

# **Japan's Monetary Policy Transition, 1955-2004**

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PRELIMINARY. Comments and suggestions are encouraged.

## Japan's Monetary Policy Transition, 1955-2004

**Abstract:** This paper surveys the postwar evolution of Bank of Japan (BOJ) monetary policy. Using both qualitative and quantitative data, we describe the changes in the money supply process in response to changing institutional constraints. We focus on the transition from quantitative to qualitative control mechanisms, illuminating, in particular, the important role of the BOJ's lending guidance ("window guidance") in the early periods and financial liberalization in subsequent periods. Monetary policy reaction functions are estimated and used to identify major changes in policy instruments, targets, and indicators. We analyze the historical behavior of the money multipliers and their components, highlighting reasons for their current depressed state. We conclude with comments on current challenges facing the monetary authorities.  
JEL: E52, E51, E58, E42

### I. Introduction

Monetary systems and policies receive little attention when economies are performing well. Until recently, there was not much interest in Japanese monetary policy. Through most of the postwar period, Japanese economic performance was strong. Low inflation with high and relatively steady output growth won the Bank of Japan (BOJ) plaudits from all quarters. Keynesians praised the Bank for following Keynesian policies while Milton Friedman characterized BOJ policymakers as "closet monetarists." Not many economists outside of Japan were very interested in the actual workings of Japanese monetary policy. Most economists simply assumed—and a few even set out to prove—that Japan's monetary system was built on a strong institutional platform. For most, it was enough to know that BOJ policy worked. If we had bothered to look deeper, perhaps we would have wondered how it could have worked so well.

Since the bursting of the "economic bubble" in 1990, contemporary monetary policy has come under intense scrutiny. The BOJ, more than any other institution, is held responsible for Japan's current economic stagnation. There is irony here, since it is only recently that the BOJ has acquired the independence and instruments to conduct a modern monetary policy.

Japan's monetary policy has undergone a profound transition over the postwar period in response to structural changes in the institutional environment. It is insufficiently appreciated that the period of Japan's "miracle economy" (ca. 1955-71) was a period of tightly controlled financial markets. During this "high growth period," a limited menu of financial products was permitted to be sold at administratively determined interest rates and in highly segmented markets (Suzuki, 1980, 1987). The "bubble economy" (ca. 1985-90) overlapped a period of extensive financial liberalization. Current monetary difficulties follow in the wake of the "big bang" reforms that commenced in 1996. As part of these reforms, the new Bank of Japan Law, that took effect in April 1998, gave the Bank considerable independence from the Ministry of Finance (MOF) and other organs of the government. Although this provocative history is fascinating in its own right, the motivation for this paper is the belief that Japan's current economic difficulties can best be understood in light of it.

From the point of view of monetary policy, Japan's post-occupation economy can be usefully divided into three policy regimes. The first period, which we refer to as the "quantitative control period," runs roughly from 1955 up to the breakdown of the Bretton Woods system of fixed exchange rates in early 1971. This was a period of comprehensive economic controls and bureaucratic guidance of markets. The bureaucratic control regime was shook to its foundations in the turbulent years of the early 1970s. The collapse of the fixed exchange rate system, Nixon's surprise opening to China, and the two oil shocks (1973-74 and 1979-80) ushered in a new era of globalization pressures. More shocks, both internal and external, followed. The next twenty years witnessed a slow but deliberate liberalization of the Japanese economy and financial system. The "financial liberalization period" (ca. 1971-90) brought about

a substantial relaxation or elimination of many legal and administrative constraints on the financial sector. Economic growth remained strong and Japan was increasingly viewed as the leader in the emerging “Pacific Century.” The great asset inflation of the “bubble economy” era (ca. 1985-90) was initially viewed as a natural consequence of Japan’s economic prowess. Towards the end of the period, however, concerns that ordinary Japanese were being priced out of the housing market led to increasing pressure on the BOJ to take corrective action. The “post-bubble stagnation period” (ca. 1990-present) begins with the pricking of the asset bubble by the BOJ in the third quarter of 1991 and continues to the present. One of the distinctive features of this period is the adoption by the BOJ of policy tools and practices broadly patterned after those of the U.S. Federal Reserve System.

For convenience, we use the traditional instruments-targets approach in describing Japan’s monetary policy transition. Caution is required, however, in the interpretation of policies under this framework. Until recently, Japanese policy instruments and implementation procedures deviated substantially from those under the Anglo-American model. During most of the postwar period, key policy instruments and non-final targets were under the direct guidance of monetary policymakers. Final targets, however, were similar to those of other OECD countries. The final targets of the BOJ have consistently been three: economic growth, price stability, and balance of payments stability. Short-term emphasis has shifted between the three targets depending on current economic and political conditions. Over the long-term, price stability has been the dominant policy concern. Memories of the nearly disastrous hyperinflation of the early postwar period still hold sway over the BOJ.

In what follows, we provide a succinct summary of Japan’s monetary policy

transition over the postwar period. It is a panoramic view from several observation points. We ignore many details and nuances in order to focus on what we believe are the broad contours of policy. We emphasize the institutional constraints underlying these policy choices. Our descriptive analysis is based on BOJ policy statements, newspaper articles, and our reading of the relevant economic literature. Our empirical work uses quarterly data. The appendix provides definitions and sources for the data.

## II. Quantitative Control Period (ca. 1955-1970)

The early postwar, post-occupation period was one of rapid economic growth. Over the period 1955-70, the real GNP growth rate averaged 9.7 percent. An often overlooked aspect of this “miracle economy” is the highly controlled nature of the supporting financial system. The domestic financial markets were segregated from the global markets by capital controls. Banks and other financial firms operated in highly segmented domestic markets. Virtually all interest rates were administratively controlled. The development of securities markets was suppressed. Banks provided over 90 percent of the funds for industrial and commercial expansion. As a consequence, there was a near one-to-one correspondence between investment spending and loan growth. Money growth was also highly correlated with loan growth. MOF, through money market dealers (*tanshi gaisha*), administered the call lending rate in the interbank market. Interest rates in the short-term money markets were *never* permitted to fall below the BOJ’s discount rate. The discount rate was a tool for adjusting the profit margin of banks. With BOJ loans rationed, the discount rate was *not* an important policy instrument. With interest rate spreads pre-determined, the incentive for banks was to maximize size rather than return on assets. The MOF provided an implicit guarantee that no bank would be allowed to fail and no bank did.

Companies were tied to banks through the main bank system. Borrowers were tied to lenders through “relational banking” rather than market-based contractual relationships. Calder (1993) fittingly described the Japan of this period as a “bankers’ kingdom.”

Although BOJ policy makers faced a set of complex institutional constraints, the monetary policy that emerged was relatively simple (figure 1). With overall economic policy focused on high-speed growth, the BOJ’s task was to support rapid investment while containing inflation. Bank loans were the logical intermediate target. Since indirect control of lending and investment was not possible under the interest rate control regime enforced by the MOF, the BOJ relied on quantitative control measures. BOJ loans provided the main source of funds for bank loans. With the discount rate fixed below the interbank and open market lending rates, the demand for BOJ loans was highly elastic. BOJ credit was rationed to prevent “excessive competition” from generating explosive inflation.

Bank loans were also directly controlled through a policy known as “window guidance.” The window in question was *not* the discount window at the central bank. Rather, it was the lending window at major banks. The BOJ provided periodic guidance to banks in the form of quarterly loan growth targets. Although this policy is often described as “moral suasion,” it is more appropriately considered an application of administrative guidance (*gyōsei shido*). Rhodes and Yoshino (1999) found a near perfect compliance with BOJ lending guidance. Figure 2 shows that city bank loans during this period stayed within one percent of the BOJ growth target (with the exception of 1964:4). Banks had good reasons to “voluntarily” comply with window guidance. BOJ controlled access to the discount window and MOF approval was

needed for new bank branches. BOJ loans and bank branches were crucial to increasing size and profitability. Bigger size led to larger window guidance allocations. Increased size conferred prestige and led to greater access to political markets.

Window guidance was generally used in cooperation with other policy instruments. Figure 3 indicates that window guidance and call rate changes tended to be mutually supporting (the discount rate moved in sync with the call rate). During periods of monetary tightening, the call rate was raised and the BOJ lowered its WG target. This complementary employment of window guidance is the reason it is often described as a “supplementary tool” of monetary policy (Suzuki, 1987; Yasuda, 1981). In our view, it is more accurately described as a “primary tool” during this period. Window guidance was crucial in preventing excessive lending and money growth.

In retrospect, the success of monetary policy during this period owed a lot to favorable banking conditions. High economic growth and captive borrowers made it easy to find good bank customers. With most lending collateralized by land, steadily rising land prices made lending appear virtually risk free. The quantitative control policy “worked” as long as banking markets were protected and high growth persisted. Such specialized conditions could not endure, but few people realized it at the time.

Table 1 shows the results of estimated reaction functions using quarterly data. Explanatory variables were lagged four quarters. Lagged dependent variables were added to allow for partial adjustment of instruments to targets. In column one, the logarithm of BOJ loans ( $L_{boj}$ ) was used as the dependent variable. The results support the view that the BOJ was targeting all bank loans ( $L$ ). As expected, the BOJ reduced lending when bank loans expanded beyond the target level (assumed to be constant). It also reduced lending when its long-run targets, real GDP ( $Y$ ) and the GDP deflator ( $P_g$ ),

increased beyond desired levels. The current account share of GDP (CASHARE), another long-run target, entered with a positive sign, but was insignificant by normal standards. The log of broad money (M2 + CDs) was positive and highly significant. As long as bank loans and nominal GDP stayed within target ranges, the BOJ was willing to accommodate money expansion.

The dependent variable in column two is window guidance (WG) to city banks. Although WG was in effect over the entire period, our WG data begins in 1964:1. Regression results are for periods of active guidance only. As expected, bank loan growth entered with a negative and significant sign. The BOJ imposed lending restrictions whenever aggregate bank loans exceeded target levels. Only one other potential target/indicator entered with a significant sign. The regression results suggest that the BOJ increased the growth targets for bank loans when the rate of change of land prices was positive. Clearly, the BOJ was not trying to control land prices during this period. Since land provided collateral for bank loans, the BOJ may have been willing to extend more credit when the collateral values of banks' loans were increasing.

### III. Liberalization Period (ca. 1971-89)

The four main pillars of the financial control system were capital controls, interest rate controls, product restrictions, and market segmentation. From the early 1970s onward, these pillars were slowly and steadily eroded. The breakdown of the Bretton Woods system began the process of financial liberalization as exchange rate movements became subject to the whims of the market and foreign politics. This first "Nixon shock" provided U.S. policy makers a lever to pry open Japan's financial markets. Other global pressures included the growth of world trade, the computer and information technology revolution, the Euromarket phenomenon, and the collapse of



the Communist system. Japan's ballooning current account surplus led to increasing international frictions and helped to drive the liberalization process. The main domestic catalyst for liberalization was the large budget deficits of the 1970s. These deficits resulted when the 1970s growth slowdown failed to provide enough tax revenues to support Prime Minister Tanaka's ambitious public spending program. The deficits were greatly exacerbated by the two oil shocks. The large deficits were more than the controlled interest rate regime could bear. The control regime, which relied upon the willingness of banks to absorb government debt at below market rates, could not be sustained once the level of debt pushed banks beyond their thresholds of pain.

To foreigner market participants, the gradual liberalization process was akin to Chinese water torture. Japanese bureaucrats and politicians argued that the slow pace was necessary to avoid costly economic disruptions. Confusing matters was the fact that liberalization measures were often said to be "in principle" or subject to "customary practices." Even when fully opened, it didn't take market participants long to learn that the door was still firmly attached to its hinges. In 1979, for example, legislation authorizing the liberalization of capital flows was passed by the Diet. The fight over implementation continued until 1984 with the signing of the Yen-Dollar Accord. The liberalization of deposit rates can be traced to the introduction of large denomination CDs in May 1979. The last phase of deposit rate liberalization was said to have been completed in 1994, but the BOJ continues to issue "voluntary" guidelines as to the maximum allowable deposit rates. Over this period many new financial products were introduced and market segmenting barriers were substantially lowered. The relaxation of bank branching and ATM restrictions reduced the MOF's leverage in matters of informal guidance. Increased competition in the financial sector gradually

weakened the effectiveness of window guidance which was formally ended in 1990.

Integrating backwards over all the liberalization measures, one cannot help but be impressed at the extent of financial control during the earlier high growth era.

Japan's real economic growth rate averaged a respectable 4.2 percent during this period. The rapid growth obscured fundamental problems in the financial sector. Liberalization of capital markets brought intense competition to the banking sector. As major corporations began to rely increasingly on capital markets for funding, banks had to look elsewhere for new customers and markets. Banks continued to compete aggressively to maximize loan size. Compensation of branch managers was based on their loan growth performance relative to competitors. Banks created lending companies (Jusen) in an effort to avoid remaining interest rate controls and window guidance. An increasing share of loans went to finance real estate, construction, and equity transactions. Using the logic of the "real bills doctrine," bank management felt they were making prudent investments. Their loans were collateralized with assets that were rising rapidly in value. By the end of the period, Japan dominated the ranks of the world's largest banks. Few economists foresaw the crisis in the making.

Although a schematic diagram of monetary policy during the liberalization period (figure 4) suggests little change, policy implementation became increasingly complicated as liberalization progressed. The strong linkage between bank lending and the economy that characterized the earlier period was substantially weakened. With the liberalization of capital markets, central bank control over bank lending no longer guaranteed control of investment spending and the money supply. As corporations increasingly diversified their sources of funds, banks began to aggressively compete for loans in unfamiliar markets. The BOJ continued to target bank loans, but it began to

look at other policy indicators as well. The money supply (M2 + CDs) became an important auxiliary indicator. With interest rate liberalization and a weakening of the bank loan channel, the call rate became an important instrument of monetary policy. Window guidance was actively used, but its effectiveness in controlling aggregate lending and money growth probably weakened toward the end of the period (Rhodes and Yoshino, 1999). With the spread between the call rate and the discount rate remaining positive throughout the entire period, the BOJ continued to ration credit.

Rising trade frictions over the period led to increasing pressure on Japan to reduce its huge current account surplus. Since domestic politics prevented liberalization of key sectors such as agriculture, construction, and finance, there were calls for Japan to increase imports by expansion of aggregate demand. With MOF ruling out fiscal policy due to the large budget deficits, monetary policy was the default option. Monetary expansion, however, conflicted with the Reagan Administration's goal of yen appreciation. Following the Plaza Accord of September 1985, the yen began a rapid appreciation. The Louvre Agreement in February 1987 sought to check the rise in the yen. Expansionary money growth from 1986 to 1990 fueled a dramatic rise in asset prices. The "bubble economy" was the result of a complex interaction of domestic politics, foreign pressure, and banking behavior.

Table 2 reports the results of regressions for the liberalization period. Reaction functions were estimated for the (inverse) call rate ( $R_c$ ) and window guidance (WG). In the case of the call rate regressions, we discovered some significant differences between the early and late liberalization periods. Column one provides estimates for the early period. The log of the monetary base (MB) entered the regression with a positive sign. Other things the same, an increase in the monetary base was associated

with a contemporaneous decline in the call rate. As expected, the BOJ responded to inflation, by raising the call rate one quarter later. Increases in equity prices ( $P_s$ ) were also associated with subsequent increases in the call rate. The positive but insignificant sign on the yen-dollar exchange rate (Yendol) does not offer evidence of exchange rate targeting.

Column two gives regression results for the later phase of the liberalization period. This was a time of trade frictions and the bubble economy. In this period, the sign on the money base coefficient is reversed. An increase in the monetary base is associated with a contemporaneous rise in the call rate. This positive correlation may indicate that the BOJ was attempting to offset changes in the demand for base money. Inflation enters with a highly significant sign. The rate of change of land prices is marginally significant. The positive sign on the coefficient suggests that the BOJ did not attempt to thwart the emerging land price bubble. There is evidence that the BOJ was concerned about the exchange rate (Yendol) in this period of trade frictions. The BOJ responded to yen appreciation by lowering the call rate.

Column three reports regression results using city bank window guidance (WG) as the dependent variable. The results for WG are qualitatively the same as for the earlier period of quantitative controls. The BOJ appears to have used WG to control the growth of bank loans (L). The bank tightened WG whenever bank loan growth rose above desired levels. The rate of change of land prices was also highly significant. Once again, the correlation between land appreciation and the BOJ's lending growth target was positive. Clearly, the BOJ was not attempting to offset the growth of land prices during the bubble period. It tolerated, in fact, substantial increases in lending growth during this period.

#### IV. Post-Bubble Stagnation Period (1990-Present)

During the six years of the “bubble economy” (1985-90) real GDP grew at an average annual pace of 4.9 percent. What came to define the period, however, was the rapid run-up of asset values (real estate, stocks, and collectables). Land prices in Japan’s six major cities grew at a compound annual rate of 20.5 percent. With the younger generation complaining bitterly about being priced out of the housing market, the BOJ came under tremendous pressure to do something about the “bubble.” In May 1989 the BOJ took action by raising the discount rate from 2.5 to 3.25 percent. With the public and politicians clamoring for further action, the BOJ raised the rate four more times until it reached a plateau of 6 percent in August 1990. The growth of money (M2+CDs) went from 11.7 percent in 1991 to 0.6 percent in 1992. The bubble had been pricked: prices of land and equities collapsed. Although the BOJ reversed its policy course in July 1991, land prices have continued to decline up to the present time. At the end of 2002, the urban land price index was back to its 1983 level. Stock prices had fallen to a 20 year low. The bubble has turned into a black hole.

No one was surprised when the Japanese economy decelerated from 5.6 percent growth in 1990 to 2.4 percent in 1991. Concern was expressed when the annual growth continued at less than one percent through 1994. When the economy registered back to back growth rates of 3.1 and 3.3 percent in 1995 and 1996, it appeared that the corner had been turned. In 1997, the year of the Asian financial crisis and several major Japanese bank failures, the economy fell back to near zero growth. It has been stagnating ever since. From 1991 through 2002, the average annual rate of GDP growth was only 1.2 percent. With the government debt now exceeding 140 percent of GDP, there is little support for further fiscal expansion. Professional and public

attention has turned to monetary policy.

By traditional measures, monetary policy has been expansionary throughout the long stagnation. In July 1991 the discount rate was lowered from 6 to 5.5 percent. Since that time, it has been lowered fifteen times until it achieved an unprecedented low of 0.10 percent in September 2001. The call rate has fallen from 5.6 percent in 1991 to its current value of 0.002 percent. Since February 1999 the BOJ has followed a zero interest rate policy (ZIRP). With its preferred operating target reaching a floor, the BOJ has turned its attention to the monetary base. The money base grew an average 7.8 percent in nominal terms over the period 1996 through 2001. The lowest annual rate of growth during that period was a healthy 7.3 percent in 1999. Since March 2001, the BOJ has adopted a “quantitative easing policy.” In 2002, the average of the monthly year-on-year growth rate was a record high of 27.6 percent. The average for the first five months of 2003 has been 13 percent.

While the growth of narrow money (M1) has responded to the rapid growth in the monetary base, broader measures of money (M2 + CDs, M3 + CDs, and Liquidity) have barely grown at all. Over the period 1996-2002, M1 growth averaged 12 percent. Over this same period, however, the growth rate of M2+CDs averaged only 3 percent. A look inside the multipliers is revealing. Since 1996, the multipliers for broad money (m2cd and m3cd) have been nearly cut in half (figure 5). Figure 6 reveals two important reasons for this development. Bank reserves held at the central bank have risen sharply relative to ordinary deposits (“deposit money”). There has also been a dramatic portfolio shift from less liquid deposits (“quasi money” and CDs) to ordinary deposit money. With interest rates on all assets near zero, there is little reason to hold less liquid deposits.

In spite such unprecedented monetary stimulus, the real Japanese economy continued to languish and deflation appeared on the scene. Over the period 1994-2002, the GDP deflator fell in 8 out of the last 9 years and declined at an average annual rate of 0.94 percent. Since 1995, the CPI has fallen 5 of the last 8 years and declined at an average annual rate of 0.5 percent. Is this modest deflation a sign of the *Götterdämmerung*? Many proclaim it so. Does it reflect a failure of BOJ policy? That is not so easy to establish.

By the midpoint of this period, Japan had acquired all of the tools necessary to conduct a modern monetary policy. A schematic depiction of the BOJ's instruments and targets (figure 7) looks very similar to that of the Federal Reserve. The one exception, perhaps, is the long laundry list of intermediate indicators. The list reflects, no doubt, the political pressures accumulating from the lengthy stagnation. During this period, the BOJ dropped its last ties to the old quantitative control system. Window guidance was discontinued after the third quarter of 1990. On March 31, 1995 the discount rate rose above the call rate for the first time. It has remained there for most of the subsequent period. The call rate, until its dramatic decline, took center stage as a true operating instrument. The BOJ influences the call rate through buying and selling operations in the interbank markets. Open market operations (OMO) have emerged as the primary tool of monetary policy. Figure 8 shows the "quantitative easing policy." With the call rate at zero, base money has now taken a position as the *de facto* operating target.

Table 3 provides estimates of a reaction function for the post-bubble period. The dependent variable is the (inverse) call rate. Inflation is the only variable that enters the regression with a significant coefficient. In the first decade of the period, the

call rate and lagged inflation were positively correlated. The BOJ progressively lowered the call rate as deflation progressed. The call rate lost all effectiveness as a policy instrument after 1999:1.

Table 4 reports regression results using money multipliers as dependent variables. The regressions include a dummy variable for the first oil shock. The estimated results are qualitatively the same for M1 and M2+CDs. The multipliers are negatively correlated with the rate of change of the call rate and positively correlated with the rate of change of land prices and the log of GDP. These results are expected. A fall in the call rate increases bank reserves and, *ceteris paribus*, lowers the base multiplier. An expanding economy (increase in GDP) will encourage bank lending. Increased lending will also be encouraged by higher land prices since land serves as collateral for most loans. The decline in all three variables during the past decade is behind the fall in the money multipliers.

## V. Conclusion

The BOJ now possesses the tools it requires to conduct a modern, market-based monetary policy. Why is it, then, that monetary policy is commonly asserted to be “broken”? Many of the tools are new. Could it be that they were designed for a more advanced financial structure? For the market-based tools to be effective, markets and market mechanisms must be well functioning. Japan’s banking system, which performed adequately under earlier guided-market regimes, has found the transition to a market-based system difficult to manage. Compounding matters, the banking system is burdened with large amounts of non-performing loans. Although bank lending rates are now free “in principle,” they cannot be said to be market rates. Few transactions are occurring at posted lending rates. In spite unprecedented easing by the BOJ, bank loans



have fallen for 65 consecutive quarters. Cowboys and Keynesians know that a horse led to water may not drink. If it has not taken a drink after eleven years, should we shoot the cowboy or the horse?

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## ABBREVIATIONS:

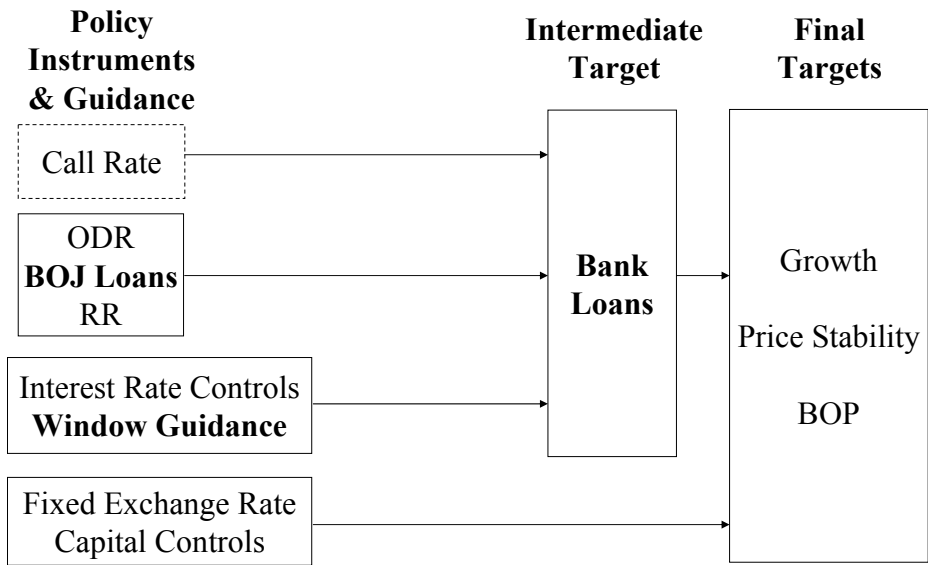
BOJ: Bank of Japan  
CAB: Bank Reserves (Current Account Balances at BOJ)  
CASHARE: Current Account Share of GNP  
CUR: Currency in Circulation  
DD: Demand Deposits  
DM: Deposit Money  
D.W. Durbin-Watson Statistic  
FEMO: Foreign Exchange Market Operations  
FOREX: Foreign Exchange  
GDP: Gross Domestic Product  
GNP: Gross National Product  
IMO: Interbank Market Operations  
QM: Quasi Money (Total deposits less demand deposits)  
L: All Bank Loans  
 $L_{boj}$ : BOJ Loans  
MB: Monetary Base  
M1: CUR + DM  
m1: M1/MB  
M2: M1 + QM  
M2CD: M2 + CDs  
m2cd: M2CD/MB  
OMO: Open Market Operations  
 $P_G$ : Goods Price Index  
 $P_L$ : Urban Land Price  
 $P_S$ : Stock Price Index  
RR: Required Reserve Ratio(s)  
 $R_C$ : Overnight Call Rate  
 $R_{DC}$ : Official Discount Rate (ODR)  
WG: Window Guidance to City Banks  
YENDOL: Yen-dollar Exchange Rate

## DATA:

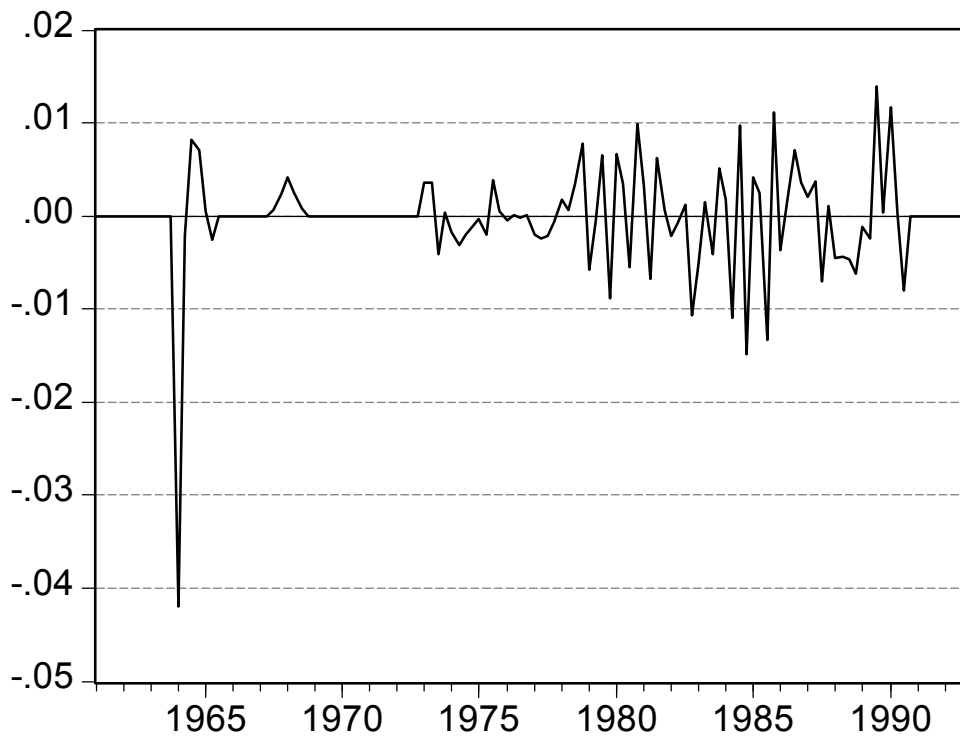
The primary source of data was NEEDS-ECONOMY, a computer database compiled by the Nihon Keizai Shimbun. Recent monetary data were obtained from the *Financial and Economics Statistics Monthly* published by the BOJ. Urban land prices were obtained from the *Japan Statistical Yearbook*. The WG data used in this study are official BOJ statistics released at periodic new conferences and reported in various issues of the *Nihon Keizai Shinbun*. Most of the data used in this study are described in detail in the appendix to Rhodes and Yoshino (1997).

FIGURE 1

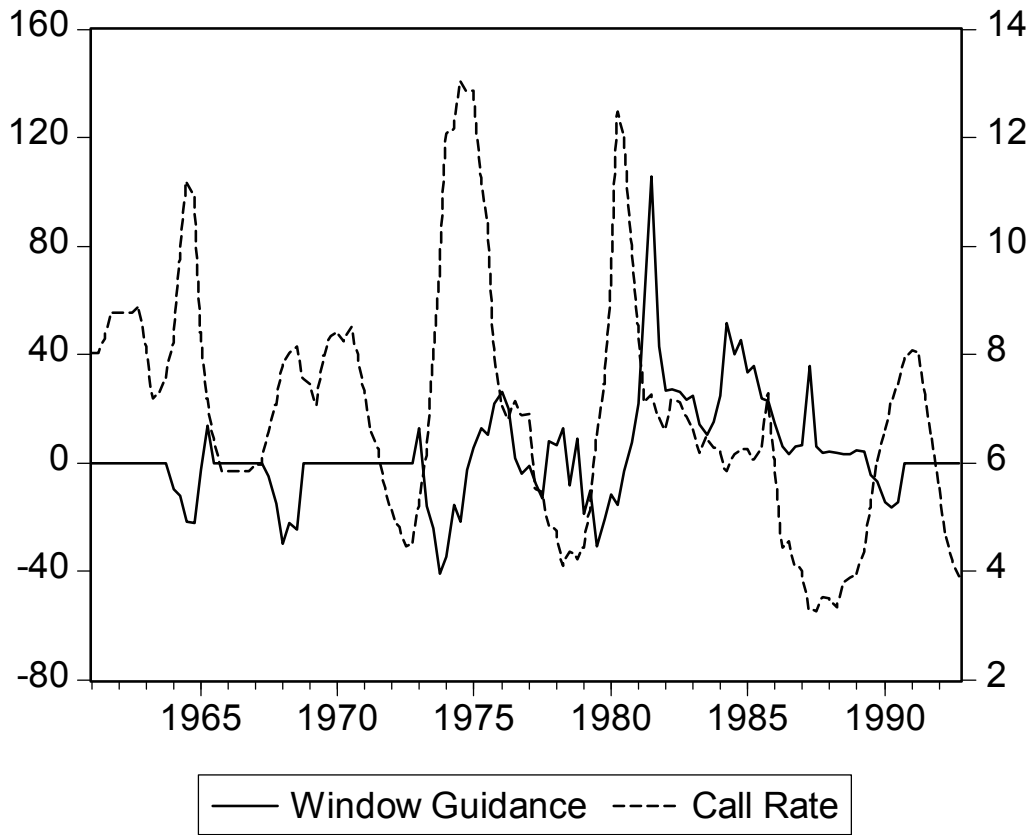
**Monetary Instruments & Targets**  
**Quantitative Control Period (ca. 1955-70)**



**FIGURE 2**  
Deviation of City Bank Loans from Window Guidance



**FIGURE 3**  
The Call Rate and City Bank Window Guidance



**TABLE 1**  
Reaction Functions (Quantitative Control Period)

Explanatory Variables	Dependent Variable	
	(1) Log(L <sub>boj</sub> )	(2) WG
Constant	4.604 (4.403)***	27.666 (1.334)
( $\Delta L/L$ ) <sub>t-4</sub>		-413.570 (-2.037)*
( $\Delta P_L/P_L$ ) <sub>t-4</sub>		419.270 (2.150)*
Log(L) <sub>t-4</sub>	-3.462 (-4.374)***	
Log(Y) <sub>t-4</sub>	-0.982 (-3.834)***	
Log(P <sub>g</sub> ) <sub>t-4</sub>		
CASHARE <sub>t-4</sub>		
Log(M2CD) <sub>t-4</sub>	3.949 (4.666)***	
WG <sub>t-1</sub>		0.646 (2.143)*
Log(L <sub>boj</sub> ) <sub>t-1</sub>	0.900 (23.552)***	
Adjusted R <sup>2</sup>	0.977	0.381
h		
F	575.577	3.050
Sample Period (Adjusted)	1956:1—1970:4	1964:1—1968:3

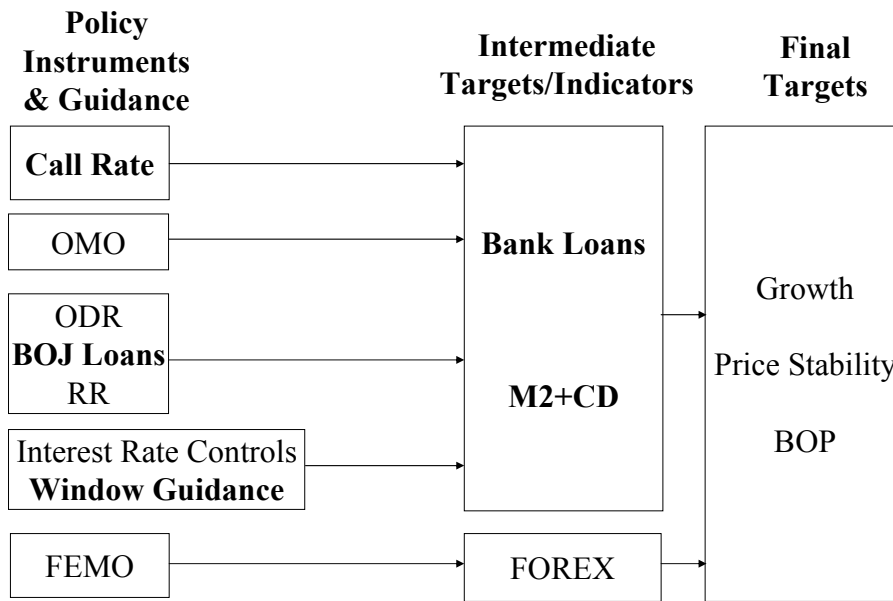
*Notes:* t-values are in parentheses. Level of significance: \*\*\*(1%), \*\*(5%) and \*(10%).

*Sources:* NEEDS-Economy and BOJ



**FIGURE 4**

**Monetary Instruments & Targets  
Liberalization Period (ca. 1971-89)**



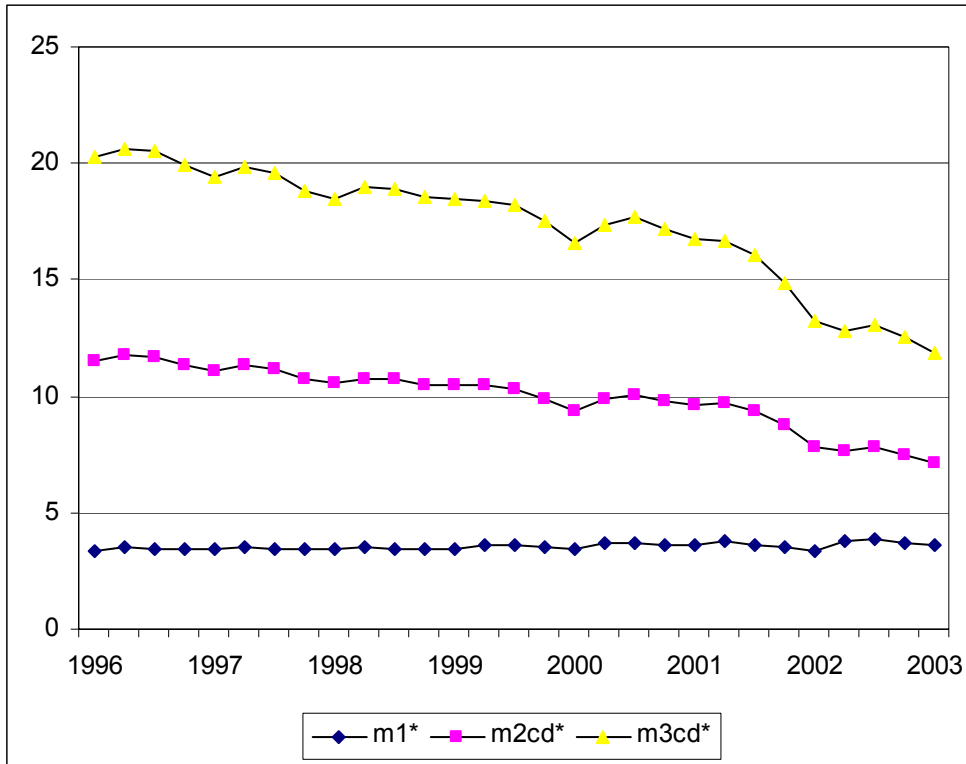
**TABLE 2**  
Reaction Functions (Liberalization Period)

Explanatory Variables	Dependent Variable		
	(1) 1/R <sub>c</sub>	(2) 1/R <sub>c</sub>	(3) WG
Constant	-0.590 (-1.422)	1.333 (3.163)**	17.234 (3.044)***
Log (MB)	0.039 (1.819)*	-0.0780 (-2.822)*	
( $\Delta L/L$ ) <sub>t-4</sub>			-148.762 (-3.207)***
( $\Delta P_g/P_g$ ) <sub>t-1</sub>	-0.008 (-1.789)*	-0.030 (-5.336)***	
( $\Delta P_s/P_s$ ) <sub>t-1</sub>	-0.002 (-1.989)*		
$\Delta P_L/P_L$		0.009 (1.590)	
( $\Delta P_L/P_L$ ) <sub>t-4</sub>			56.237 (2.174)**
(Log (Y <sub>endol</sub> )) <sub>t-1</sub>	0.036 (0.946)	-0.062 (-2.270)**	
(1/R <sub>c</sub> ) <sub>t-1</sub>	1.056 (7.766)***	0.713 (8.177)***	
WG <sub>t-1</sub>			0.675 (8.396)***
Adjusted R <sup>2</sup>	0.919	0.940	0.633
h or d			
F	80.768	122.426	44.085
Sample Period (Adjusted)	1971:1—1979:4	1980:1—1989:4	1971:1—1989:4

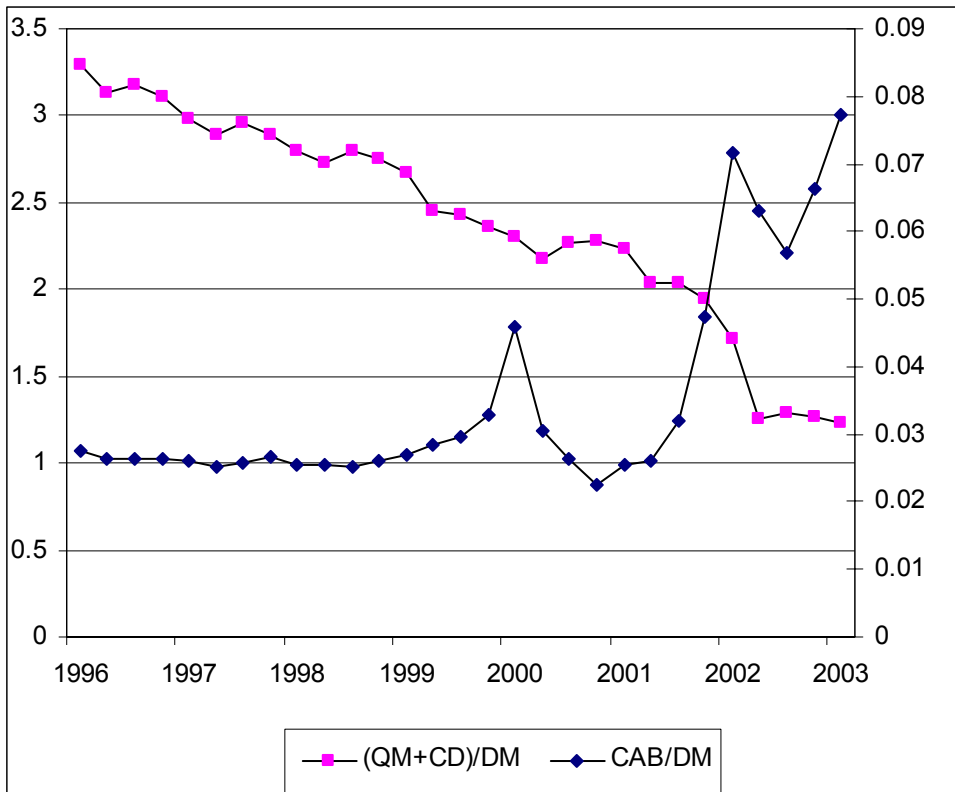
Notes: t-values are in parentheses. Level of significance: \*\*\*(1%), \*\*(5%) and \*(10%).

Sources: NEEDS-Economy and BOJ

**FIGURE 5**  
Money Multipliers

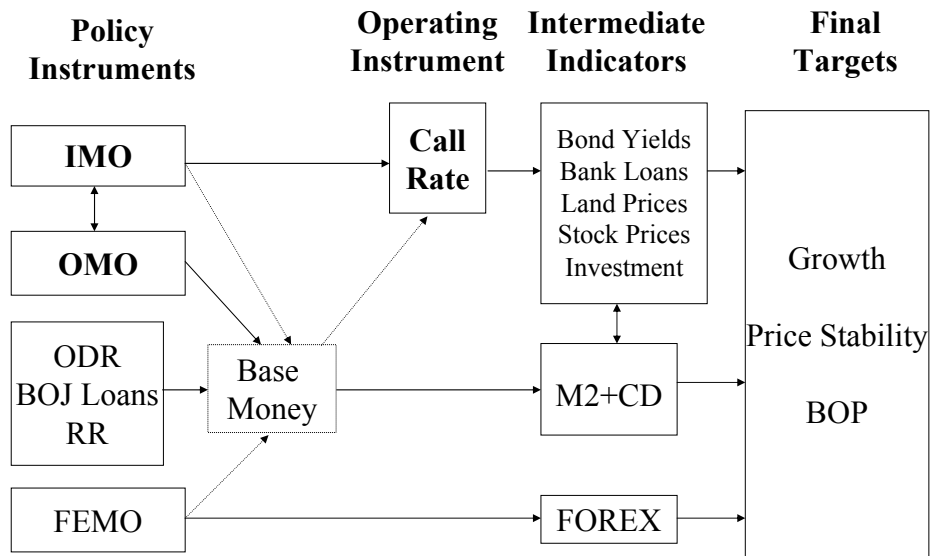


**FIGURE 6**  
Money Ratios



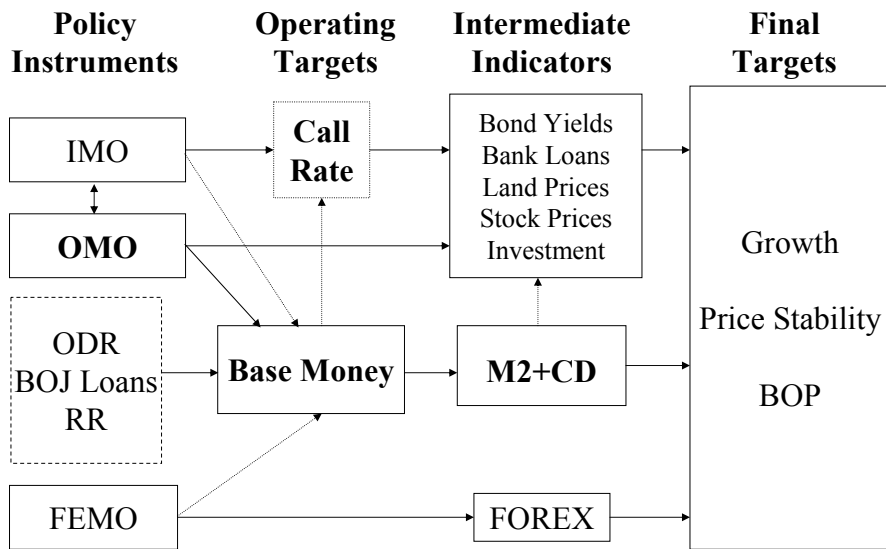
**FIGURE 7**

**Monetary Instruments & Targets  
Post-Bubble Stagnation Period (1990-2000)**



**FIGURE 8**

**Monetary Instruments & Targets**  
**Quantitative Easing Period (March 2001-Present)**



**TABLE 3**  
Reaction Function (Post-Bubble Period)

Explanatory Variables	Dependent Variable
	$1/R_c$
Constant	607.350 (0.351)
Log (MB)	-35.701 (-0.319)
$(\Delta P_g/P_g)_{t-1}$	3.811 (0.229)
$(\Delta P_g/P_g)_{t-1} * DUM(90:1-99:1)$	-107.176 (-3.684)***
$(\Delta P_s/P_s)_{t-1}$	-0.038 (-0.509)
$\Delta P_L/P_L$	
$(\text{Log (Yendol)})_{t-1}$	-17.888 (-0.138)
$(1/R_c)_{t-1}$	0.803 (9.982)***
Adjusted R <sup>2</sup>	0.869
h	
F	57.298
Sample Period	1990:1—2002:4

*Notes:* t-values are in parentheses. Level of significance: \*\*\*(1%), \*\*(5%) and \*(10%).  
*Sources:* NEEDS-Economy and BOJ

**TABLE 4**  
Money Multiplier Regressions

<b>Explanatory Variables</b>	<b>Dependent Variable</b>	
	(1) m1*	(2) m2cd*
Constant	-12.814 (-3.183)**	-13.368 (-3.413)***
DUM(1975)	0.300 (1.844)*	0.291 (1.837)*
$\Delta R_c/R_c$	-0.019 (-4.350)***	-0.019 (-4.559)***
$\Delta P_L/P_L$	6.036 (2.171)**	6.193 (2.290)**
Log (GDP)	1.327 (8.606)***	1.357 (9.048)***
Adjusted R <sup>2</sup>	0.425	0.449
d	0.407	0.338
F	23.189	25.426
Sample Period	1971:1—2001:1	1971:1—2001:1

*Notes:* t-values are in parentheses. Level of significance: \*\*\*(1%), \*\*(5%) and \*(10%).

*Sources:* NEEDS-Economy and BOJ