THE EFFECTIVENESS OF BANK RECAPITALIZATION IN JAPAN

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Abstract

This study examines the effectiveness of Japanese banking recapitalization policies. Based on the careful reading of individual business revitalization plans submitted by several banks requesting government funds, we identified four primary goals of the capital injection plan: to increase the bank capital ratios; increase lending to avoid a credit crunch; increase the number of write-offs for non-performing loans; and encourage restructuring. Using a panel of individual bank data, we empirically estimated the effectiveness of the policy. Our findings suggest that capital injections are more effective for international banks than for domestic banks. The capital injections do not appear to affect lending to SMEs for either bank type. For international banks however, receipts of injected capital seem to relax the constraint on overall loan growth. The receipt of injected capital strengthens the capital positions of both international and regional banks, but these results do not hold up once we control for possible endogeneity when tested.

JEL Classification: F28
Key words: Bank recapitalization, Japan, Capital injections, Non-performing loans.

1. Introduction

In recent years, Japanese taxpayers have contributed over 10 trillion yen (or 2 percent of Japan's nominal GDP) into the country's troubled banking sector in the form of capital injections. 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 to be removed, all would drop below their capital adequacy requirement. This month, new legislation explicitly allowing "preventive" capital injections will become effective.

The underlying question is whether or not capital injections are effective. Panic and large-scale bank runs have been successfully avoided. However, Fukao

(2003) predicted "the Japanese government will have to nationalize most of the banking sector by 2005. Capital injections will not solve the problems." Despite over 1 billion yen in capital injections to Resona Bank (which is Japan's 5th largest bank created through the merger of Daiwa Bank Holdings, Inc. and Asahi Bank), they had to receive another 2 trillion yen in May 2003, effectively nationalizing the bank. Ashikaga Bank (which is Japan's 10th largest regional bank) was nationalized in December of that same year despite having already received more than 135 billion yen 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.[1] Ito and Sasaki (2002) showed that banks with lower capital ratios tended to issue more subordinated debts in order to reduce overall lending. Peek and Rosengren (1997) found evidence of the international transmission of negative capital shocks to U.S. loan markets. In later research, Peek and Rosengren (2003) along with Watanabe (2004), found evidence that negative shocks to bank capital result in a shift to lower quality loan portfolios. Montgomery (2004) demonstrated that although both domestic and international banks are relatively insensitive to overall regulatory capital, international banks' heavily risk-weighted assets are very sensitive to core, tier I capital.

Despite the large amounts of money that are at stake, there has been no quantitative research that specifically examines 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 Financial Crisis of 1997, governments throughout the world have been allocating huge amounts of public funds to bail out the troubled financial sectors in those countries.

Based on the careful reading of the individual "business revitalization plan" submitted by several banks requesting government funds, we identified four primary goals of the capital injection plan:

1) to increase the bank capital ratios
2) to increase lending, in particular to small and medium enterprises, by avoiding a "credit crunch"
3) to increase write-offs of non-performing loans
4) to encourage bank restructuring.

Using a panel of individual bank data, we empirically estimated the effectiveness of the Japanese government policy of public fund injection in achieving the first three of these stated goals.

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[1] 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).

Section 2 will briefly outline the most recent history of Japan's banking sector crisis where Section 3 will aim to catalogue policy response, focusing on the government's decision to inject public funds into the banking sector. Section 4 will explain the mechanisms by which capital injections may influence bank behaviour. Lastly, section 5 will describe the data and empirical specification as well as the results of our regression analysis, ending with Section 6's closing remarks.

2. Japan's banking sector in crisis

Although warning signs had been evident much earlier[2], 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[3], 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. That very same year, Nippon Credit Bank followed on December 13. The DIC acquired all outstanding shares of both banks and provided credit to them to continue operating.[4]

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. 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 in bank shares on the stock market and the emergence of the so-called "Japan Premium" in overseas lending markets.

Policy Response: 1998-1999: In February 1998, the Diet responded to the financial crisis with the creation of the Financial Function Stabilization Plan.[5]

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[2] Several small financial institutions failed between 1992 and 1997. By the end of 1997, sixteen (16) credit cooperatives, along with shinkin and regional banks, had failed. 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.

[3] Actual grant and asset purchase by the DIC took place in October of 1998.

[4] Actual grant and asset purchase by the DIC took place in August and October of 1999.

[5] This included two laws to stabilize the financial system, including the Financial Function Stabilization Law.

Under this plan, 30 trillion yen was allocated 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 yen 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. As a result, 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[6]. 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[7] 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.[8] In April 1998 (the start of fiscal year for 1998), the "Law to Ensure the Soundness of Financial Institutions"[9] which is equivalent to the Prompt Corrective Action (PCA) measures in force in the United States since the late

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[6] Tokyo-Mitsubishi is the only bank to have repaid the public funds in full.

[7] 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.

[8] 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.

[9] 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.

[10] 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. The "Early Strengthening Law" is officially called the Law Concerning Emergency Measures for the Early Strengthening of the Financial Function.

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. During fall 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 was 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[10] 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). Fourteen 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[11].

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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 has to consolidate 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-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 that were neither subsidiaries nor affiliates and then transfer their non-performing loans to these related companies at the above market value. The banks had a meagre share of less than 5% in these related companies, along with positions in the firms inside the banks' keiretsu with whom the banks 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 to be operated by public administrators as a bridge bank until successor institutions were found. Two other regional banks, Niigata-Chuo Bank[12] 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, probably giving banks incentives to sell off unprofitable investments rather than keeping 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.

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[12] Niigata-Chuo Bank later failed. See appendix for details.

Table 1: Injected Capital (billion Yen)

March 1997 – International Banks

Bank Name	Amount of Capital Injection	…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	

March 1997 – Regional Banks

Bank Name	Amount of Capital Injection	…of which Tier I	…of which Tier II
Ashikaga	30	30	
Hokkaido	45	45	
Hokuriku	20	20	

March 1998 – International Banks

Bank Name	Amount of Capital Injection	…of which Tier I	…of which Tier II	
Asahi	500	400	100	
Daiichi Kangyo	900	700	200	
Daiwa	403	403		
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	500	100	200	
Tokai	600	600		
Toyo Trust	200	200		

March 1999 – Regional Banks

Bank Name	Amount of Capital Injection	…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	1359	8.54	2.22	0.4	15.4
Ratio 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

3. Capital injections and bank behaviour

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

$$BIS = TierI + TierII + TierIII - Goodwil + RWA \quad (1)$$

Table 3: Panel Estimates (Fixed Effects Model) – International Banks, Dependent Variable = % Change in Total Lending

RHS variables at t-1	(1)	(2)	(3)	(4)	(5)	(6)
% Change Profits	-0.08	-0.38	-2.42***	-0.30	-0.31	-2.05**
% Change GDP	0.41	0.36	0.004	0.37	0.56	0.29
BIS	1.57			-0.29		
BIS x Dummy for Capital Injection	-0.47**					
Capital Ratio		3.20***			3.16***	
Capital Ratio x Dummy for Capital Injection		-1.01*				
Core Capital			2.82**			2.61**
Core Capital x Dummy for Capital Injection			-1.33***			
Amt. Capital Injection to Assets				0.98	-1.45	-1.65
Constant	-15.20	-12.58***	-11.67**	1.62	-13.16	-11.91**
# Obs.	*120*	*120*	*118*	*120*	*120*	*118*

*** represents statistical significance at 1%, ** at 5%, * at 10% level

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

$$MOF = TierI + TierII\ (MOF) - Goodwill + RWA(MOF) \qquad (2)$$

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. 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. Conversely, banks receiving a capital injection from the government may be inclined to shift their portfolios by shifting out of government bonds into loans.

4. Empirical analysis

This section presents an empirical analysis of the effectiveness of the capital injections made to banks in March of 1998 and 1999.

Data: A panel of data from 106 banks' balance sheets and income statements for fiscal years 1990-1999 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

[13] 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.

appendix 1 for details). Mergers are accounted for by treating the merged bank as one entity for the entire sample period. 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:

1. the official regulatory capital ratio (the MOF ratio for domestic banks, BIS ratio for internationally active banks: jikoshihon hiritsu)
2. the ratio of capital as reported on the balance sheet (shihon) to total assets (shisan)
3. 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. 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, are largely determined by the Financial Services Agency's (FSA) "self assessment of asset quality", but are also 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[13]. 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[14] 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

[14] 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.

[15] 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.

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national and regional business cycle. With the exception of the MOF and 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 Electoronic Publishing Bankscope data set, and publicly available data on national GDP, prefectural level GDP, and the amount of capital injections.

Empirical Specification: We investigated the effect of the capital injections on three dependent variables: growth in total lending, growth in lending to small and medium enterprises, and the regulatory capital ratio[15] (BIS or MOF ratio) with the following specification (equation 1):

$$Y_{i,t} = x = B(X_{i,t-1}) + \gamma(Z_{i,t-1}) + \Sigma_{i,t} \qquad (3)$$

- $Y_{i,t}$ 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.

5. Results

International Banks: OLS estimation results for the panel of international banks are reported in tables 3-5. Looking at table 3, we see that total lending is sensitive to the total and core capital measure, indicating that relatively well (poorly) capitalized banks tend to grow loans more quickly (slowly). However, the coefficient estimate on capital interacted with a dummy variable for capital

[16] Hoshi (2001) first documented the correlation between bank lending to the real estate sector during the bubble period and low bank capital during the banking crisis a decade later. Watanabe (2004) applies this finding by using the shift in bank lending to the real estate sector as an instrumental variable for bank capital. We would like to thank Professor Hidehiko Ichimura, University College London, for suggesting the interaction with changes in real estate prices.

Table 4: Panel Estimates (Fixed Effects Model) – International Banks, Dependent Variable = % Change in SME Lending

RHS variables at t-1	(1)	(2)	(3)	(4)	(5)	(6)
% Change Profits	0.62	0.59*	-1.51***	0.29	0.59*	-1.29**
% Change GDP	0.39	0.72**	0.35	0.21	0.72	0.51*
BIS	0.23			-1.84*		
BIS x Dummy for Capital Injection	0.11					
Capital Ratio		2.58***			2.47***	
Capital Ratio x Dummy for Capital Injection		0.26				
Core Capital			2.34***			1.89**
Core Capital x Dummy for Capital Injection			-0.28			
Amt. Capital Injection to Assets				4.40***	0.78	0.49
Constant	-4.56	-12.84	-12.00***	14.99	-12.39***	-10.65***
# Obs.	*120*	*120*	*118*	*120*	*120*	*118*

*** represents statistical significance at 1%, ** at 5%, * at 10% level

Table 5: Panel Estimates (Fixed Effects Model) – International Banks, Dependent Variable = BIS Ratio

RHS variables at t-1	(1)	(2)	(3)
% Change Profits	0.18**	0.11	0.41***
% Change GDP	0.22*	0.12	0.01
Bad Loan Write-Offs	0.002	0.002	0.002
BIS	0.38		
Capital Ratio		-0.32*	
Core Capital			-0.75**
Amt. Capital Injection to Assets	1.04**	1.68***	1.83***
Constant	5.88**	10.78***	13.01***
# Obs.	*88*	*88*	*86*

*** represents statistical significance at 1%, ** at 5%, * at 10% level

injection is statistically speaking, significantly negative, indicating that loan growth is less sensitive to capitalization for those banks that received a capital injection. The overall coefficient is still positive, but less so. The actual amount of capital injected (columns 4-6 of Table 3) does not seem to affect total loan growth.

Looking in particular at lending to small and medium enterprises (Table 4), we see that loans to SME's are again sensitive to total and core capital ratios,

indicating that relatively well (poorly) capitalized banks tend to grow SME lending relatively quickly (slowly). The interaction term between capital ratios and a dummy for receipt of a capital injection is not statistically significant: receiving injected capital does not significantly reduce the sensitivity of SME loans to capitalization. There also does not appear to be any significant effect on SME lending of the actual amount of capital injected.

Regulatory capital on the other hand, is significantly influenced by the amount of capital injection (Table 5). An injection of capital leads to a higher capital ratio in the following period. These OLS results do not take into account the possible endogeneity of the amount of capital injected into each bank with the dependent variables (total loan growth, growth in lending to small and medium enterprises, and the regulatory capital ratio). To address this issue, we used the ratio of lending to the real estate industry to total domestic lending in 1990 – just before the burst of Japan's "bubble economy" – multiplied by the ratio of the decline in the regional land prices since that time as an instrument for the amount of capital injection.[16] The results of the estimates for international banks using instrumental variables are reported in Tables 9-11. For lending, the results using the instrumental variables approach largely confirm our findings using OLS. Receipt of injected capital significantly reduced the sensitivity of total lending to capitalization, but neither total lending nor partial lending to the SME sector is sensitive to the actual amount of capital injected. However, the findings for the effect of the capital injections on regulatory capital are quite different using the instrumental variables approach. After controlling for possible endogeneity, we find no statistically significant impact of capital injections on regulatory capital in the following period.

Table 6: Panel Estimates (Fixed Effect Model) – Regional Banks, Dependent Variable = % Change in Total Lending

RHS variables at t-1	(1)	(2)	(3)	(4)
% Change Profits	0.79***	0.78***	0.80***	0.77***
% Change GDP	0.39***	0.42***	0.39***	0.43***
MOF	-0.49**		-0.49***	
MOF x Dummy for Capital Injection	0.01			
Capital Ratio		-0.61**		-0.61**
Capital Ratio x Dummy for Capital Injection		-0.21		
Amt. Capital Injection to Assets			-0.36	-0.32
Constant	5.06***	3.45**	5.06***	3.45***
# Obs.	*996*	*998*	*996*	*998*

*** represents statistical significance at 1%, ** at 5%, * at 10% level

Table 7: Panel Estimates (Fixed Effects Model) – Regional Banks, Dependent Variable = % Change in SME Lending

RHS variables at t-1	(1)	(2)	(3)	(4)
% Change Profits	0.69	0.58	0.69	0.58
% Change GDP	0.12	0.22	0.11	0.22
MOF	-1.13**		-1.13**	
MOF x Dummy for Capital Injection	-0.11			
Capital Ratio		-1.07		-1.08
Capital Ratio x Dummy for Capital Injection		-0.48		
Amt. Capital Injection to Assets			-0.94	-0.89
Constant	10.76**	5.61	10.78**	5.63
# Obs.	*992*	*994*	*992*	*994*

*** represents statistical significance at 1%, ** at 5%, * at 10% level

Table 8: Panel Estimates (Fixed Effects Model) – Regional Banks, Dependent Variable = BIS Ratio

RHS variables at t-1	(1)	(2)
% Change Profits	0.04	0.10*
% Change GDP	-0.06**	-0.09***
Bad Loan Write-Offs	-0.0006	-0.0002
BIS	0.54***	
Capital Ratio		0.64***
Core Capital		
Amt. Capital Injection to Assets	0.66***	0.62**
Constant	4.05***	5.98***
# Obs.	*718*	*718*

*** represents statistical signifigance at 1%, ** at 5%, * at 10% level

Regional Banks: OLS estimation results for the panel of regional banks are reported in Tables 6-8. In contrast to the international banks, neither total loan growth nor lending to SME's by regional banks are at all affected by the injection of capital (Table 6 and 7). Regulatory capital is again significantly influenced by the amount of capital injection (Table 8). However, as for the international banks, this result disappears once we control for possible endogeneity using instrumental variables (Table 14).

Table 9: IV Estimates – International Banks, Dependent Variable = % Change in Total Lending

RHS variables at t-1	(1)	(2)	(3)	(4)	(5)	(6)
% Change Profits	1.84	0.44	-3.28***	-10.33	0.36	-3.79
% Change GDP	1.32	2.31	-0.84	-7.99	2.11*	-0.71
BIS	12.88*			-50.01		
BIS x Dummy for Capital Injection	-3.72**					
Capital Ratio		9.61***			8.94***	
Capital Ratio x Dummy for Capital Injection		0.89				
Core Capital			7.32**			17.53*
Core Capital x Dummy for Capital Injection			-4.03***			
Amt. Capital Injection to Assets				67.05	1.78	-15.09
Constant	-119.08	-42.069**	-27.76	480.70	-38.89	-72.64*
# Obs.	*120*	*120*	*118*	*120*	*120*	*118*

*** represents statistical signifigance at 1%, ** at 5%, * at 10% level

Table 10 : IV Estimates – International Banks, Dependent Variable = % Change in SME Lending

RHS variables at t-1	(1)	(2)	(3)	(4)	(5)	(6)
% Change Profits	2.50*	1.33*	-1.98**	-4.67	1.17**	-2.25
% Change GDP	1.64	2.12*	-0.53	-3.84	1.67**	-0.46
BIS	9.74*			-27.38		
BIS x Dummy for Capital Injection	-2.19*					
Capital Ratio		6.34**			4.89**	
Capital Ratio x Dummy for Capital Injection		1.93				
Core Capital			3.46			8.98
Core Capital x Dummy for Capital Injection			-2.18**			
Amt. Capital Injection to Assets				39.52	3.84	-8.15
Constant	-93.60*	-30.92**	-13.815	259.9727	-24.03	-38.08
# Obs.	*120*	*120*	*118*	*120*	*120*	*118*

*** represents statistical signifigance at 1%, ** at 5%, * at 10% level

Table 11: IV Estimates – International Banks, Dependent Variable = BIS Ratio

RHS variables at t-1	(1)	(2)	(3)
% Change Profits	3.59	-0.05	0.74
% Change GDP	1.77	-0.39	0.41
Bad Loan Write-Offs	-0.04	0.0001	0.012
BIS	19.13		
Capital Ratio		-2.18**	
Core Capital			-3.03*
Amt. Capital Injection to Assets	-25.99	1.70	4.35
Constant	-170.93	18.44***	21.37***
# Obs.	*88*	*88*	*86*

*** represents statistical signifigance at 1%, ** at 5%, * at 10% level

Table 12: IV Estimates – Regional Banks, Dependent Variable = % Change in Total Lending

RHS variables at t-1	(1)	(2)	(3)	(4)
% Change Profits	10.16	1.67	1.36	0.80
% Change GDP	-2.87	0.07	0.18	0.46
MOF	7.60		2.57	
MOF x Dummy for Capital Injection	-261.13			
Capital Ratio		4.45		3.34
Capital Ratio x Dummy for Capital Injection		-95.42		
Amt. Capital Injection to Assets			-244.66	-102.39
Constant	-44.11	-14.16	-17.28	-11.46
# Obs.	*875*	*877*	*875*	*877*

*** represents statistical signifigance at 1%, ** at 5%, * at 10% level

Table 13: IV Estimates – Regional Banks, Dependent Variable = % Change in SME Lending

RHS variables at t-1	(1)	(2)	(3)	(4)
% Change Profits	16.98	4.65	2.11	1.78
% Change GDP	-5.83	-1.77	-0.68	-0.51
MOF	9.98		1.50	
MOF x Dummy for Capital Injection	-438.98			
Capital Ratio		5.56		1.93
Capital Ratio x Dummy for Capital Injection		-311.92		
Amt. Capital Injection to Assets			-416.79	-335.99
Constant	-50.62	-10.74	-5.33	-1.92
# Obs.	*871*	*873*	*871*	*873*

*** represents statistical signifigance at 1%, ** at 5%, * at 10% level

Table 14: IV Estimates – Regional Banks, Dependent Variable = BIS Ratio

RHS variables at t-1	(1)	(2)
% Change Profits	0.14	0.15
% Change GDP	-0.19	-0.05
Bad Loan Write-Offs	-0.003	0.001
BIS	0.62	
Capital Ratio		0.80*
Core Capital		
Amt. Capital Injection to Assets	-25.72	-0.21
Constant	3.95	5.27**
# Obs.	*631*	*631*

*** represents statistical signifigance at 1%, ** at 5%, * at 10% level

6. Conclusions

Our findings using OLS on a panel of international and domestic banks suggest that capital injections are more effective for international banks than for domestic banks. The capital injections do not appear to effect lending to SME's for either bank type, but for international banks, receipt of injected capital seems to relax the constraint that capitalization makes on overall loan growth.

OLS results suggest that the receipt of injected capital strengthens the capital position of both international and regional banks, but these results do not hold up once we control for possible endogeneity using an instrumental variables approach.

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APPENDIX 1:

Banks Included in the Analysis
Regional Banks FY1990 - FY2002

Aichi Akita Aomori Ashikaga Awa Bank of Fukuoka Bank of Ikeda Bank of Iwate Bank of Kansai Bank of KinkiBank 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 Bank of Kinki data available through FY1999 Hiroshima Sogo Hokkaido Hokkoku Hokuetsu Hokuriku Howa Hyakugo Hyakujushi Iyo Joyo Juroku Kagawa Kagoshima Kanto Keiyo Kita Nippon Kiyo 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 The following banks are excluded from the

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[18] 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.

[19] In February 2001 the failed Namihaya Bank was absorbed by Daiwa Bank and Kinki Osaka Bank.

[20] 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.

[21] Yachiyo was originally established in 1924 as Credit Union. In 1991, its name changed to Yachiyo Bank.

[22] Minato Bank was formed from the merger of Midori Bank and Hanshin Bank on April 1, 1999.

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

[24] Sendai Bank was originally established on July 5, 1951.

[25] Tokyo Sogo Bank converted to a regional II bank in 1989 and its name changed to Tokyo Sowa Bank.

[26] The merged bank was first named the Kyowa Saitama Bank. The bank name was changed to Asahi Bank on September 21, 1992.

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[18] 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[19] Hanwa Bank failed in November 1996. Kofuku Bank , which absorbed Kyoto Kyoei Bank on October 26, 1998, closed on May 21, 1999. Kokumin Bank[20] failed on April 11, 1999, and was absorbed by Yachiyo Bank[21] on August 14, 2000. Minato Bank[22] was established toward the end of the sample on September 1, 1999. Niigata-Chuo Bank[23] failed in October 1999. Tokuyo City Bank failed on November 26, 1997, and was absorbed by Sendai Bank[24] on November 24, 1998. Tokyo Sowa Bank, established in 1950 as a "sogo" bank[25], 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,[26] 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.

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 the 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. Beginning in 1994, restructured loans were reported by the largest banks. 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 were 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 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. Since 1993, the largest banks have reported these loans, but the regional banks had only begun to report 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. All the banks (City, Trust, Long-Term Credit, and Regional) since fiscal year 1993 report this category of loans. 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", for which repayment is judged "unlikely".

End notes

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 jusens into the Resolution and Collection Corporation (RCC), which is 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 the Prime Minister's 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, operating the bank until it was ready to resume business as a new bank. The FRC was due to complete its task by 2001. It closed on January 6, 2001.

[2]DKB, Fuji Bank, IBJ, and Yasuda Trust formed a holding company in September 2000. They later merged into the Mizuho Financial Group in January 2003. With assets of 14 billion Yen, it 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 is also a Japanese institution.

Tokyo-Mitsubishi Bank established the Mitsubishi-Tokyo Financial Group (MTFG) in April 2001, along with the merger of three trust banks (Mitsubishi, Nippon, and Tokyo Trust) in October that very same year. The UFJ Group formed a holding company in April 2001 that merged Sanwa, Tokai, and Toyo Trust in April 2002. Daiwa and Asahi had also merged into Resona Bank in March of 2003, but Resona has since then failed.[iii] Until fiscal year 2001 when 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 unrealised gains toward Tier 2 Capital.