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The International Transmission of Financial Shocks: The Case of Japan

Joe Peek* and Eric S. Rosengren**

Abstract

One of the more dramatic financial events of the late 1980s and early 1990s was the surge in Japanese stock prices that was immediately followed by a very sharp decline of more than 50 percent. While the unprecedented fluctuations in Japanese stock prices were domestic financial shocks, the unique institutional characteristics of the Japanese economy produce a framework that is particularly suited to the transmission of such shocks to other countries through the behavior of the Japanese banking system.

The large size of Japanese bank lending operations in the United States enables us to use U.S. banking data to investigate the extent to which this domestic Japanese financial shock was transmitted to the United States, as well as to identify a supply shock to U.S. bank lending that is independent of U.S. loan demand. We find that binding risk-based capital requirements associated with the decline in the Japanese stock market resulted in a decline in commercial lending by Japanese banks in the United States that was both economically and statistically significant. This finding has added importance given the severe real estate loan problems currently faced by Japanese banks. How Japanese bank regulators decide to resolve these problems will have significant implications for credit availability in the United States as well as in other countries with a significant Japanese bank presence.

*Professor of Economics, Boston College, and Visiting Economist, Federal Reserve Bank of Boston.
**Vice President and Economist, Federal Reserve Bank of Boston.

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The International Transmission of Financial Shocks:

The Case of Japan The increasing globalization of banking and financial markets provides important advantages in terms of gains in efficiency and diversification, but it also offers potential pitfalls. One such pitfall is associated with the risks that would emanate from any group of globally active financial institutions collectively suffering financial difficulties. Given the size and global penetration of Japanese banking organizations, the significant problems at large Japanese banks following the dramatic decline in the Japanese stock market at the beginning of this decade may have created just such an event. Several factors contribute to the potential for Japanese banks to be particularly effective transmitters of domestic financial shocks overseas. First, large cross-holdings of Japanese corporate stocks by Japanese banks make these banks susceptible to downturns in the stock market. Second, bank regulatory changes in Japan in the late 1980s both enhanced enforcement of capital requirements and allowed changes in the value of bank stock holdings to directly affect bank capital, setting the stage for the banking sector to transmit an adverse stock price shock through reductions in credit availability. Third, bank-firm lending relationships are particularly strong and important in Japan, making banks reluctant to reduce credit to their long-time domestic customers. Fourth, the large international presence of Japanese banking organizations allowed them to shift much of the asset and loan shrinkage overseas, insulating domestic firms from much of the shock.

This paper confirms the hypothesis that Japanese banking problems caused by the decline in Japanese stock values were transmitted internationally to the United States. In particular, we find that U.S. branches of Japanese banks reduced lending at the time of declines in their parents' capital positions.[1] This event enables us to identify and isolate an external supply shock to U.S. bank lending. By focusing on the transmission of the effects of Japanese stock market losses via the actions of Japanese bank branches and subsidiaries in the United States, we overcome a major problem of previous studies investigating the linkage between bank capital ratios and bank loan growth in the United States: the inability to completely isolate bank loan supply shocks from demand effects.

While we do show that much of this decline in lending reduced credit made available to U. S. firms and not just to affiliates of Japanese firms, we do not quantify the potential costs of the lost credit availability to the U. S. economy. Some of these costs likely were ameliorated because many U. S. and non-Japanese foreign banks had already recapitalized and were capable of extending credit, particularly to the larger borrowers. However, a number of studies (for example, Slovin, Sushka, and Polonchek 1993 and James 1987) have found that banking relationships can be costly to replace, even for large firms with access to national credit markets.

I. Background

One of the more dramatic financial events of the second half of the 1980s was the rise and subsequent decline in the Japanese stock market. Because of the Basle Accord, an international agreement that set common standards by which to evaluate capital adequacy, the dramatic fluctuations in Japanese stock prices had a substantial impact on Japanese bank capital. The Basle Accord contains a provision that allows up to 45 percent of unrealized gains on equity security holdings (hidden reserves) to be included in bank capital.[2] The rapid growth of Japanese banks was relatively unaffected initially by the adoption of the Basle Accord because of the boost in their tier 2 capital that came from the substantial accrued capital gains associated with the dramatic rise in Japanese stock prices during the 1980s. Furthermore, higher stock prices enabled Japanese banks to increase tier 1 capital by issuing new equity shares and debt securities at favorable prices, as well as by selling some of their stock holdings in other companies that had substantial unrealized gains.[3]

With a booming stock market, low domestic interest rates, and a strong yen, Japanese banks expanded aggressively during the late 1980s. By 1988, all of the world's 10 largest banking organizations were headquartered in Japan. The aggressive expansion included greater penetration of foreign markets. By 1990, Japanese branches and subsidiaries had dramatically increased their commercial and industrial (C&I) loans in the United States, at their peak accounting for 18 percent of all C&I loans to borrowers located in the United States.[4]

The subsequent decline in Japanese stock prices, with the Nikkei index losing more than half its value between 1989 and early 1992, caused a dramatic decline in tier 2 capital, given that Japanese banks hold approximately 20 percent of Japanese common stock (French and Poterba 1991; Prowse 1990). In 1990, total risk-based capital ratios of many major Japanese banks, including 5 of the 10 largest banks in the world, temporarily fell below the 8 percent minimum required under the Basle Accord. As a result of the widespread decline in Japanese bank capital, total assets of Japanese banking organizations declined steadily after

1990, an outcome unprecedented in the postwar period.[5]

If Japanese banks had not had international operations, the necessary loan shrinkage would have to have been accomplished domestically. Instead, the large overseas operations of Japanese banking organizations allowed Japanese banks to insulate domestic customers from much of the shrinkage that was required to restore capital ratios. Close lending relationships in Japan, documented in previous studies (Gibson 1995; Hoshi, Kashyap, and Scharfstein 1990, 1991; Hoshi, Scharfstein, and Singleton 1993; Frankel and Morgan 1992), made it difficult for banks to reduce credit availability to their customers. Even though Japan was suffering from its worst post World War II recession, domestic loans continued to grow, albeit at a much slower rate. In contrast, overseas lending by branches of Japanese banks exhibited a sharp reversal. Over the March 1987 to March 1991 period, overseas loans grew on average twice as fast as domestic lending. The growth in overseas loans then slowed sharply, reaching a peak in 1992 that roughly coincided with the trough in Japanese bank risk-based capital ratios. The subsequent decline in overseas loans by Japanese banks occurred even though the economies in many of the foreign markets most important for Japanese banks were doing well, with the United States recovering from its recession and GDP growth quite strong in Asia.

The fact that the declines in lending were concentrated in their overseas rather than their domestic operations is consistent with Japanese banks valuing historical lending relationships at home. While beneficial to Japanese borrowers, any country with a large Japanese banking presence could be adversely affected by the shrinkage of external lending by Japanese banks.

II. Data and Methodology

The panel data include semiannual observations from September 1988 (when risk-based capital measures were first reported for Japanese parent banks) until September 1995 for the U.S. branch and subsidiary activity of 11 city banks, 3 long-term credit banks, 5 trust banks, and the 10 largest regional banks.[6] While the Japanese branch and subsidiary data are available quarterly from U.S. call report data, we use only the March and September reports to match the reporting dates available for the Japanese parent banks, which report capital and assets only semiannually.

For our panel of data, we have consolidated the branches of each parent company, for two reasons. First, all aggregated branches are capitalized by the same parent. Second, branch openings and closings can result in large changes in individual branch data associated with the transfer of assets between branches of the parent bank, even if no significant change in overall branch activity has occurred.[7]

The distinction between Japanese branches (which account for roughly three-fourths of all U.S. loans by Japanese banking organizations) and subsidiaries is potentially important. Japanese subsidiaries are likely to have a much larger retail operation, are separately capitalized, and are not included in the capital or assets of their Japanese parent. Thus, one might expect their behavior to be sensitive to local market conditions but less sensitive to capital problems of their parent. On the other hand, Japanese branches are not separately capitalized, and their size and portfolio composition affect the risk-based capital ratio of the parent. Still, even though Japanese subsidiaries tended to maintain relatively high risk-based capital ratios, the overall percentage contraction by the well-capitalized subsidiaries was, on average, of the same magnitude as that for the branches, which relied on relatively poorly capitalized parents.

The estimated equation for Japanese bank branches is of the following form:

$$\frac{\Delta loans_{i,t}}{assets_{i,t-1}} = \alpha + \beta_1 PRBC_{i,t-1} + \beta_2 LAND_{i,t-1} + \gamma XTS_{t-1} + \theta XBS_{i,t-1} + \varepsilon_{i,t}$$

We calculate the dependent variable in two ways. The unadjusted dependent variable is the change in total loans of all U.S. branches of parent bank i from period t-1 to period t (a six-month period), divided by the beginning-of-period assets held by U.S. branches of parent bank i. We also estimate an adjusted dependent variable to control for loan demand by subtracting from the unadjusted dependent variable the change in total loans at all non-Japanese banks in the same state and of the same size class (with asset size classes defined as less than $300 million, $300 million to $1 billion, and greater than $1 billion) divided by beginning-of-period assets. If the Japanese bank capital supply shock was unimportant, Japanese branches would have a pattern of changes in loans similar to that of similarly sized banks in their state, reflecting changes in local loan demand associated with changes in general economic activity, and we would expect an insignificant coefficient on the parent risk-based capital ratio.

The primary focus is on the Japanese parent's risk-based capital ratio, PRBC, since, unlike subsidiaries, branches have no separate capital and are considered part of the parent company. Capital is measured as of the beginning of the period. If the parent company has a low risk-based capital ratio and is unable or unwilling to raise additional capital, it may choose to satisfy its capital requirement by shrinking its assets and liabilities, including those in its overseas branches.[8] If Japanese banks do respond by shrinking their overseas branches, then the coefficient on PRBC should be positive.

Because Japanese banks have been slow to reserve for their serious bad loan problems, their capital ratios do not accurately reflect their financial health. To control for this overstatement of capital ratios, we have included an additional variable, LAND, in an attempt to capture the effect of the bad loan problem on bank behavior. Even though their problems are not fully reflected in the official capital ratios, the banks are aware of the extent of their problems and may be reacting to the probable need to eventually reserve for and charge off those loans. LAND is measured as the percentage reduction in the commercial land index for all urban districts (constructed by The Japan Real Estate Institute) relative to its peak in September 1991. The series has a value of zero until the September 1991 observation and then takes on a negative value, reflecting the cumulative decline since that time. The land price index is chosen as our proxy because most business loans in Japan are collateralized by the real estate holdings of the borrowers. Consequently, much of the bank bad loan problem is related to loans collateralized by commercial real estate. We anticipate a positive estimated coefficient, with loan growth slowing as collateral values decline and the (unreserved for) loan problems become more severe.

The independent time series variables (XTS) include the percentage change in foreign direct investment by Japanese companies in the United States (FDI) and state payroll employment growth, each measured over the prior six-month period. Because Japanese companies frequently utilize Japanese banks, increases in foreign direct investment should be positively related to lending by Japanese branches.[9] State payroll employment growth is included to control for loan demand. To the extent changes in branch loans reflect changes in loan demand, the coefficient should be positive.

The final set of explanatory variables (XBS) controls for bank-specific effects. This set includes the beginning-of-period logarithm of assets of the U.S. branches of the parent Japanese bank to control for the size of the U.S. presence of each bank. We also include nonperforming loans (loans 90 or more days past due plus nonaccruing loans) divided by total loans at the parent's U.S. branches in the total loans equation, and use the same calculation, replacing total loans with C&I loans, as an argument in the C&I loan equation. Branch holdings of commercial and industrial loans and of real estate loans, each divided by the parent's total U.S. branch assets, are also included. Each of these variables is measured as of the beginning of the period. These measures control for perceived lending risks, as well as for U.S. demand shocks that might disproportionately affect a segment of the portfolio. Finally, we include a set of dummy variables indicating whether the parent is a trust bank, a long-term credit bank, or a regional bank.

A similar set of regressions is estimated for Japanese subsidiaries. Because Japanese subsidiaries are independently capitalized, we must include the subsidiary's risk-based capital ratio as well as the parent's risk-based capital ratio. We would expect the subsidiary's capital to be important, while the parent's capital ratio might play only a secondary role, perhaps reflecting the extent to which the parent could inject additional capital into the subsidiary if needed. Thus, we would expect the parent's capital ratio to be less important for subsidiaries than for branches. Because no regional bank owns a U.S. subsidiary, the regional bank dummy variable is not included in the subsidiary equations. All other independent variables are the same as in the branch equation.

All equations were estimated using ordinary least squares, fixed-effects, and variance components specifications. Hausman specification tests indicated that the variance components specification was the most appropriate specification for the branch data, while the fixed-effects specification was most appropriate for the subsidiary data.

Isolating Demand Shocks

Numerous previous studies have found an association between capital ratios and bank lending, but they have been unable to isolate supply shocks satisfactorily. This is because weak loan demand is likely to be associated with periods when bank capital declines. As the economy slows, firm balance sheets deteriorate, and banks are forced to charge off past due loans that cannot be repaid, causing bank capital to fall. However, the adverse shock to Japanese bank capital caused by the sharp decline in the Japanese stock market, not being associated with demand conditions in the United States, provides an opportunity to isolate a pure supply shock at U.S. branches of Japanese banks.

When a supply shock occurs in Japan, loan demand at U.S. branches of

Japanese banks might be affected through two possible channels, so that the decline in Japanese branch lending might not be a pure supply shock phenomenon. First, to the extent that Japanese banks provide much of the lending to Japanese nonbank affiliates in the U.S. and the decline in the Nikkei caused a slowing of Japanese business activity worldwide, not just in Japan, the decline in lending could reflect decreased loan demand from Japanese affiliates here. However, Table 1 shows that Japanese nonbank affiliates in the U.S. continued to grow, whether measured by assets, gross product, total liabilities, or, in the two benchmark years available, bank loans. To the extent that Japanese nonbank affiliates rely disproportionately on U.S. branches and subsidiaries of Japanese banks for their loans, much of the shrinkage in U. S. domestic lending by Japanese banks would have been at the expense of non-Japanese borrowers.[10]

A second possible linkage to a weakening of Japanese demand might occur through a reduction in lending by U.S. branches and subsidiaries of Japanese banks to Japanese firms operating in Japan. To the extent that Japanese banks have moved domestic loans to branches in the U.S. to avoid Japanese regulation, a reduction in loan demand in Japan that was coincident with the fall in Japanese stock prices (and the decline in Japanese bank capital) could account for a portion of the observed decline in Japanese bank lending in this country. However, as can be seen in Table 1, C&I loans to non-U.S. addresses held by U.S. branches and subsidiaries of Japanese banks account for only a very small percentage of their total C&I lending. Thus, this component is not substantial enough to account for the decline in lending at U.S. branches and subsidiaries of Japanese banks, and, in any case, we use only those C&I loans made to U.S. addresses in our regressions to avoid this problem.

III. Empirical Results

Table 2 presents the results for the Japanese branch equations for the change in both total loans (columns 1 to 3) and C&I loans (columns 4 to 6), each measured relative to beginning-of-period assets. Column 1 shows the variance components specification of the total loans equation, using the adjusted loan growth series measured relative to loan growth at non-Japanese banks in the same state and of the same size class. The estimated coefficients on both the parent risk-based capital ratio and the decline in urban commercial land prices are positive (as predicted) and significant at the 1 percent level. The estimated coefficient on the parent risk-based capital ratio implies that a 1 percentage point reduction in the risk-based capital ratio would result in loan growth relative to assets at that bank's U.S. branches being reduced by nearly 2 percent per six-month period. Because loans comprise roughly two-thirds of Japanese branch assets, this number substantially understates the percentage reduction in loans, roughly a 7 percent annual rate of decline (in current dollars). This finding of a coefficient that is both economically and statistically significant indicates a substantial loan supply effect transmitted from Japanese parent banks through their U.S. branches.

Both of the time series variables have statistically significant estimated effects of the predicted sign. FDI has a positive coefficient significant at the 1 percent level. Employment growth has a positive coefficient significant at the 5 percent level. Thus, both variables appear to be controlling for loan demand influences at Japanese branches as intended.

Among the bank-specific variables, none is statistically significant. While the share of C&I loans has the predicted sign, the variables for nonperforming loans and the share of real estate loans each have positive rather than the predicted negative effects. The dummy variables for bank type indicate no systematic differences among types of parent bank.

When the dependent variable is not adjusted to reflect the change in loans at similarly sized banks in the same state (column 3), we obtain very similar coefficient estimates. Thus, the results do not appear to be sensitive to the specification used to control for loan demand effects. This is consistent with the loan supply response of Japanese branches to parent capital being independent of U.S. loan demand shocks.

The corresponding equations for the change in C&I loans relative to assets (columns 4 and 6) indicate smaller responses to both parent risk-based capital ratios and the decline in land prices, in part because C&I loans comprise a smaller share of Japanese branch assets (roughly 40 percent). Employment growth is not significant, and both the nonperforming loans variable and the share of C&I loans have estimated coefficients that have the predicted negative signs, although only the nonperforming loans variable in the final column has a significant effect. In addition, the dummy variable for long-term credit banks has significant positive coefficients.[11]

Table 2 also shows estimates of the fixed-effects specifications in columns 2 and 5. The results are very similar to the variance components estimates. Even though Hausman tests indicate that the variance components specification is preferred, we present the fixed-effects estimates to show that our results are not specific to the use of the variance components specification and to permit comparisons with the estimates for Japanese bank subsidiaries, where Hausman tests indicate that the fixed-effects specification is preferred.

Table 3 presents the results for Japanese subsidiaries. The fact that the fixed-effects specification is the preferred specification suggests that idiosyncratic factors are relatively more important at subsidiaries. While the estimated coefficients on the subsidiary risk-based capital ratio are positive, the effect is significant (at the 1 percent level) only for the C&I loans equations. The parent's risk-based capital ratio also has positive estimated coefficients, although they are never significant. This finding could be a result of the diversity in subsidiary activity. However, when we estimate the same set of regressions excluding small subsidiaries (those with total assets less than $500 million), we obtained qualitatively similar results to those presented in Table 3 (see the unpublished appendix). This is consistent with our expectation that subsidiary capital ratios would be the more relevant, with parent capital serving primarily as a backup for the subsidiary if a capital infusion became necessary.

The decline in urban commercial land prices in Japan again has a significant positive estimated coefficient in each equation, although one might expect this variable to be less relevant to subsidiary activity given the evidence on parent versus subsidiary capital ratios. For subsidiaries, neither FDI nor employment growth is significant. Among the bank-specific variables, only the logarithm of subsidiary assets and nonperforming loans in the total loans equations have significant estimated coefficients.

Because, on average, Japanese subsidiaries in the United States are quite well capitalized, one might expect the t-statistics of the subsidiary capital ratio coefficients to be relatively weak. Because they tend not to be near the margin of the risk-based capital requirements, a decrease in their capital ratio may have little effect on their behavior. In fact, that is the case for the change in total loans equations. Alternatively, since U.S. regulators enforce a leverage ratio requirement as well as the risk-based requirement, it may be that it is the (unweighted) leverage ratio rather than the risk-based capital ratio that is most relevant for U.S. subsidiaries. However, when the subsidiary risk-based capital ratio is replaced with the subsidiary leverage ratio, we obtain results with even weaker subsidiary capital ratio effects (see appendix).

Because our evidence indicates that the shock to Japanese parent bank capital resulted in substantial loan shrinkage at their U.S. branches, but not at their subsidiaries, one might be concerned that part of the reduction in branch loans reflected a shifting of assets by Japanese banks from their branches to their much better capitalized subsidiaries. To verify that the net effect of the parent bank capital shock was to reduce total Japanese lending in the United States, we reestimated the equations with the dependent variable calculated from the combined balance sheets of all U.S. branches and subsidiaries of each Japanese parent bank. Overall, the results are similar to those for branches and suggest that loan shifting was not a factor (see appendix).

IV. Conclusion

One unanticipated effect of the Basle Accord may be that lending outside Japan has become sensitive to Japan-specific shocks, given the importance of Japanese banks worldwide. In particular, declines in the Nikkei uncorrelated with movements in stock markets elsewhere may nonetheless be transmitted to other countries via the lending responses of Japanese banks. Because Japanese banks account for nearly one-fifth of commercial and industrial loans to U.S. addresses by banks in the United States, the international transmission of Japanese banking problems has potentially large effects on U.S. bank lending. In fact, we find that the Japanese parent's risk-based capital ratio has a statistically significant impact on Japanese branch lending in the United States.

This study addresses only changes in bank loans, not the effects on borrowers of disruptions to their lending relationships. However, several previous studies have documented that even large customers at large banks in the United States are adversely affected if their banking relationship is disrupted. Future work needs to determine the extent to which reductions in foreign bank lending impose real losses on U.S. businesses, a topic beyond the scope of the current study.

The Japanese banking experience enables us to identify a shock to bank capital not related to demand conditions in the United States, thus overcoming the problem of finding a good proxy for supply shocks that is uncorrelated with changes in U.S. loan demand. The substantial rise in Japanese stock values significantly increased Japanese bank capital ratios in the 1980s, and the substantial decline in Japanese stock values beginning in 1990 substantially decreased them. Thus, the effects of the "bubble economy" in Japan could be transmitted to U.S. credit markets through the U.S. branches of Japanese banks in a way unrelated to the demand for loans in the United States.

Shocks that in the past may have been localized and easily contained within a single country now have the potential to be spread internationally. This paper has focused on capital problems stemming from the decline in Japanese stock prices The decline in Japanese real estate values, yet to be fully addressed by Japanese banking regulators, represents an even larger potential problem. However, this process is ongoing, with nearly all the major Japanese banks in March of 1996 substantially increasing their specific loan loss reserves for their Jusen real estate loans. While these losses were quite large, they occurred after a substantial recovery in the Japanese stock market, so that no Japanese bank fell below the Basle Accord's 8 percent risk-based capital standard, unlike the earlier period of stock market declines. Nonetheless, the four Japanese banks with the lowest risk-based capital ratios as of March 1996 did shrink their U. S. operations, with total assets at their U. S. affiliates declining by over 8 percent in the first half of 1996 at the same time that U.S. bank assets were rising by 2 percent. Thus, losses from real estate, as well as fluctuations in Japanese stock values, are likely to have a continuing impact on the U.S. operations of Japanese banks.

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Table 1
Activity by Nonbank U.S. Affiliates of Japanese Firms and U.S. Branches and Subsidiaries of Japanese Banks (Millions of U.S. Dollars)

	U.S. Nonbank Affiliates				U.S. Branches and Subsidiaries	
	Economic Activity		Current Liabilities and Long-Term Debt		C&I Loans	
Year	Total Assets	Gross Product	Total Liabilities	Bank Loans	US Addresses	Non-US Addresses
1987	80,597	14,265	40,701	18,296	52,298	2,183
1988	117,126	19,363	58,946		71,742	2,229
1989	160,865	25,521	76,881		89,042	2,694
1990	228,390	33,176	114,902		103,255	2,092
1991	255,853	38,124	130,705		105,056	2,901
1992	269,158	41,183	137,636	49,871	96,534	3,372
1993	279,717	44,248	153,275		92,037	3,127
1994	297,423	50,798	161,827		94,692	3,370

Note: Economic activity and total liabilities data exclude finance affiliates. Bank loans exclude loans to finance and real estate affiliates to make the series more comparable to the C&I loans to U.S. addresses series. All liabilities are for the "U.S. persons" category, equivalent to having a U.S. address.

Source: Bureau of Economic Analysis and Call Reports.

Table 3
Determinants of Japanese Lending in the United States, U.S. Subsidiaries
Estimation Method: Fixed Effects, 1989:1 to 1994:2

	ΔLoan/Asset - ΔStLoan/StAsset	ΔLoan/Asset	ΔCI/Asset - ΔStCI/StAsset	ΔCI/Asset
Subsidiary Risk-Based Capital Ratio	0.204 (1.36)	0.182 (1.23)	0.503** (3.92)	0.510** (3.99)
Parent Risk-Based Capital Ratio	0.081 (0.17)	0.345 (0.72)	0.574 (1.39)	0.548 (1.33)
Land Price	0.369** (4.36)	0.334** (4.01)	0.294** (4.07)	0.279** (3.87)
Foreign Direct Investment	-0.011 (0.35)	0.013 (0.39)	0.019 (0.68)	0.030 (1.10)
Employment Growth	0.534 (1.33)	0.439 (1.11)	0.278 (0.83)	0.160 (0.48)
Log(Asset)	-14.331** (4.12)	-14.618** (4.28)	-5.655 (1.93)	-5.619 (1.93)
Nonperforming Loans/Loans	-0.561* (2.05)	-0.525* (1.96)	-0.261 (1.02)	-0.271 (1.07)
C&I Loans/Assets	-0.026 (0.35)	-0.024 (0.32)	-0.023 (0.36)	-0.026 (0.41)
Real Estate Loans/Assets	0.136 (1.51)	0.135 (1.52)	0.158 (1.94)	0.154 (1.91)
Hausman test P-value	0	0	0.003	0.003
Observations	242	242	242	242
R^2	0.305	0.311	0.279	0.283
SSR	13986	13497	9907	9837
SER	8.084	7.942	6.804	6.78

Note: The data are semiannual observations for March and September. Independent variables are measured as of the beginning of the period. The land price series is the commercial land index for all urban districts and is measured relative to its peak in September 1991. Foreign direct investment and employment growth are measured over the prior six-month period. Nonperforming loans as a share of total loans are used in Columns 1 and 2, and nonperforming C&I loans as a share of total C&I loans are used in the last two columns. Absolute values of t-statistics are in parentheses.

* Significant at the 5 percent level.
**Significant at the 1 percent level.

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This appendix provides additional details on a variety of specification tests that validate the robustness of the results. Table 1A provides robustness tests for the Japanese bank branch equations with the adjusted dependent variables that measure loan growth relative to the average for non-Japanese banks in the same states and in the same asset size classes as the branches. The first column contains a univariate specification with the parent risk-based capital ratio as the only explanatory variable (other than the constant) to determine whether the results are sensitive to the inclusion or exclusion of the other independent variables. The estimated coefficient on parent risk-based capital in the total loans equation is 2.218, with a t-statistic of 8.14, compared to 1.928 with a t-statistic of 6.58 in the full specification in column 1 of Table 2. Because the other explanatory variables have been omitted from the equation, the Hausman test now indicates that a fixed-effects specification is preferred. However, the fixed-effects specification provides results similar to the variance components specification, with the estimated coefficient having a value of 2.694 with a t-statistic of 8.13. Thus, the results are qualitatively the same as in the full specification, indicating that the results are not an artifact of interactions with other explanatory variables.

As an additional robustness test, we consider three alternatives to the commercial land price series for all urban districts used in the paper: the index for the average of commercial, residential, and industrial land prices in all urban districts; the index for the average of commercial, residential, and industrial land prices for the six largest cities; and the index for commercial land prices in the six largest cities. In each instance, the results for the parent risk-based capital ratio are quite similar to those reported in column 1 of Table 2, ranging from 1.785 to 1.911, each with a t-statistic greater than six.

The final column of Table 1A contains results from the same specification as in column 1 of Table 2, with the sample size reduced by excluding the largest and smallest values of the dependent variables, using only those observations with changes in loans that were between -10 and 15 percent of assets. The results show that while the estimated coefficient on the parent risk-based capital ratio is substantially smaller, it is still significant at the 1 percent level when outliers are removed.

Our results are quite similar whether we use OLS, fixed-effects, or variance components estimation procedures, although we report only the variance components specification because the Hausman test indicates that it is the most appropriate specification. The results are also qualitatively the same if we adjust the dependent variable to control for possible demand influences by subtracting the average loan growth at all non-Japanese banks in the United States, instead of subtracting the average loan growth at non-Japanese banks in the same state and in the same asset size class as the Japanese branches.

Table 2A presents results for alternative specifications for Japanese bank subsidiaries. The fact that the fixed-effects specification is the preferred specification suggests that idiosyncratic factors are relatively more important at subsidiaries and may reflect the much smaller number of Japanese banks that have U. S. subsidiaries. Column 1 contains results from a reestimation of column 1 of Table 3, excluding small subsidiaries (those with total assets less than $500 million). The results are qualitatively similar for the estimated coefficient on the parent risk-based capital ratio, although the estimated coefficient for the subsidiary risk-based capital ratio is now only about one-third of its original value (in neither case is it significant).

Because, on average, Japanese subsidiaries in the United States are quite well capitalized, one might expect the t-statistics on the estimated coefficients for the subsidiary capital ratio to be relatively weak, and indeed, that is the case. Since U.S. regulators enforce a leverage ratio requirement as well as the risk-based capital requirement, it may be that it is the (unweighted) leverage ratio rather than the risk-based capital ratio that is most relevant for U.S. subsidiaries. However, when the subsidiary risk-based capital ratio is replaced with the subsidiary leverage ratio (column 2, Table 2A), we obtain results with even weaker subsidiary capital ratio effects.

Table 3A contains results from specifications that correspond to those in Tables 2 and 3, with the dependent variable constructed from the combined balance sheets of all U.S. branches and subsidiaries of each Japanese parent bank. By examining the results for the total U.S. operations of Japanese banks, we can ensure that our results for bank branches were not due to Japanese banks shifting their lending from their branches to their much better capitalized subsidiaries. The first two columns show the results for the full sample. Because many Japanese banks have only a branch presence in the United States, and thus do not have the opportunity to shift loans to their U.S. subsidiaries, we also examined a subsample of Japanese banks that have both subsidiary and branch operations in the United States, with the results shown in the final two columns.

In each of the four equations, the parent risk-based capital ratio has a positive estimated effect that is significant at the 1 percent level. Overall, the results are similar to those for branches and suggest that loan shifting was not a factor. This is not surprising, given the large size of branch operations relative to those of subsidiaries that make it doubtful that the significant loan shrinkage found in the branches could be explained by a shift between branches and subsidiaries.

Table 4A investigates whether the change in parent capital (scaled by assets), rather than the parent risk-based capital ratio, better describes the decline in Japanese branch lending. Because the risk-based capital ratio is the threshold that is the focus of the Basle Accord capital regulation, the change in a bank's capital may not capture the nature of the regulatory constraint. In particular, changes in capital when a bank has a high capital ratio may have little impact on bank lending behavior, while changes in a bank's capital when a bank has a capital ratio near the BIS 8 percent minimum may cause a more significant change in lending behavior.

Because we include the contemporaneous change in capital (provided by the Bank of Japan) as the explanatory variable, we must use an instrumental variables estimation technique. The instruments include its own lagged value and the set of other independent variables included in the equation, as well as information on bond ratings changes of the parent bank (provided by IBCA, the largest European bank rating agency), hidden reserves of the parent bank (the unrealized gains on securities after the 55 percent discount that are available to be used as tier 2 capital, provided by The Bank of Japan), the exchange rate, the Nikkei stock price index, and Japanese land prices. The debt rating variables are a set of four (0,1) dummy variables indicating an upgrade in the short-term debt rating, an upgrade in the long-term debt rating, a downgrade in the short-term debt rating, and a downgrade in the long-term debt rating. The hidden reserves measure is constructed as the change in hidden reserves during the prior six-month period, scaled by the parent bank's beginning-of-period assets. The exchange rate, the Nikkei index, and the land price index are each measured as the percentage change during the prior six-month period.

The decline in parent bank capital due to the decline in share prices of the cross-shareholdings of firms which do not operate in the United States would be the ideal measure of the change in capital, were it available, because it would better control for indirect demand effects. However, the results in Table 1 in the paper show that indirect demand effects likely go the opposite way--U. S. affiliates of Japanese firms grew rather than shrank their operations, implying that any reduction in loans by U.S. branches and subsidiaries of

Japanese banks would fall disproportionately on non-Japanese firms that borrow from Japanese banking organizations.

The first four columns of Table 4A present the results from adding the change in parent bank capital scaled by assets (instrumented) to the original set of explanatory variables. The parent risk-based capital ratio retains its significance, with qualitatively similar coefficients to those reported in Table 2. However, the change in parent capital has the wrong sign (negative), but is not statistically significant in any of the four equations. Furthermore, the OLS and fixed-effects regressions produce similar results.

The final four columns of the table contain specifications that replace the parent risk-based capital ratio with the change in parent capital, instead of adding it as an additional explanatory variable. Unfortunately, such a specification does not capture the threshold effect embodied in the BIS capital standards. Now the negative estimated coefficients on the change in parent capital are statistically significant.

However, if we limit the sample to the subset of observations in which the parent risk-based capital ratio is below 9 percent, that is, those institutions that are capital constrained or near the BIS constraint, the estimated coefficient on the change in capital when the parent risk-based capital ratio is included is positive, as predicted, although with a t-statistic of only 0.07. When the parent risk-based capital ratio is not included, the estimated coefficient on the change in capital is still negative but no longer significant, having a t-statistic of only -0.19.

In general, the empirical results are quite robust.

The estimated coefficients on the parent risk-based capital ratio are qualitatively similar across estimation techniques, adjustments to the dependent variable for demand effects, and the elimination of extreme values of the dependent variable. The coefficients are similar in univariate as well as multivariate regressions, so that they are not sensitive to the inclusion of other independent variables.

Table 1A

Alternative Specifications of Determinants of Japanese Lending in the U.S. - Branches

Estimation Method: Variance Components; Dependent Variable: ΔLoan/Asset -ΔStLoan/StAsset

Estimation Method Dependent Variable	Include Risk-Based Capital of Parent Only	Alternative Land Price Series			Excluding Outliers
Constant	-19.634**	-34.649*	-32.558*	-33.102*	-8.497
	(7.43)	(2.21)	(2.11)	(2.13)	(0.61)
Parent Risk-Based	2.218**	1.911**	1.785**	1.815**	1.113**
Capital Ratio	(8.14)	(6.55)	(6.15)	(6.23)	(4.03)
Land Price					0.367**
					(8.77)
Land Price 1		0.563**			
		(7.79)			
Land Price 2			0.176**		
			(8.37)		
Land Price 3				0.143**	
				(8.14)	
Foreign Direct		0.076**	0.052**	0.061**	0.071**
Investment		(3.89)	(2.65)	(3.11)	(4.25)
Employment Growth		0.610*	0.731**	0.694*	0.480*
		(2.24)	(2.68)	(2.54)	(2.10)
Log(asset)		1.268	1.243	1.248	0.304
		(1.43)	(1.42)	(1.42)	(0.39)
Nonperforming Loans		0.015	0.021	0.021	-0.165
Loans		(0.14)	(0.204)	(0.20)	(1.81)

<u>C&I Loans</u>		0.042	0.036	0.038	-0.013
Assets		(1.28)	(1.11)	(1.17)	(0.45)
<u>Real Estate Loans</u>		-0.049	-0.040	-0.044	-0.036
Assets		(1.00)	(0.84)	(0.92)	(0.84)
Trust Bank		0.381	0.581	0.543	-0.415
		(0.29)	(0.45)	(0.42)	(0.36)
Long-term Credit Bank		1.601	1.753	1.703	1.353
		(1.10)	(1.22)	(1.18)	(1.07)
Regional Bank		2.626	2.624	2.633	-1.627
		(1.01)	(1.02)	(1.02)	(0.70)
Hausman test P-value	0.012	0.835	0.852	0.849	0.872
Observations	370	370	370	370	345
R^2	0.169	0.392	0.404	0.399	0.377
SSR	11806	13757	13479	13591	8496
SER	7.437	6.457	6.391	6.418	5.278

Note: The data are semiannual observations for March and September. Independent variables are measured as of the beginning of the period. Foreign direct investment and employment growth are measured over the prior six-month period. The land price series is the commercial land index for all urban districts and is measured relative to its peak in September 1991. The alternative land price measures are: Land Price 1, Index for the average of commercial, residential and industrial land prices in all urban districts; Land Price 2, Index for the average of commercial, residential and industrial land prices in the six largest cities; Land Price 3, Index for commercial land prices in six largest cities. Absolute values of t-statistics are in parentheses.

*Significant at 5 percent level.

**Significant at 1 percent level.

Table 2A

Alternative Specifications of Determinants of Japanese Lending in the U.S. - Subsidiaries

Estimation Method: Fixed Effects; Dependent Variable: ΔLoan/Asset - ΔStLoan/StAsset

	Excluding Small Subsidiaries	Substitute Leverage Ratio for RBC of Subsidiary
Subsidiary Risk-Based Capital Ratio	0.060 (0.24)	
Subsidiary Leverage Ratio		-0.034 (0.09)
Parent Risk-Based Capital Ratio	0.555 (0.88)	0.142 (0.29)
Land Price	0.283** (2.85)	0.314** (3.27)
Foreign Direct Investment	-0.051 (1.46)	-0.017 (0.52)
Employment Growth	0.670 (1.67)	0.490 (1.22)
Log(asset)	-17.217** (4.66)	-16.965** (4.29)
Nonperforming Loans / Loans	-0.616* (2.08)	-0.579* (2.11)
C&I Loans / Assets	-0.182* (2.19)	-0.067 (0.93)
Real Estate Loans / Assets	0.017 (0.17)	0.092 (1.04)
Hausman test P-value	0.001	0.001
Observations	178	242
R^2	0.309	0.299
SSR	7297	14106
SER	6.88	8.119

Note: The data are semiannual observations for March and September. Independent variables are measured as of the beginning of the period. The land price series is the commercial land index for all urban districts and is measured relative to its peak in September 1991. Foreign direct investment and employment growth are measured over the prior six-month period. Absolute values of t-statistics are in parentheses.

*Significant at 5 percent level.
**Significant at 1 percent level.

Table 3A
Determinants of Japanese Lending in the United States, Total U.S. Operations
Estimation Method: Variance Components, 1989:1 to 1995:2

	Full Sample		Japanese Banks with Both U.S. Subsidiaries and Branches	
	ΔLoan/Asset - StLoan/StAsset	ΔCI/Asset - StCI/StAsset	ΔLoan/Asset - StLoan/StAsset	ΔCI/Asset - StCI/StAsset
Constant	-32.543** (2.46)	7.986 (0.87)	-73.954** (4.26)	-8.576 (0.67)
Parent Risk-Based Capital Ratio	1.882** (6.87)	0.778** (3.86)	2.188** (6.98)	0.909** (3.84)
Land Price	0.380** (8.08)	0.197** (5.75)	0.340** (6.10)	0.164** (4.09)
Foreign Direct Investment	0.076** (3.96)	0.069** (4.64)	0.091** (3.88)	0.069** (3.66)
Employment Growth	0.558* (2.17)	0.156 (0.81)	0.420 (1.30)	0.150 (0.60)
Log(asset)	1.082 (1.50)	0.291 (0.58)	2.892** (3.22)	0.168 (0.25)
Nonperforming Loans / Loans	0.032 (0.29)	-0.281* (1.97)	0.174 (1.13)	-0.276 (0.91)
C&I Loans / Assets	0.053 (1.59)	-0.036 (1.49)	0.194** (3.62)	-0.015 (0.39)
Real Estate Loans / Assets	-0.037 (0.80)	0.003 (0.08)	0.083 (1.26)	0.025 (0.51)
Trust Bank	0.436 (0.33)	-0.532 (0.57)	1.492 (1.17)	-0.917 (0.91)
Long-term Credit Bank	1.204 (0.80)	2.29* (2.20)	1.231 (1.03)	2.159* (2.47)
Regional Bank	2.506 (1.02)	-0.719 (0.42)	-	-
Hausman test P-value	0.682	0.843	0.137	0.102
Observations	365	365	246	246
R^2	0.398	0.299	0.448	0.305
SSR	12304	6791	7136	4099
SER	6.153	4.571	5.735	4.346

Note: The data are semiannual observations for March and September. Independent variables are measured as of the beginning of the period. The land price series is the commercial land index for all urban districts and is measured relative to its peak in September 1991. Foreign direct investment and employment growth are measured over the prior six-month period. Nonperforming loans as a share of total loans are used in columns 1 and 3 and measured as nonperforming C&I loans as a share of C&I loans in columns 2 and 4. Absolute values of t-statistics are in parentheses.

* Significant at the 5 percent level.
**Significant at the 1 percent level.

Footnotes

1. The term "branches" will be used to refer to both branches and agencies. The important distinction here is whether the entity is included in the balance sheet of the parent bank (agencies and branches) or not (subsidiaries).

2. Unrealized capital gains can be included in tier 2 capital, as long as tier 1 capital accounts for at least 50 percent of total capital. Thus, unrealized gains on stock market holdings can be utilized to the extent the bank has sufficient tier 1 capital to maintain the required tier 1 share of total capital.

3. If a bank has substantial unrealized gains that have not been included in its tier 2 capital because of the binding tier 1 share constraint, an increase in tier 1 capital will increase tier 2 capital in a ratio of two to one.

4. While Japanese banks initially may have expanded U.S. operations in order to serve their Japanese customers opening or expanding operations in the U.S., by the late 1980s they were actively expanding their business with U.S.-based customers, with Japanese banks committing fewer loans to Japanese-owned borrowers than to non-Japanese borrowers (Nolle and Seth 1996). In fact, many U.S.-owned companies, including small and mid-sized firms, list Japanese banks as their primary lender.

5. Frankel and Morgan (1992) report that the first yearly asset decline (5 percent) in Japanese city banks since World War II occurred in 1991.

6. City banks are by far the most important bank type, accounting for two-thirds of the assets and loans made by all Japanese branches and subsidiaries in the United States. Next in importance are the long-term credit banks, followed by trust banks, and finally, regional banks.

Our sample includes all Japanese banks with significant U.S. operations but excludes approximately 20 Japanese banks that have very small operations in the United States and for which we have no parent capital data. The total C&I loans of these omitted banks together represent less than 3 percent of Japanese C&I lending in the United States. The data set includes all city banks and long-term credit banks. While seven trust banks operate in Japan, we have not included the two smallest, which have no significant presence in the United States. We also have included the 10 largest regional banks, each of which has at least one branch (but none a subsidiary) in the United States.

7. Several adjustments were made to the data set. For the branch data, we required that commercial and industrial loans account for at least 5 percent of assets. Some Japanese branch operations are primarily bond trading units with no implications for the availability of domestic U.S. bank loans. Because de novo entry usually results in a very rapid initial expansion of loans unrelated to the capital position of the parent, we eliminated the first two years that a Japanese parent had branch operations in the United States. In addition, we had to exclude a few branches that did not provide data on nonperforming loans.

Subsidiary observations were deleted for the same reasons. In addition, we deleted any observation in which a subsidiary acquired another bank, since this would result in a jump in the loan series reflecting the acquisition rather than ongoing operations. We also deleted two subsidiaries with risk-based capital ratios exceeding 100 percent, each with few loans and a portfolio dominated by government securities, which have a zero weight in risk-based capital calculations.

Because the first observation was lost owing to the need to lag the parent's risk-based capital ratio, all regressions are estimated over the 1989:1 to 1995:2 period, providing a maximum of 14 semiannual observations per bank. However, the panels are unbalanced, since not all banks operated branches over the entire period and some subsidiaries had not operated for a full two years prior to the beginning of our sample or were closed before 1995:2. The branch panel has 29 banks and a total of 370 observations. The subsidiary panel has 19 banks and a total of 242 observations.

8. Stein (1995) provides a model based on information problems that make it difficult for banks to raise funds with instruments other than insured deposits. As a consequence, if they are unable to raise external funds at a reasonable price, banks may choose to shrink assets to satisfy capital requirements.

9. Because the FDI data are available only as annual observations, we calculate the March observation as the average of the current and previous years' values. We use the current-year value for the September observation. We then calculate the percentage change over the prior (six-month) period.

10. Because Japanese nonfinancial firms substantially increased their reliance on bank debt as a percent of all debt during this period (Nolle and Seth 1996), it is even more likely that much of the brunt of the decline in loans at Japanese branches and subsidiaries was at the expense of non-Japanese borrowers.

11. To ensure that the results for the significant negative response to parent capital ratios were robust, we considered a number of alternative specifications that are described in detail in an unpublished appendix available from the authors. The results are not sensitive to using parent risk-based capital ratio as the only explanatory variable, to alternative land price series, or to excluding the largest and smallest values of the dependent variable.

Table 2
Determinants of Japanese Lending in the United States, U.S. Branches, 1989:1 to 1995:2

Estimation Method Dependent Variable	Variance Components ΔLoan/Asset - ΔStLoan/StAsset	Fixed Effects ΔLoan/Asset - ΔStLoan/StAsset	Variance Components ΔLoan/Asset	Variance Components ΔCI/Asset - ΔStCI/StAsset	Fixed Effects ΔCI/Asset - ΔStCI/StAsset	Variance Components ΔCI/Asset
Constant	-34.473* (2.18)	-	-35.768** (2.25)	-9.827 (0.85)	-	-8.823 (0.76)
Parent Risk-Based Capital Ratio	1.928** (6.58)	1.912** (5.02)	2.189** (7.53)	0.792** (3.68)	0.819** (2.89)	0.819** (3.79)
Land Price	0.380** (7.56)	0.341** (5.70)	0.320** (6.42)	0.197** (5.52)	0.208** (4.91)	0.167** (4.67)
Foreign Direct Investment	0.081 (4.08)	0.071** (3.11)	0.095** (4.88)	0.070** (4.63)	0.071** (4.04)	0.080** (5.22)
Employment Growth	0.553* (2.03)	0.526 (1.77)	0.383 (1.42)	0.171 (0.85)	0.132 (0.60)	0.016 (0.08)
Log(Asset)	1.237 (1.38)	-0.995 (0.41)	1.178 (1.31)	0.432 (0.67)	-1.008 (0.57)	0.362 (0.55)
Nonperforming Loans/Loans	0.020 (0.19)	0.060 (0.47)	0.018 (0.17)	-0.286 (1.91)	-0.223 (1.32)	-0.299* (2.00)
C&I Loans/Assets	0.045 (1.37)	0.081 (1.46)	0.047 (1.43)	-0.044 (1.86)	-0.103** (2.58)	-0.044 (1.84)
Real Estate Loans/Assets	-0.054 (1.11)	-0.108 (1.20)	-0.068 (1.40)	0.004 (0.11)	0.016 (0.24)	-0.002 (0.04)
Trust Bank	0.357 (0.27)	-	-0.223 (0.17)	-0.677 (0.70)	-	-0.852 (0.88)
Long-Term Credit Bank	1.540 (1.05)	-	1.296 (0.87)	2.546* (2.41)	-	2.448* (2.30)
Regional Bank	2.553 (0.97)	-	2.134 (0.81)	-0.649 (0.34)	-	-0.884 (0.46)
Hausman test P-value	0.812	-	0.729	0.812	-	0.775
Observations	370	370	370	370	370	370
R^2	0.387	0.408	0.406	0.294	0.318	0.294

Table 2 Determinants of Japanese Lending in the United States, U.S. Branches, 1989:1 to 1995:2						
SSR	13866	13392	13573	7577	7328	7603
SER	6.482	6.37	6.413	4.792	4.712	4.8

Table 2

Note: The data are semiannual observations for March and September. Independent variables are measured as of the beginning of the period. The land price series is the commercial land index for all urban districts and is measured relative to its peak in Spetember 1991. Foreign direct investment and employment growth are measured over the prior six-month period. Nonperforming loans as a share of total loans are used in the first three columns and nonperforming C&I loans as a share of total C&I loans are used in the last three columns. Absolute values of t-statistics are in parentheses.
* Significant at the 5 percent level.
**Significant at the 1 percent level.

Table 4A
Alternative Methods of Estimating Determinants of Japanese Lending in the United States - Branches
Two-Stage Least Squares Estimation Instrumenting for Change in Parent Capital

Estimation Method	2SLS	2SLS, Fixed-Effects	2SLS	2SLS, Fixed-Effects	2SLS	2SLS, Fixed-Effects	2SLS	2SLS, Fixed-Effects
Dependent Variable	ΔLoan - ΔStLoan Asset StAsset	ΔLoan - ΔStLoan Asset StAsset	ΔCI - ΔStCI Asset StAsset	ΔCI - ΔStCI Asset StAsset	ΔLoan - ΔStLoan Asset StAsset	ΔLoan - ΔStLoan Asset StAsset	ΔCI - ΔStCI Asset StAsset	ΔCI - ΔStCI Asset StAsset
Constant	-26.992* (2.06)	-	-12.740 (1.31)	-	10.185 (0.84)	-	1.223 (0.14)	-
Change in Parent Capital Assets	-0.710 (1.58)	-0.876 (1.88)	-0.473 (1.42)	-0.536 (1.54)	-1.336** (2.98)	-1.319** (3.05)	-0.732* (2.29)	-0.793* (2.50)
Parent Risk-Based Capital Ratio	1.829** (6.06)	1.617** (3.82)	0.686** (3.07)	0.773* (2.45)	-	-	-	-
Land Price	0.426** (8.33)	0.373** (6.52)	0.207** (5.46)	0.236** (5.52)	0.470** (8.81)	0.345** (5.92)	0.224** (5.89)	0.222** (5.20)
Foreign Direct Investment	0.104** (4.57)	0.101** (4.27)	0.077** (4.55)	0.084** (4.78)	0.093** (3.90)	0.085** (3.53)	0.073** (4.28)	0.077** (4.35)
Employment Growth	0.482 (1.78)	0.365 (1.27)	0.245 (1.21)	0.184 (0.86)	0.960** (3.49)	0.490 (1.67)	0.422* (2.15)	0.239 (1.11)
Log(asset)	0.946 (1.31)	-4.720 (1.75)	0.703 (1.31)	-0.976 (0.49)	-0.196 (0.27)	-10.858** (4.94)	0.273 (0.52)	-3.918* (2.43)
Nonperforming Loans Loans	-0.035 (0.33)	0.052 (0.42)	-0.110 (1.42)	-0.102 (1.10)	-0.089 (0.81)	0.047 (0.37)	-0.131 (1.66)	-0.104 (1.11)
C&I Loans Assets	0.028 (1.00)	0.068 (1.26)	-0.040 (1.91)	-0.114** (2.83)	0.014 (0.46)	0.062 (1.12)	-0.046* (2.15)	-0.117** (2.87)
Real Estate Loans Assets	-0.066 (1.61)	-0.108 (1.10)	-0.007 (0.23)	0.058 (0.80)	-0.131** (3.11)	-0.287** (3.26)	-0.032 (1.05)	-0.028 (0.43)
Trust Bank	-0.020 (0.02)	-	-0.727 (0.93)	-	2.593* (2.54)	-	0.248 (0.34)	-
Long-term Credit Bank	1.402 (1.22)	-	1.868* (2.20)	-	1.394 (1.15)	-	1.863* (2.16)	-
Regional Bank	1.516 (0.72)	-	0.052 (0.03)	-	-0.491 (0.22)	-	-0.702 (0.45)	-
Observations	348	348	348	348	348	348	348	348

R^2	0.397	0.443	0.255	0.306	0.328	0.413	0.233	0.29
SSR	11740	10853	6463	6017	13098	11431	6653	6161
SER	5.92	5.917	4.392	4.406	6.244	6.063	4.45	4.451

Note: The data are semiannual observations for March and September. Independent variables are measured as of the beginning of the period. The land price series is the commercial land index for all urban districts and is measured relative to its peak in September 1991. Foreign direct investment and employment growth are measured over the prior six-month period. Nonperforming loans as a share of total loans are used in columns 1, 2, 5, and 6, and nonperforming C&I loans as a share of total C&I loans are used in columns 3, 4, 7, and 8. The set of instruments for the change in parent capital include its own lagged value, changes in hidden reserves, the percentage changes in the Nikkei stock price index, the exchange rate and land prices, and dummy variables for changes in the ratings of long-term and short-term debt, as well as each of the other explanatory variables. Absolute values of t-statistics are in parentheses.

*Significant at 5 percent level.

**Significant at 1 percent level.