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THE EVOLUTION OF "TOO-BIG-TO-FAIL" POLICY IN JAPAN: EVIDENCE FROM MARKET EQUITY VALUES

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Comments welcome

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Abstract

This paper examines the evidence in bank equity markets concerning bank regulatory policies in Japan over the turbulent 1995-1998 period. We find that investors grouped banks according to regulatory status in assessing whether a bank was currently treated as "too-big-to-fail." When a failure of a bank of certain regulatory status was announced, excess returns on other banks of that regulatory status and below displayed heightened sensitivity to adverse news. This suggests that investors updated their beliefs about which classes of banks were protected by to-big-to-fail policies over the course of the sample. The pattern that emerges suggests that government officials pursued a policy of "regulatory triage," where initially Credit Cooperatives, then Second Regional banks, then First Regional banks, and finally City banks were allowed to fail.

JEL classification numbers: G21, G38

Key words: Japan, bank regulation, too-big-to-fail

1. Introduction

Government bank regulatory policy has traditionally favored banks whose failure would be threatening to the system as a whole. Such banks are commonly designated as "too-big-to-fail" (TBTF). The implication of a TBTF designation is that the regulatory authority is the ultimate guarantor of the bank's liabilities [e.g. see Roth (1994)]. The practice of TBTF policy is controversial. While supporting an insolvent large bank may be optimal ex-post, as its failure may lead to instability in the entire banking system, it may create moral hazard problems ex-ante. In particular, TBTF policy may reduce the incentives for large depositors and investors to impose financial discipline on lenders [Black, et al (1997)].[1] The policy also distorts bank lending incentives, as weak banks have an incentive to grow in order to attain TBTF status.

The United States officially abandoned its TBTF policy by enacting the Federal Deposit Insurance Corporation Improvement Act of 1991. This law requires the resolution of failed banks at the lowest cost to the Federal Deposit Insurance Corporation (FDIC). While the law provides the possibility of exceptions for banks whose failure "…would have serious adverse effects on economic conditions or financial stability," it restricts such designations. The systemic threat that would be posed by an institution's failure must be acknowledged by the FDIC, the Federal Reserve, and the United States Treasury, and reviewed by the General Accounting Office. Moreover, the costs of any assistance given to a large insolvent bank are to be borne by the entire banking industry, who are likely to question the unwarranted designation of an insolvent institution as too big to fail [Wall (1993)].

In Japan, bank regulators have historically resisted closing failed banks more forcefully than their U.S. counterparts. Through most of the post-war era, the resolution of failed Japanese banks was conducted under the "convoy system." This system insulated taxpayers from liabilities associated with the closure of failed banks. When banks found themselves experiencing extreme difficulties, the Ministry of Finance (MOF) typically intervened by merging the troubled bank with a healthy bank. Before the 1990's, the Japanese government had bailed out almost all failed banks or financial institutions by arranging the mergers and acquisition by other banks. Under the convoy system, the

[1] For example, see Hetzel (1991), Charles and Lamy (1992), and Wall (1993).

commercial banks effectively provided their own financial safety net [see Hoshi (1999) and Spiegel (1999a)].

Rather than a TBTF policy, then, the Japanese regulatory regime could be characterized as a "no failure" policy prior to the 1990's. For example, when Heiwa Sogo Bank fell into financial difficulties in 1985, the MOF arranged a merger with Sumitomo Bank. The merger was assisted with approximately 200 billion yen from the Bank of Japan (BOJ) and other banks.

With the financial turbulence experienced in the 1990s, however, the Japanese government was forced to abandon its no failure policy. The number of bank failures in that decade exceeded those in the preceding post-war era. The sheer size of the liabilities associated with these failures had two primary effects: First, side payments to banks, such as the provision of valuable branching rights under the convoy system, were no longer sufficient to induce solvent banks to acquire failed banks [Spiegel (1999b)]. Instead, the government modified the convoy approach. Rather than placing the full burden of resolution on the acquiring bank, the government used the funds of the Deposit Insurance Corporation (DIC) and groups of healthy commercial banks to finance the burden of resolving failed banks. Second, the government was forced to give up its "no failure" policy. In its place, the government pursued a form of "regulatory triage," under which the set of banks classified as TBTF was progressively narrowed as the financial situation deteriorated and the funds of the DIC were depleted.

The government initially allowed only small banks to fail, such as Toyo Shinkin Bank in 1991. Over time, Second and then First Regional banks were also exposed to failure. Finally, with the failures of Hokkaido Takushoku and Long Term Credit Bank (LTCB), it became clear the even the largest banks were no longer covered under a credible TBTF policy.

The announcement of a bank failure may provide relevant information for the value of surviving banks in a number of dimensions: First, it may convey negative information about the true underlying health of the financial system. Because Japanese disclosure standards had permitted banks to overstate their financial positions, failure announcements reveal bad news about institutions' true positions [Genay (1999)].

Second, it may convey information about the regulatory regime in which banks operate, as well as the probability of future changes in regulatory regime. If classes of banks are believed to enjoy

similar levels of regulatory protection, news concerning the failure of a bank within a certain class alters the market's perception of the coverage of the entire class under TBTF policy. For example, the failure of Hyogo Bank, the second largest Regional bank in 1995, revealed that Second Regional banks were exposed to failure. The failure also increased the probability that larger banks, particularly First Regional banks, would also lose their TBTF status in the future. Similarly, the failure of Hokkaido Takushoku in November 1997 revealed that even City Banks were no longer immune from failure, despite the fact that the government had insisted that the top 20 Japanese banks were TBTF.

Finally, failure announcements convey negative information about large individual debtors of the failed bank. This latter information may have heterogeneous impacts on surviving banks to the extent that the market is aware of differences in bank exposure.

We argue that the loss of TBTF coverage was observed and priced in bank equity markets, even before these changes in regulatory policy were officially announced. We demonstrate that "watershed" bank failures, in which a bank of a class that had not previously experienced failures was allowed to fail, exposed other banks within that class to more rigorous market discipline. We test this argument with evidence from Japanese equity markets by examining the effects of bank failure announcements on bank equity values.

We follow Aharony and Swary (1996), who used an event study methodology to investigate the impacts of bank failures on surviving bank equity values in the United States. Our study examines daily returns on Japanese banks. We also allow for changes in market risk. Finally, as in Kane and Gibson (1996), we use a multivariate market model to estimate abnormal returns and systematic risk.

There are a number of previous studies that examine the market's response to perceived changes in bank regulatory policy. O'Hara and Shaw (1990) examine the response to the government's 1984 announcement that a failure by one of a group of large U.S. commercial banks would have systemic implications, which implied that these banks were covered by TBTF policy. They find that the market priced the announcement positively for banks designated as systemic. In a related study, Flannery and Sorescu, (1996) found that the loss of TBTF protection in the United States increased the market's sensitivity to bank risk. There are mixed results concerning the effect of the announcement on banks not included in the list as TBTF. O'Hara and Shaw find no measurable impact on

unmentioned banks, while Swary (1986), finds a negative valuation effect and Black, et al (1997) find evidence of a positive impact.

In the case of Japan, Peek and Rosengren (1998) investigated the effect of bank failures on the "Japan premium," the premium that Japanese banks paid relative to their U.S. and U.K. competitors on Eurodollar and Euroyen loans. They find that the Japan premium responded most to news about failures that disclosed additional financial losses. For example, they find that the large undisclosed losses revealed at the Yamaichi Securities failure exacerbated the Japan premium, while the Hokkaido Takushoku failure did not. Brewer, et al (1999) examine the impact of bank failure announcements on the equity values of surviving Japanese banks. Their results demonstrate that shareholders interpreted these failures as adverse changes in the banking system. They also found that the sensitivity of banks to news concerning bank failures was systematically related to bank financial health. However, they do not explicitly examine changes in TBTF policy over time.[2]

Our results demonstrate that investors perceived that Japanese regulators moved from a "no failure" policy to a TBTF policy over the 1990s. The market treated classes of banks as subject to similar levels of regulatory status. On learning of the closure of a bank, the market appears to have placed greater discipline on bank of equal and lesser regulatory status. In particular, the equity values of banks of equal or lesser regulatory status exhibit greater sensitivity to future bank closure announcements, and the excess returns of banks can be related to indicators of bank asset risk.

The remainder of the paper is organized as follows: Section 2 provides a brief review of about Japanese banking policy in the 1990's. Section 3 explains the methodology used in the paper. Section 4 provides the results from event studies of portfolios of bank equity. Section 5 provides cross-sectional evidence from individual banks. Section 6 concludes.

2. Japanese bank failures in the 1990's

Over its first twenty years following inception in 1971, Japan was never forced to use DIC funds to rescue a failing bank. This era of stability ended abruptly, however, with the collapse of Japanese real estate and equity markets. In 1992, the DIC provided eight billion yen in low-interest

[2] Brewer, et al (1999) do introduce dummies for classes of banks in their cross-sectional regressions. However, these are introduced to control for regulatory differences, rather than as the focus of their investigation.

loans to induce the Iyo Bank to acquire the failed Toho Sogo Bank. Three months later, the DIC provided twenty billion yen to Sanwa Bank to encourage it to acquire the failed Toyo Shinkin Bank.

Initially, most considered the Toho Sogo and Toyo Shinkin Bank failures isolated incidents, attributable mainly to mismanagement. Market investors still widely believed that the MOF and the BOJ could stabilize the banking sector. Nevertheless, these failures were shortly followed by "convoy" style rescues of two more small banks, Kamaishi Shinkin Bank and Osaka Fumin Credit Cooperative, in 1993.

Table 1 reports the 18 major financial institution bankruptcies that took place in Japan from 1995 through 1998. We define a large failure as one that cost the DIC more than 100 million yen. The announcement date in the table refers to the time that the market was able to process the new information produced by the failure announcements. For example, the Hyogo Bank failure was announced after the market's close on August 30, 1995. The announcement date for that failure is recorded as August 31.

Japan experienced three large failures of depository institutions in the summer of 1995, followed by a fourth in December. The Cosmo Credit Cooperative was ordered to suspend its business in July 1995 by its primary regulator, the Tokyo Metropolitan Government. The credit cooperative was primarily liquidated with funds from its largest creditor, Sanwa Bank, but a number of other banks, the National Federation of Credit Cooperatives, the DIC, and the Tokyo metropolitan government also contributed to the resolution of the failed financial institution. Kizu Credit Cooperative failed in August of 1995. The Osaka Prefecture government played a key role in forming Kizu's resolution plan. Sanwa Bank and others who had invested in the Kizu's non-bank subsidiaries, bore a share of the resolution burden. Since both of these failures represented credit cooperatives, their failures had limited implications for the credibility of TBTF protection on banks.

The failure of Hyogo Bank at the end of August 1995, on the other hand, represented the first major bank liquidation since World War II. The government's resolution plan called for other financial institutions and major companies in the Hyogo prefecture to contribute to the establishment of a new bank. The government also announced that the stockholders of Hyogo Bank would lose their equity value, and that the former vice president of Sakura Bank would be installed as the new bank's president. The liquidation of Hyogo Bank demonstrated that Japanese banks were now expected to

share in the burden of the resolution of failed banks. Peek and Rosengren (1998) note that the "Japan premium," under which Japanese banks faced additional costs of funds began just after the Hyogo Bank's failure.

However, the resolution of the Hyogo failure did not imply that the government was moving towards a laissez-faire policy. First, the Hyogo bank was too small to cause systemic risk to the banking system. This left open the possibility that the government would still consider a larger bank TBTF. Second, the government also contributed to the establishment of the successor bank, Midori. Third, the government had tried to arrange a merger or acquisition of Hyogo bank along the lines of the modified convoy system.

A number of other failures followed. The resolution of the Osaka Credit Cooperative failure in December 1995 followed the modified convoy method. The DIC gave 170 billion yen to the acquiring Tokai Bank and bought 83 billion yen of non-performing loans. These loans were transferred to the Resolution and Collection Bank. Taiheiyo Bank, a Second Regional bank, failed in 1996. The DIC contributed 117 billion yen to the resolution of that failed bank. Four city banks, Sakura Bank, Fuji Bank, Tokai Bank, and Sanwa Bank, renounced their claims on Taiheiyo Bank. By and large, the resolution of these bank failures suggested that the government was still pursuing the modified convoy method towards bank resolution when doing so was not prohibitively expensive.

The first regulatory watershed occurred with the failure of a Hanwa Bank, a Second Regional bank, in November 1996. Hanwa was ordered to suspend business, except for the repayment of deposits. Unlike the previous closures, the MOF did not attempt to find a rescuing bank. All liabilities were assumed by the DIC and the bank was closed.

Following Hanwa bank, the next major failure was the bankruptcy of Nissan Life Insurance in April of 1997. Nissan's failure had important implications for the banking industry because life insurance companies are the primary purchasers of preferred bank stocks and engage in extensive subordinated lending towards banks. The failure of Nissan deteriorated the ability of banks to raise equity to finance loan losses and maintain required capital ratios.

The failures of Tanabe Credit Cooperative and Chogin Osaka Credit Cooperatives in May 1997 were treated similarly. All financial losses stemming from the liquidation of these institutions

were borne by the DIC. Sakura Bank took over the deposits and performing loans of the Tanabe Credit Cooperative."

The failure of Kyoto Kyoei bank in October 1997 appears to represent a temporary reversion to the modified convoy system. Koufuku, the acquiring bank, absorbed all branches and employees of Kyoto Kyoei. Although both banks were members of the Egawa Group, there was no legal obligation for Koufuku Bank to acquire Kyoto Kyoei.

During this period, then, regulators exhibited the willingness to close and liquidate credit cooperatives and second-tier regional banks. There was also an apparent regime change in the desire of regulators to continue the "modified convoy system" with the liquidation of Hanwa bank. However, the non-liquidation of Kyoto Kyoei demonstrated that regulators still preferred to arrange a merger of a failed bank, if doing so were not prohibitively expensive.

The pace at which banks and financial institutions lost their regulatory guarantees increased markedly with the wave of bank and securities company failures in November of 1997. Most notable was the first announced failure of a city bank, Hokkaido Takushoku Bank. Hokkaido Takushoku had 5500 employees and 133 branches. On November 25, the MOF also decided to liquidate Tokuyou City Bank, a Second Regional Bank. Sendai Bank, Seventy-Seven Bank, and other institutions acquired its deposits and performing loans. All financial losses were placed on the DIC and these banks were not forced to employ Tokuyou's workers.

Two large Japanese securities companies also failed that month. On November 3, Sanyo Securities suspended portions of its business filed with the Tokyo District Court for reorganization. Sanyo Securities had suffered heavy losses from real estate. Bank of Tokyo-Mitsubishi, Daiwa Bank, and Nippon Credit Bank, had all provided financial assistance to Sanyo since 1994. These banks were asked to contribute to the resolution of Sanyo's bankruptcy.

On November 25, Yamaichi Securities failed, revealing that it had failed to disclose 200 billion yen in losses. Yamaichi was one of the big four Japanese security firms. Fuji Bank, Yamaichi's main bank, did not provide it with any assistance, which was contrary to standard main bank practices. The conventional application of the modified convoy program would have had Fuji or the MOF arrange a group of banks to participate in its rescue. Yamaichi's failure therefore set an important precedent reducing the burden of healthy banks. The impact of Yamaichi's failure on banks is therefore mixed.

While the failure demonstrated that firms in Japan were in even worse financial positions than investors had previously believed, neither Fuji nor other commercial banks were asked to share the burden of its resolution.

Wakayamaken Credit Cooperative failed in March of 1998. The resolution of this bank followed the Hanwa pattern. Kiyou Bank acquired its deposits and performing loans, while the DIC absorbed all financial losses. Kiyou was not forced to employ workers of the failing institution.

The Midori Bank's liquidation in May of 1998 was another that appeared to represent a temporary reversion to the modified convoy system. Rather than liquidating the Midori Bank, the government arranged a merger with Hanshin Bank by purchasing 266 billion yen of bad debt from Midori and making a 790 billion yen side-payment to Hanshin. The government admitted that Midori was a "special case" because of the bank's importance to firms adversely affected by the Kobe earthquake. Therefore, the implications of the resolution of Midori for the rest of the banking system are limited.

Finally, the Law Concerning Emergency Measures for the Reconstruction of the Functions of the Financial System and the Financial Function Early Restoration Law were passed in October 1998. The first law allows the authorities to deal with a failed bank without first finding a receiving bank. The second law provided financing for bank resolution. The law created a 60 trillion yen pool of funds. 25 trillion yen was to be used for recapitalizing weak but viable banks, 18 trillion yen was to be used for government purchases of shares in failed banks, and the remaining 17 trillion yen was to be used for guaranteeing deposits at failed banks. Shortly following the law's passage, LTCB and Nippon Credit Bank (NCB) were temporarily nationalized. As both banks were insolvent, their equity values were set to zero.

In summary, over the 1995-1998 period, the government lost its capacity to maintain its no failure policy. The policy change evolved in two dimensions: First, the government slowly, and with some temporary backtracking, was forced to abandon the convoy approach to bank resolution, which placed a share of the resolution burden on the commercial banking system. This was positive news for banks, particularly healthy ones who stood to be asked to contribute most generously to resolution packages.

Second, the government's TBTF policy slowly changed. During the first wave of banking failures, the government allowed credit cooperatives and Second Regional banks to fail, but closed no First Regional banks or City banks. That changed in the second failure wave with the failure of the Hokkaido Takushoku City Bank.

3. Methodology and Data

3.1 Methodology

We estimate the following equation for bank portfolios

$$(1) \qquad R_{it} = \alpha_i + \beta_i R_{mt} + \sum_{e=1}^{15} \beta_{i,e}\left(R_{mt} \times D1_{e,t}\right) + \sum_{e=1}^{16} \gamma_{i,e} D2_{e,t} + \varepsilon_{i,t}$$

where $R_{i"}$ represents the daily stock return of bank portfolio i on day t,[3] R_{mt} represents the market portfolio return for day t, proxied in our sample by the return on the TOPIX index, and $\varepsilon_{i,t}$ is an i.i.d. disturbance term. $\beta_{i,e}$ represents the change in the market beta of bank portfolio i subsequent to event e. It is quite likely that the market betas of banks varied over the course of our sample, particularly in the wake of events that may signal changes in the underlying regulatory regime. We allow for such changes by interacting the shift dummy, $D1_{et}$, which equals one on the day of and after the event e, and is zero otherwise, with the return on the market portfolio.[4] γ_{ie} represents the sensitivity of the bank portfolio the bank failure announcement represented by $D2_{et}$, which takes value one on the event date and zero otherwise. Our sample has sixteen event dummies.

3.2 Data

Daily closing equity values for 114 Japanese banks were obtained from the Toyo-Keizai Kabuka CD-ROM from January 4, 1995 to December 30, 1998. When a stock was not traded on a single day, it was assigned the previous day's closing price. Many Japanese banks list their stocks on

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[3] Using the closing stock prices of the bank i on date t, P_{it}, the return of each security on date t, $R_{i,t}$, is $log(P_{it})$-$log(P_{it-1})$. To obtain the returns of the portfolio, we average the returns of individual securities in the portfolio.

[4] There are 15 shift dummies. Two pairs of failures, Tanabe Credit and Chogin Osaka Credit, and Yamaichi Securities and Tokuyou City Bank, occurred on the same day, and are treated as a single event. These event dates are referred to as Chogin and Yamaichi below. Another pair, Kizu Credit Cooperative and Hyogo Bank failed on consecutive days. We estimate one shift dummy beginning on the date of the Hyogo failure.

several exchanges, such as Tokyo and Osaka. We use the stock prices on the exchanges where the stock was most actively traded.

Newly-listed or de-listed banks whose equity values were not available were dropped from the sample. We also dropped thinly-traded banks, defined as those who reported no transactions on more than 100 days in our 988-day sample period. This left us with 94 banks in our sample.

3.3 Bank category portfolios

As the bank failure announcements affected all banks in the sample on the failure date, we cannot assume that the residual returns would be cross-sectionally independent. A standard response in the event study literature, e.g., O'Hara and Shaw (1990), is to use the returns on a portfolio of banks.

We construct several portfolios of banks based on their administrative category. The bank portfolios included are:

1. *All*, all 94 banks in our sample.
2. *Large*, a portfolio of the nine city banks and the Industrial Bank of Japan.
3. *Trust*, a portfolio of seven trust banks.
4. *Regional*, a portfolio of the seventy-seven regional banks.

As a group, the regional banks would be expected to enjoy less regulatory protection than the *Trust* or the *Large* banks. It is useful to further divide the Regional banks into two groups, the *First Regional* banks and the *Second Regional* banks. In general, the *First Regional* banks are larger and have a higher probability to receiving favorable regulatory treatment.

In addition, there is a possibility that market sensitivity to news concerning bank failures will differ by bank financial strength. In particular, changes in the market's perception of the determination of regulatory authorities to maintain the convoy system, under which healthy banks are asked to contribute to the costs of resolving failed banks, will affect healthy and weak banks quite differently. In response, we also construct portfolios of banks of a certain size category with common financial health. We divide the ten largest banks into two groups. Using the Moody's credit rating shown in Table 2, Bank of Tokyo-Mitsubishi, Sumitomo Bank and Sanwa Bank are included in *Large strong*.[5] These banks are commonly considered to be the most sound in Japan [e.g., see Sesit and Webb (1998)].

[5] Although Nippon Trust Bank also had an A2 credit rating, we did not include it in the Large strong portfolio because it was a small subsidiary company of Bank of Tokyo-Mitsubishi.

By chance, these three were also the largest three banks in March 1997. The other seven large banks are included in *Large weak*. We also construct a portfolio of the weakest large banks in our sample, Daiwa Bank, Chuou Trust Bank, and Yasuda Trust Bank, in *Large weakest*.

For most of the regional banks, credit ratings were not available. To divide regional banks by financial soundness, we instead use information from bank dividends.[6] Under the traditional Japanese "convoy system," most banks set their annual dividends per share at the same level, namely, five yen or more. Nevertheless, banks experiencing financial difficulties, such as Hyogo Bank in 1992, halted dividend payments. As a result, interruption of dividend payments provides a signal of financial difficulty.

We specify problem regional banks as those paying dividends of less than five yen. According to the financial statements at the end of March 1997, we find six of the first regional banks and five of the second regional banks in our sample paid less than five yen dividends per share.[7] We compile a portfolio of the eleven banks titled *Regional weak*. We also break up this portfolio into the six troubled First Regional Banks entitled *First Regional weak* and the five troubled Second Regional Banks entitled *Second Regional weak*.[8]

Finally, equation (1) calls for the estimation of 31 parameters, including 15 market beta coefficients, corresponding to each event date. To obtain a more parsimonious specification, we limit the number of shifts in the beta parameter in our specifications below. We only include beta shifts on those event dates for which the full specification showed evidence for a beta shift for some group of banks at higher than a one-percent confidence level.[9]

On the basis of this criterion, we identified five events as potential shifts in the market beta. These include the failures of Hanwa Bank, Sanyo Securities, Hokkaido Takushoku Bank, Yamaichi Securities and Midori Bank. Of these dates, the Sanyo Securities, Hokkaido Takushoku Bank, and Yamaichi Securities failures all occurred in November of 1997. We therefore include one beta shift for this month, beginning on the date of the Sanyo Securities failure, which occurred first.

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[6] Banks that failed to pay dividends are classified as "unhealthy" under the Financial Stabilization Law of 1998.

[7] Nippon Trust Bank is excluded as it was a subsidiary of Bank of Tokyo-Mitsubishi.

[8] The banks included in the *First Regional weak* portfolio are Hokkaido Bank, Hokuriku Bank, Ikeda Bank, Kantou Bank, Kiyou Bank, and Osaka Bank, while the banks included in the *Second Regional weak* portfolio include Hanshin Bank, Kansai Bank, Kinki Bank, Niigata-Chuou Bank, and Tokyo-Sowa Bank.

[9] Estimates including all sixteen event dates as beta shifters had similar results and are available upon request.

4. Results

4.1 Bank portfolios grouped by size

The results for bank portfolios grouped by size are shown in Table 3. Looking at the various subgroups, not all event dates had significant impacts on bank equity values. This is not surprising, as the market may have already learned about a failed financial institution's difficulties long before the failure announcement. Nevertheless, it is clear that a number of the failure announcements did have a significant impact on bank equity values. In all, nine of the sixteen failure events were priced significantly by some subgroup. We concentrate our discussion on these events.

The Cosmo Credit failure was priced positively at the ten percent confidence level for the full sample and for the sample of first regional banks, and at the five percent confidence level for the sample of trust banks. This result is surprising. As we discussed above, commercial banks were asked to contribute to the cost of the resolution of the Cosmo failure. However, the failure of other credit cooperatives appears to have limited implications. Neither the Kizu Credit Cooperative nor the Osaka Credit Cooperative events were significantly priced by any subgroup.

The next two significantly priced events were the Hyogo and Hanwa failures. The Hyogo failure entered insignificantly in the large bank and trust bank sub-samples, but was significantly negative at a ten percent confidence level for the regional banks. Moreover, when we separate the Regional banks into the First and Second regional bank sub-samples, we see that only second regional bank equity values were adversely impacted by the Hyogo failure at a ten percent confidence level. Similarly, the Hanwa failure only entered significantly into the Second regional bank sub-sample.

The data clearly suggests that the Second Regional banks were considered by the market to have greater exposure to failure than the other subgroups through the end of 1996. As Hyogo and Hanwa were both Second Regional banks, the announcements of their failures revealed that the government was now limiting regulatory protection of financial institutions of this level. With the Hanwa failure, the government also confirmed that equity holders would share in the losses stemming from bank failures.

The first event of 1997 in our sample is the Nissan Life Insurance failure. This event was priced negatively at a five-percent confidence level for the full sample, and at a ten percent confidence level for the *Large banks* and *Regional banks* sub-samples. The Nissan failure had adverse

implications for all banks' abilities to acquire capital in the future. Life insurance companies were an important source of capital for banks, as they were the primary purchasers of preferred stocks and engaged in extensive subordinated lending to banks.

The Chogin Osaka failure also followed the pattern of greater investor discipline for the *Second Regional banks.* The failure was significantly negatively priced for the *All banks, Regional banks,* and *Second Regional banks* groups. However, among the individual subgroups, only the *Second Regional bank* subgroup priced the failure significantly negatively. This indicates that the sensitivity of the Second Regional bank subgroup is driving the performance of the *All banks* and *Regional banks* subgroups.

The first bank failure event which adversely affected the large bank portfolio at standard confidence levels was that of Kyoto Kyoei bank in October 1997. It is unclear why the failure of Kyoto Kyoei should have significantly affected the market's perception of the regulatory protection from failure enjoyed by large banks. Instead, it appears more likely that large bank sensitivity to the Kyoto Kyoei failure was attributable to the perception that its resolution implied increased large bank regulatory burdens. We provide some evidence along these lines below, after separating financially strong and weak large banks.

For the remaining three events in 1997, the failures of Sanyo Securities, Hokkaido Takushoku, and Yamaichi securities, the regional bank subgroups were adversely affected at standard confidence levels, while the large banks were not. These failures are also the first that were priced negatively by the *First Regional bank* portfolio. By allowing a City bank to fail under the proper circumstances, the regulatory authorities had made it clear that all banks below that level of regulatory status, such as the First Regional banks, no longer enjoyed TBTF protection.[10]

The fact that the Hokkaido Takushoku and Yamaichi Securities failures were not priced significantly by the large bank portfolio is somewhat surprising. The Hokkaido Takushoku failure demonstrated the unwillingness or inability of Japanese officials to avoid failures under any circumstances, even in the cases of the largest City Banks. Below, we investigate whether the

[10] Surprisingly, the Second Regional bank portfolio was not significant. However, this was due to high standard errors. For two of the three events in November 1997, the point estimate on the *Second Regional bank* coefficient exceeded that obtained for the *First Regional bank* subgroup.

insignificant coefficient on the large bank portfolio may be attributable to heterogeneity in the implications of the details of the Hokkaido Takushoku resolution for strong and weak banks.

The three bank failures in 1998, Midori, LTCB, and Nippon Credit, produced no significant effects. This is not a surprise in the case of Midori. Its resolution program was shaped by the desire of the government to mitigate damages to the area subsequent to the Kobe earthquake and had few implications for the general regulatory regime.

Finally, the Hanwa and Sanyo beta shifters indicate increasing risk from the point of those events until the end of the sample period. As both of these failures occurred in periods of escalating uncertainty, their performance is intuitive. On the other hand, the Midori beta-shifter indicates a reduction of uncertainty in the banking sector in 1998.[11]

4.2 Implications of bank financial strength

Results with the subgroups further divided by financial strength are shown in Table 4. The results reveal some interesting disparities between the sensitivities of weak and strong banks.

As above, we see that only regional banks were adversely affected by the Hanwa and Hyogo bank failures at standard confidence levels. As was the case for the full subgroups, only weak Regional banks and Second Regional banks were negatively affected at standard confidence levels. The subgroup of weak Second Regional banks was more sensitive to the news of the Hyogo failure than the entire group of second regional banks. The weak Second Regional Banks lost 1.8% of their equity value on the day, while the Second Regional Banks as a whole lost only 0.6%. Similarly, the coefficient estimate on the event date for the weak Second Regional bank subgroup is greater and enters at a higher level of significance than the entire group. This result is consistent with the hypothesis that at the time of the Hyogo Bank closure, *Second Regional banks* were perceived to enjoy much lower levels of regulatory protection than the other bank classes.

[11] To investigate the robustness of our results, we also examined a three-day event window. By and large, the results were very similar to those with a one-day event window. There are, however, two notable differences: First, all subgroups of banks, including the largest banks, priced the Yamaichi Securities failure negatively with the three-day event window. Second, the closure of LTCB was priced significantly positive for both the *Large bank* portfolio and the *Trust bank* portfolio with a three-day event window. These results are available from the authors upon request.

Another interesting disparity with the results above concerns the *First Regional bank* group. While the whole *First Regional banks* group was not affected by the announcement of the Hanwa failure at standard confidence levels, the subset *of Weak First Regional banks* was significantly adversely affected by the event. The same result emerges for the Nissan Life Insurance failure. This indicates that the degree of regulatory protection during this period for *First Regional banks* was also in question.

The most interesting disparities by financial strength appear among the *Large banks* subgroup during the Hokkaido Takushoku and Yamaichi Securities failures, which both took place in November of 1997. Recall that the event dates for both of these failures for the entire group entered insignificantly with a positive sign. When separated by financial strength, however, we see significant disparity between the strong and weak *Large banks* subgroups. The *Weak Large banks* subgroup priced the events significantly negatively. This result seems consistent with the possibility that the Hokkaido Takushoku and Yamaichi Securities failures indicated that no financial institutions were TBTF.

However, the *Strong Large banks* subgroup priced the events significantly positively. News about the degree of TBTF protection would be expected to have little impact on the strongest banks, whose probability of failure was close to zero. Instead, it appears that the primary impact of these failures on strong large bank equity values was their implications for healthy commercial banks' responsibilities in the future resolution of failed banks. The resolution of the Hokkaido Takushoku and Yamaichi Securities failures did not require commercial bank assistance. This explains the event's positive pricing for strong large bank equity values. This disparity in the sensitivity of equity values to the Yamaichi Securities failure is consistent with Peek and Rosengren (1998), who found that its failure enlarged the difference between interest rate premia among strong and weak Japanese banks.[12]

[12] We also investigated the bank financial strength sub-sample results with three-day event windows. Our results were again largely similar, with two notable exceptions: First, the coefficient on the Hokkaido Takushoku failure for the strong large bank subgroup was smaller and no longer statistically significant. Second, the Wakayamaken Credit Corporation and LTCB failure announcements in 1998 were priced significantly positive for the weak large bank subgroup. While the intuition behind the Wakayamaken result is unclear, the results for the LTCB failure may be understood as the positive reaction of weak large banks to the news that the government was once again willing to contribute public funds for the resolution of large failed banks.

5. Cross-sectional Evidence

5.1 Methodology

This section investigates the cross-sectional evidence concerning the evolution of too-big-to-fail policy over the sample period. Following Brewer, et al (1999) we proceed in two stages: First, we estimate excess returns for each of the 94 banks in our sample. Second, we regress these estimated coefficients on several fundamental variables including the size of each bank. Our three samples consist of 55 First Regional Banks, 22 Second Regional Banks, and 10 City Banks and 7 Trust Banks respectively.

We use the natural log of total assets, *Assets*, as a proxy for bank size. If market participants believe that large banks enjoy greater too-big-to-fail regulatory protection, the sensitivity of asset prices to adverse news would be negatively related to bank size. For adverse news such as a bank failure, we would expect a positive coefficient on *Assets*.

We also examine bank asset risk. Previous studies [Aharony and Swany, (1996); Flannery and Sorescu, (1996); and Yamori, (1999a)] have argued that evidence that returns are responsive to bank risk factors indicate investor discipline, and hence diminished regulatory protection. We introduce three bank risk measures: First, we use a dummy variable indicating dividend payments of less than five yen per share, *Lowdiv*. Dividend payments above this level are the norm. Falling below that level therefore indicates financial distress. We would expect a negative coefficient on this proxy. We also use the returns on equity, *ROE*, as a proxy for current performance or profitability. We would expect that the coefficient on *ROE* is positive. Finally, we use the ratio of bad loans in the bank's lending portfolio, *Badloan*. Our definition includes loans with delayed or reduced payments, as well as loans to bankrupt firms. We would expect a negative coefficient on *Badloan*.[13] Individual statistics are calculated as of the end of March 1997.

[13] Bank capital-asset ratios are unavailable as risk measures. There are two different standards for the calculation of this ratio in Japanese banks: The MOF standard, which is primarily used by small banks, and the Bank for International Settlements standard. Eight banks in our sample disclosed their capital ratios based on the MOF standard. Moreover, eleven of the banks in our sample did not disclose their capital ratios at all.

5.2 Results

The second-stage estimation results are shown in Table 5. Table 5a shows the results for the Second Regional banks. The results for the early failure of the Cosmo Credit Cooperatives are poor. The Cosmo regression obtained very low R^2, and the *ROE* variable enters significantly at the five percent confidence level with the incorrect positive sign.

In contrast, there is some evidence of risk pricing throughout the rest of the sample, indicating that beginning with the failure of the Kizu Credit corporation, the regulatory protection of the Second Regional banks was questioned. The *Assets* variable enters with its expected positive sign in the Kizu Credit Cooperative and in the NCB failures at five and ten percent confidence levels respectively. The *Badloan* variable enters with its expected negative sign at a five percent confidence level in the Yamaichi Securities failure. The *ROE* variable enters with its expected positive signs at five percent confidence levels in the Kizu Credit Corporation and the Taiheyo Bank failures. Finally, the *Lowdiv* variable enters with its expected negative sign in the Hyogo, Hanwa, and Hokkaido Takushoku failures at five percent confidence levels. However, the variable enters with the wrong sign in the Yamaichi Securities failure at the ten-percent confidence level. Nevertheless, the risk indicators enter with their expected coefficient signs in eight of the nine cases in which they enter significantly at standard confidence levels.

Table 5b gives our results for the First Regional Banks. In general, the results for the First Regional banks are inferior to those for the Second Regional banks. Many of the coefficients enter with the incorrect sign. For example, while the *Log(Assets)* variable enters with its predicted positive sign at a ten percent confidence level during the Hyogo Bank failure, it enters with the incorrect sign at a five percent confidence level in the Chogin Osaka Credit Corporation and Yamaichi Securities failures. Similar mixed results are reported for the *ROE* and *Lowdiv* variables. However, the *Badloan* enters with its predicted negative signs for the Osaka Credit Corporation, the Chogin Osaka Credit Corporation, and the Yamaichi Securities failures at greater than ten-percent confidence levels.

Finally, Table 5c displays the results for the City Banks and Trust Banks. The *Lowdiv* variable must be dropped from our specification for this regression, because none of the City Banks or Trust

Banks failed to issue dividends of at least five yen per share.[14] The results are again mixed. The *ROE* and *Badloan* variables enter significantly with both correct and incorrect signs. However, the *Assets* variable enters with its expected positive sign in the Osaka Credit Corporation, Midori, and Sanyo bank failures. Presumably, this reflects differences in the perceived regulatory treatment of City Banks and Trust Banks.

In summary, the results do provide some suggestive evidence that the market perceived the Second Regional banks to be less protected by regulatory guarantees than either First Regional or City and Trust Banks. While the risk factors appear to enter as predicted in a number of the failures in the Second regional Bank sample, we often see these factors entering with incorrect signs in the other samples.

To examine this possibility formally, we conducted F and log likelihood ratio tests of the validity of pooling these sub-samples for the cross-sectional regression report on above. Our results are reported in Table 6.

Pooling is rejected for all of the potential pairs of subgroups tested for the Cosmo Credit Corporation. Again, it is difficult to interpret the empirical performance of banks corresponding to this bank's failure announcement, so we concentrate on the remaining fifteen event dates.

Comparing the Second Regional banks and the rest of the sample, we see that pooling is rejected for the Taiheiyo and Kyoto Kyoei bank failures. These failures occurred on April 1996 and November 1997 respectively. Comparing the Second Regional banks and First Regional banks, we see that pooling is rejected for four failures, the Hanwa bank, Chogin Osaka Credit Corporation, Kyoto Kyoei Bank, and Yamaichi Securities failures. These failures all took place between November of 1996 and November of 1997. Comparing the First Regional banks and the City and Trust banks, we reject the null hypothesis that pooling is valid at standard confidence levels Chogin Osaka, Kyoto Kyoei, Sanyo Securities, Hokkaido Takushoku, and Yamaichi Securities failures. These failures took place from May of 1997 through November of 1997. Finally, comparing the City and Trust banks against the Regional Banks as a group, we reject the pooling assumption for the Kyoto Kyoei bank

[14] An exception is the Nippon Trust Bank, which is a subsidiary of Bank of Tokyo-Mitsubishi. It is not included in the *Lowdiv* group because its failure to pay dividends is unrelated to its financial position.

failure, the Hokkaido Takushoku bank failure, and the Yamaichi Securities failure. These failures took place in the relatively short interval from October 14, 1997 through November 25, 1997.

In summary, our cross-sectional evidence suggests two features in the data: First, the cross-sectional regressions suggest that investors treated the Second Regional banks differently than the other banks in our sample. In particular, risk factors had greater explanatory power for the Second Regional banks than either the First Regional banks or the City and Trust banks groups. This finding would be consistent with the hypothesis that the Second Regional banks enjoyed systematically less regulatory protection over the sample period, particularly up to the failure of Hanwa bank at the end of 1996.

However, formal testing for the validity of pooling across these subgroups revealed that the differences among these subgroups were greatest over a relatively short time interval. With the exception of the Cosmo Credit Corporation failure, which rejected pooling for all pairs of sub-groups, all of the statistically significant differences between sub-groups arose for failures that took place between April of 1996 and November of 1997.

The evidence is therefore consistent with the notion that there was a period with little systematic differences in regulatory protection, followed by a brief period in which first the Second Regional Banks and then the First Regional banks lost their regulatory status and were treated differently by investors. However, once it was revealed that large banks were also exposed to the risk of failure, these regulatory differences diminished.

6. Conclusion

The data presented above indicate that investors were following the regulatory behavior of the Ministry of Finance, and not just its stated policies, in assessing the regulatory regime in place for the commercial banking system. After experiencing a number of bank failures, market investors recognized that the government had decreased the coverage of its too-big-to-fail policy.

The gradual changes in the sensitivity of equity prices to bank failure announcements can therefore be better understood as reflections of the market's uncertainty about the current regulatory regime than investor irrationality. Indeed, our results indicate that market participants were following these announcements in an effort to ascertain the current regulatory regime. Investors responded to

failure announcements by updating their beliefs concerning the solidity of regulatory protection across different classes of banks.

These responses indicate that Japanese regulatory policy evolved over the course of our sample period. Prior to the failure of the Hyogo Bank, investors behaved as if all banks were secured from failure. However, the failure of the Hyogo bank, the largest Second Regional bank at the time, revealed that regulatory protection for the Second Regional banks was not absolute. Investors responded to this discrepancy by treating subsequent news about bank failures differently for the Second Regional banks than the other groups of banks. With the failure of the Hanwa bank, we saw that investors had also come to doubt the regulatory status of First Regional banks. At that point, financially weak First Regional banks also began to be sensitive to adverse news. Finally, with the failure of Hokkaido Takushoku, weak City banks also exhibited sensitivity to adverse news.

Our cross-sectional evidence suggests a similar pattern. The data consistently reveals that excess returns for Second Regional banks were more closely tied to risk indicators, suggesting that investors considered the Second Regional banks to enjoy weaker regulatory guarantees than the larger First Regional and City banks.

However, our formal pooling tests only reveal statistically significant distinctions between the groups for a limited period. This evidence is also consistent with the notion that the market considered all banks to be secure from failure risk early in our sample, followed by a temporary period in which first the Second Regional banks, and then the First Regional banks, lost their regulatory advantages. Finally, with the closure of Hokkaido Takushoku, it was revealed that all banks were exposed to failure, and we no longer found measurable differences across these sub-groups.

It is unclear whether this regime is still in place. We failed to find any significant negative pricing of bank failures during 1998. This suggests that the announcement that public funds were again available for the resolution of failed banks may have led investors to believe in the resumption of regulatory guarantees in Japan.

References

Aharony, Joseph, and Itzhak Swary, 1996, "Additional Evidence on the Information-Based Contagion Effects of Bank Failures," *Journal of Banking and Finance* 20, 57-69.

Black, Harold A., M. Cary Collins, Breck L. Robinson, and Robert L. Schweitzer, 1997, "Changes in Market Perception of Riskiness: The Case of Too-Big-To-Fail," *Journal of Financial Research* 20(3), 389-406.

Brewer, Elijah III, Hesna Genay, William C. Hunter, and George C. Kaufman, "Does the Stock Market Price Bank Risk? Evidence from Bank Failures," in *Proceedings of the 35th Annual Conference on Bank Structure and Competition, Global Financial Crises: Implications for Banking and Regulation,* May 1999, pp. 464-488.

Charles, Moyer R., and Robert E. Lamy, 1992, "Too Big To Fail: Rationale, Consequences, and Alternatives," Business Economics 27(3), July, 19-24.

Flannery, Mark J., and Sorin M. Sorescu, 1996, "Evidence of Bank Market Discipline in Subordinated Debenture Yield: 1983-1991," *Journal of Finance* 51, 1347-1377.

Genay, Hesna, 1999, "Japanese Banks and Market Discipline," Chicago Fed Letter 144, August, 1-3.

Hetzel, Robert L., 1991, "Too Big To Fail: Origins, Consequences, and outlook," Federal Reserve Bank of Richmond *Economic Review* 77(6), Nov/Dec, 3-13.

Hoshi, Takeo, (1999), "Convoy System," mimeo, UCSD.

Kane, Edward J., and G. Scott Gibson IV, 1996, "Impact of the Clinton Credit Availability Program on Commercial Banks (Policy Paper)," *Journal of Financial Services Research* 10, 273-293.

O'Hara, Maureen, and Wayne Shaw, 1990, "Deposit Insurance and Wealth Effects: The Value of Being "Too Big To Fail,"" Journal of Finance 45, 1587-1600.

Peek, Joe, and Eric S. Rosengren, 1998, "Determinants of the Japan Premium: Actions Speak Louder than Works," Federal Reserve Bank of Boston, Working Paper No.98-9.

Roth, Michael, 1994, "Too-Big-To-Fail and the Stability of the Banking System: Some Insights from Foreign Countries," *Business Economics* 29(4), 43-49.

Sesit, Michael R., and Sara Webb, 1998, "World Stock Markets: Managers Weigh Effect of Japan's Bank Plan on Market," *Wall Street Journal*, October 26, C-1.

Spiegel, Mark, 1999a, "Moral Hazard under the Japanese "Convoy" Banking System," Federal Reserve Bank of San Francisco *Economic Review* 99-3, 3-13.

Spiegel, Mark M. (1999b), "Bank Charter Value and the Viability of the Japanese Convoy System," Federal Reserve Bank of San Francisco Center for Pacific Basin Studies Working Paper No. PB99-06.

Wall, Larry D., 1993, "Too-Big-to-Fail After FDICIA," Federal Reserve Bank of Atlanta *Economic Review*, January/February, 1-14.

Yamori, Nobuyoshi, 1999a, "Stock Market Reaction to the Bank Liquidation in Japan: A Case for the Informational Effect Hypothesis," *Journal of Financial Services Research* 15, 57-68.

Yamori, Nobuyoshi, 1999b, "Contagion effects of the bank liquidation in Japan," *Applied Economics Letters* 6(11), 701-703.

Yamori, Nobuyoshi, and Akinobu Murakami, 1999, "Does bank relationship have an economic value? The effect of main bank failure on client firms," *Economics Letters* 65, 115-120.

Table 1[a]

Major Japanese Financial Failures: 1995-1998

Event Date	Financial Institution	Deposit Insurance Expense (100 million yen)
7-31-95	Cosmo Credit Cooperative	1,250
8-30-95	Kizu Credit Cooperative	10,340
8-31-95	Hyogo Bank	4,730
12-7-95	Osaka Credit Cooperative	2,526
4-1-96	Taiheiyo Bank	1,170
11-21-96	Hanwa Bank	2,960
4-25-97	Nissan Life Insurance	NA
5-14-97	Tanabe Credit Cooperative	1,081
5-14-97	Chogin Osaka Credit Coop.	3,159
10-14-97	Kyoto Kyoei Bank	1,019
11-04-97	Sanyo Securities	NA
11-17-97	Hokkaido Takushoku Bank	33,726
11-25-97	Yamaichi Securities	NA
11-25-97	Tokuyou City Bank	2,888
3-17-98	Wakayamaken Shoko Credit Coop.	2,193
5-15-98	Midori Bank	10,560
10-23-98	Long-term Credit Bank of Japan	NA
12-14-98	Nippon Credit Bank	NA

[a] Major bank and large credit cooperative failures include all failures whose resolution costs to the DIC exceeded 100 million yen.

Table 2[a]

Major Japanese Banks

Moody's Long-term deposit credit rating

	Large Banks	Trust Banks
A1	Tokyo-Mitsubishi, Sanwa	
A2	Sumitomo	Nippon-Trust
A3	Daiichi-Kangyo, Industrial Bank of Japan	
Baa1	Sakura, Fuji, Asahi, Tokai	Mitsubishi-Trust, Sumitomo-Trust, Toyo-Trust
Baa2		Mitsui-Trust
Baa3	Hokkaido-Takushoku, Daiwa, Long-Term Credit Bank, Nippon Credit Bank	Chuou-Trust, Yasuda-Trust

[a] Ratings as of October, 1998.

Table 3[a]

Estimation Results: Portfolios of Banks grouped by size

Event Date	Failure Event	*All Banks*	*Large Banks*	*Trust Banks*	*Regional Banks*	*First Regional Banks*	*Second Regional Banks*
7-31-95	Cosmo CC	0.0043*	0.0006	0.0150**	0.0038	0.0045*	0.0020
		(0.0024)	(0.0053)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
8-30-95	Kizu CC	0.0000	-0.0039	0.0018	0.0004	0.0006	-0.0002
		(0.0024)	(0.0054)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
8-31-95	Hyogo	-0.0036	0.0028	-0.0060	-0.0042*	-0.0036	-0.0059*
		(0.0024)	(0.0053)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
12-7-95	Osaka CC	0.0002	0.0014	-0.0002	0.0001	0.0004	-0.0008
		(0.0024)	(0.0054)	(0.0075)	(0.0024)	(0.0025)	(0.0033)
4-1-96	Taiheiyo	0.0025	-0.0031	0.0063	0.0029	0.0038	0.0008
		(0.0024)	(0.0054)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
11-21-96	Hanwa	-0.0016	0.0024	0.0017	-0.0024	-0.0012	-0.0056*
		(0.0024)	(0.0053)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
4-25-97	Nissan Life	-0.0051**	-0.0099*	-0.0088	-0.0041*	-0.0039	-0.0046
		(0.0024)	(0.0053)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
5-14-97	Chogin Osaka CC	-0.0040*	0.0004	-0.0093	-0.0041*	-0.0035	-0.0055*
		(0.0024)	(0.0053)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
10-14-97	Kyoto Kyoei	-0.0023	-0.0141**	-0.0049	-0.0005	0.0013	-0.0050
		(0.0024)	(0.0053)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
11-4-97	Sanyo Securities	-0.0033	0.0051	-0.0039	-0.0044*	-0.0041*	-0.0052
		(0.0024)	(0.0053)	(0.0075)	(0.0024)	(0.0025)	(0.0032)
11-17-97	Hokkaido Takushoku	-0.0052**	-0.0028	-0.0043	-0.0056**	-0.0056**	-0.0056
		(0.0024)	(0.0058)	(0.0081)	(0.0026)	(0.0027)	(0.0035)

[a] Estimation by ordinary least squares. CC indicates Credit corporations. Failed entities are banks unless otherwise indicated. * indicates significance at 10 percent confidence level, ** indicates significance at 5 percent confidence level.

Table 3
(continued)

Event Date	Failure Event	*All Banks*	*Large Banks*	*Trust Banks*	*Regional Banks*	*First Regional Banks*	*Second Regional Banks*
11-25-97	Yamaichi Securities	-0.0060** (0.0024)	0.0034 (0.0056)	-0.0119 (0.0078)	-0.0067** (0.0025)	-0.0081** (0.0026)	-0.0032 (0.0034)
3-17-98	Wakayamaken CC	-0.0009 (0.0024)	-0.0003 (0.0053)	-0.0005 (0.0075)	-0.0011 (0.0024)	-0.0012 (0.0025)	-0.0008 (0.0032)
5-15-98	Midori	-0.0018 (0.0024)	-0.0019 (0.0053)	-0.0068 (0.0075)	-0.0014 (0.0024)	-0.0019 (0.0025)	-0.0000 (0.0032)
10-23-98	Long-Term Credit	-0.0016 (0.0024)	0.0066 (0.0053)	-0.0014 (0.0075)	-0.0027 (0.0024)	-0.0028 (0.0025)	-0.0025 (0.0032)
12-14-98	Nippon Credit	0.0016 (0.0024)	-0.0006 (0.0054)	-0.0044 (0.0075)	0.0024 (0.0024)	0.0021 (0.0025)	0.0031 (0.0033)
	Constant	-0.0001 (0.0001)	-0.0002 (0.0002)	-0.0003 (0.0002)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)
	Beta	0.7207** (0.0261)	1.3165** (0.0580)	1.5033** (0.0812)	0.5722** (0.0264)	0.6371** (0.0269)	0.4098** (0.0352)
	Hanwa Beta	0.0717* (0.0411)	0.2971** (0.0914)	0.2496** (0.1278)	0.0263 (0.0415)	-0.0091 (0.0423)	0.1146** (0.0555)
	Sanyo Beta	0.1830** (0.0462)	0.5464** (0.1027)	0.5579** (0.1436)	0.1017** (0.0467)	0.1214** (0.0476)	0.0526 (0.0623)
	Midori Beta	-0.1491** (0.0453)	-0.1830* (0.1007)	-0.3314** (0.1408)	-0.1281** (0.0457)	-0.1173** (0.0466)	-0.1553** (0.0611)
	# of observations	92,872	9,880	6,916	76,076	54,340	21,736
	R-squared	0.7699	0.7537	0.6447	0.6434	0.6725	0.3863
	Adj. R-squared	0.7651	0.7486	0.6373	0.6360	0.6658	0.3736
	Log likelihood	4557.73	3773.86	3442.81	4547.91	4529.03	4262.26

Table 4[a]

Portfolios of banks grouped by size and financial strength

Event Date	Failure Event	*Strong Large Banks*	*Weak Large Banks*	*Very Weak Large Banks*	*Weak Regional Banks*	*Weak First Regional Banks*	*Weak Second Regional Banks*
7-31-95	Cosmo CC	-0.0016	0.0016	0.0035	0.0072	0.0122**	0.0012
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
8-30-95	Kizu CC	-0.0044	-0.0037	0.0003	0.0006	0.0021	-0.0011
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
8-31-95	Hyogo	-0.0051	0.0062	0.0013	-0.0117**	-0.0066	-0.0178**
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
12-7-95	Osaka CC	0.0003	0.0019	0.0021	-0.0004	0.0030	-0.0044
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
4-1-96	Taiheiyo	-0.0040	-0.0027	0.0057	0.0025	0.0086	-0.0049
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
11-21-96	Hanwa	0.0017	0.0027	0.0035	-0.0162**	-0.0124**	-0.0207**
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
4-25-97	Nissan Life	-0.0066	-0.0038	-0.0526**	-0.0077	-0.0115**	-0.0031
		(0.0057)	(0.0066)	(0.0063)	(0.0057)	(0.0058)	(0.0084)
5-14-97	Chogin Osaka CC	-0.0032	0.0020	-0.0001	-0.0045	-0.0014	-0.0082
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
10-14-97	Kyoto Kyoei	-0.0213**	-0.0110*	0.0016	-0.0086	0.0057	-0.0120
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
11-4-97	Sanyo Securities	0.0089	0.0035	-0.0013	-0.0089	-0.0071	-0.0109
		(0.0057)	(0.0063)	(0.0109)	(0.0057)	(0.0058)	(0.0084)
11-17-97	Hokkaido Takushoku	0.0180**	-0.0118*	-0.0311**	-0.0236**	-0.0241**	-0.0230**
		(0.0062)	(0.0068)	(0.0117)	(0.0061)	(0.0062)	(0.0090)

[a] Estimation by ordinary least squares. CC indicates Credit corporations. Failed entities are banks unless otherwise indicated. * indicates significance at 10 percent confidence level, ** indicates significance at 5 percent confidence level.

Table 4
(continued)

Event Date	Failure Event	*Strong Large Banks*	*Weak Large Banks*	*Very Weak Large Banks*	*Weak Regional Banks*	*Weak First Regional Banks*	*Weak Second Regional Banks*
11-25-97	Yamaichi Securities	0.0203** (0.0060)	-0.0038 (0.0066)	-0.0526** (0.0114)	-0.0165** (0.0059)	-0.0177** (0.0060)	-0.0150* (0.0088)
3-17-98	Wakayamaken CC	-0.0067 (0.0057)	0.0025 (0.0063)	0.0009 (0.0109)	-0.0016 (0.0057)	0.0005 (0.0058)	-0.0041 (0.0084)
5-15-98	Midori	0.0026 (0.0057)	-0.0038 (0.0063)	-0.0021 (0.0109)	0.0003 (0.0057)	-0.0013 (0.0058)	0.0023 (0.0084)
10-23-98	Long-Term Credit	0.0061 (0.0057)	0.0069 (0.0063)	0.0012 (0.0109)	-0.0014 (0.0057)	-0.0021 (0.0058)	-0.0005 (0.0084)
12-14-98	Nippon Credit	-0.0035 (0.0057)	0.0007 (0.0063)	-0.0023 (0.0109)	-0.0014 (0.0057)	-0.0001 (0.0058)	-0.0029 (0.0084)
	Constant	0.0000 (0.0002)	-0.0003 (0.0002)	-0.0003 (0.0004)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0003)
	Beta	1.3727** (0.0620)	1.293** (0.0682)	1.1786** (0.1182)	0.6821** (0.0615)	0.6750** (0.0625)	0.6906** (0.0910)
	Hanwa Beta	0.1953** (0.0977)	0.3407** (0.1075)	0.5059** (0.1861)	0.0773 (0.0968)	-0.0177 (0.0984)	0.1913 (0.1433)
	Sanyo Beta	0.1738 (0.1098)	0.7061** (0.1208)	1.0377** (0.2091)	0.3937** (0.1087)	0.6301** (0.1106)	0.1101 (0.1610)
	Midori Beta	0.1667 (0.1077)	-0.3329** (0.1184)	-1.0005** (0.2050)	-0.6789** (0.1066)	-0.7949** (0.1084)	-0.5397** (0.1579)
	# of observations	2,964	6,916	2,964	10,868	5,928	4,940
	R-squared	0.7028	0.7020	0.4688	0.3698	0.3795	0.2038
	Adj. R-squared	0.6966	0.6958	0.4578	0.3567	0.3666	0.1873
	Log likelihood	3707.83	3613.98	3072.03	3713.54	3697.09	3326.59

Table 5a[a]

Cross-sectional Results
Second Regional Banks

Date	Failure event	*Constant*	*Assets*	*Badloan*	*ROE*	*Lowdiv*	*Adj R^2*
7-31-95	Cosmo CC	0.088	-0.013	-0.273	-0.033**	-0.006	0.066
		(1.041)	(-.945)	(-1.387)	(-2.331)	(-.956)	
8-30-95	Kizu CC	-0.097**	0.015**	0.103	0.011**	0	0.308
		(-3.450)	(3.416)	(1.572)	(2.325)	(.205)	
8-31-95	Hyogo	-0.084	0.012	0.176	-0.003	-0.021**	0.14
		(-.686)	(.644)	(.618)	(-.129)	(-2.214)	
12-7-95	Osaka CC	-0.104	0.017	-0.194	0.003	0.002	0.045
		(-1.240)	(1.321)	(-.994)	(.178)	(.315)	
4-1-96	Taiheiyo	-0.127	0.02	0.252	0.035**	-0.001	0.224
		(-1.562)	(1.535)	(1.328)	(2.575)	(-.095)	
11-21-96	Hanwa	-0.04	0.006	0.158	0.009	-0.02**	0.777
		(-.894)	(.793)	(1.532)	(1.188)	(-5.982)	
4-25-97	Nissan	-0.125	0.019	0.06	-0.007	-0.002	0.015
		(-1.473)	(1.424)	(.303)	(-.501)	(-.305)	
5-14-97	Chogin Osaka	-0.01	0.001	-0.064	-0.014	-0.007	0.001
		(-.171)	(.126)	(-.459)	(-1.367)	(-1.490)	
10-14-97	Kyoto Kyoei	0.142	-0.024	0.157	0.006	-0.012	0.087
		(1.312)	(-1.398)	(.624)	(.349)	(-1.391)	
11-4-97	Sanyo	-0.144	0.023	-0.061	0.013	0	0.03
		(-1.397)	(1.397)	(-.253)	(.735)	(-.040)	
11-17-97	Hokkaido Takushoku	0.027	-0.006	0.365	0.003	-0.032**	0.305
		(.206)	(-.280)	(1.193)	(.140)	(-3.100)	
11-25-97	Yamaichi	-0.15	0.028	-0.931**	0.031	0.023*	0.448
		(-.936)	(1.090)	(-2.502)	(1.147)	(1.851)	
3-17-98	Wakayamaken	-0.022	0.004	-0.031	0.012	0.001	0.137
		(-.454)	(.476)	(-.275)	(1.468)	(.296)	
5-15-98	Midori	-0.075	0.012	0.113	-0.008	-0.003	-0.113
		(-.648)	(.632)	(.419)	(-.388)	(-.291)	
10-23-98	LTCB	0.035	-0.006	0.036	0.013	0.006	-0.022
		(.503)	(-.575)	(.221)	(1.131)	(1.211)	
12-14-98	NCB	-0.129	0.021*	0.165	0.02	-0.004	0.139
		(-1.640)	(1.675)	(.902)	(1.533)	(-.696)	

[a] T-statistics are in parentheses. * and ** indicate statistical significance at 10 and 5 percent confidence levels respectively. Samples have 22 observations.

Table 5b[a]
Cross-sectional Results
First Regional Banks

Date	Failure event	*Constant*	*Assets*	*Badloan*	*ROE*	*Lowdiv*	*Adj R^2*
7-31-95	Cosmo CC	-0.022	0.004	0.017	-0.018	0.004	0.098
		(-.753)	(.879)	(.235)	(-1.491)	(.969)	
8-30-95	Kizu CC	0.012	-0.002	0.001	-0.001	0.001	-0.061
		(.572)	(-.548)	(.014)	(-.085)	(.421)	
8-31-95	Hyogo	-0.061*	0.009*	0.008	-0.032**	-0.01*	0.074
		(-1.879)	(1.795)	(.096)	(-2.306)	(-1.888)	
12-7-95	Osaka CC	0.021	-0.003	-0.106*	0.017*	0.01**	0.078
		(.874)	(-.807)	(-1.708)	(1.678)	(2.530)	
4-1-96	Taiheiyo	0.022	-0.003	-0.01	0.025*	0.011**	0.042
		(.723)	(-.638)	(-.122)	(1.889)	(2.220)	
11-21-96	Hanwa	-0.029	0.005	-0.007	-0.025**	-0.017**	0.361
		(-1.327)	(1.370)	(-.120)	(-2.665)	(-5.031)	
4-25-97	Nissan	0.013	-0.002	-0.102	-0.014	-0.008**	0.143
		(.500)	(-.516)	(-1.564)	(-1.258)	(-2.033)	
5-14-97	Chogin Osaka	0.045**	-0.007**	0.023	-0.007	0	0.145
		(2.717)	(-2.930)	(.560)	(-.960)	(-.181)	
10-14-97	Kyoto Kyoei	0.014	-0.002	-0.043	-0.015	-0.01**	0.091
		(.511)	(-.376)	(-.632)	(-1.358)	(-2.342)	
11-4-97	Sanyo	0.01	-0.002	-0.007	-0.006	-0.005	-0.031
		(.413)	(-.543)	(-.108)	(-.563)	(-1.205)	
11-17-97	Hokkaido Takushoku	0.07	-0.01	-0.519**	-0.009	-0.007	0.303
		(1.250)	(-1.118)	(-3.669)	(-.398)	(-.754)	
11-25-97	Yamaichi	0.149**	-0.022**	-0.661**	-0.059**	-0.004	0.354
		(2.389)	(-2.242)	(-4.189)	(-2.252)	(-.399)	
3-17-98	Wakayamaken CC	-0.054*	0.008	0.076	-0.006	-0.001	0.008
		(-1.698)	(1.602)	(.948)	(-.477)	(-.273)	
5-15-98	Midori	-0.059	0.008	0.105	0.015	0.001	-0.009
		(-1.292)	(1.181)	(.910)	(.775)	(.158)	
10-23-98	LTCB	-0.018	0.002	0.116	-0.001	-0.003	-0.042
		(-.481)	(.346)	(1.213)	(-.079)	-(.534)	
12-14-98	NCB	0.035	-0.005	0.001	0.011	-0.001	-0.022
		(1.321)	(-1.233)	(.021)	(.961)	(-.173)	

[a] T-statistics are in parentheses. * and ** indicate statistical significance at 10 and 5 percent confidence levels respectively. Samples have 55 observations

Table 5c[a]

Cross-sectional Results

City and Trust Banks

Date	Failure event	*Constant*	*Assets*	*Badloan*	*ROE*	*Adj R^2*
7-31-95	Cosmo CC	0.113*	-0.015*	-0.022	0.066**	0.679
		(1.841)	(-1.874)	(-.300)	(2.611)	
8-30-95	Kizu CC	-0.036	0.004	0.107**	0.019	0.322
		(-.865)	(.696)	(2.135)	(1.116)	
8-31-95	Hyogo	0.006	0	-0.052	-0.05*	0.264
		(.092)	(-.031)	(-.651)	(-1.839)	
12-7-95	Osaka CC	-0.063*	0.008*	0.068	0	0.092
		(-1.751)	(1.773)	(1.570)	(-.019)	
4-1-96	Taiheiyo	-0.019	0.001	0.161**	0.006	0.469
		(-.369)	(.198)	(2.567)	(.297)	
11-21-96	Hanwa	-0.028	0.004	0.046*	0.006	-0.002
		(-1.230)	(1.272)	(1.676)	(.651)	
4-25-97	Nissan	0.007	-0.002	-0.039	-0.002	-0.213
		(.087)	(-.183)	(-.384)	(-.067)	
5-14-97	Chogin Osaka CC	-0.085	0.011	0.038	0.018	-0.121
		(-.955)	(.945)	(.355)	(.494)	
10-14-97	Kyoto Kyoei	-0.004	-0.002	0.118	0.095	0.208
		(-.024)	(-.117)	(.617)	(1.454)	
11-4-97	Sanyo	-0.127**	0.017**	0	0.031	0.426
		(-2.223)	(2.389)	(.000)	(1.318)	
11-17-97	Hokkaido Takushogu	0.072	-0.008	-0.341**	0.144**	0.4
		(.527)	(-.463)	(-2.063)	(2.559)	
11-25-97	Yamaichi	0.043	-0.002	-0.502	0.081	0.109
		(.155)	(-.065)	(-1.500)	(.712)	
3-17-98	Wakayamaken	0.019	-0.003	0.009	-0.029	-0.113
		(.306)	(-.328)	(.123)	(-1.110)	
5-15-98	Midori	-0.107*	0.013*	0.069	0.022	0.058
		(-1.896)	(1.862)	(1.005)	(.959)	
10-23-98	LTCB	-0.003	0.001	-0.079	0.036	-0.087
		(-.033)	(.113)	(-.674)	(.892)	
12-14-98	NCB	-0.057	0.007	0.066	0.011	-0.177
		(-.758)	(.718)	(.722)	(.368)	

[a] T-statistics are in parentheses. * and ** indicate statistical significance at 10 and 5 percent confidence levels respectively. Samples have 17 observations.

Table 6[a]
Tests for the differences in responses across bank categories

		(CB+TB+FRB) vs SRB		FRB vs SRB		(CB+TB) vs (FRB)		(CB+TB) vs (FRB+SRB)	
		F-stat	**LLR**	**F-stat**	**LLR**	**F-stat**	**LLR**	**F-stat**	**LLR**
7-31-95	Cosmo CC	2.75**	14.24**	2.14*	11.42**	6.01**	22.96**	6.35**	24.34**
		(0.024)	(0.014)	(0.071)	(0.044)	(0)	(0)	(0)	(0)
8-30-95	Kizu CC	1.84	7.72*	1.11	6.15	0.75	3.30	1.32	5.6
		(0.13)	(0.10)	(0.36)	(0.29)	(0.56)	(0.51)	(0.27)	(0.23)
8-31-95	Hyogo	1.40	5.93	1.40	7.63	0.45	2.01	0.62	2.66
		(0.24)	(0.20)	(0.24)	(0.18)	(0.77)	(0.73)	(0.65)	(0.62)
12-7-95	Osaka CC	1.34	5.67	1.49	8.10	1.00	4.38	0.85	3.66
		(0.26)	(0.23)	(0.21)	(0.15)	(0.41)	(0.36)	(0.5)	(0.45)
4-1-96	Taiheiyo	1.97	8.25*	1.52	8.25	0.54	2.41	1.03	4.4
		(0.11)	(0.08)	(0.2)	(0.14)	(0.70)	(0.66)	(0.4)	(0.36)
11-21-96	Hanwa	1.46	6.16	2.86**	14.88**	1.63	6.97	1.5	6.33
		(0.22)	(0.19)	(0.02)	(0.01)	(0.18)	(0.14)	(0.21)	(0.18)
4-25-97	Nissan	1.65	6.94	1.1	6.08	0.46	2.06	0.89	3.81
		(0.17)	(0.14)	(0.37)	(0.3)	(0.76)	(0.76)	(0.47)	(0.43)
5-14-97	Chogin Osaka CC	0.97	4.13	2.99**	15.52**	1.9	8.07*	0.94	4.0
		(0.43)	(0.39)	(0.02)	(0.01)	(0.12)	(0.09)	(0.45)	(0.41)
10-14-97	Kyoto Kyoei	1.94	8.12*	2.81**	14.64**	2.58**	10.75**	3.0**	12.28**
		(0.11)	(0.09)	(0.02)	(0.01)	(0.05)	(0.03)	(0.02)	(0.02)
11-4-97	Sanyo	1.05	4.46	1.16	6.40	2.28*	9.59**	1.33	5.62
		(0.39)	(0.35)	(0.34)	(0.27)	(0.07)	(0.05)	(0.27)	(0.23)
11-17-97	Hokkaido Takushoku	0.61	2.64	1.45	7.91	6.11**	23.3**	5.9**	22.79**
		(0.65)	(0.62)	(0.22)	(0.16)	(0)	(0)	(0)	(0)
11-25-97	Yamaichi	1.23	5.22	2.60**	13.68**	5.11**	19.96**	5.23**	20.48**
		(0.31)	(0.27)	(0.03)	(0.02)	(0)	(0)	(0)	(0)
3-17-98	Wakayamaken	1.09	4.66	0.90	5.01	0.88	3.84	1.01	4.30
		(0.37)	(0.33)	(0.49)	(0.42)	(0.48)	(0.43)	(0.41)	(0.37)
5-15-98	Midori	0.65	2.81	0.46	2.6	1.34	5.81	1.36	5.76
		(0.63)	(0.59)	(0.81)	(0.76)	(0.26)	(0.21)	(0.26)	(0.22)
10-23-98	LTCB	0.39	1.71	0.37	2.09	0.89	3.92	1.29	5.48
		(0.81)	(0.79)	(0.87)	(0.83)	(0.47)	(0.42)	(0.28)	(0.24)
12-14-98	NCB	1.46	6.18	1.21	6.63	0.67	2.94	0.68	2.92
		(0.22)	(0.19)	(0.32)	(0.25)	(0.62)	(0.57)	(0.61)	(0.57)

[a] P-values are in parentheses. (CB+TB+FRB)vsSRB tests whether the cross-section equation for the Second Regional Banks (SRB) is the same as that for other banks, including City Banks(CB), Trust Banks(TB), and the First Regional Banks(FRB)). Sample includes 10 city banks, 7 trust banks, 55 First Regional banks, and 22 second regional banks. Samples including City and Trust banks do not include *Lowdiv* variable in specification to avoid singularity problem. * and ** indicate statistical significance at 10 and 5 percent confidence levels respectively.