August 26, 1997

Collateral Damage: Effects of the Japanese Real Estate Collapse on Credit Availability and Real Activity in the United States

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Valuable research assistance was provided by Faith Kasirye-Nsereko. The views expressed are those of the authors, and do not necessarily reflect official positions of the Federal Reserve Bank of Boston or the Federal Reserve System.
Collateral Damage: Effects of the Japanese Real Estate Collapse on Credit Availability and Real Activity in the United States

The major contribution of this paper is the identification of an independent loan supply disruption and the finding that this shock had effects on real economic activity. This study extends a rapidly growing literature that examines the causes and the effects of changes in bank lending (for example, Bernanke and Lown 1991; Peek and Rosengren 1995a, 1995b, 1997; Kashyap and Stein 1994a, 1994b; Kashyap, Stein, and Wilcox 1993; Hancock and Wilcox 1992, 1997). However, such studies have suffered from two serious criticisms (for example, Sharpe 1995). First, while some studies have established that banking problems reduce bank lending, critics have argued that these studies may not have adequately isolated loan supply shocks from loan demand shocks. Second, even those studies that have identified loan supply shocks have not persuasively established that reductions in bank lending have real effects. For example, even if bank lending declines, other nonbank sources may fill the void, so that any effect on real economic activity is limited.

The dramatic 70 percent decline in Japanese commercial real estate prices from their peak in 1990 provides a natural experiment to test the extent to which a loan supply shock can affect real economic activity. Because the shock was external to U.S. credit markets, yet connected through the substantial penetration of U.S. lending markets by Japanese banks, this event allows us to identify an exogenous loan supply shock and ultimately link that shock to construction activity in major

commercial real estate markets in the United States. The linkage occurs through the decline in U.S. lending by internationally active Japanese banks that had established a substantial presence in particular commercial real estate markets in the United States.

A confluence of circumstances allows us to more cleanly identify a loan supply shock and to closely link that shock to real economic activity, a combination that has eluded most previous studies. This is accomplished by using panel data that exploit the variation across geographically distinct commercial real estate markets in the United States, both in the degree of Japanese bank penetration and in local demand conditions. Given this variation, we are able to show that Japanese lenders behaved similarly across distinct geographic markets while their domestic competitors reacted more to local market conditions.

By focusing on commercial real estate markets, we can isolate the real effects of the Japanese retreat from the market. Because the Japanese had a significant presence in only a few markets, a natural test of any real impact of credit disruptions is provided by examining differences in construction activity across these different geographic markets. We find that Japanese lending had a substantial impact on real estate activity, indicating that alternative financing was not easily obtained.[1] This is consistent with the idiosyncratic nature of many commercial real estate loans, which require lender understanding

of the borrower and project, and with the large penetration in specific markets where virtually all Japanese banks then pulled back, although to differing degrees.

The first section of the paper describes problems in the Japanese real estate market and the role these problems played in Japanese bank lending in the United States. The second section describes the panel data set and the methodology for isolating loan supply from demand shocks. It shows that the large real estate price shocks in Japan were transmitted through Japanese bank lending as a supply shock to the real estate credit markets in the United States. The third section documents that this loan supply shock had real effects on construction activity in major U.S. commercial real estate markets. The final section discusses the implications of the results for both policymakers and future research.

I. Japanese Lending in U.S. Real Estate Markets

The commercial real estate market in the United States has become increasingly internationalized. This foreign penetration is the result of large financial intermediaries seeking higher returns and greater diversification by focusing more globally. Numerous studies have found that the market for residential investment is inefficient (Case and Shiller 1989; Genesove and Mayer 1997), and even greater inefficiencies are likely in commercial real estate markets, which have fewer transactions,

more heterogeneous characteristics and uses, and much longer lags in creating new supply. The trend towards international financing of commercial real estate should stimulate competition and enhance the efficiency of real estate markets.

The penetration of U.S. commercial real estate markets by Japanese banks has been striking.[2] At their peak in 1992, U.S. subsidiaries and branches of Japanese banking organizations accounted for one-fifth of all commercial real estate loans held by domestically owned commercial banks plus foreign bank subsidiaries and branches in the United States.[3] In several of the major urban markets, the Japanese penetration was far more substantial. Japanese branches and subsidiaries accounted at their peak for 44 percent of commercial real estate loans by large($300 million or more in assets) U.S. commercial banks and foreign bank affiliates located in California, 35 percent in New York State, and 23 percent in Illinois, while they had virtually no penetration in many of the other major U.S. metropolitan areas. Such significant penetration of a few major commercial real estate markets suggests that any reduction in lending by Japanese banks could have a significant impact on credit availability in those markets, and thus on real economic activity in the real estate sector.

Figure 1 highlights the more than eightfold increase in Japanese commercial real estate lending in the United States between March 1987 and March 1992. Japanese banks then

substantially reduced their commercial real estate loans, a process that is still ongoing. This period of decreasing lending to U.S. commercial real estate markets follows with only a short lag the substantial slump in commercial land prices in Japan. However, at the same time that Japanese banks were significantly reducing their U.S. lending, they continued to lend in Japan.[4]

Most bank loans in Japan are secured by real estate, although many support non-real estate activities. The series for high-risk loans in Japan shown in the figure represents a subset of total bank loans that is more directly related to real estate activity, loans made directly to the real estate sector plus loans made to financial institutions that lend to the real estate sector. These loans, which one would expect to be most affected by the sharp drop in Japanese commercial real estate prices, do not show the dramatic decline apparent in the U.S. lending by Japanese banks.[5]

Figure 2 shows the fluctuations in bank commercial real estate loans for the United States and for the three commercial real estate markets with the greatest Japanese penetration: California, New York, and Illinois. A comparison of these three markets shows how idiosyncratic commercial real estate markets are, and why examining only national data might fail to capture important regional differences. Commercial real estate lending by domestic commercial banks peaked for New York commercial real estate in the late 1980s and for California in the early 1990s,

while Illinois shows relatively little variation over this period. The domestic bank lending patterns in these three markets are quite diverse, yet the Japanese bank lending patterns are similar. (Because Japanese bank lending shows such dramatic movements, the ratio scale for Japanese banks is a multiple of the scale for U.S. banks, and is shown on the right side of each figure.) In each of the three separate state markets, Japanese lending expanded dramatically in the late 1980s, peaked in late 1991, and then declined sharply. In contrast to Japanese banks, other foreign banks operating in the United States generally followed domestic patterns until recently, when they increased their commercial real estate lending both nationwide and in New York, while showing a slight decline in California and a much sharper decline in Illinois.[6]

Commercial real estate prices in most major U.S. markets were substantially higher at the end of 1996 compared to their trough in the first quarter of 1994. For example, San Francisco office prices were up 37 percent, the increase in Chicago was 22 percent, and in midtown New York, 25 percent.[7] Nonetheless, Japanese banks continued to withdraw from all three of these markets over this period. Thus, Japanese banks withdrew from the U.S. real estate markets even as prices were recovering, while continuing to lend in a home market that was deteriorating rapidly.

The similarity in the patterns of commercial real estate lending by Japanese banks in all three markets, in contrast to the variations in lending patterns of other foreign and domestic competitors, suggests that supply factors relating to the fortunes of the Japanese parents, rather than local demand factors, are likely to account for these movements. While the regressions described in the next section of the paper will control for both demand and supply factors, the patterns of Japanese lending here appear similar to the movements in commercial real estate prices in Japan, shown in Figure 1. This suggests that problem loans in Japan, almost all of which are secured by real estate, may affect U.S. commercial real estate lending by Japanese banks.

II. Transmission of Japanese Shocks to U.S. Commercial Real Estate Lending

Data and Methodology

The analysis focuses on the three large, spatially separated markets that have experienced the greatest penetration by Japanese banks: California, New York, and Illinois. Because commercial real estate markets are segmented, a focus on the individual markets emphasizes the idiosyncratic local demand characteristics that may be important in these markets.

For each of the three markets, we created a panel data set that included all large domestically owned commercial banks located in the state that held commercial real estate loans in their portfolios, as well as the Japanese bank branches and subsidiaries located there.[8] The domestically owned banks in these markets provide a comparison group for determining whether Japanese-owned banks, as a result of their parents' nonperforming loan problems in Japan, behaved differently than their competitors in the local U.S. markets. Since commercial real estate lending by very small banks goes primarily to small businesses rather than for the larger commercial projects of the kind that involve Japanese banks, we included only large commercial banks in our U.S. panel, defined as those banks with at least $300 million in assets as of the beginning of our sample, the third quarter of 1988.

Data on Japanese parent banks are available only semiannually, at the end of March and September. We use semiannual observations for the panel of banks in the three U.S. markets from September 1988, when risk-based capital ratios for Japanese parent banks were first constructed, to September 1996. In addition, we combine Los Angeles and San Francisco branches of the same parent bank when it operates in both locations, in order to form a single California entity for each Japanese parent bank.

The Japanese banks include subsidiaries and branches of city banks, long-term credit banks, and trust banks located in one of

the three markets. We do not include regional banks, which account for less than 4 percent of Japanese commercial real estate loans in the United States, because the parent bank disclosure provides insufficient information on nonperforming loans in Japan. We have a total of 20 Japanese subsidiaries and 63 individual Japanese branches operating in any one of the three markets, with the number reduced to 56 branch operations when the Los Angeles and San Francisco branches of the same parent bank are consolidated.[9] Of the three markets, Illinois has the smallest Japanese presence, with only one subsidiary and 16 Japanese organizations with branches in Illinois.

The estimated equation for all large banks engaged in commercial real estate loans in one of the three markets is of the following form:

$$\frac{\triangle Loans_{i,j,t}}{Assets_{i,j,t-1}} = \beta_0 + \beta_1 JPARENT_{i,j,t-1} + \beta_2 JAPAN_{i,j,t-1} + \beta_3 US_{i,j,t-1} + \varepsilon_{i,j,t}$$

The dependent variable is the change in total commercial real estate loans of banking institution i in state j from period t-1 to period t (a six-month period), divided by the beginning-of-period assets held by that bank in that state. Thus, the operations of a given Japanese parent bank can be represented by observations on up to three banking entities (if it has operations in all three states), with each entity corresponding to its operations in a particular state.

The first vector of variables, JPARENT, contains three variables based on Japanese parent bank data. By identifying problems of parent banks in Japan rather than domestic U.S. events as the source of the shock, we are able to examine the effects of credit supply shocks to U.S. markets that are not associated with the demand for real estate loans in the United States.[10] This overcomes a standard problem with credit availability studies: Credit supply shocks are difficult to isolate from credit demand shocks. For example, declining real estate loan demand typically occurs at the same time as increases in nonperforming real estate loans. Because the deterioration in market fundamentals causes firms to slow their investment activities and also causes banks to reduce their willingness to lend to the real estate sector, independent credit supply shocks are difficult to isolate.

The three variables contained in JPARENT are the ratio of nonperforming loans to risk-adjusted assets, a (0,1) dummy variable indicating the period during which nonperforming loans were reported, and the risk-based capital ratio. In each case, we use the beginning-of-period value (value for the previous period) for the series. Prior to March 1993, Japanese banks did not publicly disclose nonperforming loans, defined as loans to clients in bankruptcy plus loans on which no interest payments have been made for at least six months. Thus, the nonperforming loans variable has a value of zero prior to March 1993 and

thereafter it is equal to the disclosed value. To account for this discontinuity, a (0,1) dummy variable is used, with a value of zero through September 1992 and a value of one beginning in March 1993.

While the reported values of nonperforming loans are widely believed to be understated, presumably this ratio does provide a relative ranking among Japanese banks of the extent of the nonperforming loan problem. For example, both Hokkaido Takushoku and Nippon Credit, which failed in 1997, consistently had among the highest values for the ratio of nonperforming loans to risk-adjusted assets. This series should serve as a good proxy variable, one that captures the relative degree of problems across Japanese parent banks cross-sectionally as well as the deterioration over time at individual institutions. We expect the sign on the nonperforming loan ratio coefficient to be negative.

While we used a measure of nonperforming loans that is consistently defined and measured over time, broader measures have become available for the most recent observations. However, to combine these components into a single measure would result in movements in the series related to the changing coverage of the nonperforming loans measure as well as to any change in nonperforming loans consistently measured. Consequently, we considered as separate explanatory variables estimates of loans sold to the Cooperative Credit Purchasing Company (CCPC) and

Jusen loans, and reported values of restructured and supported loans. However, we found no significant correlation between these measures and Japanese bank lending in the United States.[11]

Previous work has emphasized the role of risk-based capital ratios of Japanese parent banks in determining their U.S. lending (Peek and Rosengren 1997). Most of the movements of the total risk-based capital ratio of these banks during our sample period are a result of the fluctuations of the Japanese stock market, with relatively little of the nonperforming loan problem being reflected in the capital ratio. Since the portion (typically less than 100 percent) of nonperforming loans that is charged off is likely to be reflected in a lower capital ratio eventually, we would expect the coefficient on the risk-based capital ratio to be larger (in absolute value) than that of the nonperforming loan ratio (they are each scaled by the bank's risk-adjusted assets), and to be positive.

The second set of explanatory variables, JAPAN, includes two Japan-related variables. The first is a (0,1) dummy variable that has a value of one if the bank is a Japanese bank branch or subsidiary. This is intended to capture any differences in behavior (on average) of Japanese subsidiaries and branches relative to domestic U.S. commercial banks, after controlling for their parent bank's nonperforming loan ratio and risk-based capital ratio. The second variable that might affect the behavior of Japanese banking operations in the United States is

foreign direct investment (FDI), measured as the percentage change (at an annual rate) in foreign direct investment by Japanese companies in this country over the prior six-month period.[12] Because Japanese companies frequently utilize Japanese banks, increases in foreign direct investment should be positively related to lending by Japanese branches and subsidiaries.

The final vector, US, includes variables reflecting factors related to the U.S. economy or banking operations that might affect commercial real estate lending in a particular market. The U.S. risk-based capital ratio variable includes values for the set of U.S. commercial banks and for the set of Japanese subsidiaries operating in the United States, since these operations are capitalized separately from the parent Japanese bank. However, this variable has a zero value for Japanese branches, since they are capitalized by their parent banks in Japan. We expect the estimated coefficient on the risk-based capital ratio to be positive, as commercial real estate lending should be positively related to the capital ratio of the bank.

In some specifications, we also include as a separate explanatory variable the risk-based capital ratio of Japanese subsidiaries. The estimated coefficient on this variable would measure the differential effect of the risk-based capital ratio for Japanese subsidiaries relative to domestically owned commercial banks. An estimated value for this coefficient that

differed significantly from zero would indicate that Japanese subsidiaries react differently to their capital position than do domestic banks. Note that Japanese subsidiaries have both the parent capital and their own subsidiary capital as cushions for adverse shocks, and that Japanese subsidiaries in the United States have generally been quite well capitalized. As a result, we do not have a prior on whether Japanese subsidiaries will react to changes in their risk-based capital ratios in a way that differs from that of domestic banks.

Formal regulatory actions are binding agreements between regulators and a troubled bank that frequently require the bank to raise capital and shrink assets (Peek and Rosengren 1995a, 1996). Because banks operating under formal regulatory actions appear to behave differently than less restricted banks, we include as additional explanatory variables a formal action (0,1) dummy variable, alone and interacted with the bank's risk-based capital ratio. The variable equals one if a formal action is in place and zero otherwise. We expect the formal regulatory action coefficient to be negative and the formal regulatory action variable interacted with the risk-based capital ratio to have a positive coefficient. Other variables included in the US vector include nonperforming commercial real estate loans, bank size, and the ratio of a bank's total loans to assets. The estimated coefficient on nonperforming commercial real estate loans (loans 90 or more days past due plus nonaccruing loans) divided by total

commercial real estate loans should have a negative sign, as banks reduce exposure in sectors where they are experiencing problems. The beginning-of-period logarithm of assets controls for the size of the U.S. presence of each bank. The loans-to-assets ratio controls for differences in how actively the institution is involved in lending.

In addition to the previously listed variables, we include a set of three (0,1) dummy variables to control for a Japanese parent bank opening a new branch in the United States, opening a new branch in the same market, and closing a branch in the United States. It is likely that such actions could affect lending at existing branches, as the parent bank shifts lending operations between branches. We also control for differences in commercial real estate loan demand in the individual markets. For the equations using the variance components estimation technique, we include 47 time-region dummies (three regions, California, New York, and Illinois, and 16 six-month time periods, minus one observation to avoid collinearity with the constant term). In the fixed-effects specifications, we include the growth rate of state payroll employment over the prior six-month period to control for loan demand (in addition to the fixed effects). The coefficient on state employment growth should be positive. The 47 time-region dummy variables are not included in the fixed-effects equations and the state employment growth variable is not included when the 47 time-region dummy variables are included.

Empirical Results

Table 1 presents the results for equation 1. In all six columns, we use the set of U.S. domestic banks as a control group. The specifications in the first two columns have combined the data for Japanese branches and subsidiaries operating in a given state into one entity. Thus, we have one entity per state for each Japanese parent bank, if that parent bank has any operations in that state. The second pair of columns omits Japanese subsidiary data, including only the branch data for Japanese parent banks, again consolidated into one entity per state per parent. The final two columns omit Japanese branch data and treat each Japanese subsidiary as a separate observation regardless of parent.

The results for the combined operations (branches plus subsidiaries) of Japanese parent banks show that the effect of the nonperforming loan ratio of Japanese parent banks on their U.S. commercial real estate lending is negative and highly significant. The estimated coefficient in the first column indicates that for every 1 percentage point increase in the nonperforming loan ratio of the Japanese parent, their branches and subsidiaries combined decreased their commercial real estate lending by 0.750 percent of risk-adjusted assets per six-month period. Note that over this period, nonperforming loans relative to risk-adjusted assets for Japanese parent banks ranged as high

as 9 percent for some banks. Column 2 shows that the results are similar when the equation is estimated using the fixed-effects technique instead, with state employment growth replacing the set of time-region dummy variables as a control variable.

The estimated coefficient on the nonperforming loan ratio is again significant at the 1 percent level and somewhat larger (in absolute value) than that shown in column 1. The coefficient on the parent's risk-based capital ratio is positive and highly significant for the fixed-effects specification and positive but just missing the 5 percent significance level for the variance components specification.

One of the most striking characteristics of these estimates is the relative sizes of the estimated coefficients on the nonperforming loan ratio compared to those on the parent risk-based capital ratio. Both variables are scaled by the risk-adjusted assets of the parent bank. Yet the nonperforming loan ratio has an estimated effect that is nearly four times as large as that of the capital ratio in the first column and nearly three times as large in the second column. Since the portion (typically less than 100 percent) of nonperforming loans that are charged off will at some point be reflected in the capital position of the bank, one might expect the coefficient on nonperforming loans to be less than that on the capital ratio. In particular, if nonperforming loans had been adequately reserved for, one would expect that the nonperforming loan

coefficient would be insignificant, because the problems would be fully reflected in the reduced capital ratio of the bank.[13] But because this measure of nonperforming loans includes only loans to bankrupt borrowers or loans that have made no interest payments for six months or more, the true magnitude of problem loans is likely to be significantly larger, even when CCPC, restructured, and supported loans are included. Thus, the relatively larger estimated coefficient on the nonperforming loan ratio likely reflects the underreporting of problem loans at Japanese banks, with many private estimates of their problem loans two to three times as large as the reported value.

Among the other Japan-specific variables, the estimated coefficients on the dummy variables for the announcement of nonperforming loans and for being a Japanese banking entity are negative, but not statistically significant. The estimated coefficient on Japanese foreign direct investment growth is positive and highly significant.

Among the domestic U.S. variables, the most significant effect comes from the commercial real estate nonperforming loan ratio, which is negative and highly significant. The logarithm of assets has a negative effect and is significant at the 5 percent level only in the fixed-effects specification. The state employment growth rate effect is positive and significant at the 1 percent level in the fixed-effects specification. The

remaining variables do not have estimated coefficients that are significant at the 5 percent level.

The results in the second and third pairs of columns of Table 1 make clear that the behavior of Japanese subsidiaries is quite different from that of Japanese branches. Japanese branch behavior responds strongly to problems at the parent bank, which is consistent with the branches being a component of the unconsolidated parent bank balance sheet. The nonperforming loan ratio of the parent has a negative and highly significant effect for Japanese branches, and the parent's risk-based capital ratio has a positive and highly significant effect.

In contrast, Japanese subsidiaries show no significant reaction to problems at the parent bank. In the specification that includes Japanese subsidiaries (as well as the control group of domestic banks), the only variables that have a significant estimated effect are the commercial real estate nonperforming loan ratio for U.S. operations and bank size. The estimated coefficient on the differential effect of the risk-based capital ratio is not statistically significant, indicating that Japanese subsidiaries react to changes in their risk-based capital ratio in the same way as domestic U.S. banks. These results are not particularly surprising, since Japanese subsidiaries in the United States are separately capitalized, are not included in the unconsolidated reports that tend to be the focus of Japanese investors and regulators, and are more retail-oriented than

Japanese branch operations. Apparently, these differences make Japanese subsidiaries behave more like domestic U.S. banks than like Japanese branches.

Table 2 reports results of equations that examine in more detail the behavior of Japanese branches in the individual commercial real estate markets, reporting separate results for New York, California, and Illinois. The estimated coefficients on the nonperforming loan ratio of parent banks are negative for each of the three states and significant at the 1 percent level for New York and California, but only at the 10 percent level for Illinois. The weaker results may reflect the fact that fewer Japanese banks have branch operations in Illinois. Some of the weaker Japanese banking organizations, such as the recently failed Hokkaido Takushoku and Nippon Credit, had operations in California and New York, but not in Illinois. As a result, we lose some of the cross-sectional variation present in the other two markets. With less cross-sectional variation, the Japanese dummy variable may be picking up many of the behavioral differences between Japanese branches and domestic U.S. banks. Consistent with this interpretation, the estimated coefficient on the Japanese dummy variable is negative and significant at the 5 percent level in Illinois, but insignificant in the other two markets.

The parent’s risk-based capital ratio has positive estimated coefficients that are significant at the 5 percent level in New

York and Illinois, but not significant in California. Among the other control variables, the estimated coefficients on Japanese FDI are positive and significant, at the 5 percent level for New York and California and at the 1 percent level for Illinois. The estimated coefficients on the U.S. nonperforming commercial real estate loan ratio are negative and significant at the 1 percent level in all three markets, while those on the logarithm of assets are always negative, but significant at the 5 percent level only in California.

The similarities across states indicate how robust the findings are for the nonperforming loan ratio at parent banks. By estimating separate equations by state, the sample size and the power of the test are substantially diminished, particularly given the idiosyncratic features of individual Japanese branches and subsidiaries. Nonetheless, we find that Japanese banks with problem loans reduced their U.S. commercial real estate lending not only overall but in each of the three distinct markets, which had very different environments.

III. Real Effects of Declines in Japanese Commercial Real Estate Lending

Data and Methodology

Now that it has been established that commercial real estate problems in Japan were transmitted to U.S. commercial real estate

markets in the form of reduced lending by Japanese bank affiliates, an important question remains: Did this reduction in Japanese lending have an effect on real activity in U.S. commercial real estate markets? To address this question, we investigate the effect of changes in commercial real estate loans held by Japanese bank affiliates on three alternative measures of construction activity, using data disaggregated at the state level. This will allow us to determine whether construction activity differed systematically in states that had a large Japanese lending presence compared to those that did not.

In those states with a substantial Japanese presence, particularly California, New York, and Illinois, Japanese banks contributed not only to a substantial decline in credit to commercial real estate activity in the 1990s, but also to a strong increase in the late 1980s and early 1990s, as Japanese banks greatly expanded their operations in the United States. Because Japanese lending behavior was similar across states, even though demand conditions in many of these markets were not, we should be able to test whether the supply shock to lending altered real activity in those states with a large Japanese lending presence.

Our test follows an earlier study by Hancock and Wilcox (1997). The following regression is estimated:

$$\frac{CONSTR_j}{POP_j} = \alpha_0 + \alpha_1 BANK_j + \alpha_2 STATE_j + \alpha_3 NATIONAL + \eta_j$$

Three alternative measures of the dependent variable are considered, each based on F.W. Dodge data on new construction contracts. The three measures are for the value, number, and square footage of total construction projects in a state, indexed by the subscript j.[14] We divide the value of construction contracts in each state by the GDP investment structures price deflator to create a constant dollar series. All three of the construction series for each state are divided by that state's population, so that they are measured on a per capita basis.

While all three series are related to construction activity, they highlight different aspects of that activity. The value of construction contracts must be divided by a price index and thus may be distorted somewhat by differences in the timing and magnitude of commercial real estate price fluctuations across locations. Both the value and the square footage series exhibit large fluctuations associated with the lumpiness of construction projects, with discrete jumps in the series occurring as big projects are initiated. While the series for the number of construction contracts avoids this problem, it may not capture fluctuations in real activity as well to the extent that the mix between large and small projects changes over time.

Three sets of explanatory variables are used. The first set (BANK) includes three variables related to commercial lending activity by banks in each state. The explanatory variable of particular interest here is the contemporaneous change in commercial real estate loans held by all branches and subsidiaries of Japanese banks in state j, divided by the beginning-of-period value of commercial real estate loans held by domestic commercial banks and foreign-owned (including Japanese) bank affiliates (branches and subsidiaries) in that state. We expect the estimated coefficient on this variable to be positive, indicating that a rise or decline in Japanese bank lending in that state will cause a corresponding rise or fall in commercial real estate activity in that market.

The second variable in this vector is the contemporaneous change in commercial real estate loans held by domestic commercial banks and non-Japanese foreign-owned bank affiliates in state j, divided by the beginning-of-period commercial real estate loans held by domestic commercial banks and foreign-owned bank affiliates in that state. We expect the estimated coefficient on this variable to be positive. The third variable in this vector is intended to capture the extent of problems in the commercial real estate lending sector in the state. This variable is measured as the value for the previous (six-month) period of the ratio of nonperforming commercial real estate loans (90 days past due and nonaccruing loans) for all domestic

commercial banks plus foreign-owned bank affiliates in state j, divided by total commercial real estate loans for the same time period held by the same set of institutions. We expect the estimated coefficient on this variable to be negative, as both loan demand and loan supply are likely to decline as the commercial real estate market deteriorates.

The second vector of explanatory variables, STATE, is intended to control for local demand conditions. This vector contains four variables, each measured at the state level. The first variable is the vacancy rate constructed from data published by CB Commercial Real Estate Group. These data are based on a quarterly survey of major office buildings that covers multi-tenant office buildings, but excludes government-owned buildings. The survey data cover 49 major metropolitan areas, rather than being aggregated to the state level. Consequently, in states with only one major metropolitan area covered by the survey, that vacancy rate is used for the entire state. In states with multiple metropolitan areas covered, we take the average of the vacancy rates for those cities as the state vacancy rate. This vector of state-level variables also includes the state unemployment rate, the state's population growth rate, and the growth rate of real state personal income per capita. Each of these variables is measured as of the prior period.

The third vector of explanatory variables (NATIONAL) includes four macroeconomic variables: the level of the Michigan

consumer sentiment index, the level of the effective federal funds rate, the CPI inflation rate, and the interest rate on the 30-year fixed-rate mortgage. An alternative specification of equation 2 replaces this set of national economic variables with a set of dummy variables for each time period. While including the set of time dummy variables is a less restrictive specification, it has the disadvantage of not easily being interpreted in terms of macroeconomic factors. Both specifications are reported, and they give qualitatively similar results.

The estimation is based on semiannual observations from March 1987 through September 1996. Each observation covers a six-month interval, ending March 31 or September 30 (the end of the first and third quarters, respectively), so that the data correspond to the frequency of the Japanese parent bank data used as instruments for the contemporaneous values of the change in the commercial real estate loan variables. The sample includes each state that had a complete series for the vacancy rate over the full sample period. This excludes primarily rural states that had relatively few major commercial real estate construction projects and, in any case, would not be comparable to the states in which Japanese banks have been active.[15]

Contemporaneous values for both the change in commercial real estate loans by Japanese banks and the change in commercial real estate loans by non-Japanese banks are included as

explanatory variables. Since movements in these two variables could reflect shocks to both demand and supply for commercial real estate credit, we estimate equation 2 using two-stage least squares. As instruments, we include the list of other explanatory variables in the equation along with an additional lagged value of each, two lagged values of each of the two contemporaneous variables being instrumented, and two lagged values each of a set of variables reflecting Japanese activity. These include the percentage change in the Nikkei, the percentage change in Japanese real estate prices in the six largest cities, the percentage change in Japanese foreign direct investment in the United States, the average risk-based capital ratio for Japanese parent banks with operations in the state, and the average ratio of nonperforming loans to assets of Japanese parent banks with operations in the state. Because parent risk-based capital ratios and the parent nonperforming loan ratios are not available for the entire period, they have a zero value for the period prior to their availability. To allow for this discontinuity, we also include a (0,1) dummy variable for each of these two variables, with a value of one for the observations for which data are available. In addition, the Japanese instruments are constructed to have zero values for the states that have no Japanese banking operations.

Empirical Results

Table 3 provides the results of estimating equation 2 using two-stage least squares and including fixed-effects for each state. The equations in the first group of three columns follow Hancock and Wilcox (1997) by including as explanatory variables a set of national macroeconomic variables, while the equations in the second group of three columns replace the set of national macroeconomic variables with a set of dummy variables for each time period. The data set is a balanced panel that includes 20 observations each for 23 states, for a total of 460 observations.

For the first set of estimates, the estimated coefficients on the change in commercial real estate loans held by Japanese banks are each positive (as predicted) and significant at the 1 percent level. Thus, the evidence indicates that increases and declines in U.S. commercial real estate lending by Japanese banks affect construction activity in the same direction, other things equal, whether construction activity is measured by the number, value, or square footage of new construction projects.[16]

Similarly, the change in commercial real estate loans held by non-Japanese banks (domestic plus foreign-owned) has a positive effect in each of the three alternative specifications, although only two of the three are significant and the coefficient magnitudes are smaller than those for the Japanese lending. The nonperforming commercial real estate loan ratio has the predicted sign (negative) in two of the three specifications, but is never significant. Each of the four local-conditions

variables have estimated coefficients with the predicted signs in each specification, although only those on population growth are significant for all three specifications. Among the national macroeconomic variables, each estimated coefficient is significant with the exception of that for the inflation rate in the second column.

When the national macroeconomic variables are replaced by the set of time dummy variables as shown in the last three columns, the estimated coefficients on the change in commercial real estate loans held by Japanese banks again are each significant at the 1 percent level, and they are similar in magnitude to the corresponding estimates in the first three columns. However, while still positive, the coefficients on the change in commercial real estate loans held by non-Japanese banks are much smaller and no longer significant.

These results indicate that the set of time dummy variables likely are capturing much of the effect of local economic conditions but are relatively uncorrelated with the supply shocks emanating from Japan that are driving Japanese bank lending in U.S. commercial real estate markets. Furthermore, the overall fit of the equation is substantially better in the less restrictive specifications that include the set of time dummy variables. While the national macroeconomic variables yield sensible results, they nonetheless leave unexplained time-dependent shocks that are captured by the set of time dummy

variables. Since the specification with the set of time dummy variables represents a less restrictive way to control for economywide demand shocks compared to using the set of national macroeconomic variables, the fact that the coefficients on the Japanese lending variable retain their size and significance reinforces the view that fluctuations in Japanese bank lending in the United States during this period were dominated by supply rather than local demand conditions.

With respect to the other explanatory variables, the nonperforming loan ratio again has no significant coefficients and only one that is of the predicted sign. However, the vacancy rate now has estimated coefficients that are significant in each of the three alternative specifications. The unemployment rate has a significant effect in two of the three specifications, with the third close to being significant at the 5 percent level. Population growth still has positive and significant effects in each instance. However, the growth in real personal income per capita now has negative estimated coefficients, although none are significant.

Examination of the first stage of the two-stage procedure yields several interesting results. When estimating the regression explaining the change in commercial real estate loans by Japanese banks, the instruments measuring macroeconomic variables, local conditions, and the state and time dummy variables each have effects that are statistically insignificant.

However, variables reflecting domestic Japanese factors, such as land prices and parent risk-based capital ratios, do have significant effects. In contrast, when estimating the first-stage regression explaining the change in commercial real estate loans by non-Japanese banks, the coefficients on the instruments for local conditions and time variables, which capture primarily demand conditions, are frequently significant. Thus, the first-stage estimates, like the second-stage estimates, provide evidence consistent with fluctuations in U.S. lending by Japanese banks being driven by a supply shock emanating from Japan, while the non-Japanese bank commercial real estate lending reflects primarily domestic loan demand.

IV. Conclusion

This study finds that the collapse of the Japanese real estate market caused a decline in real economic activity in the commercial real estate sector in the United States. The transmission of the shock occurred through globally active Japanese banks that responded to the problems in Japan by reducing lending in the United States. Because Japanese banks had attained such a large penetration in some of the major commercial real estate markets in the United States, this decline in lending had real effects on construction activity.

An earlier study (Peek and Rosengren 1997) showed that declines in risk-based capital ratios associated with the decline

in Japanese stock prices caused Japanese commercial and industrial lending in the United States to decline. This paper emphasizes a different mechanism, the increase in nonperforming commercial real estate loans in Japan, which was not fully reflected in Japanese bank capital ratios. Focusing on the commercial real estate market rather than the C&I loan market, which is more tied to national business conditions, provides a more powerful test for the presence of an independent loan supply shock. This is because the variation across spatially separated commercial real estate markets in the United States, as well as the variation across banks in these markets, contributes to our ability to identify the effects of the supply shock.

Not only do the heterogeneous markets improve our ability to isolate loan supply shocks, they also provide a natural test for whether these shocks have real effects. Because the Japanese banking presence is concentrated in a few regions of the country, we are able to exploit the variation across commercial real estate markets to verify that the Japanese loan supply shock had a real effect on U.S. construction activity. We find that this loan supply shock significantly reduced construction activity in those markets with a large Japanese bank penetration, providing clear evidence that an internationally transmitted shock to credit availability can have real effects on the host country.

The evidence of the Japanese bank pullback in these commercial real estate markets may be indicative of actions by

both bank management and bank regulators. To date, Nippon Credit and Hokkaido Takushoku are the two largest Japanese depository institutions requiring rescue plans as a result of their nonperforming loan problems. In March 1997, these banks had assets of $156 billion and $94 billion, respectively, and were among the 100 largest banking institutions worldwide. The rescue announcements disclosed both banks' intention to abandon all international operations and focus instead on core domestic operations, a move that, based on reported comments by officials at the Bank of Japan, was supported by regulators. While these two banks were extreme cases, our results indicate that less troubled banks also responded to increases in nonperforming loans in Japan by reducing their commercial real estate lending in the United States.[17] Thus, the extent of real estate problems at the Japanese parent banks strongly affected their U.S. real estate lending. And because Japanese banking organizations represent such a large proportion of bank real estate lending in major U.S. markets, their retreat from U.S. lending had a significant impact on real estate activity in those markets.

From a public policy standpoint, this study indicates that credit flows by global banks will be influenced by both domestic and foreign conditions. Moreover, a bank's capitalization will not be a sufficient statistic for predicting its willingness to lend. Nonperforming loans, even those yet to be reflected in

capital ratios or publicly disclosed, can alter the willingness of global banks to lend.

While the Japanese have been retreating recently from the U.S. market, it must be remembered that borrowers benefited from their willingness to lend in the late 1980s and early 1990s at a time when many U.S. banks were undercapitalized and reluctant to lend. The increased integration of local commercial real estate markets through the entry of globally active banks should increase competition in these markets, providing a more diversified source of funding to the commercial real estate sector and making these markets more efficient and less sensitive to localized supply shocks. These benefits are likely to be even greater in countries with less developed financial markets that may be more dependent on bank financing. In that case, a foreign banking presence could provide much needed stability to a country experiencing a severe domestic shock.

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Footnotes

1. Because bank as well as nonbank sources other than Japanese banks are important providers of credit to commercial real estate markets in the United States, it is particularly important to directly test, rather than merely assert, the hypothesis that the decline in lending by Japanese banks adversely affected real economic activity.

2. For the purposes of this study, commercial real estate loans will be defined to include both nonfarm, nonresidential real estate loans and construction loans.

3. 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). Branches have reporting requirements that differ from those of subsidiaries; in particular, the real estate loan data for branches are not disaggregated by type. Because virtually all of the real estate lending by Japanese branches is composed of nonfarm, nonresidential real estate and construction loans, we use their total real estate loans series as our measure. On the other hand, Japanese subsidiaries file commercial bank call reports that report the separate nonfarm, nonresidential and construction components of real estate loans.

4. Bank-firm lending relationships are particularly strong and important in Japan, making Japanese banks reluctant to reduce credit to their long-time domestic customers (Hall and Weinstein 1997; Gibson 1995; Hoshi, Kashyap, and Scharfstein 1990, 1991; Hoshi, Scharfstein, and Singleton 1993; Frankel and Morgan 1992).

5. This is consistent with the pattern of domestic compared to overseas commercial and industrial (C&I) lending by Japanese banks (Peek and Rosengren 1997).

6. The large decrease in non-Japanese foreign loans in California in 1988 reflects the sale of Union Bank by Standard Chartered, a British bank. The big increase in non-Japanese foreign loans in Illinois in 1987 reflects substantial increases at the Chicago Branch of Bank of Montreal.

7. These increases are based on Standard & Poor’s real estate indexes that provide price and rent per square foot for office space in 24 U.S. locations. The data are not seasonally adjusted.

8. Our definition of domestic U.S. commercial banks excludes shell banks, credit card banks, trust banks, banks with risk-based capital ratios over 100 percent, banks with a loans-to-assets ratio of less than 5 percent, and banks with a ratio of transactions deposits to assets of less than 5 percent. These criteria remove banks with a commercial bank charter that do not operate as traditional commercial banks.

9. We excluded the first two years of a Japanese parent bank's U.S. branch operations as well as the first two years of operations of an individual Japanese branch or subsidiary. This period is likely to be dominated by rapid growth as the bank establishes a new presence in a particular region, rather than reflecting problems or lack of problems at the parent banks. We also omit any observation in which a Japanese or domestic bank is involved in a merger or substantial branch acquisition, which removes the observation in which the balance sheet data increase as a result of the acquisition. This provides a total of 2,277 observations, with 1,316 for domestic banks, 710 for branches of Japanese banks, and 251 for subsidiaries of Japanese banks operating in one of these three states during our sample period.

10. One might be concerned about an indirect effect on demand in the United States operating through Japanese nonbank affiliates. However, Peek and Rosengren (1997) have shown that Japanese nonbank affiliates in the United States continued to grow during this period, whether their activity is measured by assets, gross product, or total liabilities, and thus did not account for any general weakening in the demand for credit. For this study, however, the real estate sector, rather than activity generally, may be more relevant. Still, Japanese foreign direct investment in the real estate sector shows no evidence of a sharp decline in U.S. activities. Japanese foreign direct investment in the real estate sector rose sharply between 1993 and 1994, exhibited a slight decline in 1995, and rose again in 1996.

11. In part, this result may reflect the short period for which this information has been disclosed and the fact that we include a set of (0,1) time period dummy variables in the regressions that may pick up much of their effect. Jusen, restructured, and supported loans were first reported in 1996, and the formation of the CCPC in January 1993 would make a CCPC dummy variable identical to the nonperforming loans dummy variable already included in the equation. Furthermore, the weak correlation with the volume of loans sold to the CCPC by a bank may be related to offsetting effects. While this measure may be an indicator of the extent of problems at a bank, it also may be inversely related to bank health, reflecting the incentive of relatively

healthy institutions to clean up their balance sheets while more troubled institutions could not afford to reserve for loans that potentially could be sold or restructured.

12. FDI data are taken from various issues of the Survey of Current Business. Because the FDI data are available only as annual observations, we calculate the March observation as the average of the current and previous year's values. We use the current-year value for the September observation. The FDI variable has a nonzero value only for Japanese branches and subsidiaries.

13. Problem loans in Japan affect bank capital only when the banks make provisions for these loans by adding to their specific loan loss reserve, through a direct write-off of the loan (when no specific reserve has been allocated for that loan), or through losses realized on sales of problem loans to the Cooperative Credit Purchasing Company (CCPC). Even now, Japanese banks have not fully reserved for many of their nonperforming loans.

14. The value of construction contracts excludes the value of the land and architectural fees. For manufacturing buildings, the value also excludes equipment that is not part of the structure.

15. The sample includes 23 states. Nine states have Japanese bank affiliate operations: California, Florida, Georgia, Illinois, Massachusetts, New York, Oregon, Texas, and Washington. The remaining 14 states do not: Arizona, Colorado, Connecticut, Indiana, Kansas, Maryland, Minnesota, Missouri, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, and Utah.

16. When we estimated the equations in this table using ordinary least squares rather than the two-stage least squares technique, we obtained estimated coefficients on the change in commercial real estate loans held by Japanese banks that were smaller in magnitude but still statistically significant.

17. Termination of international operations has an additional advantage that simply scaling back overseas operations does not have. For Japanese banks active only in domestic markets, the risk-based capital ratio requirement is only 4 percent, compared to the 8 percent Basle requirement for internationally active banks.

Table 1
Commercial Real Estate Lending by U.S. Commercial Banks and U.S. Branches and Subsidiaries of Japanese Banking Organizations

	Branches and Subsidiaries		Branches		Subsidiaries	
	Variance Components[1]	Fixed Effects	Variance Components[1]	Fixed Effects	Variance Components[1]	Fixed Effects
Announcement of Nonperforming Loans	-.321 (0.67)	-.550 (0.99)	-.470 (0.89)	-.522 (0.80)	-.852 (1.12)	-1.605 (1.79)
Nonperforming Loan Ratio at Japanese Parent	-.750** (6.15)	-.844** (5.41)	-.853** (6.47)	-.982** (5.66)	-.130 (0.53)	-.068 (0.23)
Risk-Based Capital Ratio at Japanese Parent	.201 (1.95)	.306** (2.80)	.339** (3.00)	.445** (3.53)	-.002 (0.01)	.085 (0.49)
Japanese Dummy	-.845 (0.83)		-1.771 (1.59)		.642 (0.42)	
Japanese Foreign Direct Investment Growth	.020** (3.42)	.022** (4.08)	.027** (4.29)	.029** (4.80)	.004 (0.55)	.007 (0.90)
US Risk-Based Capital Ratio	-.004 (0.26)	-.018 (0.70)	-.003 (0.15)	-.035 (0.93)	.005 (0.24)	-.012 (0.33)
Risk-Based Capital Ratio of Japanese Subsidiaries					-.019 (0.59)	-.015 (0.30)
US Risk-Based Capital Ratio *Formal Action	.076 (0.90)	.003 (0.03)	.074 (0.92)	.026 (0.27)	.041 (0.54)	-.002 (0.02)
Formal Regulatory Action	-1.563 (1.59)	-1.834 (1.61)	-1.543 (1.63)	-2.119 (1.89)	-1.295 (1.46)	-1.520 (1.45)
US Nonperforming Commercial Real Estate Loan Ratio	-.429** (9.03)	-.610** (11.01)	-.392** (8.22)	-.584** (10.42)	-.519** (6.82)	-.772** (8.61)
Log(Assets)	-.140 (1.69)	-.696* (2.34)	-.167* (2.03)	-.517 (1.75)	-.147 (1.91)	-.960** (3.26)
US Loans to Assets Ratio	.008 (1.43)	-.001 (0.11)	.006 (0.99)	.003 (0.31)	.017* (2.57)	.010 (0.92)
State Employment Growth		.120** (2.72)		.123** (2.78)		.082 (1.89)
SSR	19,980	20,458	16,069	16,645	10,680	10,801
SER	3.136	3.139	2.989	3.005	2.783	2.755
R^2	.283	.265	.311	.286	.209	.200
Hausman Test	1.000		1.000		1.000	

[1] Includes 47 state-quarter interactive dummy variables (3*16-1) to control for demand factors, as well as dummy variables to control for the opening of new branches and the closing of existing branches by a parent bank.

Absolute values of t-statistics in parentheses.

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

Table 2
Commercial Real Estate Lending by U.S. Commercial Banks and U.S. Branches of Japanese Banks
Estimation Method: Variance Components[1]

	New York	California	Illinois
Announcement of Nonperforming Loans	-.542 (0.87)	-.141 (0.12)	-1.001 (1.17)
Nonperforming Loan Ratio at Japanese Parent	-.489** (3.45)	-1.469** (5.38)	-.455 (1.80)
Risk-Based Capital Ratio at Japanese Parent	.301* (2.51)	.181 (0.78)	.618* (2.46)
Japanese Dummy	-2.087 (1.68)	.488 (0.21)	-5.256* (2.30)
Japanese Foreign Direct Investment Growth	.017* (2.16)	.031* (2.39)	.038** (4.201)
US Risk-Based Capital Ratio	-.046 (1.47)	.027 (0.82)	-.031 (0.88)
US Risk-Based Capital Ratio *Formal Action	.212 (0.74)	.037 (0.32)	-.123 (0.06)
Formal Regulatory Action	-2.090 (0.68)	-1.806 (1.28)	.525 (0.03)
US Nonperforming Commercial Real Estate Loan Ratio	-.433** (5.66)	-.420** (4.69)	-.263** (4.17)
Log(Assets)	-.053 (0.55)	-.415* (2.44)	-.120 (1.13)
US Loans to Assets Ratio	.002 (0.20)	.017 (1.13)	.009 (1.00)
SSR	2,667	10,620	2,496
SER	2.243	3.961	2.096
R^2	.311	.353	.173
Hausman Test	1.000	.999	.178

[1] Each equation also includes a set of individual time dummy variables, as well as dummy variables to control for the opening of new branches and the closing of existing branches by a parent bank.

Absolute values of t-statistics in parentheses.

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

Table 3
The Determinants of Real Estate Construction Contracts
Estimation Method: Two-Stage Least Squares with Fixed-Effects, 1987:1 to 1996:2

	Number of Construction Projects	Real Value of Construction Projects	Square Feet of Construction Projects	Number of Construction Projects	Real Value of Construction Projects	Square Feet of Construction Projects
Change in Commercial Real Estate Loans by Japanese Banks	19.232** (4.01)	15.394** (2.66)	44.636** (2.76)	15.205** (4.11)	19.556** (3.58)	49.487** (3.48)
Change in Commercial Real Estate Loans by Non-Japanese Banks	7.875** (3.67)	2.596 (1.29)	21.507** (3.42)	1.500 (0.84)	2.454 (1.06)	10.387 (1.80)
Nonperforming Commercial Real Estate Loans	1.887 (0.55)	-1.767 (0.52)	-1.286 (0.12)	1.123 (0.46)	-1.146 (0.35)	8.647 (1.00)
Vacancy Rate	-1.600 (1.02)	-5.105** (2.79)	-11.551* (2.27)	-3.945** (3.10)	-6.047** (3.42)	-13.806** (3.06)
Unemployment Rate	-2.535 (0.44)	-18.337* (2.52)	-24.257 (1.24)	-12.144* (2.54)	-15.796* (2.14)	-37.930 (1.91)
Population Growth	106.191** (4.72)	73.285** (2.71)	237.053** (3.18)	173.859** (8.86)	100.890** (3.71)	461.668** (5.90)
Growth in Real Personal Income Per Capita	4.246 (1.64)	6.815* (2.14)	16.169 (1.88)	-.388 (0.13)	-6.542 (1.69)	-9.188 (0.93)
Mortgage Rate	-15.918* (2.07)	-41.804** (3.95)	-54.667* (2.11)			
Inflation Rate	16.945** (3.04)	-7.600 (1.02)	36.695* (1.97)			
Federal Funds Rate	-26.307** (5.07)	-22.856** (3.40)	-32.921* (2.03)			
Consumer Confidence Index	3.877** (5.63)	4.129** (5.00)	12.220** (4.99)			
R^2	.819	.654	.759	.898	.726	.824
SSR	2,956,930	5,076,370	31,952,300	1,655,470	4,021,300	23,247,200
SEE	83.314	109.162	273.871	63.466	98.915	237.829

Notes: The equations in the first three columns also include a set of state dummy variables (fixed-effects). The equations in the last three columns include both the set of state dummy variables and a set of time dummy variables.

Absolute values of t-statistics are in parentheses. The t-statistics have been computed using coefficient standard errors corrected for heteroscedasticity.

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