan should end its full bank deposit protection and shift to a payoff limited protection next April as planned now.
December 20, 2001	Prime Minister Junichiro Koizumi told a key Liberal Democratic Party official Japan will introduce the "payoff" bank deposit protection limits in April 2002 as scheduled.

Source: Jiji Press Ltd

Table 2: Distribution of MBFS ratings as of October 1, 2004

MBFS ratings	*All Banks*	*US Banks*	*Japanese Banks*
A	18	8	0
B+	28	11	0
B	81	21	0
B-	64	27	0
C+	101	24	5
C	120	31	6
C-	110	21	0
D+	101	6	9
D	73	5	10
D-	57	1	6
E+	91	0	4
E	40	0	14
Total	884	155	54

Source: Moody's Website (http://www.moodys.com/cust/default.asp)

Table 3: Distribution of Interest Rates on Ordinary Deposits

Interest Rates	0.001	0.002	0.005	0.01	0.02	0.03
7/16/2001	0	0	0	2	43	1
7/23/2001	0	0	0	2	43	1
7/30/2001	0	0	0	2	43	1
8/6/2001	0	0	0	2	43	1
8/13/2001	0	0	0	2	43	1
8/20/2001	0	0	0	2	43	1
8/27/2001	0	0	0	2	43	1
9/3/2001	0	0	0	2	43	1
9/10/2001	0	0	0	2	43	1
9/17/2001	0	0	0	2	43	1
10/1/2001	0	0	0	5	39	1
10/15/2001	0	0	0	6	38	1
10/22/2001	0	0	0	8	36	1
10/29/2001	0	0	0	9	35	1
11/5/2001	0	0	0	14	30	1
11/12/2001	0	0	0	14	30	1
11/19/2001	0	0	0	15	29	1
11/26/2001	0	0	0	16	28	1
12/3/2001	0	0	0	19	25	1
12/10/2001	0	0	0	19	25	1
12/17/2001	0	0	0	20	24	1
1/7/2002	0	0	0	22	22	1
1/21/2002	0	0	2	21	20	1
1/28/2002	0	0	2	20	21	1
2/4/2002	0	1	2	19	21	1
2/18/2002	0	2	2	18	21	1
2/25/2002	0	2	2	19	20	1
3/4/2002	0	4	3	16	20	1
3/11/2002	0	6	3	16	18	1
3/18/2002	1	7	1	17	17	1
3/25/2002	1	8	1	16	17	1
4/1/2002	***9***	***12***	***2***	***7***	***11***	***1***
4/8/2002	***11***	***11***	***2***	***7***	***10***	***1***
4/15/2002	***15***	***11***	***2***	***5***	***8***	***1***
4/22/2002	***16***	***11***	***2***	***4***	***8***	***1***
5/13/2002	***20***	***13***	***1***	***1***	***7***	***0***
5/20/2002	***20***	***13***	***1***	***1***	***7***	***0***
5/27/2002	***20***	***13***	***1***	***1***	***7***	***0***
6/3/2002	***21***	***13***	***1***	***1***	***6***	***0***
6/10/2002	***21***	***13***	***1***	***1***	***6***	***0***
6/17/2002	***21***	***13***	***1***	***1***	***6***	***0***
6/24/2002	***21***	***13***	***1***	***1***	***6***	***0***
7/1/2002	***21***	***13***	***1***	***1***	***6***	***0***
7/8/2002	***21***	***13***	***1***	***1***	***6***	***0***
7/15/2002	***21***	***13***	***1***	***1***	***6***	***0***
7/22/2002	***21***	***13***	***1***	***1***	***6***	***0***
7/29/2002	***21***	***13***	***1***	***1***	***6***	***0***
8/5/2002	***21***	***13***	***1***	***1***	***6***	***0***
8/12/2002	***23***	***13***	***1***	***1***	***4***	***0***
8/19/2002	***23***	***14***	***0***	***1***	***4***	***0***

Source: The Japan Financial News, Co.

Table 4: Distribution of Interest Rates on Large Time Deposits

Interest Rates	0.005	0.01	0.013	0.015	0.02	0.03	0.04
7/16/2001	0	0	0	0	3	42	1
7/23/2001	0	0	0	0	3	42	1
7/30/2001	0	0	0	0	3	42	1
8/6/2001	0	0	0	0	3	42	1
8/13/2001	0	0	0	0	3	42	1
8/20/2001	0	0	0	0	4	41	1
8/27/2001	0	0	0	0	4	41	1
9/3/2001	0	0	0	0	4	41	1
9/10/2001	0	0	0	0	4	41	1
9/17/2001	0	0	0	0	4	41	1
10/1/2001	0	0	0	0	7	37	1
10/15/2001	0	0	0	0	8	36	1
10/22/2001	0	0	0	0	8	36	1
10/29/2001	0	0	0	0	10	34	1
11/5/2001	0	0	0	0	13	31	1
11/12/2001	0	0	0	0	14	30	1
11/19/2001	0	0	0	0	15	29	1
11/26/2001	0	0	0	0	16	28	1
12/3/2001	0	0	0	0	19	25	1
12/10/2001	0	0	0	0	19	25	1
12/17/2001	0	0	0	1	19	24	1
1/7/2002	0	0	1	1	22	20	1
1/21/2002	0	1	0	1	23	18	1
1/28/2002	0	1	0	1	23	18	1
2/4/2002	0	1	0	1	23	18	1
2/18/2002	0	1	0	1	23	18	1
2/25/2002	0	1	0	1	23	18	1
3/4/2002	0	2	0	1	22	18	1
3/11/2002	0	2	0	1	23	17	1
3/18/2002	1	1	0	1	23	17	1
3/25/2002	1	1	0	1	23	17	1
4/1/2002	***2***	***2***	***0***	***1***	***22***	***14***	***1***
4/8/2002	***2***	***2***	***0***	***1***	***24***	***12***	***1***
4/15/2002	***2***	***3***	***0***	***1***	***24***	***11***	***1***
4/22/2002	***2***	***3***	***0***	***1***	***24***	***11***	***1***
5/13/2002	***2***	***3***	***0***	***1***	***26***	***10***	***0***
5/20/2002	***2***	***3***	***0***	***1***	***26***	***10***	***0***
5/27/2002	***2***	***3***	***0***	***1***	***26***	***10***	***0***
6/3/2002	***2***	***3***	***0***	***1***	***26***	***10***	***0***
6/10/2002	***3***	***3***	***0***	***0***	***26***	***10***	***0***
6/17/2002	***3***	***3***	***0***	***0***	***26***	***10***	***0***
6/24/2002	***3***	***3***	***0***	***0***	***26***	***10***	***0***
7/1/2002	***3***	***3***	***0***	***0***	***26***	***10***	***0***
7/8/2002	***3***	***3***	***0***	***0***	***26***	***10***	***0***
7/15/2002	***3***	***3***	***0***	***0***	***26***	***10***	***0***
7/22/2002	***3***	***3***	***0***	***0***	***26***	***10***	***0***
7/29/2002	***3***	***4***	***0***	***0***	***25***	***10***	***0***
8/5/2002	***3***	***4***	***0***	***0***	***25***	***10***	***0***
8/12/2002	***3***	***4***	***0***	***0***	***27***	***8***	***0***
8/19/2002	***3***	***4***	***0***	***0***	***27***	***8***	***0***

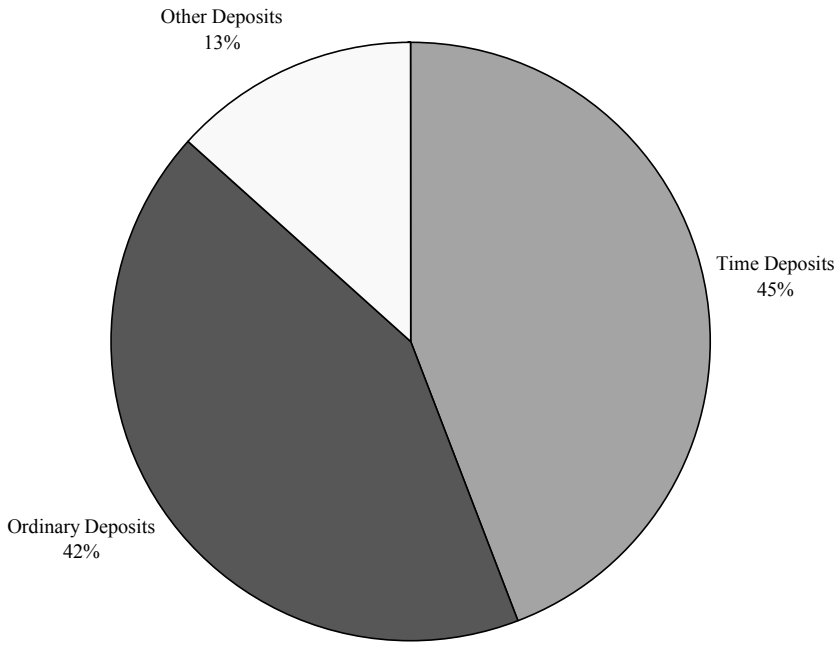
Source: The Japan Financial News, Co.

Table 5: Response of Deposits to Bank Risk Profile

The table reports regression results of deposit growth on bank risk profiles. The estimation method is Zellner's seemingly unrelated regression. I use STATA command *sureg* with option *dfk* and *small* to make a small sample adjustment in the estimation of covariance matrix and test statistics.

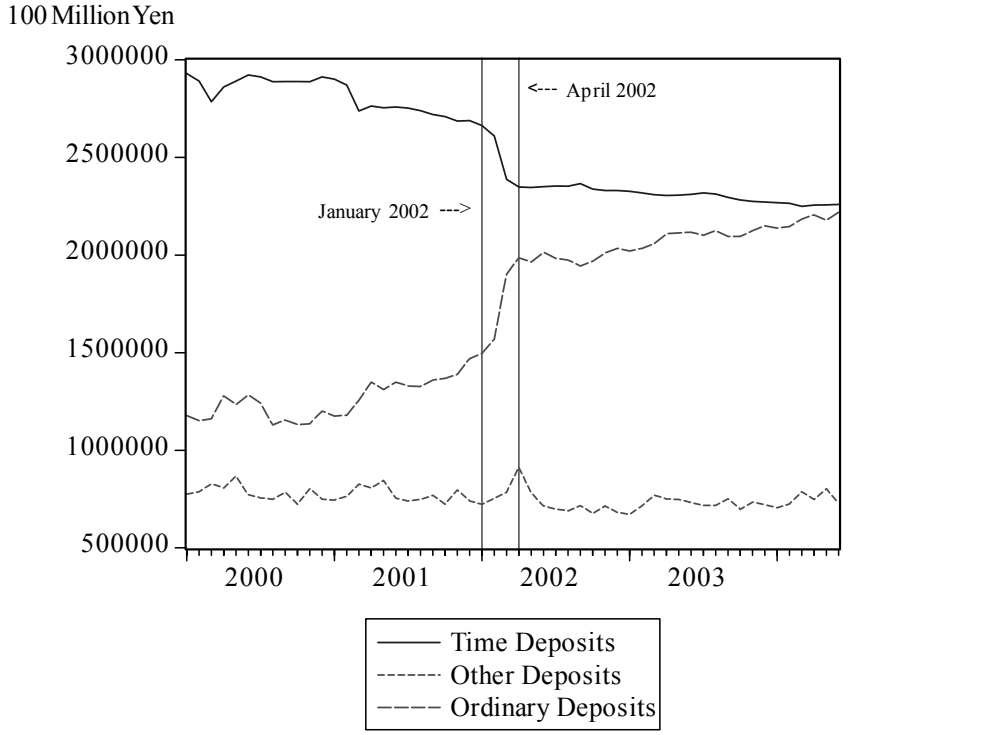
	3/31/2000-4/1/2001			3/31/2001-4/1/2002			3/31/2002-4/1/2003		
	Time	Ordinary	Total	Time	Ordinary	Total	Time	Ordinary	Total
C	-0.013	-0.022	-0.031	0.037	-0.053	0.009	0.032	-0.000	0.023
	(0.14)	(0.51)	(0.50)	(0.42)	(0.22)	(0.16)	(0.26)	(0.01)	(0.36)
D+	0.026	-0.010	0.004	-0.024	-0.001	-0.011	0.017	-0.007	0.011
	(0.32)	(0.27)	(0.08)	(0.45)	(0.00)	(0.30)	(0.24)	(0.23)	(0.28)
D	0.025	0.020	0.011	-0.033	0.073	0.004	0.095	-0.024	0.046
	(0.34)	(0.58)	(0.22)	(0.64)	(0.52)	(0.13)	(1.39)	(0.83)	(1.26)
D-	0.162	-0.162	0.048	-0.070	0.190	-0.027	0.036	-0.024	0.016
	(1.23)	(2.70)**	(0.56)	(1.27)	(1.27)	(0.72)	(0.49)	(0.79)	(0.42)
E+	0.113	-0.064	0.060	-0.021	0.437	0.058	0.010	0.015	0.032
	(1.53)	(1.93)	(1.25)	(0.41)	(3.14)**	(1.67)	(0.13)	(0.45)	(0.74)
E	-0.012	0.006	-0.024	-0.159	0.222	-0.050	0.062	-0.054	0.017
	(0.16)	(0.17)	(0.48)	(3.21)**	(1.64)	(1.48)	(0.88)	(1.83)	(0.45)
Constant	-0.030	0.100	0.020	-0.096	0.262	0.024	-0.078	0.094	-0.008
	(0.46)	(3.34)**	(0.46)	(2.22)*	(2.21)*	(0.80)	(1.30)	(3.75)**	(0.25)
Observations	46	46	46	42	42	42	39	39	39
R-squared	0.19	0.40	0.18	0.42	0.41	0.38	0.11	0.22	0.08
F test on Risk Profile	1.55	4.34**	1.41	4.29**	4.01**	3.51**	0.68	1.51	0.48
Absolute value of t statistics in parentheses									
* significant at 5%; ** significant at 1%									

Figure 1: Share of Ordinary and Time Deposits in Japanese Banks as of August 2004



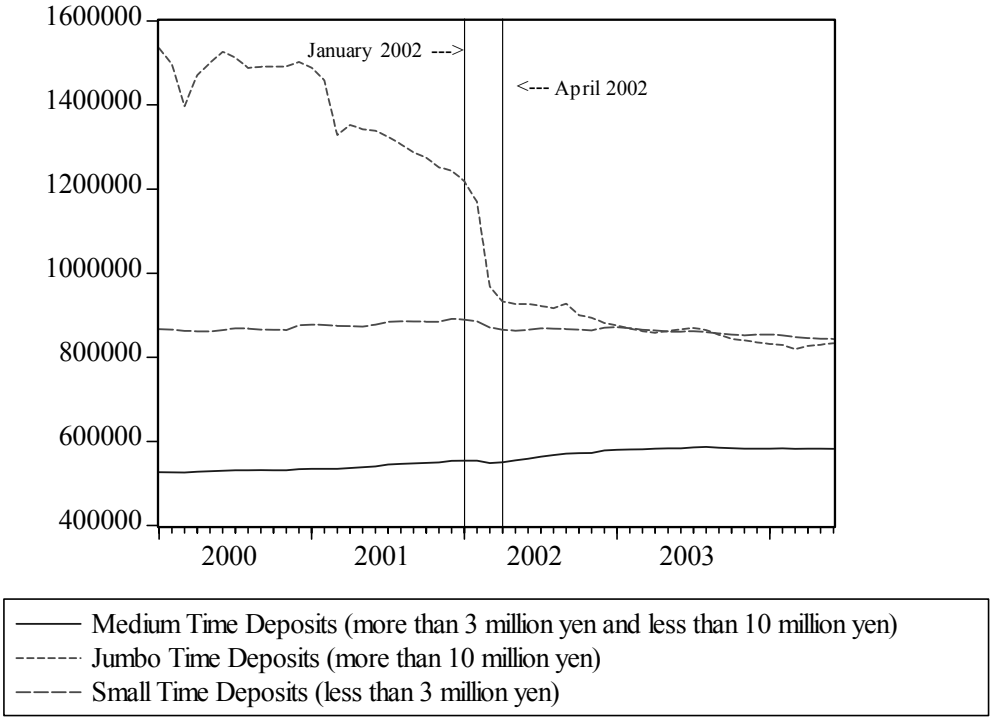
Source: Bank of Japan's website (http://www.boj.or.jp/stat/dlong_f.htm)

Figure 2: Amount Outstanding of Deposits



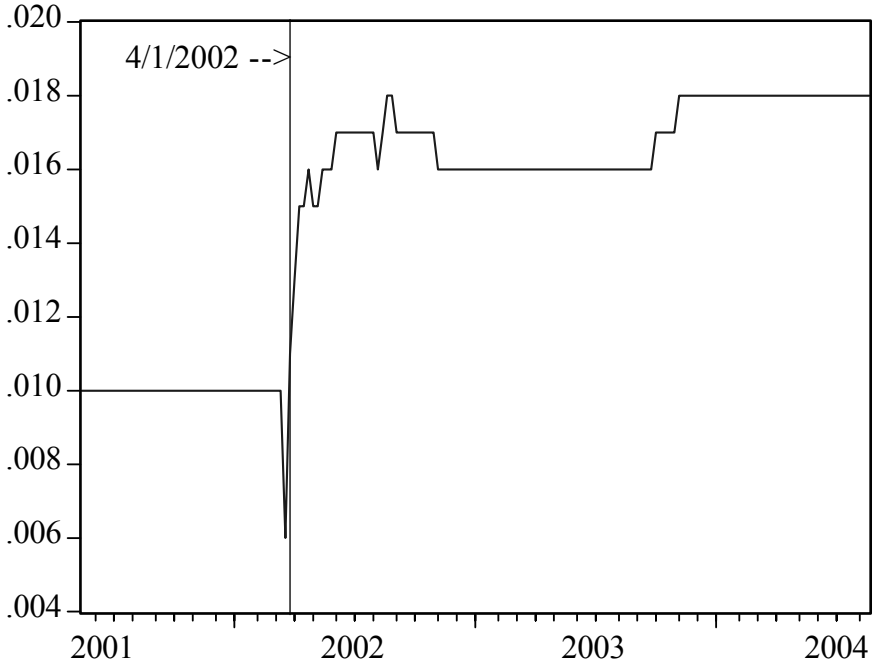
Source: Bank of Japan's website (http://www.boj.or.jp/stat/dlong_f.htm)

Figure 3: Amount Outstanding of Time Deposits by Size



Source: Bank of Japan's website (http://www.boj.or.jp/stat/dlong_f.htm).

Figure 4: Difference in Interest Rates between Large Time Deposits and Ordinary Deposits.



Source: Bank of Japan's website (http://www.boj.or.jp/stat/dlong_f.htm).

Figure 5: R-square of Time Deposit Regression Equation and Ordinary Deposits Regression Equation
For each week in during 2001-2002, the interest rates of time deposits and ordinary deposits are regressed on dummy variables associated with different levels of Moody's Bank Financial Strength (MBFS) ratings. This figure shows the R-squares of the estimated equations.

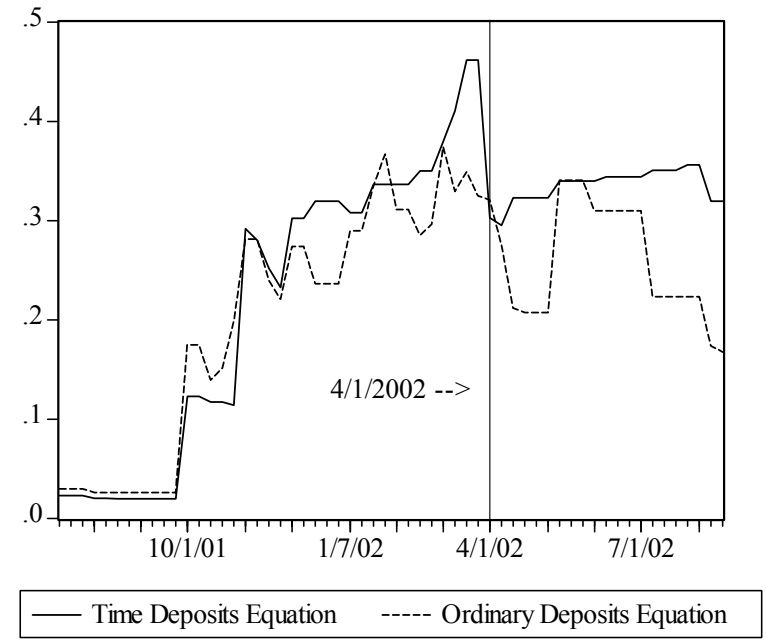


Figure 6: P-value Associated with Joint Significance of Moody's Bank Financial Strength Ratings in Time Deposit Regression Equation and Ordinary Deposit Regression Equation.
For each week in during 2001-2002, the interest rates of time deposits and ordinary deposits are regressed on dummy variables associated with different levels of Moody's Bank Financial Strength (MBFS) ratings. This figure shows the p-values of the null hypothesis that MBFS ratings have no effects on deposit rates.

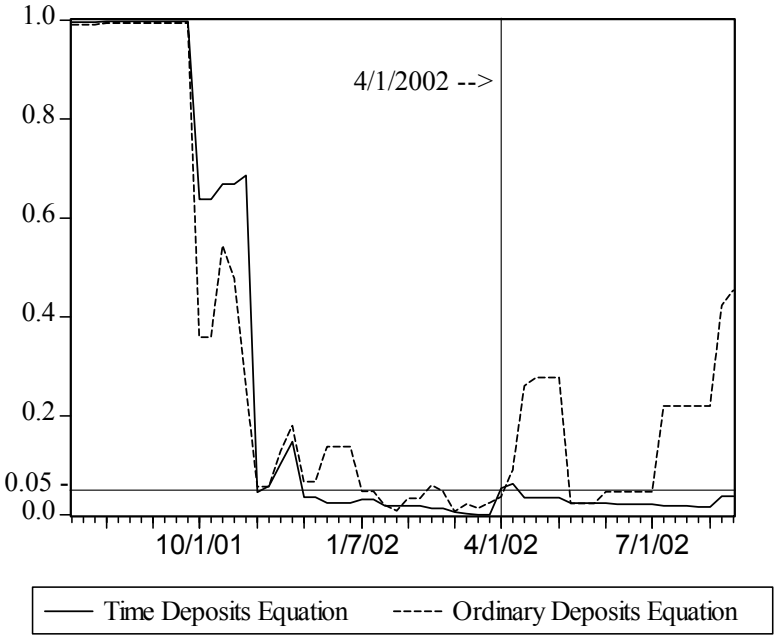


Figure 7: Estimated Risk Premium of Deposits

Solid line and dotted line represent the risk premium in time and ordinary deposits, respectively. Large dots show that the estimated risk premia are statistically discernible from zero at 5% significance level.