

BIS Capital Regulations and Japanese Banks' Bad Loan Problems*

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We present evidence that the loan problems of Japanese banks are related to the introduction of the 1992 BIS capital regulations. The cross-sectional correlation between the major twenty-one banks' prior-to-1992 BIS capital deficiencies and their risky lending is around 50%. The risky lending generated higher short-term retained earnings and thus increases in capital. More capital-deficient banks also used the external capital market less, indicating greater asymmetry-of-information problems for the weaker banks. Regional II banks that were not affected by the BIS regulations did not increase their risky lending, while their brethren with overseas operations did. Finally, we find no evidence in excess returns on Japanese banks' stocks that the BIS regulations *ex ante* benefited them.

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1. Introduction

The 1990s bad loan problems of Japanese banks and their consequences continue to receive extensive press coverage. In the last year or so, it has become reasonably well-agreed that these problem loans amount to some 100 trillion yen, or roughly 15% of outstanding loans. However, there is still little systematic analysis of the underlying cause of the problems. We look at the evidence here, and find that the BIS capital regulations,¹ which have covered banks' credit risk since 1992 and will be extended to cover market risk in 1997, were a major factor. Our evidence is that, in the late 1980s and early 1990s, the impending BIS regulations had the perverse effect of giving banks an incentive to increase the risk of their loan portfolios; that the mandated loan loss provisioning and bad debt write-off procedures abetted rather than restrained the risk-taking incentive; that the incentive was compounded by the decline in profitability of banks' traditional business; and that the early-1980s deregulation in bank lending, i.e. relaxation of "window guidance," made it possible for banks to act on their incentives.

Our empirical evidence covers two sets of Japanese banks. One consists of all city, trust, and long-term banks for which failure to meet the BIS requirements was not a viable option. We find that, among these banks, those with the bigger capital deficiencies *vis-à-vis* the impending eight percent risk-weighted capital requirement had higher subsequent growth rates in risky lending in the late 1980s and early 1990s. For example, in March 1989, the first fiscal year in which BIS ratios were reported and a point in time at which passage of the regulations seemed reasonably certain, the rank correlation between banks' capital deficiencies and their subsequent increase in risky real-estate-related-lending was 49%. Next, the 1990 stock market crash depleted banks' hidden reserves, 45% of which count as Tier II capital. The cross-sectional rank correlation between the declines in banks' hidden reserves from March

¹ The standards were actually established by the Basle Committee on Banking Supervision which was established at the end of 1974 by the central bank governors of the Group of Ten industrialized countries. The Committee holds its meetings at the BIS headquarters in Basle, Switzerland, which perhaps is why the capital standards are conventionally referred to as "BIS capital standards." This said, we follow the conventional terminology in this paper.

1989 to March 1991 (the stock market had fallen about 32% from its peak by March 1991) and their subsequent increase in real-estate related lending was about 54%.

A second set of Japanese banks, the Regional II banks, enables us to do a “controlled” experiment of the proposition that BIS capital regulations were a major stimulus to risky lending. Capital deficiencies were positively correlated with risky lending for the regional banks which appeared to have some overseas operations and which reported BIS capital ratios, but the correlation was weaker than for the main banks. However, for the regional banks which did not have overseas operations and were not affected by the BIS capital guidelines, essentially no relationship existed between their synthetic BIS capital ratios or estimated capital deficiencies and risky lending.

The hypothesis which these results support is that Japanese banks responded to the tighter BIS capital regulations by increasing the risk of their loan portfolios. BIS capital consists in large part of shareholders equity plus retained earnings and general reserves. Faced with declining margins and the approaching BIS capital requirements, banks could make *ex ante* riskier loans with higher promised rates of return and improve retained earnings and thus their capital positions so long as the higher expected defaults on riskier loans were not charged “up-front” against the loans. In fact, tax-deductible general reserves in Japan were a fixed 0.3% of domestic and OECD loan capital. Moreover, the legal and administrative rules that Japanese banks had to satisfy for tax deductibility of write-offs and specific provisions were stringent, so neither kept up with increased defaults as they began to be realized. At the same time, the BIS risk categories for assets are extremely broad --- all commercial loans have the same 100% weighting --- so the riskier loans weren’t penalized with higher risk weights in computing risk-weighted assets, the denominator of the capital ratio.

Banks could also meet the capital guidelines by raising external equity. However, we find evidence of a “pecking order” among sources of capital. Over the 1987-1992 period leading up to the end-of-fiscal-year-1992 implementation date for the guidelines, the banks making the riskier, higher-yielding, loans which on average generated higher short-run retained earnings resorted less to the external market for capital. The pecking-order for raising capital is consistent with the potential asymmetries in

information about banks' bad loans and hidden reserves during this time, and the asymmetry appears to have been more severe for the weaker banks.

On average, Japanese banks elected to increase loan risk in order to satisfy the accounting-based BIS capital standards. In the short-run, they thereby avoided the real economic costs associated with exclusion from international transactions. Moreover, it was widely believed that the Japanese Government regulation effectively formed banks into a "convoy system"² from which no weak bank would be allowed to drop out. Gennotte and Pyle (1991) showed that, given subsidies from deposit insurance like that which is implicit in a convoy system style of regulation, banks do in fact have an incentive to increase their asset risk when facing tighter BIS-like minimum capital requirements. Indeed, the shift in asset risk can be substantial enough to result in higher bank risk and probability of default *after* the minimum capital requirements are imposed.

Deposit insurance incentives aside, Besanko and Kanatas (1996) point out that capital requirements which force banks to substitute equity for deposit financing thereby potentially reduce management's equity stake. As a result, managers' reward for ensuring that profits are realized on loans is reduced, again with the result that tighter minimum capital standards perversely result in greater probability of bank defaults. These effort-reduction moral hazard incentives are consistent with our results, but not directly testable. Anecdotes go both ways. For example, it's often said that "loss of face" and "cultural sense of responsibility" are much more important deterrents to moral hazard incentives in Japan than in most countries. At the same time, Japanese banks' aggressive loan pricing in the late 1980s-early 1990s was often cited as evidence of empire-building, one of the more obvious agency problems.³

Our evidence suggests that the riskier loans made by the Japanese banks to meet the BIS regulations were, if anything, *ex ante* unprofitable. Certainly the risky loans were *ex-post* unprofitable. It is interesting, then, that Wagster (1996) reports a "...wealth gain for Japanese bank shareholders [from

² Hoshi (1994b) outlines several cases in which "[t]he Ministry of Finance successfully encouraged healthy financial institutions to absorb troubled financial institutions to avoid bank failures." There is some well-informed debate over the degree to which the convoy system had weakened by the late 1980s.

³ Indeed, some observers believe that Japanese banks' cut-rate loan pricing was a major reason that the BIS guidelines came about in the first place, i.e. though the stated objective was to level the playing field for international banking, the real objective was to "level" the Japanese banks.

the Basle Accord] of 31.63 percent.” Upon examination, we see that all these big wealth gains occurred in the first half of 1987. In Section 6, we propose that these 1987 increases in Japanese bank share prices can more plausibly be attributed to events other than Basle Accord announcements..

In the following section, we examine the time series evidence on aggregate Japanese bank spreads and loan portfolio composition during the 1980s and early 1990s. In Section 3, we analyze the cross-sectional relationship between city, trust, and long-term banks’ anticipated BIS capital deficiencies in the late 1980s and their subsequent loan making and capital raising activities. In Section 4, we analyze the lending behavior of the Regional II banks, and show that those regional banks not doing international business didn’t increase their loan risk as did the city banks and BIS-Regional II banks. In Section 5, we provide a detailed description of loan loss reserve and write-off rules for Japanese banks. The inflexibility of these rules played a major role in giving banks the incentive to increase their loan risk in the face of the impending BIS capital requirements. Section 6 contains our analysis of the Japanese banks’ stock price reactions to the Basle Accord. Section 7 contains a summary and discussion of the results.

2. Overall Banking Trends in Japan

As can be seen from Fig. 1, Japanese banks’ profit margins both trended down and became more erratic in the early 1980s. The general down-trend in the profit margin resembles that in other countries. Fig. 2 shows Japanese and U.S. banks’ rates of return on loans over the years 1984-1993.⁴ It can be seen that the year-to-year variations in both countries’ bank returns tended to track each other very closely until the fiscal year ending in 1990. In 1990, the average rate of return for Japanese banks increased (from about 5.32% in 1989 to about 6.58% in 1990), while on average U.S. bank returns decreased.

Japanese bank returns increased because end-of-year assets of large commercial banks in Japan declined from 508 trillion yen in 1989 to about 491 trillion yen in 1990, while interest income climbed

⁴ Write-offs and allowances for loan losses have not been subtracted from the interest income in computing the rate of return.

from 27 trillion yen to 32 trillion yen⁵. The leveling off in Japanese banks' asset growth might in part be attributable to *soryo-kisei*, a directive initiated by then-Minister of Finance Hashimoto, intended to restrain banks in making real-estate-related loans and so, it was apparently believed, the increase in real-estate prices. To implement it, the Ministry of Finance directed the financial institutions which it supervised to not let their respective end-of-year level of real estate loans precede the previous year's total loans outstanding.⁶ *Soryo kisei* aside, however, Gennotte and Pyle also showed that financial institutions may well voluntarily reduce their total loans (assets) outstanding as they substitute toward riskier loans in the face of tightening capital constraints (Gennotte and Pyle (1991, Proposition 2)).

The promised interest rates on the banks' loans also increased substantially in 1990. Bank of Japan statistics⁷ show that in 1989 loans and discounts outstanding for all banks with a promised interest rate of 7.25% and below were 27 times the value of loans and discounts with interest rates of 7.5% and above. By 1990, loans with interest rates of 7.5% and above were 3 times the value of those with a rate of 7.25% and below. On average there was a twelve-fold increase in loans with interest rates greater than 7.5%. Of the 1990 loans with interest rates of 7.5% and above, 94% of them had interest rates between 7.5% and 9.0%; and for this major subset, there was a twenty-six fold increase in loans in 1990 compared to 1989.

Unless there were substantial resets of coupon rates on "old" loans, the loans with interest rates of 7.5% and above were presumably new loans. The increase in promised interest rates on loans might simply have reflected a general increase in yields on Government securities. Short, medium, and long-term yields in Japan rose from roughly the beginning of 1989 until the closing months of 1990. Moreover, banks' interest expense as a fraction of non-equity liabilities increased sharply from 4.83% in 1989 to

⁵If we measure the return as interest income divided by previous year-end assets, the big increase "shows up" in 1989---an increase of about 20%, nearly double that for U.S. banks.

⁶ We are indebted to Yasuhiko Tanigawa for originally drawing our attention to this directive. We understand that there was an unwritten MOF regulation that a bank's assets at fiscal year end not exceed that of the bigger banks to preserve the so-called "finance order," or "goso-sendan-hoshiki." This would have required proportionate increases in all banks' loan business if aggregate increases in lending were not to be restricted.

⁷ Bank of Japan, 1992, Research and Statistics Department, Economic Statistics Annual, Table 71.

6.13% in 1990 (using end-of-year liability numbers⁸). However, if we look at *the spread* between loan yields and the interest rate on deposits and debentures for “Ordinary Banks,”⁹ plotted in Fig. 3a, we can see that after decreasing from around 3% in the mid-1970s to around 1.7% by 1987, it had increased again to about 2.2% by 1990. Fig. 3b also shows that, according to the OECD, Japanese banks’ interest margins increased steeply in calendar year 1990 and 1991 as compared with U.S. banks. The higher spread was maintained through 1991, even though the steepness of the yield curve declined in the 1989-1990 period; indeed, the yield curve was inverted for much of 1990.

On what types of loans were these higher spreads being earned? One directly measurable characteristic of loans is their maturity or duration. Two sources of evidence indicate that the *maturity* of Japanese bank loans increased in the late 1980s. First, the Bank of Japan breaks out the Outstanding Loans and Discounts of all Banks and City Banks into those with a maturity of less than 3 months, 3 months to 1 year, and more than 1 year.¹⁰ The “More than 1 year” category increased steadily from about 40% in the early 1980s to about 56% in 1991. Second, loan maturity on the borrower side increased --- as Japanese non-financial firms built up accumulated earnings in the 1980s, they were increasingly able to meet short-term funding needs internally and through equity cross-holdings and trade payables rather than bank loans.¹¹

If the term structure risk and/or default risk is higher for the longer maturity loans, higher premiums for bearing that risk could explain higher *steady-state* spreads on loans. Moreover, if loan values are not marked-to-market and instead spreads are calculated using accounting income after loss provisions, an *increase* in loan risk will generate a transitory increase in spreads if accounting loan loss provisions understate true expected losses. Turning to the term structure risk, if the maturity of the loans is increasing relative to deposits and debentures, then part of the spread may reflect a bigger gap between

⁸Reported interest expense for large commercial banks increased from 23,847,400 million yen in 1989 to 29,334,600 million yen in 1990 while Nonbank Deposits, Bonds, and Other Liabilities decreased, and Central Bank borrowing remained approximately constant. (Source: “Table 34, Income and Expenses of Ordinary Banks,” *Economic Statistics Annual*, Research and Statistics Department, Bank of Japan, March, 1992; Referenced Source: The Federation of Bankers Associations of Japan).

the average maturity of bank loans and their funding.¹² In fact, Bank of Japan statistics show that there was a steep increase in 1990-1991 in the proportion of deposit funds coming from “Time Deposits with Liberalized Interest Rates,” “Money Market Certificates,” and “Small denomination Money Market Certificates.” We don’t have enough data to determine whether the increased duration of these funding sources exactly matched the increased duration on the loans, nor do we know to what degree the loans were variable rate and/or banks were hedging their interest rate risk, so we can’t rule out the possibility that a bigger maturity gap may explain part of the higher spreads.

Another possibility is that, for a given borrower type, the ex ante *default risk* (per period) is higher on the longer maturity loans, so that the lengthening maturity of loans alone should have commanded higher loss provisions. We can see from Fig. 3a that the yield on lending and the spread between loan rates and funding costs move quite closely together. Indeed, banks’ yield on lending and 10-year Government bond yields both increased about 43% between fiscal year 1988 and 1990. Term structure risk aside, such co-movement between the default premium component of loan spreads and the level and volatility of interest rates is to be expected if default risk moves up and down with the level and volatility of interest rates. Such co-movement in default risk and interest rates is typically what we see empirically in other countries in the pricing of corporate debt (Gennotte and Marsh (1994) and the references therein).

The 50 basis point increase in loan spreads, i.e. from around 1.7% by 1987 to about 2.2% in 1990, is an increase in the average spread across all loans in banks’ portfolios, both old and new. How much of an increase in the risk of the average loan portfolio would it have taken to generate the 50 basis point increase in average loan spreads? It is well known that the Black-Scholes option-pricing formula can be used for pricing default risk (see Merton (1974)). Let’s assume that bank loans have a maturity of 5

¹¹ The same trend toward increasing loan maturities has occurred in the U.S., except that in the U.S. the replacement for short-term bank loans was the commercial paper market (the domestic corporate debt market in Japan has been held back by onerous restrictions).

¹²Conceptually even a perfect match between average loan maturity and bond maturity would not be sufficient --- the individual loans should be matched one-by-one on maturity with the Government bonds, and then the average of the spreads calculated, i.e. here, the average of the spreads is not the same as the spread of the average.

years, that the loan-to-value ratio is 80%, and that the interest rate is 6.0%. Then, if the volatility of percentage changes in the value of the collateral is constant over time and the value doesn't typically jump up or down sharply, a volatility of about 27% per annum in the value of that collateral would be consistent with a 1.7% default premium on a real estate loan.¹³ With these same parameters, the volatility of the collateral's value would only have to increase to approximately 30% to justify an increase in the default premium to 2.2%. That is, the volatility of the collateral value on the new loan portfolio would only have to be about 3 percentage points higher to account for the observed 50 basis point increase in spreads.

Of course, the loan portfolio wouldn't have turned over in this short period. Let's suppose that 30% of the loans were new and, for further illustration, that rates were fixed on the "old loans," and that the default risk on these new loans were orthogonal to that on the current loans. Then the default premium would have had to be 3.36% on the new loans in order for the average spread to be 2.2%. The volatility of the assets backing the new loans would then have had to be in the 35% range, i.e. eight percentage points higher on the new loans. In practice, the new loan risk was undoubtedly not orthogonal to that on the old loans. In fact, the increased concentration in commercial real estate-backed loans in major urban areas in Japan presumably made bank loan portfolios even less diversified, even if all else were equal. If so, the own-asset volatility of these new loans could have been even less than eight percentage points higher than the old and at the same time have been commensurate with the increase in loan spreads.

We now turn to the changes in banks' loan portfolios in order to determine if there is any direct evidence of an increase in their *ex ante* risk along with loan spreads. Not surprisingly, the much-discussed shift toward real estate-related lending shows up strongly in the data. For example, Fig. 4 gives a bank-by-bank breakdown of real-estate-related lending from 1986 to 1992. The increase in real-estate-related lending is particularly evident for the city banks.

¹³ For simplicity of illustration, the loan is taken to be a discount loan. Note that the important point in the illustration concerns the *relative change* in the volatility --- the absolute level of the volatility could be recalibrated by changing the assumptions about the characteristics of the debt.

The 1980s shift to real estate lending and away from traditional loans can also be seen in the aggregate statistics on Japanese bank lending by industry.¹⁴ If we interpret “kensetsu fudosan gyō” to be commercial real estate loans, which in Japan as elsewhere are considered more risky than residential, then commercial real estate increased substantially, from 11.0% of loans in 1980 to 17% in 1991. Housing Funds (juutaku shikin), i.e. *explicit* loans for residential real estate, also increased slightly, from 9.0% to 10.5%, over the same period.¹⁵ Loans to Manufacturing and to Wholesale and Retail Trade decreased from 32% and 25.5% respectively, in 1980, to 15.1% and 18% in 1990.¹⁶

The small increase in aggregate bank Housing Fund loans during the 1980s also conceals a substantial “reshuffling” of All-Bank new Housing Fund loans among the three main bank lenders: the city banks, regional banks, and shinkin banks. The proportion of new Housing Fund loans made by the city banks increased dramatically during the 1980s---from about 27% in 1983 to about 42% in 1991. Not all of the increase can be directly attributed to the BIS Accord, however. For example, the proportion of new Housing Fund loans actually rose to 57% in 1989, before falling back to about 42% in 1991. Some of the 1983-1989 undoubtedly reflects the relaxation of window guidance. The proportion of Housing Fund loans made by the regional and shinkin banks dropped by a factor of 2 between 1983 and 1989, as did their share of the consumer credit loan business.

Some of the banks’ shift away from traditional business loans toward real estate¹⁷ can be explained by the steep increase in Japanese real estate prices in the 1980s. For example, the value of City

¹⁴ Source: “Table 31: Outstanding Lendings of Commercial Banks by Industry,” *Comparative Economic and Financial Statistics: Japan and other Major Countries 1993*,” International Division, Bank of Japan.

¹⁵ By way of comparison, in the U.S., roughly 30% of FDIC-insured commercial bank and trust loans, or about 12% of total loans and leases, were secured by non-farm, nonresidential properties at the end of 1991. Whilst it is hard to rely on cross-sectional comparisons of real-estate related lending because many loans classified as “non-real-estate” are often secured by land. For example, it has been estimated that 50% - 70% of U.K. bank loans in the late 1980s were related in one way or another to property.

¹⁶ In spite of the evidence for this shift in lending, there was virtually no change in the composition of collateral backing loans, or the ratio of secured to unsecured loans, according to Bank of Japan figures. We don’t currently have a good explanation for this apparent disparity.

¹⁷ While the shift to residential real estate doesn’t show up strongly in the Bank of Japan numbers, it presumably would if we could consolidate in the seven housing loan companies (Nippon Housing Loan Co., Japan Housing Loan Inc., Jyuso Inc., Daiichi Housing Loan Co., Housing Loan Service Co., Sogo

Banks' new loans to Housing Funds (residential real estate) increased by about 580% from 1983 to 1990. But still, over the same period, the *number* of new loans increased by 171%.

Do real-estate-backed loans *as a class* have a higher *ex ante* risk than banks' "traditional" industrial loans (of course, *ex post* the loans were risky!)? It is difficult to estimate *ex ante* real-estate-related loan risk in any country, including Japan and the U.S., because transactions are infrequent and appraisal values tend to be smoothed. In the U.S., Ross and Zisler (1991) estimated the annual volatility of unlevered real estate returns to be in the 9% - 13% range based on the prices of REITs with primarily non-residential holdings. The estimated volatility of Japanese land prices in the 1970s through 1990s, using land prices as assessed by Japan's Ministry of Land, are shown in Table 1. As can be seen, the volatility of national (unlevered) land prices is about 10.42% over the 1971-1996 period. For the period 1971-1986 which excludes the 1990s decline, it is 10.24%. Interestingly, these volatilities are reasonably similar to the Ross and Zisler estimates for the U.S. Moreover, the volatility of real estate prices has more or less mirrored the volatility of stock prices (or vice versa!), i.e. unlevered real estate prices --- particularly in Tokyo and Osaka, have tended to have a beta of about one *vis-a-vis* equity returns. For example, from 1978 to 1996, commercial land prices in Tokyo had a volatility of about 19.61%, while the volatility of the Nikkei over the same period was 18.87%.¹⁸ Remembering that equity price changes partly reflect corporate leverage, these estimates suggest that land-related loans carried considerable *ex ante* risk.

In using the volatility of the prices of land to measure default risk on land-backed loans (via an options-pricing model), we assume that banks don't have any information that land was under-priced and hence was a positive "alpha" investment. Models for national level mispricing of real estate involve

Jukin Co., and Chigin Seiho Housing Corp.), which are all joint ventures between banks, insurance companies, and securities firms.

¹⁸ Moreover, it is not that these 1970s-1990s statistics pertain to an "unusual" period. Asakura (1993) documents that prices of rice paddy land went from 100 yen (per acre) in 1877, to 250 yen in 1880, and back to 45yen in 1885. If they were random points rather than after-the-fact extremal points, these figures imply a land price volatility back then of 41% - 75% per annum.

macroeconomic variables like inflation and growth, and it seems unlikely that banks in aggregate would have inside information about such variables.¹⁹

As noted in the introduction, one of the problems with BIS capital guidelines is that they define credit risk only in terms of broad classes of loans, just as we've done so far in the discussion, whereas risks can (and can be made to) differ substantially among loans in the classes. Upon examination, many of these loan-specific risk factors seem to have accentuated, not reduced, the *ex ante* risk of Japanese banks' loans, particularly the real estate-related ones. For example, the real estate market in Japan can reasonably be considered even more illiquid than other countries like the U.S., adding a substantial "appraisal uncertainty" to the risk of real estate loans. Also, neither the degree of recourse or recovery on the loans, nor detailed covenants governing banks' abilities to intercede in borrowers' operations under adverse conditions (borrowers have an incentive to take on more risk under adversity) can be observed. But we do know that Japanese banks' reported at least considerable *ex post* difficulty in recovering real estate collateral on defaulted loans.

Further, the ratio of the loan-to-collateralized real estate value for the typical Japanese commercial borrower reportedly averaged around 80%. Loans in excess of 100% of stated collateral value were not unknown.²⁰ In fact, irrespective of the formal loan agreement, *first* main bank lenders are often regarded as implicitly committing to add capital to keep group borrowers afloat if they get into financial difficulty, i.e. first main banks are effectively residual claimants with "100%" financing. Also the loan-to-asset values for banks' (especially long-term banks') holdings in *jusen* should mirror that of the *jusen*'s on a "flow through" basis (although the *ex post* settling up banks' responsibilities for their respective *jusen*-in-default suggests that the "flow through" is anything but clear).

¹⁹ If banks did have information about real estate, they should be in the real estate business, not the banking business (perhaps, with 100% loan-to-value ratios, they were!). Werner (1994) shows that quarterly changes in Japanese land-related loans were closely related to quarterly changes in Japan's net capital flows over the 1979-1991 period. It seems plausible that this correlation makes the real-estate loans more risky, e.g. it would certainly reduce the diversification in the banks' loan portfolios. We are still studying this result and its implications.

²⁰ By way of comparison, in the U.S. the loan-to-value ratio on real estate was limited to about two-thirds until 1982; following decontrol, it surged to 80% for some institutions. (It has now dropped back to about 2/3 after FIRREA).

In addition to their increase in real estate lending, Japanese banks also appeared to have shifted some of their remaining business lending to smaller enterprises. These enterprises have, on average, higher volatility of earnings before interest and taxes (EBIT) and, all else equal, higher default risk. For all banks, 41.6% of total outstanding loans and discounts went to “small enterprises” in 1982, but by 1989, that fraction had increased to 57.22%.²¹ Small enterprise “equipment financing”²² increased from about 8.44% in 1982 to 16% in 1989. Loans to small and medium-size businesses which were guaranteed by municipal entities (“shinyo hosho kyokai”) received a risk-weight of only 10% in the BIS calculations, and banks were reportedly quite aggressive in making these kyoho kasidashi loans; this is undoubtedly part of the explanation for the growth of loans to small enterprises, as well as direct evidence that the banks were concerned with the BIS capital standards.

Of course, shifts in bank lending toward real estate also occurred in the U.S. and other countries in the 1980s. In the U.S., for example, total loans secured by real estate increased from about 29% of total FDIC-insured commercial bank and trust loans and leases to about 41% over the 1986-1991 period²³, while Commercial and Industrial Loans decreased from 34.2% to 27% over the same period. This is not surprising given the world-wide trend toward declining demand and margins for traditional commercial banking services, the widespread 1980s deregulation of banks’ lending activities, explicit and implicit insurance, and possibly the world-wide prevalence of BIS and national capital requirements.

To sum up, we believe that the statistics on aggregate bank lending in Japan in the late 1980s show a short-term increase in loan spreads which was both counter to past trends and to rates of return in other countries. These increased spreads accompanied a discernible shift in banks’ loan portfolios toward real estate. In the next section, we present evidence across individual banks that directly supports the

²¹Source: “Table 60, Loans and Discounts of Banking Accounts of all Banks by Industry,” *Economic Statistics Annual*, Research and Statistics Department, Bank of Japan, March, 1992.

²²This is not inconsistent with the trend toward real estate loan-related financing. Nearly two-thirds of the “equipment” financing is to real estate and services industry.

²³“A Statistical Profile of the United States Banking Industry,” *FDIC Division of Research and Statistics, Table RC-8*. (The FDIC numbers closely accord with the numbers in Table 31: Outstanding Lendings of Commercial Banks by Industry, *Comparative Economic and Financial Statistics: Japan and other Major Countries 1993*,” International Division, Bank of Japan).

hypothesis that the BIS capital guidelines were an important force behind these aggregate Japanese banking trends.

3. Cross-Sectional Evidence for the City, Trust, and Long-Term Banks

The BIS capital standards began as a 1985 US-UK initiative, the stated objective of which was a reduction in the risk of international banking transactions and a “levelling of the playing field” for banks. A significant modification of the initial accord, due primarily to pressure from Germany and Japan, allowed these countries to continue making loan loss reserves based on historical default rates and at the same time count 45% of “hidden reserves” as Tier II capital. Thus, instead of applying U.S.-U.K. accounting rules in which loan risk must be provisioned against (so that, term structure risk aside, the net book value of a loan approximates its mark-to-market value), the German and Japanese treatment introduced a mixture of non-GAAP valuation of loans with marked-to-market valuation of other assets (i.e. the hidden reserves). Negotiations concluded in December 1987 and the agreement was signed in 1988.²⁴ Banks were required to have a 7.5% risk-weighted capital ratio by the end of 1990, of which 3.25% was to be in core capital (basic equity). On December 31, 1992 (March 31, 1993 for Japanese banks), at the end of the phase-in period, the risk-weighted capital standard was stepped up to 8%, with 4% required to be in Tier I capital.²⁵

The BIS capital standards, although often termed risk-based capital adequacy standards, can be more correctly understood as accounting risk-based standards. That is, neither risk nor capital is measured on a mark-to-market basis, but rather risk factors are assigned to categories of assets, and historical cost accounting valuations are used in computing the capital ratios. Also, even though off-balance-sheet commitments are taken into account, they are converted to on-balance-sheet equivalents and then assigned to the various risk categories.

In 1986-1987, many banks around the world began to realize that they would probably be considered under-capitalized by the international capital standards that later became the BIS. In

²⁴ Paragraphs 18 and 21 of the BIS Accord were amended in 1991 to strengthen the distinction between general and specific provisions. The amendments effectively precluded supervisors from including any specific provisions in Tier II capital.

²⁵ C.J. Thompson, “The Basle Concordat: International Collaboration in Banking Supervision”; “Report of the Basle Committee on International Convergence of Capital Measurement and Capital Standards,” in *Current Legal Issues Affecting Central Banks*, Vol. I, Ed. by Robert C. Effros, IMF.

particular, press coverage in the late 1980s increasingly speculated that the Japanese banks would have a difficult time meeting the BIS standards.²⁶ To improve their BIS ratios, banks had to increase their reported capital and/or decrease their risk-weighted assets. One short-run way to increase reported accounting capital is to increase the riskiness of loans and thus loan margins, but not make commensurately higher loan loss provisions. This procedure simply borrows tomorrow's profit in the form of higher retained earnings today.

The evidence is that, at least in the U.S., banks do tend to manipulate loan loss provisions when minimum capital requirements are binding. Banks can either "bend" accounting procedures for a given set of transactions, or they can carry out advantageous transactions when confronted with fixed accounting procedures. They appear to do both. For example, Kim and Kross (1995) show that a 1989 change in minimum capital requirements, along with a change in the capital ratio computation, caused U.S. banks with low capital ratios to change their accruals so as to increase their capital ratios. Similarly, Stinson (1991) finds that federally-regulated U.S. Savings and Loans adjusted the size of loss provisions to meet net worth requirements when their net worth was close to the minimum required. Barth, Beaver, and Wolfson (1990) find that U.S. banks use securities gains and losses and/or loan loss provisions to smooth earnings. Williams (1996, p. 3) reports that "[U.S.] banks with inadequate risk-based capital increased their equity relative to banks with sufficient risk-based capital after Basle was announced [but]... most of the [post-Basle] change in equity was due to accounting manipulations and shifts of funds within bank holding companies rather than to genuine increases in equity."

To do a cross-sectional bank-by-bank analysis of the proposition that the Japanese banks facing higher prospective capital inadequacies did increase loan risk, we assembled a time-series cross-section database on the 11 city banks, 3 long-term credit banks, and 7 trust banks²⁷ covering the period 1981-1995. We begin the analysis at the end of fiscal year 1988, which is March 1989 for Japanese banks, for

²⁶For example, *Euromoney* estimated that on average Japanese banks Tier I capital was 2.76% in 1987 (*Euromoney*, July 1989, p. 63)

²⁷ Boyd and Gertler (1993) show that, among U.S. banks, bank size is an important variable in explaining shifts in asset composition etc.. We did not stratify our sample by size ---Japanese city, trust, and long-term banks are all large by almost any standard, and indeed their record does tend to resemble that reported by Boyd and Gertler for the large U.S. banks.

three reasons. First, March 1989 is the first year that BIS ratios were reported by Japanese banks. Second, negotiations concerning the definition of capital, inclusion of hidden reserves, countries to be included, and the like, appeared to have taken place in earnest during 1987 and 1988, with a resolution taking shape toward the end of 1988. The Accord was in reasonably final form by the end of 1988. Finally, the Basle Accord was reported to have been implemented by the Ministry of Finance by administrative guidance in 1988.

First, we determine whether banks with lower BIS capital ratios had higher subsequent growth rates in risky lending. Risky lending is defined as real-estate related lending, i.e. loans to financial institutions (non-banks), commercial real estate developers, and construction companies, divided by total loans. The rank correlation between March 1989 BIS capital ratios and March 1989 – March 1991 growth rates in risky lending across all banks, i.e. across city, trust, and long-term banks taken together, was:

$$\hat{r}^R (BIS_i^{89}, REGR_i^{89-91}) = 0.47 \quad (1)$$

where \hat{r}^R is the rank correlation coefficient, BIS_i^{89} is the reported BIS ratio for bank i on March 31, 1989 (i.e. for fiscal year 1988), $REGR_i^{89-91}$ is the real-estate-related loan growth rate over the two fiscal years March 1989 – March 1991, where “real-estate-related” is defined as loans to financial institutions (non-banks), commercial real estate developers, and construction companies²⁸ as a fraction of total lending; and $i = 1, \dots, 21$, the number of city, trust, and long-term banks in our sample. In (1), the order of ranking is that higher BIS ratios are assigned lower BIS ratio ranks, and smaller growth rates in real-estate-lending are assigned lower ranks. Thus, those banks with the worst BIS ratios in 1989 on average increased their real-estate-related lending the most over the period 1989-91.

The rank correlation in (1) is a robust measure of association between banks’ 1989 BIS capital ratios and their subsequent lending. If, however, this association is instead fitted using a linear regression, much the same result is obtained:

²⁸ This breakdown was obtained from the Quick database.

$$\hat{E}(REGR_i^{89-91} | BIS_i^{89}) = \underset{(10.01)}{1.25} - \underset{(-1.55)}{0.02} BIS_i^{89} \quad (2)$$

The multiple R^2 is 33%, and the negative coefficient indicates that banks with lower BIS capital ratios in March 1989 had higher growth rates of real-estate-related lending over the next two years.

The rank correlation between BIS capital ratios and subsequent risky lending for all banks is of roughly the same magnitude in the following two years, 0.49 in March 1990, and 0.51 in March 1991. Then, in March 1992, by which time it would have been too late to try to “enhance” capital ratios to meet the requirements which became binding in March, 1993, the correlation dropped to 0.02.

The increase in loan risk over the years 1989 to 1991 is likely to have been even greater for the capital-deficient banks than we’ve estimated. The increase in real-estate related lending would, all else equal, have reduced the diversification of default risk in the banks’ loan portfolios. Moreover, the fraction of all banks’ loans going to small and medium-sized businesses increased from 56% in 1986 to 70% in 1989,²⁹ and all else equal, these smaller businesses would have a higher volatility of underlying asset value. The BIS capital standards simply treat all commercial loans as stand-alone and give them a 100% risk weight. Thus, these new loans continued to receive a 100% risk weighting despite reduced diversification of default risk and likely greater volatility of the value of assets underlying the loans.

The BIS rules allow 45% of the hidden reserves of Japanese banks to be counted as Tier II capital. Thus, even if Japanese banks met the 7.5% 1990 capital requirement and had been “on track” to meet the 8% 1992 requirement, the stock market slide which began when trading recommenced after the 1990 New Year holidays would have caused an unforeseen decline in hidden reserves. If the BIS standards influenced Japanese banks’ lending, we might expect a “second wave” of riskier lending after 1990.

The Nikkei had decreased 32% from its December 1989 peak by the end of March 1991. The rank correlation between banks’ 1991 BIS capital ratios and their subsequent risky lending is indeed strong and positive; it is: $r^R(BIS_i^{91}, REGR_i^{91-93}) = 0.51$. Moreover, if this correlation is due to the drop in

²⁹ Source: “Table 64, Loans and Discounts of Banking Accounts of all Banks by Industry,” *Economic Statistics Annual*, Research and Statistics Department, Bank of Japan, 1995.

hidden reserves, we should also expect to find a direct relationship across banks between the changes in those hidden reserves and growth in risky lending. The correlation between the drop in banks' hidden reserves from March 1989 to March 1991 and the growth rates in their real estate related lending over the subsequent two years is 54% for all banks, and 31% for city banks.³⁰

If banks with BIS capital deficiencies were making riskier, under-provisioned loans to enhance their retained earnings and thus Tier I plus Tier II capital, retained earnings would have had to increase. The correlation between banks' risky lending over the March 1989 – March 1991 period and changes in retained earnings over the same period was 47% for all banks, and 17% for city banks. These positive correlations are consistent with the hypothesis that the higher yields on riskier loans did indeed increase retained earnings and thus Tier II capital.

So far, we have used banks' published or estimated BIS ratios as a measure of their potential capital shortfall in meeting the guidelines. However, because the guidelines didn't become fully binding until the end of fiscal year 1992 (i.e. March 1993 for Japanese banks), it could be argued that it was the *projected* shortfall as of 1989 in the ratio which would have been the most important stimulus to bank behavior. We estimated bank *i*'s March 1993 capital deficiency as projected in, say, March 1989, as follows:

$$CD_i^{89} = [(TotalAssets_{i,3/93} \times 8\%) - (TotalAssets_{i,3/91} \times BIS_{3/89})] \div [TotalAssets_{3/93} \times 8\%] \quad (3)$$

where: CD_i^{89} is the capital deficiency for bank *i* at the end of March 1989, and where we assume that bank *i* had perfect foresight with respect to its BIS asset growth from 1989 to 1993.³¹ Since the published

³⁰ In this calculation, the decline in hidden reserves is standardized by any capital surplus over the BIS requirements that banks had achieved by March 1989 (their "on track" level of capital). If the percentage change in hidden reserves instead of this standardization is used in the calculations, the rank correlations are 15% for all banks and 20% for city banks.

³¹ For banks to perfectly forecast BIS asset growth, they would have had to be able to perfectly forecast the relative growth rates of assets in the various BIS asset categories. In fact, banks which increased their total lending through risky lending would rationally have forecast the higher capital that would be required come March 1993. (Note that our variable REGR, i.e. real-estate-related growth rate of risky lending, is always defined as the growth rate in risky lending as a fraction of total lending; there is no induced correlation between capital deficiency and growth in real-estate-related lending which would occur if capital deficiency were computed using 1993 total assets which includes real-estate-related loans).

BIS ratio is used to calculate capital at the end of March 1989, hidden reserves are taken into account, because they are included in Tier II capital.

The bank with the biggest capital deficiency in March 1989 by this measure, i.e. the bank which was “at the bottom,” is given the highest rank. Using the convention that the bank with the biggest growth in real-estate-related lending from the end-of-March 1989 to the end of March 1993 had the highest rank, the rank correlation between the estimate of capital deficiency and growth in real-estate-related-lending is, for all banks together:

$$\hat{r}^R (CD_i^{89}, REGR_i^{90-93}) = 0.61 \quad (4)$$

For city banks alone, the rank correlation is 75%. If capital deficiency is calculated similarly in 1991, the correlation between that capital deficiency and subsequent growth in real-estate-related lending is 0.57 for all banks, and 0.80 for city banks.

Of course, these rank correlations are computed across a relatively small number of banks. If we regarded these banks as a sample from a large population of all banks, the standard error would indeed be large --- approximately $1 / \sqrt{n - 3}$ where $n=21$ for city, trust, and long-term banks taken together. But the correlations just reported are actually those for the *populations* of banks, not for a sample. Any statistical error in the correlations stems from measurement errors in the true capital shortfall and growth-in-risky-lending variables. We have no precise way of assessing the likely magnitude of this error. However, we’ve found that the rank correlations are remarkably robust to alternative measures of the variables.

Horiuchi and Shimizu (1996) find that, across the 21 city, trust, and long-term banks grouped together, the banks with the bigger capital deficiencies during the 1990-1995 period had the higher growth rates of lending and the higher rates of change in loans standardized by total bank assets. While their estimation approach, sample period, and bank grouping are quite different from that here, their results are consistent with our’s. However, we emphasize that it is the growth rate in *risky* (real-estate-related) lending which was associated with capital deficiencies which drives the results. For example, the

rank correlation between BIS rankings at March 31, 1990 and growth in non-real-estate-related lending over the subsequent two-year period for city banks is zero.³²

So far, results have been presented for the 21 city, trust, and long-term banks as a population. We now examine city banks and trust banks separately; since there are only three long-term banks, we can't meaningfully apply the same procedure to them. It turns out that there is a degree of heterogeneity between the city and trust banks, and it is in a direction that seems consistent with the BIS hypothesis. In March 1989, $r^R(BIS_i^{89}, REGR_i^{89-91}) = 0.52$ for the city banks. However, the rank correlation is -0.21 for the trust banks, i.e. trust banks with lower BIS capital ratios decreased their real-estate-related lending. But the trust banks' BIS capital ratios were all above 8% in 1989. Indeed, all but one had ratios above 8.5%. Over the entire period 1989 – 1993 for which BIS ratios were published, no trust bank had a *reported* ratio less than 8%. Questions have been raised concerning the reported numbers for trust banks, e.g. the Economist (October 19, 1996, pp. 78-79) referred to them as "Distrust Banks." If we take the Trust Banks' reported BIS ratios at face value, then an interpretation of these results is that those banks meeting the requirements with the least margin of safety were the most cautious in their lending decisions. If we look just at the city banks (i.e. exclude the trust banks and long-term banks) when calculating of the rank correlation between March 1991 reported BIS ratios and 1991-1993 growth in risky lending, we find $r^R(BIS_i^{91}, REGR_i^{91-93}) = 0.31$.

Implicit in the argument that banks used their lending activities to help meet their BIS capital standards is the requirement that profits be a potentially important source of increases in their capital. Table 2 provides evidence on the relative importance of retained earnings versus new shares issues as sources of equity capital. In this table, the year-by-year ratio of proceeds from new share issues to total proceeds from new share issue plus the unappropriated retained earnings³³ is given for each of the city

³² As another reference point, we computed the rank correlation between estimates we made of the city banks' BIS ratios in 1987 and their 1987-89 growth in non-real-estate related lending. It again turned out to be 0.036, i.e. again, a negative relationship between capital deficiency and change in loans outstanding appears to be due entirely to the growth in real-estate-related lending.

³³ The data for proceeds from new issues was taken from Toyo Keizai's *Japan Company Handbook*. Using the information there, we calculated the number of shares and multiplied it by the issue price to get proceeds. We accounted for public issues at market price, so-called mid issues to shareholders at half the

banks. It can be seen from Table 2 that roughly half the equity funding for many banks in the 1988 - 1990 fiscal years came from retained earnings, and roughly half from new share issues.

Since funds from both new share issues and retained earnings count toward Tier I capital, banks with an anticipated capital deficiency *vis-à-vis* the BIS standards would have an incentive to raise funds from either source. All else equal, we expect them to choose the cheapest source. An important factor in determining the relative cost of outside and inside equity is the degree of asymmetry in information between that available to the stock market and that available to internal managers. For example, if managers issue shares when, based on their inside information, they think that the firm's shares are overpriced, then we'd expect rational investors who realize that managers know more than they do to "mark down" the price they're willing to pay. Myers (1984), Myers and Majluf (1984) argue that this information asymmetry thus results in a "pecking order" for funding sources in which internal funds will be used before resorting to external funding. The degree of asymmetry between insiders and outsiders was arguably substantial at the beginning of the 1990s as stock market prices began to slide and there was much public speculation about the effects thereof on banks' hidden reserves and the extent of problem loans. The information asymmetry is potentially more severe for the weaker banks, a conjecture which is supported by results by Cornett and Tehranian (1994). They find that announcements of equity issues by U.S. banks with capital deficiencies *vis-à-vis* regulatory standards are on average associated with declines in the prices of banks' stocks, which suggests that information asymmetry is indeed more likely the higher a bank's capital deficiency.³⁴ Compounding any disincentive effects of potential asymmetry on share issues was Ministry of Finance "guidance" which essentially ruled share issues out after 1990.

market price (in proportion to shares outstanding --- like rights), and issues to specific buyers at a price set by the bank (private placements). We excluded convertible bond issues and stock splits. We aggregated the proceeds from the new share issues by fiscal year and expressed them as a ratio of unappropriated earnings plus the proceeds from new issues to get the numbers which are given in Table 2. The unappropriated retained earnings numbers include dividends on the basis that dividends are a control variable, and thus contribute to the banks' ability to meet BIS guidelines. However, we re-computed the numbers in Table 2 where dividends are taken out of retained earnings and verified that their treatment is not important.

³⁴ Barth, Beaver, and Landsman (1995) report that accounting items such as banks' non-performing loans and fair values of securities and loans which are disclosed but not recognized in financial statements under SFAS 107 are significant in explaining cross-sectional equity prices. At least in the U.S., the implication is that investors derive information from these items in accounting reports; their absence in

If there is a pecking order running from inside to outside funding, then we would expect to see a tendency for the banks to only raise outside funds when they've exhausted their inside funding. Thus, holding total equity funding constant, we would expect to see banks which made riskier-higher yield loans to generate short-run increases in retained earnings to have lower outside funding. To investigate these possibilities further, we computed the correlation for each city bank between its year-to-year outside funding and the year-to-year fraction of its loans tied to real estate over the period 1987 to 1992. These correlations are negative for all long-term, trust, and city banks except IBJ and Sumitomo Trust.³⁵ The average correlation (including the outlier for IBJ) is -0.37. These correlations are consistent with the hypothesis that banks which were making higher yielding and riskier loans to generate retained earnings because of capital deficiencies relative to the BIS standards faced less pressure to go to the external capital markets. Note that this negative correlation between real-estate related lending and external equity issues is the opposite of what we would have expected if real-estate lending and new share issues were all being driven by real estate prices. That is, most of the share issues occurred in a three year period of high share prices. We know from empirical work by Marsh (1982) and others that on average corporate stock issues increase when stock prices increase, and it can be argued that a major "fundamental" behind high stock prices in Japan was high real estate prices, i.e. one couldn't conclude that stocks were overvalued in Japan in the late 1980s unless one concluded that real estate was overvalued. So if real estate lending went up when real estate prices and stock prices were going up, we would have expected to find a positive correlation between real-estate related lending and external equity issues.

Whilst the evidence is consistent with banks on average resorting to outside equity issues only when they were unable to generate accounting equity increases internally, we would also expect to see a *total* capital demand effect. That is, banks with bigger capital deficiencies needed bigger increases in capital from all sources. We've already shown that the bigger a bank's capital deficiency, the more likely

Japanese reports presumably reduces investor information and increases asymmetry between the level of their information and management's.

³⁵ The correlations are 0.68, -0.75, -0.08, -0.55, -0.73, -0.24, -0.23, -0.78, -0.70, -0.10, -0.96, -0.86, -0.71, -0.34, -0.18, -0.13, 0.05, -0.18, -0.24, -0.64, -0.01 for IBJ, LTCB, NCB, DKB, HTB, BOT, SAKURA, MB, FUJI, SUM. BK, DAIWA BK, SANWA, TOKAI, ASAHI, MITSUI TR, MITSUBISHI TR, SUMITOMO TR, YASUDA TR, NIPPON TR, TOYO TR, and CHUO TR respectively.

it endeavored to generate retained earnings from riskier, higher margin, loans. To complete our cross-sectional analysis then, we looked at the rank correlation between banks' estimated BIS capital ratios in March 1987 and their new equity funding over the period April 1987 to March 1993. This correlation is quite low for city banks, 0.08, and for trust banks, 0.14, though it is 0.50 for the long-term banks (of which there are only three!).

These correlations between BIS ratios and equity funding suggest that, at least for city banks and trust banks, asymmetric information problems could have been important enough to make new equity issues an expensive source of funds. Indeed, the city banks, for whom the correlation between new issues and BIS capital deficiencies are the lowest, had the highest correlation between risk-taking and those deficiencies. It is plausible that the asymmetry is most likely to be highest for banks doing the most risk-taking which on average have the biggest capital deficiencies, consistent with Cornett and Tehranian's (1994) results for the U.S.

To summarize the results in this section, there is consistent evidence that, among Japanese banks, the ones with bigger late-1980s capital deficiencies *vis-à-vis* the impending BIS standards tilted their loan portfolios toward higher margin/higher *ex ante* risk loans. Given the loan loss provision and write-off rules, these shifts generated higher short-term retained earnings growth and thus short-term improvement in their BIS ratios. This behavior is strikingly consistent with evidence that U.S. banks which are up against minimum capital standards do, on average, adjust discretionary accounting items to help meet the standards

4. Cross-Sectional Evidence for the Regional Banks

The evidence that we've presented so far is consistent with the hypothesis that, in the late 1980s and early 1990s, the major Japanese banks' lending decisions were strongly influenced by the then-impending BIS capital regulations. For these banks, not meeting the BIS standards, which would have meant exclusion from international business, would have been life threatening. In this section, we look at the lending decisions of a set of regional Japanese banks for which failure to meet the BIS standards would have had little, or no, consequence.

We collected data for the thirty-seven "Regional II" banks.³⁶ These banks are much smaller than the city, trust, and long-term banks. For example, the average size of city banks' loan portfolios is some thirty times that of these Regional II banks (the median is 46 times). Of the thirty-seven Regional II banks, twelve actually report BIS capital ratios.³⁷ Nine of these appear to have some overseas operations, so we put them in a separate category which we call the "BIS Regional Banks." The remainder of the 37 will be referred to as the "Non-BIS Regional Banks."

We begin by comparing aggregate lending by the BIS Regional Banks with aggregate lending by the Non-BIS Regional banks. Fig. 5 contains a plot of these two groups' cumulative growth in real estate-related lending, defined as above as loans to construction companies, real-estate companies, and finance companies, as a percentage of total loans. The lending for BIS and non-BIS banks is standardized to have the same 1986 base of 100 --- in 1986, real-estate related loans were actually 24.2% of total loans for the non-BIS banks versus 18.3% for the BIS banks. As can be seen, the BIS banks consistently have a higher growth rate in risky lending after 1986, when the capital guidelines began to take shape. By 1993, 22.1% of their loans were real-estate-related versus 24.6% for the non-BIS banks. After the stock market crash which began in 1990, risky lending declined for both BIS and non-BIS banks, but less so for the former.

³⁶ The "Regional II" terminology derives from the "second association" of regional banks to which they belong. When these second-association banks were converted from sogo (mutual) banks to ordinary banks, there already existed a "first association of regional banks" or Regional Banks I.

³⁷ Here, the names of these twelve.

We turn now to estimation of the cross-sectional relationship between individual banks' capital deficiencies *vis-à-vis* the BIS requirements and their lending activities.³⁸ For BIS Regional Banks, the relationship is consistent with the earlier results for the city, trust, and long-term banks. The rank correlation between the 9 BIS Regional Banks' BIS capital ratios at the end of March 1991 and the growth in their real-estate-related lending over the March 1991 - March 1993 period is 0.17 i.e. BIS Regional banks with lower capital had a higher rate of subsequent increase in real-estate related lending.

These results for the BIS Regional Banks are quite consistent with those for the city, trust, and long-term banks reported in Section 3. The consistency is particularly reassuring in view of the much smaller size of the regional banks, in light of Boyd and Gertler's (1993) finding that, in the U.S., bank size seems to be an important variable in explaining shifts in asset composition. Moreover, the lower correlation between BIS Regional Bank capital deficiencies and risk-taking is quite plausible since these regional banks presumably didn't have as much (everything) to lose if they failed to meet the BIS standards.

We turn now to the Non-BIS Regional Banks. To calculate the relationship between their level of capital and risk-taking, we needed to construct synthetic BIS ratios since the Non-BIS banks don't report BIS capital ratios. To do this, we applied the BIS rules to the balance sheet items for the non-BIS banks. Unfortunately, we had no information on hidden reserves or subordinated debt.³⁹ Before proceeding, we checked how well our synthetic ratios estimated the reported BIS ratios for the BIS regional banks. In 1989 and 1990, for example, the rank correlation between our synthetic ratio and the reported ratio was 0.57 and 0.62 respectively.

Using the synthetic BIS ratio in March 1989, we found that its cross-sectional rank correlation with growth in real-estate-related lending from 1989-1991 was 0.091. The correlation between the

³⁸ We tried using the market value of equity, divided by total assets, as a measure of equity (and thus of the "true" bad loan situation if the stock market had good information about the loan quality). The rank correlation between banks capital adequacy using March 1990 marked-to-market equity and the official BIS numbers was -0.24. Perhaps this means that the market is not fooled by the official numbers, but we have no way of independently verifying that the mark-to-market equity value is a reasonably measure.

³⁹ Horiuchi and Shimizu (1996) report that subordinated debt has become an important component of BIS (Tier II) capital beginning in the early 1990s, but at March 31, 1990, the date at which we construct the synthetic BIS ratio, subordinated debt was only 0.02% of assets.

synthetic 1991 ratio and 1991-1993 lending was -0.14. That is, the relationship is, if anything, of the “wrong sign” to be consistent with lending behavior which mimics that of the BIS-affected banks. We interpret this absence of relationship for Non-BIS Regional Banks to be strong support for our hypothesis that the BIS capital guidelines induced risky lending --- when banks are not affected by BIS, the effect disappears.

The time series behavior of our synthetic BIS ratios provide another piece of evidence in support of the hypothesis that the BIS capital requirements had a causal effect on bank lending. The nine BIS Regional Banks’ rankings in terms of their synthetic capital ratio was remarkably stable from year-to-year up until 1988. The correlation between rankings in adjacent years was in the 91%-93% range. From 1989 through 1991, however, the rankings based on the synthetic ratio became much more volatile, e.g. the rank correlation was only 37% between the 1990 and 1989 rankings. After 1991, the rankings again changed little from year-to-year, e.g. the rank correlation between 1992 and 1991 was 98%. For the Non-BIS Regional Banks, the rankings were much more stable; even the correlation of the March 1989 ranking and March 1990 ranking was 81%. A reasonable inference is that the BIS Regional Banks were more active in influencing their BIS capital ratios in the 1989 – 1991 period than their non-BIS brethren.

A final thread of evidence for the influence of the BIS capital guidelines on bank behavior consists of the relative shifts in BIS Regional Banks’ and Non-BIS Regional Banks’ holdings of Government securities. Variation in these holdings is potentially revealing because national Government securities had zero risk weight in calculation of the BIS ratios, while other securities have weights ranging from 20% to 100%. Fig. 6 shows both the BIS banks’ and the non-BIS banks’ holdings of Government securities (excluding Local Government securities) as a fraction of total securities held, from March 1986 through March 1993. (The period March 1986 through March 1993 begins when the BIS capital guidelines started becoming a possibility). As can be seen, the BIS banks and the non-BIS banks substituted Government for non-Government securities to roughly the same degree from March 1986 to March 1989. After March 1989, however, the changes in the Government securities holdings of BIS and non-BIS Regional banks diverged substantially.

The non-BIS banks held their Government securities positions relatively constant from 1989 to 1990, and then reduced them by 12% in the next two years. The reduction was possibly due to term structure movements. The yield curve was essentially flat at the beginning of 1990, had a slight positive slope of 10 basis points in August and September 1990 (the 10 year Government rate was 8.1% and the 3-month CD/Time deposit rate was 7.91%), became inverted for the remainder of 1990 and 1991, and then flattened out again at the beginning of 1992. However, the BIS banks, which presumably faced the same term structure (we have no information on the maturity or exact composition of their holdings), maintained their positions, though there was some year-to-year variability. One motivation for this behavior by the BIS Regional Banks would have been a desire to remain more heavily invested in Government securities, all else equal, because they carried a zero risk weight in the calculation of the BIS capital ratio.

In summary, the results for the regional banks corroborate our results that the enactment of the BIS capital standards led to increases in risky loans by Japanese banks. In the next section, we discuss the Japanese rules for loan provisioning and write-off in detail. We argue that, in the case of Japan, it was not the discretionary nature of the rules but rather *their rigidity* that led to increased loan risk, i.e. a situation in which asset choice is endogenous and loss rules are inflexible is equivalent to a situation where assets are fixed but rules can be manipulated.

5. *The Bad Debt Reserve and Write-off System*

Japanese banks' ability to use their risky lending activities to enhance their BIS capital ratios was all the more effective because loan loss reserves weren't perfectly adjusted to reflect the higher expected default rates on the riskier loans. In fact, Japanese banks' loan loss reserves were determined by applying inflexible "rearview" rules. Perhaps such rules might have been adequate, or at least not relevant, when bank lending policy was tightly controlled by window guidance, but it is generally agreed that window guidance was itself substantially relaxed by the mid-1980s (e.g. Rhodes and Yoshino (1996)).

Reserves against bad loans appear to have been introduced in Japan in 1964. Banks were then required to make a general bad debt reserve equal to 0.42% of outstanding loans, and the provisions against income which were credited to the bad debt reserve were tax deductible. The bad debt reserve requirement was then reduced 5 times to reach its current level, which is a tax deductible 0.3% for domestic loans and loans to OECD countries.⁴⁰ We understand that the adjustments leading to the 0.3% rate reflected default experience prior to 1985.

Making the tax-deductible allowance for loan losses a fixed percentage of loans does have the advantage that it makes it impossible for banks to manipulate the level of loan loss reserves. Since general provisions are tax deductible and count as Tier II capital, Japanese banks might have had an incentive to over-provision (just as U.S. banks did under similar tax rules in the 1980s). In the absence of a fixed loan loss rule, banks might also have had the opposite incentive to make reserves "too low" in order to disguise a deteriorating quality of its loan portfolio if they believed that it would "fool" investors or regulators. These pros of the fixed rule notwithstanding, however, a fixed loan loss allowance doesn't, *ipso facto*, respond to changes in the *ex ante* riskiness of loans. Most obviously the reserve allowance is invariant in the face of a shift in steady-state risk. But more subtly, it doesn't reflect changes in the timing at which uncertainty surrounding loan repayments is resolved: since the reserve is "reset" each year at 0.3% of the loan balance, any reserves which are "unused" for write-offs simply reduce the amount of provisions

⁴⁰Source: "The banking system in Japan," *Federation of Bankers Associations of Japan, Zenginkyo*, 1989, Tokyo, pp. 86-87.

which are required to achieve the 0.3% reserve requirement in the following year.⁴¹ “Specific provisions” are essentially identical to write-offs insofar as they are specific to loans and are not accumulated in a reserve account if not used in the financial year; the only point of difference seems to be that specific provisions are only 50% tax deductible, whereas write-offs are fully deductible. Thus even if the characteristics of loans or economic conditions change so that there is an increase in the number of loans which will likely default in a subsequent period, there is no requirement to build up reserves accordingly.⁴²

A factor which might explain post-mid-1980s regulatory forbearance in Japan is that inadequacies in accounting for potential loan losses are, at least in part, offset by another accounting distortion---the “hidden reserves,” i.e. unrealized gains on assets, especially equity holdings, which were stated at book value. Certainly it is reasonable to assume that bank managers, or their regulators, should be able to roughly associate bad debt allowances with these hidden reserves---risk controllers in large financial institutions typically try to mark-to-market and hedge the risk of liquid assets at least daily. However, the hidden reserves declined as equity values declined, just at the time that the big increase in defaults began to occur---in general, more than a dollar of hidden reserves is required per dollar of “required” bad debt reserves and write-offs because hidden reserve values are likely to vary inversely with

⁴¹This treatment is in stark contrast to that in the U.S.: “Amounts of bad debt deductions for income tax purposes are includable in taxable income of later years only if the bad debt reserves are used subsequently for purposes other than to absorb bad debt losses.”

⁴² The loss reserve provisioning procedures in Japan contrast with that in the U.S. and other countries. U.S. authorities don’t have fixed rules of regulatory accounting for allowances for loan losses (possibly because fixed rules can be “gamed”). The S.E.C., the Office of the Comptroller of the Currency, and the F.D.I.C. all recommend a “building block” approach to determining the adequacy of allowances. Considerations include: specific loans with potential losses; historical experience in default on various pools of loans, and their volume, maturity and composition; off-balance sheet credit risks; lending policies and procedures; and economic conditions. Ultimately, bank examiners judge the adequacy of the reserves. Tax deductibility seems to be “automatic” if the provisions are sanctioned by the examiners. Further, industry opinion seems to be that there is a substantial equivalence between GAAP (FASB Statement No. 5) and the regulatory accounting procedures: “In practice, few differences appear to exist between the total [allowance for loan and lease losses] for RAP [Regulatory Accounting Procedures] and GAAP, although differences often appear among components justifying the total allowance” (Baskin (1992, p. 95)). Using F.D.I.C. statistics for (federally) insured commercial banks and trust companies, the ratio of “Allowance for Loan & Lease Losses” as a fraction of “Total Loans & Leases” in the U.S. has been in the vicinity of 2.6% since 1987. Prior to that, it increased from about 1% at the beginning of the 1980s to about 1.6% in 1986.

loan losses. Interestingly, the BIS applies a 55% discount to the value of hidden reserves as a component of Tier II capital, but the rationale for the discount appears to be that it is an allowance for capital gains taxes and perhaps market illiquidity, not that equity holdings are a poor hedge against loan defaults.

Until 1994, it appears to have been very difficult for Japanese banks to write off loans. Even if a write-off was not deductible for tax purposes, it could not be taken under MOF guidelines unless the borrower was bankrupt or had been insolvent for two years. Since February 1994, banks have been permitted to establish *Write-off Special Accounts*. The Special Account can be established when: (1) the borrower's business is unlikely to improve, or the borrower has suffered a substantial loss due to natural disaster or business decline; in this case, the establishment of the Special Account requires the approval of the Japanese tax authorities; (2) the borrower has been the subject of a suspension of trade at the Clearing House, petition for commencement of bankruptcy, reorganization and restructuring procedures, etc.; in this case, the bank may, at its discretion, write off 50% of the total amount of the loan (less the value of collateral) at the time of occurrence of the event. It appears that a tax deduction is allowed at the time the Special Account is established. When loan default appears certain, the loan can be written off against the Special Account. In addition to the amount which can be transferred to the Special Account pursuant to conditions (1) or (2), banks may also transfer additional money into the Special Account without it being tax deductible. In this case, the banks must file a report with the tax authorities.

Past regulatory tightness on write-offs may be in part explained by Japanese banks' reluctance to foreclose on problem loans long beyond the point at which bankers in other countries would have. Hoshi, Kashyap, and Scharfstein (1990) have in fact presented evidence that such Japanese bank relationships with borrowers tend to help reduce bankruptcy costs. But there are also potential cons. Obviously, there will be some instances when problem loans are better handled by "workout specialists" and/or a change in the borrower's management is warranted, which may or may not be expedited by a relationship bank. Economists have also long pointed to⁴³ the "moral hazard" that managers of failing financial institutions have an incentive to increase the riskiness of their operations. Moreover, one suspects that banks'

⁴³ And the U.S. experience with failed financial institutions affirmed!

monitoring skills may be better (or more apparent) on a relatively “isolated case” basis than in a situation like that in 1990s Japan with widespread problem loans due to causes largely beyond any bank’s control.

The write-off rules could also have been consistent with banks’ own interests (and thus those of their “regulators”) if banks were concerned with their BIS capital standards, as we’ve argued the evidence suggests that they were. Assuming that general provisions are tax deductible and specific provisions are not, it is straightforward to show that, given the BIS treatment, the order of desirability of ways of handling defaults are:

$$\textit{general provision} > \textit{not recognized} > \textit{write-off} \geq \textit{specific provision}$$

That is, banks prefer not recognizing bad loans over writing them off; all else equal, the BIS effect of the former outweighs the tax advantage of the latter.

6. BIS Events and the Behavior of Japanese Banks’s Stock Prices

We’ve argued that Japanese banks increased the risk of their loan portfolios when it became clear in 1989 that capital guidelines would be imposed on international banks, and again following the adverse effect of the stock market crash on their hidden reserves. As Gennotte (1990) pointed out, deposit insurance subsidies and other incentives like income from continued international business could, in principle, induce banks to compete so much to book riskier loans that at the margin those loans become unprofitable. So far, we’ve not examined whether the marginal loans were in fact unprofitable, i.e. whether the premiums charged on the loans with higher *ex ante* risk were insufficient compensation for the added risk. If the banks’ were incented by the BIS capital regulations to make negative NPV loans, their true mark-to-market capital positions would have even worse, and the BIS effects greater, than in our estimates.

Suppose that we assume that information about Japanese banks’ lending policies and loans was available to the stock market, and that the market rationally valued their stocks on the basis of this information. Then banks’ stock prices would reflect updates in the market’s estimate of changes in loan risk and profitability due to the BIS capital standards. In fact, Wagster (1996) recently reported that “...shareholders of Japanese banks experienced ...a large cumulative wealth gain of 31.63 percent

indicat[ing] that Japanese bank shareholders benefited from the Basle accord.” Of course, it is always possible that stock prices had earlier anticipated negative effects and that the announcements were only “good news” relative to those earlier downgrades in prices. But let’s examine Wagster’s cross-sectional regression of stock returns for banks, which includes a portfolio of Japanese banks, at the announcement dates that he considers. Dummy variables are included in the regression for the weeks in which BIS (Basle) announcement effects are hypothesized to occur, and the regression captures market-wide movements in stock prices and interest rates. The regression is:

$$\tilde{R}_{JBt} = a_{JB} + b^1 \tilde{R}_{Wt} + b^2 \tilde{R}_{N225t} + b^3 \tilde{I}_{St} + b^4 \tilde{I}_{Lt} + \sum D_a d_a + \tilde{e}_{JBt} \quad (5)$$

where \tilde{R}_{JBt} is the rate of return on a portfolio of Japanese banks in week t; \tilde{R}_{Wt} is the rate of return on the Morgan Stanley Capital International World Index in week t; \tilde{R}_{N225t} is the rate of return on the Nikkei 225 stock index in week t; \tilde{I}_{St} is the change in the 3-month Japanese inter-bank rate, \tilde{I}_{Lt} is the change in yields on 10-year JGBs, D_a is a dummy variable which equals 1 for the week in which the α 'th unanticipated Basle announcement is held to have occurred, and δ_α is the rate of return attributable to that α 'th announcement. Wagster identified 18 announcement events.

It is interesting that most of the 31.63% gain on the Japanese bank stocks reported by Wagster occurred in just two of the eighteen weeks he identified --- the week containing January 5, 1987, when the coefficient on the dummy variable was 12.67%, and the week of April 15, 1987, when the coefficient was 21.21%. The only other significant week was that of June 22, 1987, when the Japanese banks experienced a 7.82% decrease in stock price after allowing for market and interest rate effects. That is, all the significant “action” in bank stock prices occurred on three dates in the first half of 1987.

The reported BIS announcement effects on U.S. banks were much smaller. This outcome is *per se* contrary to most studies which suggest that the BIS capital requirements were, if anything, relatively more beneficial to U.S. banks than Japanese banks. For example, summarizing their detailed study of the implementation of the Accord in Japan and the U.S., Scott and Iwahara (1994) “...guess that the Accord

has been of more benefit to U.S. than to Japanese banks because they operate in a more favorable accounting, tax, and regulatory context” (1994, p. 3).

We repeated regression (5) for Japanese banks over the period which begins with the week ending September 20, 1985 and ends with the week ending March 30, 1990, approximately the same as that in the Wagster study. Weighting the 20 major Japanese banks by their assets at the beginning of the period, we find:⁴⁴

$$\begin{aligned} \tilde{R}_{JBt} = & -0.012 + 0.16 \tilde{R}_{Wt} + 0.99 \tilde{R}_{N225t} + 0.09 \tilde{I}_{St} - 0.09 \tilde{I}_{Lt} + 0.115 D_{Jan9,87} + 0.134 D_{Apr17,87} \\ & - 0.034 D_{Jun26,87} + \tilde{e}_{JBt} \end{aligned} \quad (6)$$

For the city banks:

$$\begin{aligned} \tilde{R}_{JBt} = & -0.012 + 0.18 \tilde{R}_{Wt} + 0.87 \tilde{R}_{N225t} + 0.09 \tilde{I}_{St} - 0.085 \tilde{I}_{Lt} + 0.133 D_{Jan9,87} + 0.122 D_{Apr17,87} \\ & - 0.039 D_{Jun26,87} + \tilde{e}_{JBt} \end{aligned} \quad (7)$$

Wagster reports a 12.67% Basle announcement effect in the first week of 1987, which is roughly the same as what we find --- 11.5% for all banks and 13.3% for city banks. However, our estimates of the April announcement effect, 13.4% for all banks and 12.2% for city banks, are substantially less than his 21.2% estimate. Likewise, we estimate the negative June announcement effect to be in the -3.4%-3.9% range, which is about half his estimate of -7.82%. These differences are likely due to the differences in bank coverage (the exact composition of the Japanese banks in the Wagster study was not reported), returns measurement (we used returns for weeks ending on Friday, while Wagster’s weeks ended on Wednesday); choice of long and short-term interest rate variables, and the like. Overall, however, our estimates of the returns on Japanese banks are in rough agreement with Wagster’s.

However, we believe that it is unlikely that the stock price changes on Japanese banks in January, April, and June, 1987 are, in fact, due to Basle accord announcements. On January 5, 1987 the

⁴⁴ Dummy variables for Wagster’s 15 “non-significant” announcement dates for Japanese banks have been suppressed. The results are substantially the same when the banks are equally-weighted, i.e. the weekly returns of most banks are roughly of the same magnitude.

announcement identified in Wagster (1996, Appendix I) was that “The Bank of Japan announced that Gerald Corrigan, president of the Federal Reserve Bank of New York, would visit Japan this Friday to discuss regulatory cooperation. He will then proceed to the Basle Committee meeting to be held next week.” We could find no reports in the (English language) press on the week of Corrigan’s visit, suggesting that his visit may have been of minor significance. But there was news that “City and Trust Banks continued to score sharp gains due to expectations of record profits for most leading financial institutions” (Financial Times, January 7). Similar stories were published before the market closed for New Year 1987, e.g. “Analysts said banks seemed a good buy because of their long-term earnings prospects” (Asian Wall Street Journal Weekly, December 29, 1986).

On April 13, 1987, the Asian Wall Street Journal Weekly reported that “Britain Rethinks Its New Power to Punish Japanese Banks for Tokyo’s Trade Sins.” The British government had previously “...decided to...revoke licences or deny new licences for Japanese banks and insurance companies to do business in London” (p. 11) as part of a broader trade war. Especially if the government action would have been precedent-setting, it is easy to see that Britain’s decision to “back off” would explain the substantial positive returns to Japanese banks in mid-April, 1987. Indeed, if the Japanese bank stock prices were reacting to news about inclusion of Japanese bank services in a threatened trade war, it would be strong evidence of the importance of international business to the Japanese banks, and thus of the losses that would have occurred if they failed to meet the BIS capital standards.⁴⁵

The big changes in Japanese bank stocks in mid-April were also quite asynchronous, again making it less plausible that they were primarily due to announcements concerning the Basle Accord. For example, Mitsubishi Bank’s stock rose 5.9% on Thursday April 9, 11.95% on Friday April 10, and 6.6% on Tuesday, April 14 with only small movements on surrounding days. Likewise, Sakura Bank’s stock rose 10.5% on Thursday April 9, 15.1% on Friday April 10, 16.6% on Tuesday, April 14, and 14% on Wednesday, April 15. By contrast, Nippon Credit Bank’s price went up 16.8% on Tuesday, April 14,

⁴⁵ We understand that the Ministry of Finance indicated its willingness to allow banks to raise capital in a public offering in April 1987 which could have been “good news” if banks were capital constrained. Presumably public offerings could also be “bad news” if there were asymmetry-of-information problems, or if the public offerings alleviated a scarcity of free-floating bank shares.

14.08% on Friday, April 17, and 12.3% on Monday, April 20. LTCB's went up 7.61% on Friday, April 10, 7.1% on Wednesday, April 15, 7.1% on Thursday, April 16, 8.7% on Friday, April 17, and 7.6% on Monday, April 20. It is always difficult to know what shocks are unanticipated and thus cause price movements in an efficient market. But this spread over time in price reaction seems more consistent with a market resolving how different banks would be affected differently by the trade sanctions applied to financial services. Moreover, the price reactions seem to begin a couple of days before the weekend of April 11-12, 1987, about the time that news about the British government's actions would have begun to reach the market.

On June 22, 1987, the Bank of Japan was reported to be "...urging commercial banks to exercise caution in lending during the July-September quarter..." (Asian Wall Street Journal Weekly, June 22, 1987, p. 4). It is perhaps more plausible that this announcement, if unanticipated, is behind the three to four percent (7.8% in Wagster) drop in banks' stock prices that week than action on the Basle accord, viz "The Brussels formula' was conceived that defined banks' capital similar to the method used in the U.S.-U.K. agreement. For the first time, German authorities indicated that they could, in principal, support the new plan." (Wagster (1996), Appendix I).

In summary, we believe that it is difficult to attribute changes in Japanese bank stock prices in the late 1980s to news about Basle Accord negotiations. Particularly in early 1987, the price changes seem more likely to have been associated with revisions in forecasts of bank profits. The market may have interpreted the news about profits as evidence that the banks were making positive NPV loans, or it may have been "fooled" by the high margins and low provisions on the loans. The latter is perhaps less plausible because the banks did not appear to respond in earnest to the capital regulations, by making riskier loans, until later in the 1980s.

7. Summary and Discussion

The evidence presented here is that Japanese banks, when faced with tight (for them) BIS capital standards which became fully effective in March 1993, made increasingly *ex ante* risky loans in the late 1980s and early 1990s. By so doing, they were able to pump up retained earnings and thus their BIS capital ratios. The retained earnings appear to have been a lower cost source of funds than external equity issues for the banks. Cross-sectionally, the city, trust, and long-term banks with higher capital deficiencies *vis-à-vis* the BIS standards increased their risky lending the most. Moreover, after the collapse in Japanese equity prices, the banks which experienced the biggest declines in hidden reserves tended to increase their risky lending the most. Regional II banks which were subject to the BIS guidelines behaved similarly to the major banks; however, for the remaining non-BIS Regional II banks, there was no correlation between their risky lending and our estimate of their BIS capital ratio.

Our results depend upon our classification of loans to real estate, construction, and finance companies as risky. At least three arguments support this contention that the real-estate-related loans were indeed *ex ante* riskier, not just *ex post* riskier. First, Standard & Poor's lowered their debt ratings for sharply increasing numbers of Japanese banks beginning in 1990, i.e. during our sample period. As Fig. 7 shows, the debt of one bank was downgraded in 1989, while 16 debt issues were downgraded in 1990, 12 of them long-term debt issues. Since debt ratings should reflect banks' leverage as well as the riskiness of their loans and other assets, and leverage increased as equity prices fell beginning in the 1990s, not all of the ratings decline can be attributed to increases in loan risk. But the calculations in Section 2 showed that the magnitude of the change in unlevered mark-to-market value of bank assets which would have had to occur to explain the changes in observed spreads and ratings was quite plausible.

Second, the rank correlation between growth in what we've defined as banks' risky lending over the period March 1987-March 1993 and the banks' March 1994 *disclosed* non-performing loans as a fraction of total loans is 0.24 for the city banks. This might seem low, but the same rank correlation using UBS's (1994) estimates of the respective banks' non-performing loans, as opposed to the banks' *disclosed* problem loans, is 0.58. Finally, if we apply Asai's (1996) estimates of the amounts collectible to the UBS non-performing loan estimates, the correlation between our ranking of banks according to their risky

lending from 1987-1993 and their ranking in 1994 with respect to estimates of probable loan losses is 0.79.

Third, banks' decision making procedures are "visible hand" evidence of changes in loan portfolio risk. At least some banks reportedly changed the way that they organized loan originations in the 1980s which, if anything, would have led to the banks making riskier loans. For example, pursuant to a well-known consulting firm's recommendations, Sumitomo Bank is reported to have switched its loan risk evaluation responsibility from an independent credit investigation bureau to a monitoring bureau which reported to the sales division (after 1990, it reportedly switched back to the old organizational form!).⁴⁶

We examined Japanese bank stock price changes in the late 1980s which Wagster (1996) attributed to announcements concerning the Basle Accord. We argue that there are other more plausible explanations for the stock price changes, particularly in early 1987 when forecasts of increased bank profits were released. The effect of news items about increased bank profits could itself indicate that the riskier loans being made by Japanese banks were (unexpectedly) positive NPV. But generally the risk taking didn't begin in earnest until 1988-1989. There is evidence that spreads on OECD and Asian loans increased substantially from 1987 through 1989-1990 while there is no hard evidence that credit risk increased substantially in these borrower countries. McCauley and Yeaple (1994) attribute the increased spreads to Japanese banks' management decisions following decreases in the value of their equity holdings that began in 1990.

The generality of insurance subsidies and moral hazard incentives could explain why Australia and New Zealand, Norway, Sweden, Korea, and the U.S. have also recently experienced banking problems even though their regulatory and operating environments differ from Japan's. Moreover, the trend toward declining demand for commercial banks' traditional services and tighter margins seems to be world-wide. In this environment, the BIS minimum capital standards could have acted as a catalyst for bank risk-taking similar to that which we've documented in Japan.

What of the future? In January 1996, the Basle Committee reissued a Supplement to the July 1988 Basle Capital Accord, extending the Capital Accord by adding capital charges for market risk to

⁴⁶We are indebted to Takeo Hoshi for telling us about this case.

those for credit risk. “The capital standards for market risk, as set forth in [the] Amendment, will be implemented by the G-10 supervisory authorities by year-end 1997 at the latest” (Basle Committee (1996b)). It will allow a Tier 3 level of capital to be used in satisfying the capital requirement for market risk.

The definitions of Tier 1 and Tier 2 capital will still be largely accounting-based, and interdependencies between credit risk and market risk will apparently not be taken into account. Unfortunately, capital standards that apply to market risks and traded assets are also potentially much more vulnerable to regulatory arbitrage⁴⁷ than credit risk standards because a liquid securities or derivatives portfolio can be changed in a matter of minutes. For the same reason, monthly or annual inspections and disclosure requirements will be of little use in controlling the “arbitrage” of market risk regulations⁴⁸.

⁴⁷ For example, the Amendment assigns weights for general market risk by maturity classes or duration classes. But these official weights almost certainly won't match market weights --- for a start, sophisticated fixed income models won't have fixed weights over different interest rate environments (see Marsh (1995) for references).

⁴⁸ Which is why securities clearinghouses monitor positions intra-day for large positions and/or in volatile market situations, and serious securities firms hedge risk more-or-less in real time. The Basle Committee themselves make note of this problem: “Supervisory authorities have at their disposal a number of effective measures to ensure that banks do not ‘window dress’ by showing significantly lower market risk positions on reporting dates. Banks will also, of course, be expected to maintain strict risk management systems to ensure that intra-day exposures are not excessive” (Basle Committee (1996a)).

References

- Asai, Hideki, 1996, "Japan Banks," Knight-Ridder "Money-Center News #10029, Received 6:38am, July 8, 1996.
- Asakura, Kokichi, 1993, "The Land Myth: Real-Estate Backed Loans in Japanese Banking," *JCR Financial Digest*, 30, May, 1-2.
- Barth, Mary, William Beaver, and Mark Wolfson, 1990, "Components of Earnings and the Structure of Bank Share Prices," *Financial Analysts Journal*, 46, 53-60.
- Barth, Mary E., William H. Beaver, and Wayne R. Landsman, 1995, "Value-Relevance of Banks' Fair Value Disclosures under SFAS 107," Working Paper, Graduate School of Business, Stanford University, July.
- Baskin, Dorsey L. Jr., 1992, "The Allowance for Loan Losses: Understanding and Applying FASB 5," *Journal of Accountancy*, October, 95-100.
- Basle Committee on Banking Supervision, 1996a, "Amendment to the Capital Accord to Incorporate Market Risks," Monograph. January.
- Basle Committee on Banking Supervision, 1996b, "Overview of the Amendment to the Capital Accord to Incorporate Market Risks," Monograph. January.
- Beatty, Anne, Sandra L. Chamberlain, and Joseph Magliolo, 1995, "Managing Financial Reports of Commercial Banks: The Influence of Taxes, Regulatory Capital and Earnings," Working Paper, Penn State University, November.
- Besanko, David, and George Kanatas, 1996, "The Regulation of Bank Capital: Do Capital Standards Promote Bank Safety?" *Journal of Financial Intermediation* 5, 160-183.
- Boyd, John H., and Mark Gertler, 1993, "U.S. Commercial Banking: Trends, Cycles, and Policy," *NBER Working Paper* No. 4404, July.
- Cornett, M.M., and H. Tehranian, 1994, "An Examination of Voluntary versus Involuntary Security Issuances by Commercial Banks," *Journal of Financial Economics*, 35, 99-122.
- Gennotte, Gerard, 1990, "Deposit Insurance and Bank Competition," Research Program in Finance Working Paper, Walter A. Haas School of Business, U.C. Berkeley.
- Gennotte, Gerard, and David Pyle, 1991, "Capital Controls and Bank Risk," *Journal of Banking and Finance*, 15, 805-824.
- Gennotte, Gerard, and Terry Marsh, 1993, "The Term Structure, Equity Returns, and Yield Premiums on Risky Bonds, Working Paper, U.C. Berkeley.
- Horiuchi, Akiyoshi, and Katsutoshi Shimizu, 1996, "The Deterioration of Banks' Balance Sheets in Japan: Risk-Taking and Recapitalization," Working Paper, University of Tokyo, Department of Economics, June 25.

Hoshi, Takeo, Anil Kashyap, and David Scharfstein, 1990, "The Role of Banks in Reducing the Costs of Financial Distress in Japan," *Journal of Financial Economics* 27, 67-88.

Hoshi, Takeo, 1994, "Financial Deregulation and Corporate Finance in Japan," Working Paper, UCSD.

Kim, Myung-Sun, and William Kross, 1995, "The Impact of the 1989 Change in Bank Capital Standards on Loan Loss Provisions," Working Paper, Purdue University.

Kim, Sun Bae, and Ramon Moreno, 1994, "Stock Prices and Bank Lending Behavior in Japan," *Economic Review*, Federal Reserve Bank of San Francisco, No. 1, 31-42.

Lucas, Robert E., Jr., 1976, "Econometric Policy Evaluation: a Critique," in *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conference Series on Public Policy, ed. By K. Brunner and A. Meltzer, Vol. 1, North-Holland, Amsterdam.

McCauley, Robert N., and Stephen Yeaple, 1994, "Linking Lower Japanese Asset Prices and Pacific Financial Markets," Working Paper, International Finance and International Research Departments, Federal Reserve Bank of New York, N.Y., 10045.

Marsh, Paul, 1982, "The Choice between Equity and Debt: An Empirical Study," *Journal of Finance*, 37(1), 121-144.

Marsh, Terry A., 1995, "Term Structure of Interest Rates and the Pricing of Fixed Income Claims and Bonds," in R. Jarrow, M. Maksimovic, and W. Ziemba, eds., *Handbooks in Operations Research and Management Science: Finance*. Amsterdam: North-Holland.

Merton, Robert C., 1974, "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates," *Journal of Finance*, 29, May, 449-470.

Myers, Stewart C., 1984, "The Capital Structure Puzzle," *Journal of Finance* 39, 575-592

Myers, Stewart C., and Nicholas S. Majluf, 1984, "Corporate Financing and Investment Decisions when Firms have Information that Investors Do Not," *Journal of Financial Economics*, 13, 187-221.

Pyle, David H., 1986, "Capital Regulation and Deposit Insurance," *Journal of Banking and Finance*, 10, 189-201.

Rhodes, James R., and Naoyuki Yoshino, 1996, "Window Guidance by the Bank of Japan: Was it Effective?" Working Paper, Graduate School of Policy Science, Saitama University, Urawa, Saitama 338 JAPAN, and Department of Economics, Keio University, 2-15-45, Mita, Minato-ku, T108, JAPAN, September.

Ross, Stephen A., and Randall C. Zisler, 1991, "Risk and Return in Real Estate," *Journal of Real Estate Finance and Economics*, 4, 175-190.

Scott, Hal S., and Shinsaku Iwahara, 1994, "In Search of a Level Playing Field: The Implementation of the Basle Capital Accord in Japan and The United States," Group of Thirty Occasional Paper No. 46, Washington DC,

Stinson, Christopher H., 1991, "Net Worth Requirements and Management of Provisions for Losses in Savings and Loans," Ph.D. Dissertation Draft, Graduate School of Business, Stanford University, February 1.

Thompson, C.J., 1989, "The Basle Concordat: International Collaboration in Banking Supervision"; "Report of the Basle Committee on International Convergence of Capital Measurement and Capital Standards," in *Current Legal Issues Affecting Central Banks*, Vol. I, Ed. by Robert C. Effros, IMF.

UBS Securities, 1994, "Japan's Banks Face Up to Bad Debt," Global Research—Equities, UBS Securities Limited, 1-1-7 Uchisaiwaicho, Chiyod-ku, T100, Japan, August 30.

Werner, Richard A., 1994, "Japanese Foreign Investment and the 'Land Bubble,'" *Review of International Economics*, 2(2), 166-178.

Williams, Michael G., 1996, "The Efficiency of Accounting-Based Bank Regulation: The Case of the Basle Accord," Doctoral Dissertation Draft, University of Southern California, January.

APPENDIX

RELATIVE ATTRACTIVNESS OF PROVISIONING AGAINST LOAN LOSSES, WRITE-OFF, AND NOT RECOGNIZING BAD LOANS FOR JAPANESE BANKS, GIVEN TAX AND BIS CAPITAL RULES

For simplicity, we assume:

- If a loan goes bad, a 100% loss occurs
- Write-offs and general provisions (up to 0.3%) are fully tax deductible
- Loans are the only bank assets
- Specific Provisions, General Provisions, and Write-offs have the same timing

Let:

τ_{sp} = The portion of specific reserves allowed as a tax deduction

τ = The Marginal Tax Rate;

L = Total Loans Outstanding

B= Bad Loan Amount (B/L = fraction of loans which are bad)

C = BIS-defined Capital

I = Income

	Not Recognized	General Provision	Specific Provision	Write-off
<i>Total Loan</i>	L	L	L	L
<i>Capital</i>	C	C	C	C
<i>BIS Ratio</i>	C/L	C/L	C/L	C/L
<i>Pre-tax Income</i>	I	I	I	I
<i>Bad Loan Loss</i>	B	B	B	B
<i>Deductible Loss</i>	0	B	$\tau_{sp} B$	B
<i>Taxable Income</i>	I	I-B	I- $\tau_{sp} B$	I-B
<i>Tax Paid</i>	τI	$\tau (I-B)$	$\tau (I- \tau_{sp} B)$	$\tau (I-B)$
<i>After-Tax Income</i>	$I(1- \tau)$	$I(1- \tau)+ \tau B$	$I(1- \tau)+ \tau_{sp} \tau B$	$I(1- \tau)+ \tau B$
<i>DBIS Capital due to BIS Accounting</i>	0	B	0	0
<i>Total BIS Capital</i>	$C+ I(1- \tau)$	$C+B+ I(1- \tau)+ \tau B$	$C+ I(1- \tau)+ \tau_{sp} \tau B$	$C+ I(1- \tau)+ \tau B$
<i>Total BIS Assets</i>	L	L-B	L-B	L-B
<i>New BIS Ratio</i>	$\frac{C+ I (1- t)}{L}$	$\frac{C+B+ I (1- t)+ t B}{L- B}$	$\frac{C+ I (1- t)+ t_{sp} t B}{L- B}$	$\frac{C+ I (1- t)+ t B}{L- B}$

We have:

- $\frac{C+B+ I (1- t)+ t B}{L- B} > \frac{C+ I (1- t)}{L}$ (General Provision > Not Recognizing)
- $\frac{C+ I (1- t)}{L} > \frac{C+ I (1- t)+ t B}{L- B}$ (Not Recognizing > Write-off, for $B \ll L$)
- $\frac{C+ I (1- t)+ t B}{L- B} > \frac{C+ I (1- t)+ t_{sp} t B}{L- B}$ (Write-off > Specific Provisioning)

