
FRBSF WEEKLY LETTER

Number 94-06, February 11, 1994

Stock Prices and Bank Lending Behavior in Japan

Bank lending has been unusually sluggish in Japan since its economy entered the latest economic downswing. Loan growth averaged only 3.6 percent annually between February 1991 and May 1993. In contrast, in the three previous recessions Japan experienced since 1977, loan growth averaged nearly 11 percent. A similar slowdown is apparent in real loan growth.

While the reasons for the recent sluggish credit growth in Japan are not yet fully understood, the timing is suggestive: the credit slowdown followed a steep decline in the Nikkei stock price index, which fell to half of its 1989 peak. Stock market performance may affect bank credit in Japan in part because Japanese banks, unlike U.S. banks, hold equity. This *Weekly Letter* discusses a recent study (Kim and Moreno 1994) that examines regulatory developments that are likely to have strengthened the relationship between stock prices and bank lending in Japan. The study also finds that stock price movements have accounted for a large proportion of the fluctuations in bank lending in Japan in recent years.

How stock prices may affect bank lending

Changes in stock prices may influence bank lending in two ways. First, stock price fluctuations may affect loan demand by signaling changes in economic activity. For example, the decline in stock prices in Japan after 1989 may reflect contractionary influences that lowered loan demand, such as the decline in corporate capital spending triggered by the slump in final demand, poor corporate earnings, and excess capacity. Loan demand in the recent downturn may have been further weakened by the need to roll over large amounts of equity-linked bonds that Japanese firms issued in the late 1980s and by sharp declines in land prices.

Second, stock price fluctuations may affect loan supply by affecting the capital position of banks.

Although the book value of capital is unaffected by stock price fluctuations, the market value of bank equity, which is affected by stock price fluctuations, can play a significant role in bank lending. For example, a bank with substantial unrealized (off-balance sheet) capital gains will be able to write off larger amounts of loan losses by realizing the gains. Such off-balance sheet effects on lending may be particularly important in Japan because banks hold significant amounts of corporate shares. (In 1991, financial institutions held close to 45 percent of corporate shares, of which about half is estimated to have been held by banks.) These shareholdings can be thought of as a form of capital, as they can provide a buffer against insolvency in case of loan default. For any given book capital position, banks with more unrealized capital gains, or "hidden reserves," may lend more freely. Conversely, a significant decline in stock prices would make banks more reluctant to lend. Other things equal, we would expect a positive relationship between stock prices and bank lending when banks hold corporate shares.

The effects of regulation

Financial regulators can affect the extent to which stock prices affect bank lending. Until the early to mid-1980s, the regulatory environment dampened any relationship between stock prices and lending in Japan. Up to that time bank credit was heavily influenced by Bank of Japan (BOJ) credit guidelines (or "window guidance"), which limited banks' ability to adjust lending in response to market conditions or their capital positions. Moreover, banks had little incentive to pay attention to their capital positions. One reason is that the government tended to cushion banks from adverse shocks related to government sanctioned credit. Another reason is that Japanese banks were not subject to explicit capital adequacy requirements until the 1980s. Under these conditions, stock prices would be expected to have little influence on bank lending.

PACIFIC BASIN NOTES

Pacific Basin Notes appears on an occasional basis. It is prepared under the auspices of the Center for Pacific Basin Monetary and Economic Studies within the FRBSF's Economic Research Department.

FRBSF

These conditions changed in the 1980s. First, the BOJ deemphasized credit guidelines and gave Japanese banks more leeway in making loan decisions. Second, Japanese banks that were expanding their international operations were pressed to strengthen their capital positions, partly to improve their competitive stance vis-à-vis banks in the U.S., which had adopted more stringent capital guidelines, and partly in response to mounting concern among many nations to harmonize capital adequacy requirements. This concern led to the Basle Accord, which set risk-adjusted capital standards and which Japan and other industrial countries adopted formally in July 1988.

To satisfy the Basle Accord, banks had to achieve risk-adjusted capital-to-asset ratios of 8 percent, in two tiers, by 1993. Up to 45 percent of unrealized gains on equity holding could count as Tier II capital. In anticipation of these rules, it is possible that in the second half of the 1980s, rapidly rising stock prices fueled lending to a greater extent than if banks could not hold corporate shares. The subsequent decline in stock prices may have put the capital of some Japanese banks near the regulatory floor, thus constraining their loan supply. One indicator that this effect may have been important is the strong contraction in hidden reserves (reflecting unrealized capital gains) of city, long-term credit and trust banks, from a combined total of ¥55.4 trillion in March 1989 to ¥14.6 trillion in September 1992.

Empirical evidence

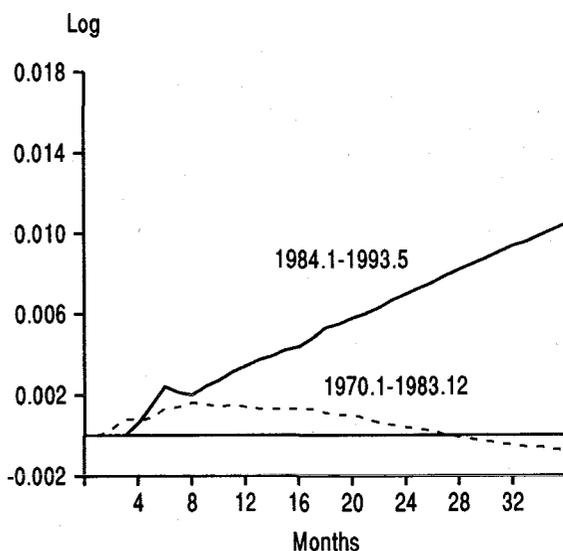
The preceding discussion poses a number of questions for empirical analysis. First, does Japanese bank lending increase in response to an increase in stock prices? Second, did the effect of stock prices on bank lending increase in the 1980s, following the change in the regulatory environment? Third, have fluctuations in the Nikkei contributed to recent fluctuations in bank loan behavior?

To address these questions, we estimated a small vector autoregression (VAR) model of the Japanese economy consisting of the Nikkei stock average, bank loans, industrial production, consumer price index, and the call money rate over two subsamples, 1970.1–1983.12 and 1984.1–1993.5. The last three variables are included to control for macroeconomic cyclical factors other than stock prices that might affect bank lending. The sample was split to see how changes in Japan's regulatory environment (specifically, the

growing emphasis on capital adequacy) may have affected the relationship between stock prices and bank lending.

Figure 1 illustrates that, as expected, bank lending in Japan rose in response to increases in stock prices. However, the magnitude of the response of loans to changes in the Nikkei is much smaller in the first period than in the second period, suggesting that the effect of stock prices on bank lending only became significant starting in the mid-1980s, after the regulatory regime had changed.

Figure 1
Responses of Lending to Changes in the Stock Index



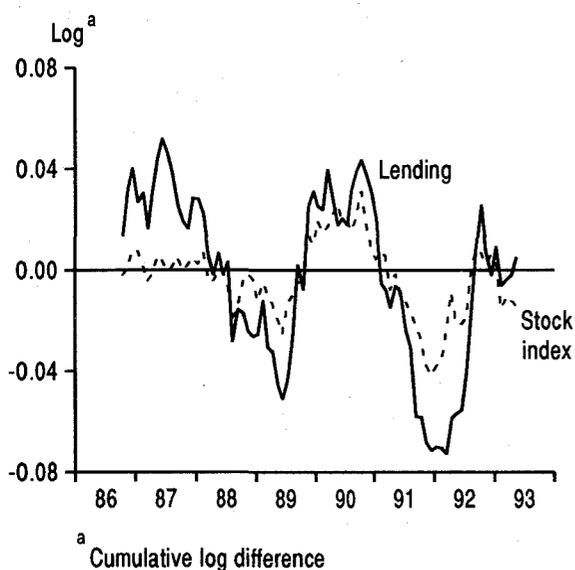
An increase in the impact of stock prices on bank lending is also suggested by two tests of predictive ability. First, the equation for bank lending in the VAR model suggests that stock prices were a poor predictor of bank lending in the first sample and a significant predictor (at the 1 percent level) in the second sample. Second, a decomposition of the variance of the forecast error of lending at various forecast horizons indicates that at a two-year horizon, changes in the stock index account for about 1 percent of the variance of the forecast error of lending in the first sample period and 28 percent in the second sample.

To assess the Nikkei stock index's contribution to recent fluctuations in bank lending, we compute

the forecast error in lending at a two year horizon, and estimate the contribution of changes in each of the variables of the model to this forecast error. A large forecast error means that lending was unexpectedly large or small, given the information available at the time the forecast was being made.

As illustrated in Figure 2, positive forecast errors in lending (reflecting unusually robust lending) occurred up to late 1987 and in 1990, and negative forecast errors (indicating unusually weak lending) occurred in 1988–89 and 1991–92. As illustrated in the Figure, changes in the Nikkei

Figure 2
Contribution of Stock Index Changes to Changes in Lending



have accounted for a large proportion of these errors since 1987, and in particular, they help explain the recent episode of sluggish growth in lending in Japan.

Conclusion

Stock market fluctuations appear to have contributed significantly to fluctuations in bank lending in Japan in recent years. While the techniques discussed in this *Letter* do not directly isolate the effects of stock prices on loan demand and supply, stock prices appear to exert an influence on Japanese bank lending after a significant change in the regulatory regime in the 1980s that placed greater emphasis on the capital position of banks. This suggests that the effect of changes in stock prices on Japanese bank lending at least partly reflects the impact on loan supply. Specifically, the unexpectedly steep decline in stock prices appears to have made this new regulatory constraint binding, or at least of concern, for Japanese banks during the current economic downturn. However, because of the wide variety of contractionary influences affecting the Japanese economy, we cannot entirely rule out sluggish demand as an important contributor to the recent marked decline in Japanese loan growth.

Sun Bae Kim
Economist

Ramon Moreno
Economist

Reference

Kim, Sun Bae, and Ramon Moreno. 1994. "Stock Prices and Bank Lending Behavior in Japan." Federal Reserve Bank of San Francisco *Economic Review* (forthcoming).

P.O. Box 7702
San Francisco, CA 94120

Research Department
Federal Reserve
Bank of
San Francisco

Index to Recent Issues of *FRBSF Weekly Letter*

DATE	NUMBER	TITLE	AUTHOR
8/8	93-27	Whither California?	Sherwood-Call
8/20	93-28	Economic Impacts of Military Base Closings and Realignments	Sherwood-Call
9/3	93-29	Bank Lending and the Transmission of Monetary Policy	Trehan
9/10	93-30	Summer Special Edition: Touring the West	Cromwell
9/17	93-31	The Federal Budget Deficit, Saving and Investment, and Growth	Throop
9/24	93-32	Adequate's not Good Enough	Furlong
10/1	93-33	Have Recessions Become Shorter?	Huh
10/8	93-34	California's Neighbors	Cromwell
10/15	93-35	Inflation, Interest Rates and Seasonality	Biehl/Judd
10/22	93-36	Difficult Times for Japanese Agencies and Branches	Zimmerman
10/29	93-37	Regional Comparative Advantage	Schmidt
11/5	93-38	Real Interest Rates	Trehan
11/12	93-39	A Pacific Economic Bloc: Is There Such an Animal?	Frankel/Wei
11/19	93-40	NAFTA and the Western Economy	Schmidt/Sherwood-Call
11/26	93-41	Are World Incomes Converging?	Moreno
12/3	93-42	Monetary Policy and Long-Term Real Interest Rates	Cogley
12/17	93-43	Banks and Mutual Funds	Laderman
12/31	93-44	Inflation and Growth	Motley
1/7	94-01	Market Risk and Bank Capital: Part 1	Levonian
1/14	94-02	Market Risk and Bank Capital: Part 2	Levonian
1/21	94-03	The Real Effects of Exchange Rates	Throop
1/28	94-04	Banking Market Structure in the West	Laderman
2/4	94-05	Is There a Cost to Having an Independent Central Bank?	Walsh

The *FRBSF Weekly Letter* appears on an abbreviated schedule in June, July, August, and December.