

# **The Effectiveness of Bank Recapitalization in Japan**

**Heather Montgomery\* and Satoshi Shimizutani\*\***

**This Version: May 2005**

**Abstract:**

This study examines the effectiveness of bank recapitalization policies in Japan. Based on a careful reading of the “business revitalization plan” submitted by banks requesting government funds, we identify four primary goals of the capital injection plan in Japan: 1) to increase the bank capital ratios 2) to increase lending, in particular to small and medium enterprises, and avoid a “credit crunch” 3) to increase write-offs of non-performing loans and 4) to encourage restructuring. Using a panel of individual bank data, we empirically estimate the effectiveness of the Japanese government policy of public fund injection in achieving the first three of these stated goals.

Our empirical analysis of international and domestic banks reveals that the second round capital injection was much more effective than the first round of 1997. Neither round of capital injections seems to have had much effect on total loan growth, but the second round – which varied by bank to reflect the banks’ individual condition, was effective in increasing regulatory capital, encouraging write off of bad loans and increasing lending to small and medium enterprises (SMEs).

---

\* Asian Development Bank Institute Tel: 03-3593-5524 E-mail: [hmontgomery@adbi.org](mailto:hmontgomery@adbi.org)

\*\* Cabinet Office Tel: 03-3581-9768 E-mail: [satoshi.shimizutani@mfs.cao.go.jp](mailto:satoshi.shimizutani@mfs.cao.go.jp)

## I. Introduction

In recent years, Japanese taxpayers have spent over 10 trillion yen, or 2% of Japan's nominal GDP, in capital injections into the country's troubled banking sector. More capital injections are likely to come in the near future. Kozo Yamamoto, a member of the LDP's Finance Committee has gone on record stating that if the three-year limit on deferred tax assets, which triggered Resona's downfall, is applied to other banks, "there will be a flurry" of banks that will need public funds. About half the capital of Japan's big four city banks is made up of DTAs. If this allowance were removed, all would drop below their capital adequacy requirement. This month, new legislation explicitly allowing "preventive" capital injections will become effective.

Are capital injections effective? Panic and large-scale bank runs have been successfully avoided, but Fukao (2003) has predicted that "the Japanese government will have to nationalize most of the banking sector by 2005. Capital injections will not solve the problems." Indeed, despite over 1 billion yen in capital injections to its predecessors, Daiwa and Asahi, Resona Bank – Japan's 5<sup>th</sup> largest - had to receive another 2 trillion yen in May 2003, effectively nationalizing the bank. Ashikaga Bank - Japan's 10<sup>th</sup> largest regional bank – was nationalized in December of that same year despite having already received more than 135 billion in government capital. Another 1 trillion yen was reportedly spent in "stabilizing funds" after nationalization.

There is clear empirical evidence that capitalization affects the behavior of Japanese banks<sup>1</sup>. Montgomery (2004) demonstrates that although both domestic and international banks are insensitive to overall regulatory capital, lending by international banks is highly sensitive to core capital. Ito and Sasaki (2002) shows that banks with lower capital ratios tended to issue more subordinated debts and to reduce lending overall and Peek and Rosengren (1997) have found evidence of the international transmission of negative capital shocks to U.S. loan markets. In later research, Peek and Rosengren (2003) and Watanabe (2004) find evidence that negative shocks to bank capital result in a shift to lower quality loan portfolios.

But despite the large amounts of money at stake, there has been no quantitative research specifically examining the effectiveness of capital injections. This study aims to inform the policy debate on how best to deal with systemic weakness in the banking sector. Thus, this study holds important policy implications, not only for Japan, but also for other countries facing similar banking sector problems. In the wake of the Asian Crisis of 1997, governments throughout have been allocating huge amounts of public funds to bail out the troubled financial sectors in those countries.

Based on a careful reading of the "business revitalization plan" submitted by banks requesting government funds, we identify four primary goals of the capital injection plan in Japan: 1) to increase the bank capital ratios 2) to increase lending, in particular to small and medium enterprises, and avoid a "credit crunch" 3) to increase

---

<sup>1</sup> In addition to the studies cited above, readers may see the following related papers: Baba (1995), Honda (2002), Horiuchi, and Shimizu (1998), Ueda (1993) and Yoshikawa and Ike (1994).

write-offs of non-performing loans and 4) to encourage bank restructuring. Using a panel of individual bank data, we empirically estimate the effectiveness of the Japanese government policy of public fund injection in achieving the first three of these stated goals.

This paper is organized as follows: section II briefly outlines the most recent history of Japan's banking sector crisis and section III catalogues the policy response, focusing on the government's decision to inject public funds into the banking sector. Section IV explains the mechanisms by which capital injections may influence bank behavior. Section V describes the data and empirical specification as well as the results of our regression analysis. Section V concludes.

## **II. Japan's Banking Sector in Crisis**

Although warning signs had been evident much earlier<sup>2</sup>, the weakness in the Japanese financial sector reached a crisis in 1997. The first to fall was Sanyo Securities, a mid-sized securities company that folded on November 3, 1997. The next failure was even larger. Hokkaido Takushoku Bank failed on November 17, 1997<sup>3</sup>, costing the DIC 3,411.3 billion yen, more than the 2,514 billion yen that had been used in all the DIC's previous history. One week later, on November 24, 1997, Yamaichi Securities, one of Japan's oldest and largest brokerage firms, followed suit. Only 2 days later, Tokuyo City Bank, a small regional bank, collapsed on November 26, 1997.

The following year, two other "top 20" banks were nationalized. The Long-Term Credit Bank of Japan was placed under state stewardship on October 23, 1998 and Nippon Credit Bank followed on December 13 of the same year. The DIC acquired all outstanding shares of both banks and provided credit to them to continue operating<sup>4</sup>.

All of these institutions had previously been considered "too big to close". The three banks were ranked among the nations "top 20" banks, which dominated the lending markets, and Yamaichi was one of the top 4 securities houses, which had previously accounted for over 70% of the securities business. These failures marked the end of the traditional "convoy system" safety net. The news led to a sell off of bank shares on the stock market and the emergence of the so-called "Japan Premium" in overseas lending markets

---

<sup>2</sup> Several small financial institutions failed between 1992 and 1997 and by the end of 1997, sixteen credit cooperatives, shinkin banks, and regional banks had failed and mergers had been arranged with healthier institutions under the so-called "convoy system". Then, in October 1995 it was reported that all 7 of Japan's *jusen* (home mortgage companies) were completely insolvent. Under a controversial resolution scheme, these losses were also largely passed on to large financial institutions.

<sup>3</sup> Actual grant and asset purchase by the DIC took place in October of 1998.

<sup>4</sup> Actual grant and asset purchase by the DIC took place in August and October of 1999. LTCB was later re-privatized as Shinsei Bank and NCB as Aozora Bank.

### **III. Policy Response: 1998-1999**

In February 1998 the Diet responded to the financial crisis with the Financial Function Stabilization Plan<sup>5</sup>, which allocated 30 trillion yen to the Deposit Insurance Corporation: 17 trillion yen for a Special Operations Account, which was to supplement the already established General Account in order to provide full deposit protection of insolvent banks, and 13 trillion yen to a newly established Financial Crisis Management Account.

The Financial Crisis Management Account funds went toward a capital injection of all 19 of the top city, trust and long-term credit banks at the close of fiscal year 1997 (March 1998). In total, 1.8 trillion in capital was given out in the form of purchases of preferred stock, subordinated debt, or as a subordinated loan (See table 1 for details). Many banks were reluctant to apply for the funds for fear of the message it would send to the market, so all banks were pressured to apply for the same amount of capital. Even Tokyo-Mitsubishi bank, which did not wish to apply for a capital injection, was pressured to apply for the standard 100 billion yen<sup>6</sup>. Regional banks - Yokohama Bank, Ashikaga Bank and Hokuriku Bank - applied for smaller capital injections. Since subordinated debt, subordinated loans and preferred stock count toward Tier II<sup>7</sup> capital in calculating the capital to risk weighted asset ratio reported to the Bank for International Settlements, this helped many banks clear the 8% capital to risk weighted asset ratio required under the Basel Accord.

Even with the capital injection, many banks faced difficulty in meeting the 8% capital requirement, so authorities also implemented several other changes. Accounting standards were relaxed in fiscal year 1997 in order to boost the banks' reported capital<sup>8</sup>. In April 1998, the start of fiscal year 1998, the "Law to Ensure the Soundness of Financial Institutions"<sup>9</sup> - equivalent to the Prompt Corrective Action (PCA) measures in force in the United States since the late 1980s - were introduced. In June 1998, the Financial Supervisory Agency (FSA) was established. The FSA took over the supervision of banks, securities firms and insurance companies from the Ministry of Finance. The FSA also took over the supervision of shinkin banks from the Regional Financial Bureaus and the supervision of credit cooperatives from the prefectural governments. In the Fall

---

<sup>5</sup> This included two laws to stabilize the financial system, including the Financial Function Stabilization Law.

<sup>6</sup> Tokyo-Mitsubishi is the only bank to have repaid the public funds in full.

<sup>7</sup> Dated (more than 5 years) subordinated debt, subordinated loans and preferred stock count as Tier II capital. Perpetual preferred stock and subordinated debt count as Tier I capital. In recent years, some short term (more than 2 years but less than 5 years) subordinated debt has been counted as Tier III capital.

<sup>8</sup> Banks were given the option of using either fair value accounting, the lower of book or market value method, or book value. This meant that banks did not necessarily have to report losses on securities held in their trading account on their balance sheets. Secondly, banks were allowed to count 45% of revalued land holdings toward Tier II capital. Although land prices were substantially lower than during the bubble period, most land held on the banks' balance sheets still carried a market value much higher than the historical cost.

<sup>9</sup> This law has two main components. First, the law defines a self-assessment process whereby banks value assets themselves according to well-defined guidelines. These findings are subject to review by external auditors and bank examiners. These new "risk asset" categories are broader than the non-performing loan categories used by the Japanese Bankers Association since 1993 (see appendix for details). Secondly, the law specifies capital thresholds under which regulators can order banks to take remedial action ranging from a forced reduction in the number of branches to liquidation.

of 1998 the FSA conducted full-scale on-site bank examinations of all the major banks. The Agency concluded that the self-assessment of asset quality undertaken by the banks in March 1998 were based on overly optimistic assumptions and that both the major banks and regional banks had significantly understated their non-performing loans.

In response to these findings, in October 1998, after months of deliberation in a special "Financial Diet Session", the Diet approved another plan to deal with the problems in the banking sector. The Financial Revitalization Plan<sup>10i</sup> doubled the amount of funds allocated to dealing with the crisis to 60 trillion yen. The 60 trillion was earmarked for three separate accounts within the DIC. The Special Operations Account, which was to supplement the already established General Account in order to provide full deposit protection of insolvent banks, received 17 trillion of the 60 trillion total. The Financial Reconstruction Account, which received 18 trillion yen, was to be used for the purchase and collection of assets in liquidating or nationalizing insolvent banks. As reported in figure 21, about 1/3 of the funds in this account have been used to date. Finally, the Early Strengthening Account replaced the Financial Crisis Management Account. The Early Strengthening Account, to be used in recapitalizing weak but solvent banks, received the largest endowment of 25 trillion yen.

The early strengthening account funds were used in a second round of capital injections in March of 1999 (the close of fiscal year 1998). 14 of the largest city, long term credit and trust banks, as well as Yokohama Bank received a total of 7.5 Trillion Yen (\$75 Billion), 4 times that of the first capital injection in March of 1998. As in 1998, the capital injection took the form of purchases by the DIC of preferred shares or subordinated debts or loans issued by the banks. Unlike the capital injection of 1998, the amount of the capital injection varied by bank and reflected the conditions of individual banks. To qualify for the capital injection, the FRC required each bank to submit a restructuring plan, including raising new capital from the private sector, which would be subject to quarterly review<sup>11</sup>.

In addition to the capital injections, regulations on consolidated balance sheet reporting were tightened in December 1998. Prior to that time, banks were required to consolidate in their financial reporting only those subsidiaries and affiliates in which they had more than a 50 percent stake and a 20 percent stake respectively. Under the new law, subsidiaries of banks and any company of which the bank group (a keiretsu with which the bank is associated) has more than a 40 percent stake have to consolidated in the financial reporting of the banks on a line by line basis. Thus, affiliation was more determined by influence than just strictly share holdings. Banks affiliates and any company of which a bank or bank group has more than a 15 percent stake and whose decisions are controlled by the bank were required to consolidate using the "equity method" (not line by line). Consolidated reporting requirements applied to non-

---

<sup>10</sup> The Financial Revitalization Plan included 4 new laws, two of which were the "Financial Function Reconstruction Law" and the "Early Strengthening Law". The "Financial Function Reconstruction Law" is officially called the Law Concerning Emergency Measures for the Reconstruction of the Function of the Financial System and the "Early Strengthening Law" is officially called the Law Concerning Emergency Measures for the Early Strengthening of the Financial Function.

<sup>11</sup> If not satisfied, the FSA could convert its holdings of preferred stocks to common stocks after a certain grace period, the length of which is determined by the strength of the bank, and as largest shareholder could put pressure on management. The Bank of Tokyo Mitsubishi did not apply for capital injection and instead made public its intention to pay off the subordinated debt issued to the government in March 1998.

performing loan estimates as well. Prior to December 1998 banks had been able to use "related companies" to clean up their balance sheets. Banks could set up related companies which were neither subsidiaries nor affiliates, and transfer their non-performing loans to these related companies at above market value. These related companies were jointly owned by the banks (who owned less than 5% each) and the firms in the banks keiretsu with whom the bank also had interlocking shares.

Tightening of financial regulation continued in fiscal year 1999. In April 1999 the FSA extended the Prompt Corrective Action (PCA) framework to purely domestic banks without international operations. The FSA then conducted an inspection of regional banks in the Fall of 1999. As a result of this inspection, the FSA recommended the merger of Hanshin Bank and Midori Bank into Minato Bank. Four other regional banks -- Namihaya, Kofuku, Kokumin and Tokyo Sowa -- were found to be insolvent. They were operated by public administrators as a bridge bank until successor institutions were found. Two other regional banks, Niigata-Chuo Bank<sup>12</sup> and Hokkaido Bank, were ordered to increase their capital in order to meet the 4% capital adequacy requirement.

Finally, mark-to-market accounting on all securities, including investment account securities, will be required as of fiscal year 2001. This will force banks to realize any hidden gains or losses on the equities held on their balance sheets and probably give banks incentives to sell off unprofitable investments rather than keep the shares as a way to cement business ties. To assist banks in this transition, the government is establishing an entity to purchase stocks held by the banks.

The most recent trend in the Japanese Banking Sector has been consolidation. The old "top 20" banks have been consolidated into 4 large groups: the Mizuho Financial Group, Sumitomo-Mitsui Financial Group, Tokyo-Mitsubishi Financial Group and UFJ Group<sup>ii</sup>.

#### **IV. Capital Injections and Bank Behavior**

Although bank managers may care about capital ratios for various reasons, capital ratios affect bank behavior primarily because of regulation. Japanese banks face different regulations on capital depending upon whether they are internationally active or a purely domestic bank.

##### **International Banks**

International banks are required to maintain a capital to risk-weighted asset ratio of at least 8%. This ratio is required not only of Japanese banks, but under the Basle Accord of 1998, of most internationally active banks worldwide.

$$BIS = \frac{TierI + TierII + TierIII - Goodwill}{RWA}$$

Tier 1, or Core Capital is basically shareholder's equity, with some adjustment for goodwill. Tier 1 Capital includes perpetual preferred stock.

---

<sup>12</sup> Niigata-Chuo Bank later failed. See appendix for details.

Tier 2 Capital in Japan includes up to 45% of the latent capital gains banks hold on equities, 45% of any revaluation of land held on their books<sup>iii</sup>, up to 1.25% of General Loan Loss Provisions, Dated Preferred Stock and Dated Subordinated Debt dated at more than 5 years. Dated Preferred Stock and Subordinated Debt are counted at full value up to 50% of the value of Tier 1 capital.

Tier 3 Capital includes short-term (more than 2 years but less than 5 years) subordinated debt.

Risk Weighted Assets (RWA) are calculated as a weighted sum of assets held by the bank. "Riskless" assets such as government bonds, receive a 0% weighting, while "risky" assets such as loans, corporate bonds and equities receive a 100% weighting. Mortgages and local government bonds fall in between.

### **Domestic Banks**

Domestic banks in Japan face a more lenient requirement of a 4% "MOF" (Ministry of Finance) ratio.

$$MOF = \frac{TierI + TierII(MOF) - Goodwill}{RWA(MOF)}$$

Most components of the MOF ratio are calculated similarly to the BIS ratio for international banks, but Tier 2 Capital does not include latent capital gains on securities and short-term subordinated debt is not counted as Tier 3 capital.

In order to meet the capital adequacy requirements discussed above, banks can either adjust risk-weighted assets (the denominator) or capital (the numerator). It is generally easier and less costly for banks to adjust their risk-weighted assets. Thus, capital constrained banks may be inclined to substitute out of heavily weighted "risky" assets such as loans and equities into lower weighted assets such as government bonds. Or conversely, banks receiving a capital injection from the government may be inclined to shift their portfolios by shifting out of government bonds into loans.

## **V. Empirical Analysis**

This section presents an empirical analysis of the effectiveness of the capital injections made to banks in fiscal year 1997 and 1998.

### **Data**

A panel of data from 106 banks' balance sheets and income statements for fiscal years 1990-1999<sup>13</sup> is used to estimate the effectiveness of the capital injections. Regional and International Banks are analyzed separately to preserve the homogeneity of the sample.

Several banks are excluded from the analysis due to nationalization, failure, or because they were established mid-sample (see appendix 1 for details). Mergers are accounted for by treating the merged bank as one entity for the entire sample period.

---

<sup>13</sup> Although longer time series data is available, the sharp consolidation of Japan's banking sector described above means that a consistent panel of data is not available after 2000.

Loans (*kashidashikin goukei*) are the sum of domestic loans to all industries plus international loans and trust account loans as reported in the annual *yukashoken hokokusho* reports.

We use three different measures of capital strength in the empirical analysis: the official regulatory capital ratio (the MOF ratio for domestic banks and BIS ratio for internationally active banks: *jikoshihon hiritsu*), the ratio of capital as reported on the balance sheet (*shihon*) to total assets (*shisan*) and the ratio of “core” Tier I capital to total assets.

Non-performing loans are measured using the Japanese Bankers Association definition (see appendix 2 for a detailed description of the various measures of non-performing assets), loans to bankrupt borrowers (*hatansaki*). This category is the strictest definition of non-performing loans and thus underestimates total non-performing assets, but we select it since it is the only measure of non-performing loans that has been reported by all banks since reporting was required in 1993 and the definition of this category of loans has not changed substantially as is the case for other classes of bad assets.

Written-off bad debt is defined as only direct write-offs (*kashidashikin kyuufukin shoukyaku*). Direct write-offs include only non-performing assets that are completely removed from the balance sheet by either write-off or selling the loan at a loss to the CCPC (Cooperative Credit Purchasing Company). Indirect write-offs, which also include transfers of funds to the allowance for loan losses on the banks' balance sheets, largely determined by the Financial Services Agency (FSA) “self assessment of asset quality” but also are to some extent dictated by past performance.

Our measure of profits is operating profits (*keijyorieki*). In order to cover bad debt write-offs, banks have taken large hits to their post-provision operating profits<sup>14</sup>. All the major banks have reported negative post-provision operating profits every year since fiscal year 1994. They have been able to compensate for this to some extent by selling off equity holdings (realizing their latent gains on equities), allowing them to report positive pre-tax profits<sup>15</sup> in some years. However, operating profits, which are calculated before provisions, write-offs, latent capital gains realizations and taxes, are the best measure of a banks current performance.

National and regional (prefectural) GDP are included to control for the national and regional business cycle.

With the exception of the BIS ratios, balance sheet data is reported at book value and on an unconsolidated basis. In fiscal year 1997 many large banks began reporting on a consolidated basis and all banks are now required to do so, but unconsolidated data is used in order to construct a continuous time series. GDP data is reported at current prices. Data was compiled from the Nikkei Needs Company data set, Bureau Van Dijk Electronic Publishing Bankscope data set and publicly available data on national GDP, prefectural level GDP and the amount of capital injections.

---

<sup>14</sup> Post-provision operating profits include deductions for other kinds of provisioning as well, such as write-down of sovereign risk loans or transfers to reserve for other credit losses, but these figures are much smaller than the sum of transfer to reserve for loan losses, loan charge-offs and losses on sales of loans to the CCPC.

<sup>15</sup> Pre-tax profits are also adjusted for profits and losses on investments in trusts, write--downs of equity securities and profits and losses on disposal of fixed assets, but these items are much smaller than the profits on sales of equity securities.

## Empirical Specification

We investigate the effect of the capital injections on four dependent variables: the regulatory capital ratio<sup>16</sup> (the BIS or MOF ratio), growth in total lending, growth in lending to small and medium enterprises, and loan write-offs (change as a ratio to total assets) with the following specification (equation 1):

$$Y_{i,t} = \alpha + \beta X_{i,t-1} + \gamma Z_{i,t-1} + \varepsilon_{i,t} \quad 1$$

where  $Y_{i,t}$  represents the dependent variable: growth in total lending, growth in lending to small and medium enterprises and the regulatory capital ratio in time  $t$  for bank  $i$ . Vector  $X_{i,t-1}$  denotes bank specific factors that influence loan growth such as GDP growth (regional GDP for the regional banks), change in operating profits to total assets and change in bad loan write offs to total assets. Vector  $Z_{i,t-1}$  comprises variables that indicate a bank's capital position, including the amount of capital injection. As described above, we use three different measures of overall capital strength: capital to total assets, regulatory capital to risk-weighted assets and "core" tier I capital to total assets. To look specifically at the effect of the capital injections, we interact these measures of capital strength with a dummy for banks and years in which capital was injected. We also do a separate estimation including the actual amount of capital injected as a percentage of the banks' total assets.

As described above, the capital injection of 1997 and 1998 were handled quite differently, and thus may well have had different effects on bank behavior. Ito and Harada (2004) finds aggregate evidence of this in their note on the disappearance of the Japan premium in March 1999. To investigate the hypothesis that the capital injections of 1997 and 1998 had differential impacts, in addition to a panel regression looking at the effect of the capital injections overall, we also look at the two injections separately in our regression analysis.

## Results

### International Banks

Estimation results for international banks are reported in tables 3-6.

Looking at table 3A, we see that overall regulatory capital was higher for those banks that received a capital injection, but regulatory capital does not seem to be sensitive to the *amount* of capital received. This finding is supported when we look at the differential effects of the 1997 and 1998 capital injections (table 3B). In both years,

---

<sup>16</sup> The regulatory capital ratio specification is estimated using Arellano and Bond's (1991) Generalized Method of Moments estimator since in some regressions we use lagged regulatory capital (the dependent variable) as a predetermined variable on the right hand side.

banks that received an injection show higher regulatory capital ratios, but those ratios are not sensitive to the amount of capital the banks received.

On aggregate, we also find no evidence that the capital injections had a significant impact of the amount of bad loan write-offs (table 4A). Analyzing the 1997 and 1998 responses separately (table 4B), we find some evidence that write-offs for international banks were sensitive the amount of capital injected for the second injection in 1998, but not for the first round in 1997.

Surprisingly, we find that the capital injections seem to have had no effect total loan growth (table 5A). Despite much public discussion, the injections seem to have done little to counteract or prevent a possible credit crunch. This finding holds both on aggregate and when we look at the injections separately. In fact, for the 1997 round of injections, we find that total loan growth was actually *lower* for those banks that received capital (table 5B).

Looking in particular at lending to small and medium enterprises (table 6A), we find that on aggregate SME lending by banks that received a capital injection was more sensitive to capital ratios and the amount of capital injected. However, looking at the disaggregated effect of the 1997 and 1998 injections, we see that this effect is entirely due to the second round of capital injections in 1998. In fact, in 1997 we again find evidence of the opposite trend. In 1998, banks that received a capital injection did more lending to SMEs and the amount of lending was more sensitive to various measures of bank capitalization and the amount of capital injected, but in 1997, the more capital banks received the *less* SME lending they tended to do and the *less* sensitive SME lending was to the banks capitalization.

### **Regional Banks**

Estimation results for the panel of regional banks are reported in tables 7-10.

The effect of the injections on regulatory capital for the regional banks is different than what we found earlier for the international banks: regulatory capital ratios are lower overall for those banks that received a capital injection, but ratios are sensitive to the amount of capital injected – the more capital the regional banks received the higher their reported regulatory capital ratio (table 7A). However, when we look at the effects of the capital injections by year (table 7B), we find that this sensitivity to the amount of capital injected comes entirely from the second round of capital injections (in fiscal year 1999 for the regional banks). In fact, for the first round of injections in 1997, the inverse relationship holds – the more capital injected into the regional banks the *lower* their reported regulatory capital ratios.

As was the case for the international banks, on aggregate, bad loan write-offs for the regional banks were insensitive to receipt of capital (table 8A) and this finding holds for the 1999 injections as well when we look at the 1997 and 1999 injections separately (table 8B). For 1997, we find that bad debt write-offs may have been higher for those regional banks that received a capital injection, but that the amount of bad debt written off has a *negative* relationship with the amount of capital injected: banks that got relatively more capital wrote off relatively *less* bad debt.

Lending by the regional banks, both in total and to SMEs, shows no sensitivity to either receipt of a capital injection or to the amount of capital injected. This result holds when we look at the capital injection on aggregate and separately for 1997 and 1999.

## **V. Conclusions**

Our findings show that the second round of capital injections (in 1998 for international banks and 1999 for regional banks) was more effective than the first capital injection in 1997.

The first round of capital injections in 1997 does seem to have raised regulatory capital ratios for international banks (the BIS ratio), but the increase in regulatory capital was not sensitive to the amount of capital injected relative to the banks existing capital, and for regional banks regulatory capital was actually *lower* for those banks that received relatively more capital. Write-off of bad debt and lending to SMEs were also negatively related to the amount of capital injected during the first round, while overall loan growth seems to have been unaffected.

The second round of injections on the other hand, were not only effective in raising capital ratios for the international banks, but the regional banks as well, and this increase was sensitive to the amount of capital the banks' received. Although overall loan growth was still unaffected during the second round, this later round of injections enabled international banks to increase lending to SMEs, which were of particular concern to policy makers at the time, and to write off bad debts.

This result is true for both international and domestic banks, although we find that the capital injections were had generally more impact on the behavior of international banks than domestic banks.

This first round capital injection was uniformly handed out regardless of the condition of the recipient banks and the banks' proposed use of the injected capital, which is why it seems to have had little effect other than a "band-aid" to keep troubled banks above the required minimum regulatory capital ratio. The amount of capital administered during the second round, however, varied by bank to reflect conditions at the individual banks. To qualify, banks were required to submit a restructuring plan that outlined how the capital would be used. This approach was clearly much more effective in achieving policy objectives.

## **References**

- Baba, N., 1995. *Kinnen no ginko kashidashi no teimei ni kansuru jissyo bunseki* (Empirical analysis on low bank lendings in recent years). Mimeo. Institute of Monetary and Economic Studies, Bank of Japan.
- Fukao (2003) “Financial Sector Profitability and Double-Gearing” in Structural Impediments to Growth in Japan Blomstrom, Magnus, Jennifer Corbett, Fumio Hayashi, and Anil Kashyap, editors. University of Chicago Press.
- Honda, Y., 2002. The effects of the Basel Accord on bank credit: the case of Japan. *Appl. Econ.* 34, 1233–1239.
- Horiuchi, A., Shimizu, K., 1998. The deterioration of bank balance sheets in Japan: risk taking and recapitalization. *Pacific-Basin Finance J.* 6, 1–26.
- Hoshi, T. 2001. What happened to Japanese Banks? . Bank of Japan’s Monetary and Economic Studies, February: 1-29.
- Ito, T., Harada, K., 2004. Credit Derivatives as a New Japan Premium. *The Journal of Money, Credit and Banking* Vol. 36, No. 5. (Oct., 2004), pp. 965-968. (The Ohio State University Press).
- Ito, T., Sasaki, Y., 2002. Impacts of the Basel Capital Standard on Japanese banks’ behavior. *J. Japanese Int. Economies* 16, 372–397.
- Kroszner, R. and Rajan, R., 1994. Is the Glass-Steagall Act Justified? A Study of the U.S. Experience with Universal Banking before 1933. *American Economic Review* 84-4, 810-832.
- Montgomery, H. 2004. The effect of the Basel Accord on bank portfolios in Japan. *J. Japanese Int. Economies* forthcoming.
- Peek, J., Rosengren, E., 1997. The international transmission of financial shocks: the case of Japan. *Amer. Econ. Rev.* 87-4, 495–505.
- Peek, J., Rosengren, E., 2003. Unnatural selection: Perverse incentives and the misallocation of credit in Japan. NBER working paper 9643.
- Ueda, K., 1993. *Heisei fukyo wo koete* (Overcoming the Heisei recession). Seisaku Koso Forum report. Tokyo.
- Watanabe, W. 2004. Do negative shocks to bank capital cause flight to quality? : evidence from the Japanese financial crisis. Unpublished mimeo, Osaka University.

Yoshikawa, H., Ike, T., 1994. *Chusho kigyo ni taisuru ginkou ni yoru kashishiburi ni tsuite keizai-bunseki: seisaku kenkyu no shiten* (Credit crunch for small and medium-size firms: policy analysis). Working paper 1. Economic Planning Agency, Tokyo.

## **Tables and Figures**

**Table 1: Details on Capital Injections****1997 – International Banks**

Bank Name	Amount of Capital Injection (billion Yen)	...of which Tier I	...of which Tier II
Asahi	100		100
Daiichi Kangyo	99	99	
Daiwa	100		100
Fuji	100		100
Industrial Bank of Japan	100		100
Mitsui Trust	100		100
Sakura	100		100
Sanwa	100		100
Tokai	100		100
Tokyo Mitsubishi	100		100
Toyo Trust	50		50
Yasuda Trust	150		150

**1997 – Regional Banks**

Bank Name	Amount of Capital Injection (billion Yen)	...of which Tier I	...of which Tier II
Ashikaga	30		30
Hokkaido	45		45
Hokuriku	20		20

**1998 – International Banks**

Bank Name	Amount of Capital Injection (billion Yen)	...of which Tier I	...of which Tier II
Asahi	500	400	100
Daiichi Kangyo	900	700	200
Daiwa	408	408	
Fuji	1000	800	200
Industrial Bank of Japan	600	350	250
Mitsubishi Trust	300	200	100
Mitsui Trust	400.2	250.2	150
Sakura	800	800	
Sanwa	700	600	100
Sumitomo Trust	300	100	200
Tokai	600	600	
Toyo Trust	200	200	

**1999 – Regional Banks**

Bank Name	Amount of Capital Injection (billion Yen)	...of which Tier I	...of which Tier II
Ashikaga	105	105	
Bank of the Ryukyus	40		40
Hiroshima Sogo	40	20	20
Hokuriku	75	75	
Kumamoto Family	30	30	

**Table 2: Summary Statistics**

Variable	# Obs	Mean	Std. Dev.	Min	Max
% Growth Total Loans	1258	1.55	7.49	-23.52	122.75
% Growth SME Loans	1254	1.15	16.02	-83.35	89.27
% Growth Bad Loan Write Offs (as % assets)	1195	0.01	0.21	-1.79	2.12
% Growth Profits (as % assets)	1258	-0.05	0.90	-13.16	7.49
% Growth GDP	1168	1.07	2.42	-6.39	8.89
BIS or MOF Regulatory Capital Ratio	1359	8.54	2.22	0.4	15.4
Capital (as % assets)	1364	4.06	1.03	0.13	8.55
Core Capital (as % assets)	654	4.19	.81	2.60	9.00
Capital Injection (as 1000th % assets)	1364	0.03	.25	0	4.24
Real Estate Lending (as % domestic loans)	1269	7.27	3.01	1.62	17.41

## Variable Definitions

<b>lagcprofit</b>	Growth Profits
<b>lagcgdp</b>	Growth GDP
<b>lagchatan</b>	Growth NPLs
<b>lagkjD</b>	Dummy – bank received capital injection
<b>lagkjD97</b>	Dummy – bank received capital injection 1997
<b>lagkjD98</b>	Dummy – bank received capital injection 1998
<b>lagkjD99</b>	Dummy – bank received capital injection 1999
<b>lagbismof</b>	BIS Ratio (for International Bank Regressions) MOF Ratio (for Regional Bank Regressions)
<b>lagbismofkjD</b>	BIS or MOF Ratio * Dummy for receipt of capital injection
<b>lagbismofkjD97</b>	BIS or MOF Ratio * Dummy for receipt of capital injection 1997
<b>lagbismofkjD98</b>	BIS or MOF Ratio * Dummy for receipt of capital injection 1998
<b>lagbismofkjD99</b>	BIS or MOF Ratio * Dummy for receipt of capital injection 1999
<b>lagkratio</b>	Capital/Assets Ratio
<b>lagkratiokjD</b>	Capital/Assets Ratio * Dummy for receipt of capital injection
<b>lagkratiokjD97</b>	Capital/Assets Ratio * Dummy for receipt of capital injection 1997
<b>lagkratiokjD98</b>	Capital/Assets Ratio * Dummy for receipt of capital injection 1998
<b>lagkratiokjD99</b>	Capital/Assets Ratio * Dummy for receipt of capital injection 1999
<b>lagcorek</b>	Core Capital Ratio
<b>lagcorekkjD</b>	Core Capital Ratio * Dummy for receipt of capital injection
<b>lagcorekkjD97</b>	Core Capital Ratio * Dummy for receipt of capital injection 1997
<b>lagcorekkjD98</b>	Core Capital Ratio * Dummy for receipt of capital injection 1998
<b>lagcorekkjD99</b>	Core Capital Ratio * Dummy for receipt of capital injection 1999
<b>lagkj</b>	Amount Capital Injection/Bank's Total Capital
<b>lagkj97</b>	Amount Capital Injection 1997/Bank's Total Capital
<b>lagkj98</b>	Amount Capital Injection 1998/Bank's Total Capital
<b>lagkj99</b>	Amount Capital Injection 1999/Bank's Total Capital
<b>Constant</b>	
<b>Number of NCODE</b>	Number of Banks

Table 3A International Banks  
Panel Estimates (Random Effects Model)

Dependent Variable: BIS Capital Ratio			
	1	2	3
lagcprofit	0.272 [0.064]***	0.13 [0.063]**	0.3 [0.107]***
lagcgdp	0.339 [0.085]***	0.259 [0.093]***	0.102 [0.085]
lagchatan	0.00159 [0.00146]	0.00259 [0.00162]	0.00164 [0.00147]
lagkjD	2.629 [0.348]***	2.747 [0.426]***	2.857 [0.358]***
lagbismof	0.778 [0.146]***		
lagkratio		0.273 [0.110]**	
lagcorek			0.515 [0.111]***
lagkj	-0.4 [0.298]	0.33 [0.282]	0.028 [0.254]
Constant	1.682 [1.421]	8.103 [0.482]***	7.263 [0.492]***
Observations	88	88	86
Number of NCODE	15	15	15
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%			

Source: ~~\*\*\*f-serv~~ ~~shared~~ ~~Montgomery~~ ~~K-Injection~~ ~~Stata~~ ~~Submit\_v1\_Panel\_RE\_GroupR-NR~~

Table 3B International Banks  
Panel Estimates (Random Effects Model)  
Differential effects

Dependent Variable: BIS Capital Ratio			
Ratio	1	2	3
lagcprofit	0.277 [0.064]***	0.13 [0.063]**	0.332 [0.107]***
lagcgdp	0.316 [0.092]***	0.203 [0.099]**	0.029 [0.091]
lagchatan	0.00136 [0.00149]	0.002 [0.00165]	0.0011 [0.00147]
lagkjD97	2.879 [0.439]***	2.599 [0.490]***	2.776 [0.425]***
lagkjD98	1.609 [0.918]*	1.727 [1.039]*	1.443 [0.912]
lagbismof	0.795 [0.153]***		
lagkratio		0.289 [0.111]***	
lagcorek			0.495 [0.110]***
lagkj97	-0.762 [0.719]	1.089 [0.679]	0.643 [0.611]
lagkj98	-0.022 [0.432]	0.608 [0.454]	0.492 [0.402]
Constant	1.56 [1.499]	8.144 [0.484]***	7.482 [0.497]***
Observations		88	88
Number of NCODE		15	15
Standard errors in brackets			
* significant at 10%; ** significant at 5%; *** significant at 1%			

Source: ~~\*\*\*f-serv~~ ~~shared~~ ~~Montgomery~~ ~~K-Injection~~ ~~Stata~~ ~~Submit\_v1\_Panel\_RE\_GroupR-NR~~

Table International Banks  
Panel Estimates (Random Effects Model)

Dependent Variable: Loan Write Offs (as ratio to total assets)			
	1	2	3
lagcprofit	0.013 [0.029]	0.020 [0.026]	0.045 [0.051]
lagcgdp	0.052 [0.039]	0.059 [0.038]	0.056 [0.040]
lagchatan	0.001 [0.00067]	0.001 [0.00067]	0.001 [0.00069]
lagkjD	0.196 [0.160]	0.236 [0.175]	0.228 [0.169]
lagbismof	-0.032 [0.067]		
lagkratio		0.015 [0.045]	
lagcorek			0.003 [0.053]
lagkj	0.052 [0.137]	-0.011 [0.116]	0.010 [0.120]
Constant	0.202 [0.654]	-0.167 [0.198]	-0.124 [0.233]
Observations		88	88
Number of NCODE		15	15
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%			

Source: ~~\\f-serv\shared\Montgomery\K-Injection\Stata\Submit\_v1\_Panel\_RE\_GroupR-NR~~

**Table 4B International Banks**  
**Panel Estimates (Random Effects Model)**  
**Differential effects**

Dependent Variable: Loan Write Offs (as ratio to total assets)			
	1	2	3
lagcprofit	0.008 [0.029]	0.021 [0.026]	0.062 [0.050]
lagcgdp	0.014 [0.042]	0.027 [0.040]	0.016 [0.043]
lagchatan	0.001 [0.00067]	0.000 [0.00067]	0.001 [0.00069]
lagkjD97	0.175 [0.197]	0.250 [0.199]	0.235 [0.199]
lagkjD98	-0.608 [0.412]	-0.540 [0.421]	-0.619 [0.428]
lagbismof	-0.058 [0.069]		
lagkratio		0.018 [0.045]	
lagcorek			-0.007 [0.052]
lagkj97	0.350 [0.323]	0.195 [0.275]	0.232 [0.287]
lagkj98	0.346 [0.194]*	0.244 [0.184]	0.301 [0.189]
Constant	0.517 [0.673]	-0.122 [0.196]	-0.008 [0.233]
Observations		88	88
Number of NCODE		15	15
Standard errors in brackets			
* significant at 10%; ** significant at 5%; *** significant at 1%			

Source: ~~Yf-serv~~ ~~Yshared~~ ~~YMontgomery~~ ~~YK-Injection~~ ~~YStata~~ ~~YSubmit\_v1\_Panel\_RE\_Group~~ ~~NR~~

Table 5A International Banks  
Panel Estimates (Random Effects Model)

Dependent Variable: Total Loan						
with	1	2	3	4	5	6
lagcprofit	-0.517 [0.473]	-0.305 [0.410]	-1.948 [0.734]***	-0.519 [0.465]	-0.302 [0.408]	-1.874 [0.727]***
lagcgdp	-0.097 [0.487]	0.231 [0.420]	-0.126 [0.394]	-0.01 [0.476]	0.273 [0.418]	-0.009 [0.400]
lagkjD	-29.158 [13.453]**	-6.12 [4.873]	-6.744 [6.300]	-8.631 [2.598]***	-5.95 [2.764]**	-8.213 [2.472]***
lagbismof	-0.701 [1.078]			-0.666 [0.982]		
lagbismofkjD	2.315 [1.282]*					
lagkratio		1.438 [0.641]**			1.294 [0.627]**	
lagkratiokjD		0.59 [1.186]				
lagcorek			1.289 [0.601]**			1.046 [0.584]*
lagcorekkjD			0.121 [1.398]			
lagkj				4.251 [1.963]**	1.763 [1.712]	1.83 [1.538]
Constant	7.277 [10.676]	-5.531 [2.843]*	-4.565 [2.902]	6.769 [9.721]	-5.06 [2.802]*	-3.752 [2.819]
Observations	120	120	118	120	120	118
Number of NCODE	15	15	15	15	15	15
Standard errors in brackets						
* significant at 10%; ** significant at 5%; *** significant at 1%						

Source: ~~Yf-serv~~shared#Montgomery#K-Injection#Stata#Submit\_v1\_Panel\_RE\_GroupR-NR

Table 5B International Banks  
Panel Estimates (Random Effects Model)

Differential effects

Dependent Variable: Total Loan Growth	1	2	3	4	5	6
lagcprofit	-0.507 [0.476]	-0.314 [0.411]	-2.073 [0.738]***	-0.491 [0.472]	-0.319 [0.412]	-1.99 [0.736]***
lagcgdp	0.094 [0.515]	0.358 [0.430]	0.131 [0.414]	0.104 [0.507]	0.339 [0.432]	0.116 [0.415]
lagkjD97	-20.369 [19.552]	9.878 [15.331]	1.142 [10.690]	-7.921 [3.301]**	-5.597 [3.260]*	-7.291 [3.011]**
lagkjD98	-11.257 [25.414]	2.63 [10.322]	3.425 [10.578]	-5.963 [6.818]	-3.001 [6.775]	-3.732 [6.355]
lagbismof	-0.512 [1.094]			-0.468 [1.035]		
lagbismofkjD97	1.319 [1.959]					
lagbismofkjD98	0.978 [2.118]					
lagkratio		1.463 [0.640]**			1.262 [0.636]**	
lagkratiokjD97		-5.665 [5.557]				
lagkratiokjD98		-0.8 [1.945]				
lagcorek			1.317 [0.596]**			1.128 [0.590]*
lagcorekkjD97			-2.437 [2.738]			
lagcorekkjD98			-1.293 [2.011]			
lagkj97				1.553 [5.319]	-0.228 [4.575]	-1.89 [4.350]
lagkj98				3.176 [3.217]	0.779 [3.010]	0.287 [2.810]
Constant	5.104 [10.872]	-5.897 [2.851]**	-5.251 [2.901]*	4.668 [10.298]	-5.08 [2.836]*	-4.387 [2.876]
Observations	120	120	118	120	120	118
Number of NCODE	15	15	15	15	15	15

Standard errors in brackets

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Source: ~~\*\*\*~~-serv~~\*\*\*~~shared~~\*\*\*~~Montgomery~~\*\*\*~~K-Injection~~\*\*\*~~Stata~~\*\*\*~~Submit\_v1\_Panel\_RE\_GroupR-NR

Table 6A International Banks  
Panel Estimates (Random Effects Model)

Dependent Variable:						
SME Loan Growth	1	2	3	4	5	6
lagcprofit	0.06 [0.386]	0.75 [0.352]**	-0.90 [0.554]	0.05 [0.371]	0.75 [0.355]**	-0.83 [0.537]
lagcgdp	-0.31 [0.397]	0.57 [0.361]	0.14 [0.297]	-0.16 [0.380]	0.54 [0.363]	0.30 [0.295]
lagkjD	-36.19 [10.959]***	-8.64 [4.187]**	-4.31 [4.749]	-2.36 [2.074]	-2.04 [2.401]	-3.30 [1.826]*
lagbismof	-3.41 [0.878]***			-3.37 [0.783]***		
lagbismofkjD	3.82 [1.045]***					
lagkratio		-0.83 [0.551]			-0.69 [0.545]	
lagkratiokjD		2.91 [1.019]***				
lagcorek			-0.62 [0.453]			-0.87 [0.432]**
lagcorekkjD			0.99 [1.054]			
lagkj				7.06 [1.567]***	3.74 [1.487]**	3.02 [1.136]***
Constant	30.90 [8.697]***	0.35 [2.443]	1.19 [2.188]	30.19 [7.760]***	-0.13 [2.434]	1.98 [2.082]
Observations		120	120	118	120	120
Number of NCODE		15	15	15	15	15
Standard errors in brackets						
* significant at 10%; ** significant at 5%; *** significant at 1%						

Source: ~~Yf-serv~~YsharedYMontgomeryYK-InjectionYStataYSubmit\_v1\_Panel\_RE\_GroupR-NR

Table 6B International Banks  
Panel Estimates (Random Effects Model)

Differential effects						
Dependent Variable: SME						
Loan Growth	1	2	3	4	5	6
lagcprofit	0.139 [0.370]	0.766 [0.340]**	-0.94 [0.504]*	0.177 [0.363]	0.693 [0.333]**	-1.021 [0.493]**
lagcgdp	0.057 [0.400]	0.735 [0.357]**	0.515 [0.283]*	0.14 [0.390]	0.723 [0.350]**	0.516 [0.278]*
lagkjD97	1.593 [15.204]	26.978 [12.711]**	21.447 [7.306]***	1.67 [2.544]	2.665 [2.640]	1.621 [2.018]
lagkjD98	-36.881 [19.762]*	-0.398 [8.558]	1.32 [7.230]	-0.955 [5.254]	-0.567 [5.487]	-1.155 [4.259]
lagbismof	-3.001 [0.850]***			-2.672 [0.798]***		
lagbismofkjD97	-0.173 [1.524]					
lagbismofkjD98	4.069 [1.647]**					
lagkratio		-0.791 [0.531]			-0.932 [0.515]*	
lagkratiokjD97		-10.697 [4.607]**				
lagkratiokjD98		1.701 [1.612]				
lagcorek			-0.584 [0.407]			-0.715 [0.395]*
lagcorekkjD97			-6.495 [1.871]***			
lagcorekkjD98			0.743 [1.374]			
lagkj97				-4.075 [4.099]	-10.335 [3.705]***	-10.554 [2.915]***
lagkj98				6.493 [2.479]***	4.326 [2.438]*	3.017 [1.883]
Constant	26.289 [8.454]***	-0.141 [2.364]	0.232 [1.983]	23.033 [7.936]***	0.419 [2.297]	0.795 [1.928]
Observations	120	120	118	120	120	118
Number of NCODE	15	15	15	15	15	15

Standard errors in brackets

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Source: ~~Wf~~-serv~~Y~~shared~~Y~~Montgomery~~Y~~K-Injection~~Y~~Stata~~Y~~Submit\_v1\_Panel\_RE\_GroupR-NR

Table 7A Regional Banks  
Panel Estimates (Random Effects Model)

Dependent Variable: MOF Capital Ratio		
	1	2
lagcprofit	-0.027 [0.058]	0.094 [0.064]
lagcgdp	-0.017 [0.021]	-0.089 [0.024]***
lagchatan	-0.00044 [0.00050]	-0.00012 [0.00057]
lagkjD	-3.435 [0.787]***	-2.254 [0.927]**
lagbismof	0.854 [0.017]***	
lagkratio		0.761 [0.061]***
lagkj	2.159 [0.454]***	1.665 [0.523]***
Constant	1.368 [0.153]***	5.478 [0.293]***
Observations	714	714
Number of NCODE	91	91
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%		

Source: ~~Wf-serv~~ ~~shared~~ ~~Montgomery~~ ~~KK-Injection~~ ~~Stata~~ ~~Submit\_v1\_Panel\_RE\_GroupR-NR~~

Table 7B Regional Banks  
Panel Estimates (Random Effects Model)  
Differential effects

Dependent Variable: MOF Capital Ratio		
	1	2
lagcprofit	-0.045 [0.059]	0.075 [0.065]
lagcgdp	-0.016 [0.021]	-0.088 [0.024]***
lagchatan	-0.00048 [0.00050]	-0.00017 [0.00057]
lagkjD97	2.808 [2.998]	3.547 [3.451]
lagkjD99	-1.614 [1.530]	-0.161 [1.769]
lagbismof	0.854 [0.017]***	
lagkratio		0.757 [0.061]***
lagkj97	-14.862 [7.193]**	-14.218 [8.274]*
lagkj99	1.319 [0.767]*	0.677 [0.888]
Constant	1.364 [0.152]***	5.497 [0.293]***
Observations	714	714
Number of NCODE	91	91
Standard errors in brackets		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Source: ~~\*\*\*f-serv~~shared\Montgomery\K-Injection\Stata\Submit\_v1\_Panel\_RE\_GroupR-NR

Table 8A Regional Banks  
Panel Estimates (Random Effects Model)

Dependent Variable: Loan Write Offs (as ratio to total assets)	1	2
	<b>lagcprofit</b>	0.063 [0.010]***
<b>lagcgdp</b>	-0.005 [0.004]	-0.005 [0.004]
<b>lagchatan</b>	0.00024 [0.00009]***	0.00024 [0.00009]***
<b>lagkjD</b>	-0.054 [0.139]	-0.052 [0.139]
<b>lagbismof</b>	0.002 [0.003]	
<b>lagkratio</b>		0 [0.007]
<b>lagkj</b>	0.012 [0.080]	0.01 [0.080]
<b>Constant</b>	0.002 [0.027]	0.016 [0.031]
<b>Observations</b>	679	679
<b>Number of NCODE</b>	91	91
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%		

Source: ~~WFF~~-~~serv~~~~shared~~~~Montgomery~~~~K~~-~~Injection~~~~Stata~~~~Submit\_v1\_Panel\_RE\_Group~~R-NR

Table 8B Regional Banks  
Panel Estimates (Random Effects Model)  
Differential effects

Dependent Variable: Loan Write Offs (as ratio to total assets)		
	1	2
lagcprofit	0.058 [0.011]***	0.059 [0.011]***
lagcgdp	-0.004 [0.004]	-0.004 [0.004]
lagchatan	0.00023 [0.00009]**	0.00023 [0.00009]**
lagkjD97	1.326 [0.526]**	1.326 [0.526]**
lagkjD99	0.4 [0.269]	0.4 [0.269]
lagbismof	0.002 [0.003]	
lagkratio		-0.001 [0.007]
lagkj97	-3.787 [1.262]***	-3.786 [1.262]***
lagkj99	-0.198 [0.135]	-0.199 [0.135]
Constant	0.001 [0.027]	0.018 [0.031]
Observations	679	679
Number of NCODE	91	91
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%		

Source: ~~Wf-serv~~~~shared~~~~Montgomery~~~~K-Injection~~~~Stata~~~~Submit\_v1\_Panel\_RE\_GroupR-NR~~

Table 9A Regional Banks  
Panel Estimates (Random Effects Model)

Dependent Variable: Total Loan Growth	1	2	3	4
lagcprofit	0.836 [0.275]***	0.863 [0.278]***	0.836 [0.274]***	0.852 [0.277]***
lagcgdp	0.464 [0.074]***	0.473 [0.075]***	0.464 [0.074]***	0.469 [0.074]***
lagkjD	-2.476 [9.661]	0.840 [7.429]	-1.755 [4.353]	-2.382 [4.358]
lagbismof	-0.121 [0.090]		-0.121 [0.091]	
lagbismofkjD	0.150 [1.158]			
lagkratio		-0.186 [0.196]		-0.214 [0.198]
lagkratiokjD		-0.615 [1.911]		
lagkj			0.334 [2.505]	0.661 [2.507]
Constant	1.932 [0.801]**	1.678 [0.845]**	1.932 [0.803]**	1.792 [0.857]**
Observations	991	993	991	993
Number of NCODE	91	91	91	91
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%				

Source: ~~WV~~-serv~~er~~shared~~W~~Montgomery~~K~~-Injection~~W~~Stata~~W~~Submit\_v1\_Panel\_RE\_GroupR-NR

Table 9B Regional Banks  
Panel Estimates (Random Effects Model)  
Differential effects

Dependent Variable: Total Loan Growth		1	2	3	4
lagcprofit	0.837 [0.278]***	0.849 [0.281]***	0.846 [0.279]***	0.861 [0.281]***	
lagcgdp	0.464 [0.074]***	0.472 [0.075]***	0.462 [0.074]***	0.468 [0.074]***	
lagkjD97	1065.787 [2,402.094]	20.512 [50.852]	-8.197 [16.600]	-8.599 [16.612]	
lagkjD99	-2.477 [9.726]	3.116 [10.421]	-3.264 [8.453]	-3.780 [8.457]	
lagbismof	-0.121 [0.091]		-0.123 [0.091]		
lagbismofkjD97	-120.075 [270.354]				
lagbismofkjD99	0.148 [1.192]				
lagkratio		-0.187 [0.196]		-0.216 [0.199]	
lagkratiokjD97		-8.613 [19.592]			
lagkratiokjD99		-1.081 [2.461]			
lagkj97			17.750 [39.844]	17.452 [39.870]	
lagkj99			1.030 [4.247]	1.305 [4.248]	
Constant	1.932 [0.802]**	1.679 [0.847]**	1.952 [0.808]**	1.801 [0.862]**	
Observations	991	993	991	993	
Number of NCODE	91	91	91	91	
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%					

Source: ~~\\f-serv\shared\Montgomery\K-Injection\Stata\Submit\_v1\_Panel\_RE\_GroupR-NR~~

Table 10A Regional Banks  
Panel Estimates (Random Effects Model)

Dependent Variable: SME Loan Growth				
	1	2	3	4
lagcprofit	0.553 [0.262]**	0.571 [0.265]**	0.554 [0.261]**	0.566 [0.264]**
lagcgdp	0.199 [0.071]***	0.214 [0.071]***	0.198 [0.071]***	0.21 [0.071]***
lagkjD	-1.631 [9.237]	2.709 [7.107]	-0.046 [4.168]	-0.656 [4.183]
lagbismof	-0.193 [0.091]**		-0.194 [0.091]**	
lagbismofkjD	0.041 [1.108]			
lagkratio		-0.314 [0.193]		-0.341 [0.196]*
lagkratiokjD		-1.078 [1.827]		
lagkj			-0.820 [2.393]	-0.452 [2.401]
Constant	2.313 [0.807]***	1.967 [0.833]**	2.329 [0.809]***	2.078 [0.849]**
Observations	991	993	991	993
Number of NCODE	91	91	91	91
Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%				

Source: ~~\\f-serv\shared\K-Montgomery\K-Injection\Stata\Submit\_v1\_Panel\_RE\_GroupR-NR~~

Table 10B Regional Banks  
Panel Estimates (Random Effects Model)  
Differential effects

Dependent Variable: SME Loan Growth				
	1	2	3	4
lagcprofit	0.57 [0.264]**	0.569 [0.268]**	0.572 [0.265]**	0.582 [0.268]**
lagcgdp	0.198 [0.071]***	0.214 [0.071]***	0.197 [0.071]***	0.209 [0.071]***
lagkjD97	-87.592 [2,295.273]	-2.824 [48.716]	0.958 [15.864]	0.67 [15.912]
lagkjD99	-1.136 [9.293]	3.17 [9.986]	-2.727 [8.081]	-3.069 [8.103]
lagbismof	-0.194 [0.091]**		-0.196 [0.092]**	
lagbismofkjD97	9.902 [258.331]			
lagbismofkjD99	-0.092 [1.139]			
lagkratio		-0.315 [0.193]		-0.341 [0.197]*
lagkratiokjD97		1.024 [18.769]		
lagkratiokjD99		-1.183 [2.358]		
lagkj97			-1.398 [38.076]	-2.013 [38.189]
lagkj99			0.445 [4.059]	0.686 [4.070]
Constant	2.323 [0.810]***	1.971 [0.836]**	2.342 [0.815]***	2.083 [0.854]**
Observations	991	993	991	993
Number of NCODE	91	91	91	91

Standard errors in brackets  
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Source: ~~Yf~~serv~~Y~~shared~~Y~~Montgomery~~Y~~K-~~Y~~Injection~~Y~~Stata~~Y~~Submit\_v1\_Panel\_RE\_GroupR-NR

# **Appendix**

### Appendix 1: Banks Included in the Analysis

#### **Regional Banks FY1990 - FY2002**

77

Aichi  
Akita  
Aomori  
Ashikaga  
Awa  
Bank of Fukuoka  
Bank of Ikeda  
Bank of Iwate  
Bank of Kansai  
Bank of Kinki<sup>17</sup>  
Bank of Kyoto  
Bank of Nagoya  
Bank of Okinawa  
Bank of Saga  
Bank of the Ryukyus  
Biwako  
Chiba  
Chiba Kogyo  
Chikuho  
Chugoku  
Chukyo  
Daisan  
Daishi  
Daito  
Ehime  
EighteenthBank  
Fukui  
Fukuoka Chuo  
Fukuoka City  
Fukushima  
Gifu  
Gunma  
Hachijuni  
Higashi-Nippon  
Higo  
Hiroshima  
Hiroshima Sogo  
Hokkaido

Hokkoku  
Hokuetsu  
Hokuriku  
Howa  
Hyakugo  
Hyakujushi  
Iyo  
Joyo  
Juroku  
Kagawa  
Kagoshima  
Kanto  
Keiyo  
Kita Nippon  
Kiyoo  
Kumamoto Family  
Kyushu  
Michinoku  
Mie  
Minami-Nippon  
Miyazaki  
Miyazaki-Taiyo  
Musashino  
Nagano  
Nanto  
Nishi-Nippon  
North Pacific  
Ogaki Kyoritsu  
Oita  
San-in Godo  
Sapporo  
Senshu  
Setouchi  
Shiga  
Shikoku  
Shimizu  
Shinwa  
Shizuoka  
Shokusan  
Suruga  
Taiko  
Tochigi  
Toho

Tohoku  
Tokushima  
Tokyo Tomin  
Tomato  
Towa  
Toyama  
Yamagata  
Yamaguchi  
Yamanashi Chuo

#### **International Banks FY1990 – FY1999**

Asahi  
Bank of Tokyo  
Mitsubishi  
Daiichi Kangyo  
Daiwa  
Fuji  
Industrial Bank of Japan  
Mitsubishi Trust  
Mitsui Trust  
Nippon Trust  
Sakura  
Sanwa  
Sumitomo Trust  
Tokai  
Toyo Trust  
Yasuda Trust

---

<sup>17</sup> Bank of Kinki data  
available through FY1999

The following banks are excluded from the analysis because they were closed or nationalized during the sample period between FY1982-FY1999. Hokkaido Takushoku Bank failed on October 17, 1997. The Nippon Credit Bank<sup>18</sup> was nationalized on December 13, 1998 and in January 2001 reopened as Aozora Bank. The Long Term Credit Bank of Japan was nationalized on October 23, 1998 and reopened on June 5, 2000 as Shinsei Bank. Namihaya Bank, which was formed on October 1, 1998 from the merger of Bank of Naniwa and Fukutoku Bank, was closed on August 6, 1999<sup>19</sup>

Hanwa Bank failed in November 1996. Kofuku Bank, which absorbed Kyoto Kyoei Bank on October 26, 1998, closed on May 21, 1999. Kokumin Bank<sup>20</sup> failed on April 11, 1999, and was absorbed by Yachiyo Bank<sup>21</sup> on August 14, 2000. Minato Bank<sup>22</sup> was established toward the end of the sample on September 1, 1999. Niigata-Chuo Bank<sup>23</sup> failed in October 1999. Tokuyo City Bank failed on November 26, 1997, and was absorbed by Sendai Bank<sup>24</sup> on November 24, 1998. Tokyo Sowa Bank, established in 1950 as a "sogo" bank<sup>25</sup>, was closed on June 11, 1999. In addition, Hokuto Bank is excluded because it was established mid-sample in 1993. The Bank was first established in 1895 as Masuda Bank and changed its name to Hokuto Bank after absorbing Akita Akebono Bank on April 1, 1993.

Data for Asahi Bank<sup>26</sup>, which was formed by the merger of Kyowa Bank and Saitama Bank on April 1, 1991, is backdated by combining data from the two bank balance sheets. The same technique is used to backdate data for Tokyo-Mitsubishi Bank, which was formed by the merger of Bank of Tokyo Bank and Mistubishi Bank on April 1, 1996 and for Sakura Bank, which was established on April 1990 through the merger of Mitsui Bank Ltd. and Taiyo Kobe Bank Ltd. In order to include Sendai Bank in the sample, the last fiscal year of data is not used.

---

<sup>18</sup> Established on April 1, 1957 as Hypotec Bank of Japan, Ltd. In 1970, its name changed to Nippon Fudosan Bank and to Nippon Credit Bank Ltd in 1977.

<sup>19</sup> In February 2001 the failed Namihaya Bank was absorbed by Daiwa Bank and Kinki Osaka Bank.

<sup>20</sup> The bank was established in 1926 as Kofuku Sogo Bank Ltd. In February 1, 1989, upon converting to a regional II bank, its name changed to Kofuku Bank, Ltd. After being closed, Kofuku Bank was purchased by the Asia Recovery Fund and reopened on February 26, 2001 as Kansai Sawayaka Bank, Ltd.

<sup>21</sup> Yachiyo was originally established in 1924 as Credit Union. In 1991, its name changed to Yachiyo Bank.

<sup>22</sup> Minato Bank was formed from the merger of Midori Bank and Hanshin Bank on April 1, 1999.

<sup>23</sup> Niigata Chuo was eventually absorbed by six other regional banks: Higashi-Nippon, Gunma Bank, Towa Bank, Taiko Bank, Daishi Bank and Hyakujushi Bank.

<sup>24</sup> Sendai Bank was originally established on July 5, 1951.

<sup>25</sup> Tokyo Sogo Bank converted to a regional II bank in 1989 and its name changed to Tokyo Sowa Bank.

<sup>26</sup> The merged bank was first named the Kyowa Saitama Bank. The bank name was changed to Asahi Bank on September 21, 1992.

Several other banks in the sample - Dai-Ichi Kangyo Bank, Joyo Bank, Minami-Nippon Bank and Tokai Bank were also formed as the result of mergers, although they occurred before the sample period so no data adjustment was necessary. Dai-Ichi Kangyo was established on October 1, 1971 (pre-sample) through the merger of the Dai-Ichi Bank Ltd. and The Nippon Kangyo Bank Ltd. Joyo Bank Ltd. was established on July 30, 1935 following merger of Tokiwa Bank and Goyu Bank. Tokai Bank was established in 1941 as the result of the merger between Aichi Bank, Nagoya Bank and Ito Bank. Minami-Nippon Bank, a domestic bank, was established in 1943 through the merger of 2 local banking institutes in Kagoshima prefecture.

Recent mergers forming the Mizuho Financial Group (a holding company of Dai-Ichi Kangyo Bank, Fuji Bank and Industrial Bank of Japan), the Sumitomo Mitsui Banking Corporation (formed by the merger of Sumitomo Bank and Sakura Bank in April 2001), Chuo Mitsui Trust Bank (formed by the merger of Chuo Trust and Mitsui Trust in April 2000), and the Mitsubishi Tokyo Financial Group (formed in April 2001 by Tokyo Mitsubishi Bank and Mitsubishi Trust; soon to be joined by Nippon Trust and Toyo Trust) occurred post-sample and thus do not require any data adjustments.

## **Appendix 2: Japanese Bankers Association - Risk Management Loans**

Risk management loans as defined by the Japanese Bankers Association have been reported by individual banks since fiscal year 1993. The categories used by the JBA include:

a. Restructured loans: The least dangerous category of loans, restructured loans were originally defined only as loans for which the interest rate had been lowered, but in fiscal year 1997 the definition was expanded to include loans for which any contract condition has been amended and loans to corporations undergoing reorganization. Restructured loans were reported by the largest banks beginning in 1994 and reporting requirements were extended to regional banks in 1996.

b. 3 Month Overdue Loans: 3 month overdue loans, or 3PDL (3 month past due loans), are defined as loans in arrears by more than 3 months but less than 6 months. Overdue loans originally included loans on which interest payments are past due by more than six months (see below), but in fiscal year 1997 this stricter category of overdue loans, loans on which interest payments are past-due by more than 90 days, was added. Reporting of 3 month overdue loans has been required of all banks only since fiscal year 1998.

c. Overdue loans: Overdue loans, or PDL (Past Due Loans), are loans on which interest payments are past due by more than 6 months. These loans have been reported by the largest banks since 1993, but the regional banks only began reporting this category of loans in 1996.

d. Defaulted loans: Defaulted loans, or LBB (Loans to Borrowers in Legal Bankruptcy), carry the strictest definition. These are loans to companies in the legal process of declaring bankruptcy. This category of loans has been reported by all banks (City, Trust, Long-Term Credit and Regional) since fiscal year 1993. In March 1999, the definition of defaulted loans was expanded to include loans for which principal or interest payments have not been made in a "long time" and for which repayment is judged "unlikely".

## Endnotes

---

<sup>i</sup> The Financial Revitalization Plan also legislated the merger of the Resolution and Collection Bank (RCB), which had been overseeing the liquidation of the assets of failed credit cooperatives, with the Housing Loan Administration Corporation (HLAC), which had been dealing with the remaining bad assets of the jusems, into the Resolution and Collection Corporation (RCC), a public asset management company. Details on this merger are available in figure 33. The RCC had an expanded mandate allowing it to purchase bad loans from solvent financial institutions as well as failed banks.

Under the Financial Revitalization Plan, the Financial Revitalization Commission (FRC) was established under Prime Ministers Office to oversee bank restructuring.

Restructuring followed one of two courses: the bridge bank scheme or nationalization. Under the bridge bank scheme, the troubled bank was to be operated by public administrators as a bridge bank until a successor bank could be found. This system was used in closing smaller banks such as the Koufuku Bank, Kokumin Bank, Tokyo Sowa Bank and Namihaya Bank, all of which went into bankruptcy in 1999. The nationalization scheme was used for larger bank failures, such as the Long Term Credit Bank of Japan and Nippon Credit. In these cases, the banks were temporarily nationalized, with the DIC purchasing all shares and operating the bank until it was ready to resume business as a new bank. The FRC was due to complete its task by 2001 and closed on January 6, 2001.

<sup>ii</sup>DKB, Fuji Bank, IBJ and Yasuda Trust formed a holding company in September 2000 and merged into the Mizuho Financial Group in January 2003, which with assets of 14 billion Yen, is now the world's largest financial institution. The Sumitomo-Mitsui Financial Group, formed by the merger of Sumitomo Bank and Sakura Bank in April 2001, is now the world's second largest bank in terms of assets. This merger is of particular interest because the two main banks represent different *keiretsu* groups (the Sumitomo and Mitsui *keiretsu*). The world's third largest financial institution will also be a Japanese institution. Mitsubishi-Tokyo Financial Group (MTFG) was established in April 2001 by Tokyo-Mitsubishi Bank and the merger of three trust banks: Mitsubishi, Nippon and Tokyo Trust October of the same year. The UFJ Group formed a holding company in April 2001 and merged Sanwa, Tokai and Toyo Trust in April 2002. Daiwa and Asahi has also merged into Resona Bank in March of 2003, but Resona has since then failed.

<sup>iii</sup> Until fiscal year 2001 when the accounting standards were strengthened, land holdings were recorded at book value on the balance sheet and banks were able to choose between the book value or fair value (lower of book or market) method for recording the value investment account equity holdings on their balance sheets. Banks that chose the fair value method could count 45% of unrealized gains toward Tier 2 Capital.