6

Monetary Policy in Japan Since the Late 1980s: Delayed Policy Actions and Some Explanations

TOSHIKI JINUSHI, YOSHIHIRO KUROKI, and RYUZO MIYAO

Introduction

Japan's monetary policy is now at a crossroads. The overnight call rate, the primary instrument of monetary policy in Japan, had been virtually zero for almost a year at the time of this writing (February 2000). There are increasing requests for further monetary easing, from both inside and outside the country, to prompt economic recovery. The requests often come with the proposal that the central bank should purchase some specific assets, such as government bonds, stocks, foreign currencies (implying unsterilized intervention), or even real estate. These proposals are in some cases accompanied by the policy strategy of ''managed inflation,'' in which the central bank makes an exclusive commitment to achieve some targeted inflation, or, more broadly, ''inflation targeting.''

In contemplating further policy actions, it may be worthwhile to look back at the history of Japan's monetary policy and seek to draw some lessons from the past. This essay reviews how monetary policy has func-

Toshiki Jinushi is professor in the department of economics, Kobe University. Yoshihiro Kuroki is a professor in the Department of Economics, Osaka Prefecture University. Ryuzo Miyao is an associate professor in the Research Institute for Economics and Business Administration, Kobe University. *The authors wish to thank Ryoichi Mikitani, Benjamin Friedman, Adam Posen, Olivier Blanchard, Ben Bernanke, Patricia Kuwayama, Yoshinori Shimizu, Kosuke Aoki, Kengo Inoue, Takayoshi Kitaoka, Yuzo Honda, Kazuo Ogawa, Naoyuki Yoshino, and seminar and workshop participants at Chuo University, Doshisha University, Kobe University, and Tohoku University for helpful comments and discussions. They are also grateful to Takami Kanayama for editorial assistance.*

tioned in Japan, especially since the late 1980s, and attempts to draw some implications for the current discussions about Japan's monetary policy.[1]

In the subsequent section, we first apply a Taylor-rule-type policy reaction function to Japan and document possible delays of monetary policy actions in the late 1980s and early 1990s. In the middle of the 1980s, Japan's monetary control since the late 1970s was viewed by some observers as a success in holding down and stabilizing money growth (e.g., Friedman 1985; Hamada and Hayashi 1985). We therefore treat the reaction function estimated for 1975-85 as the benchmark for a ''good'' policy rule and compute the call rate after 1985 using the policy rule before 1985. From this exercise, we detect some policy delays (i.e., the deviations of the computed call rate from the actual rate), especially the delay of monetary tightening in 1987-88 and the delay of loosening since 1992.

We then seek explanations for these delays from the following two perspectives. The first explanation is based on a narrative analysis. We attempt to identify the sources of these delays by inspecting various issues of the Bank of Japan's (BOJ) *Monthly Bulletin.* The inspection suggests that the delays in policy action may be attributed to the political pressures based on international policy coordination in 1986-87 and delays in judgment by the BOJ in the early 1990s.

The second explanation is based on a time-series analysis. Using Svensson's (1997) framework of inflation forecast targeting, we show that there may be a shift in the implied policy rule relationship in 1987. We then interpret the estimated shifts in the inflation and output coefficients as suggesting that there may be a shift in the underlying economic structure (a flatter aggregate supply/Phillips curve relationship) and a shift in the monetary policy weight toward a more strict (or rule-like) inflation targeting. The observed policy delays since the late 1980s can be attributed to shifts in the policy reaction function.

On the basis of these results, we finally make some remarks on the current policy discussions of Japanese monetary policy. The suggested shift toward stricter inflation targeting may have led to destabilization of Japan's real economy in the late 1980s and early 1990s. Too strict an inflation target is not a desirable strategy to take, as emphasized in the existing literature. The current proposal for ''managed inflation'' in Japan implies nothing but such inflation targeting as an absolute rule. More moderate inflation targeting as a ''framework'' may also lead to inflation targeting as a strict rule under the particular circumstances in Japan. This signals the need to take extra caution in the current policy discussion on this issue. It is still premature to conclude that Japan should adopt an explicit inflation target at present in such a very-low-inflation (if not deflationary) environment.

---

1. See, e.g., Miyao (1999a; 1999b) for other recent discussions.

Delayed Policy Actions Since the Late 1980s

In this section, we apply the Taylor-rule-type policy reaction function to Japanese monetary policy in order to examine its appropriateness in the period since the late 1980s. We find that the monetary-policy actions were delayed, primarily during the periods 1987-88, 1992-95, and 1997-98.[2]

A "Good" Policy Rule

We first estimate the BOJ's reaction function in the "pre-bubble" period of 1975-85. This is the period during which the Japanese economy enjoyed rather better performance than the other industrial countries. The monetary-policy rule in this period can be considered one contributing factor to the country's relative prosperity with lower inflation. If this is true, the estimated-policy rule in this period is a "good" policy rule for Japan, as long as the economic structure remains unchanged.

We basically adapt the empirical specification of Clarida, Gali, and Gertler (1998) but add an exchange rate term:[3]

$$r_t = b_0 + b_1(\pi_t - \pi_t^*) + b_2(y_t - y_t^*) + b_3(x_t - x_t^*) + \gamma r_{t-1} + e_t, \qquad (1)$$

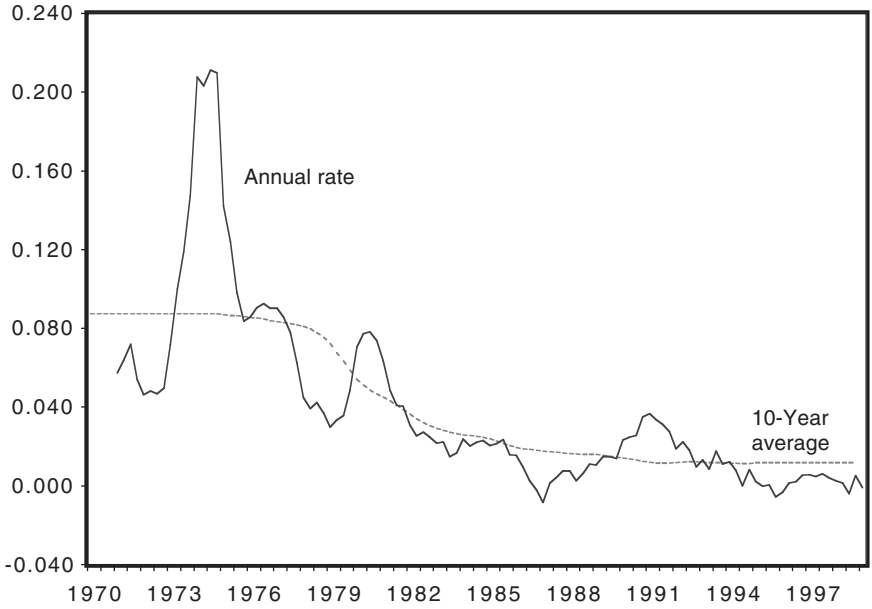
where r_t stands for the real "call rate"[4] and e_t is a disturbance term. The call rate is the interbank overnight lending rate in Japan and is considered to be the main policy instrument of the BOJ. Following the original Taylor-rule specification, all the explanatory variables are in gap form, defined as follows. The inflation rate term is the gap between π_t, the actual inflation rate, and π_t^*, the 10-year average inflation rate around the period t. The gross domestic product (GDP) term is the gap between y_t, the log of actual real GDP, and y_t^*, the quadratic trend value of y_t. The exchange rate term is the gap between x_t, the actual exchange rate, and the 10-year average

2. A similar illustration of policy delays can be found in Bernanke and Gertler (1999). In the exercise of Bernanke and Gertler, the deviations between the actual and targeted call rate basically reflect the presence of the assumed partial adjustment mechanism. In the present essay, we not only document the deviations but also explore possible explanations at some length from several perspectives in the sections below.

3. We added this term because strong attention is paid to it in the arguments about monetary policy in Japan. However, it often turns out to be not significant, as in the preceding analysis. In addition, the basic results do not change if this term is deleted. Actually, most of the results, the deviations and the changes, are robust against other specification changes, such as deleting the lagged dependent variable or discriminating the positive and negative inflation gaps.

4. The real rate is calculated using the actual inflation rate.

Figure 6.1 Inflation rate and its 10-year average (percent)



exchange rate around the period *t*. These three gap variables are depicted in figures 6.1 through 6.3.[5]

We also followed Clarida, Gali, and Gertler's empirical method of Generalized Method of Moments (GMM) estimation in order to take care of the endogeneity bias. The correlation between the error term and the explanatory variables comes partly from the contemporaneous causal relationship between the policy instrument and policy goals. It is also caused by the measurement error in the policy goal variables; for example, the revision of GDP is significant, and the level of potential GDP is the focus of the discussions.[6] The instruments are the own lags (up to 4 lags) of the explanatory variables.[7]

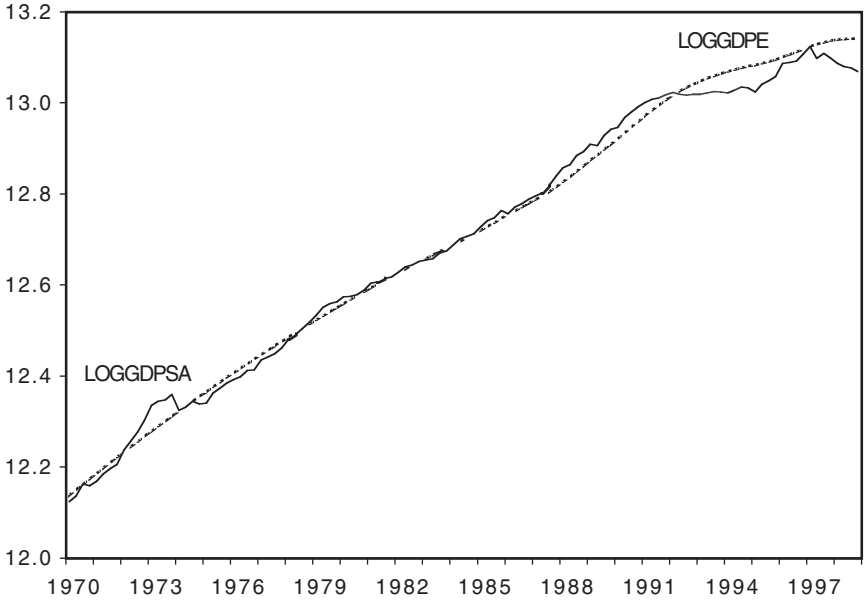
---

5. In calculating the inflation rate, we used the consumer price index (CPI) series adjusted for the changes in the sales tax rate and the copayment rate for public health insurance. We used the seasonally adjusted real GDP series. Its quadratic trend is estimated with a rolling-regression method using the data up to the period *t*. We used the yen-dollar exchange rate as the exchange rate series; it is known that the nominal effective exchange rate for the Japanese yen moves closely with the yen-dollar rate.

6. Aoki (1999) shows the important implications of measurement errors for monetary policy in the theoretical model.

7. For the GMM estimation to be valid, we rely on the assumption that all the gap variables as well as the real call rate can be characterized as I(0) for the sample period 1975-85. Using the standard Dickey-Fuller tests, the null of a unit root is rejected for the real call rate and the exchange rate term. The null is not rejected for the output gap and inflation gap, yet we view this acceptance as due to the low power of the test for our short sample period.

Figure 6.2 Real GDP and its quadratic trend (percent)



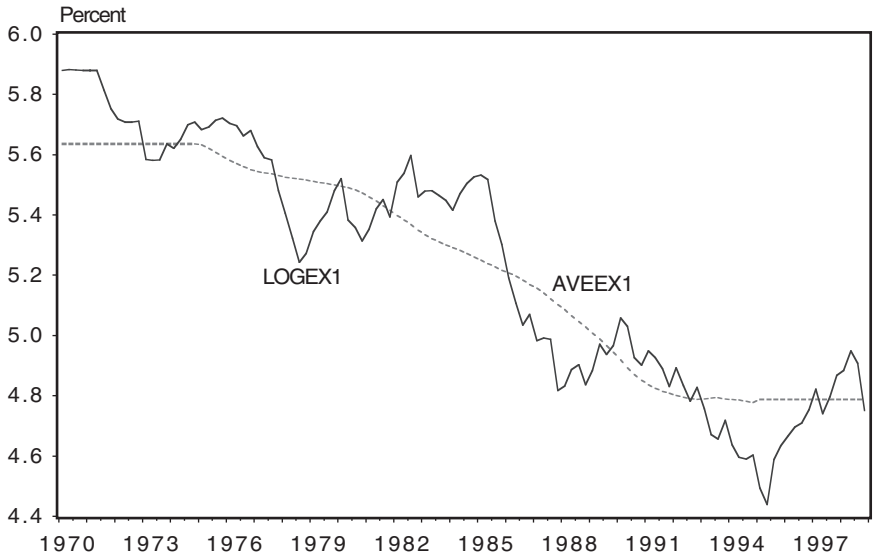
LOGGDPS = Logarithmic GDP seasonally adjusted
LOGGDPE = Logarithmic GDP not adjusted

The results are given in table 6.1, which reports the estimation results from several different specifications. In addition to the basic specification, which utilizes the contemporary explanatory variables, we tried two other specifications; they respectively use the 1-period lag and the autoregressive (AR) forecast of each explanatory variable.[8] The main purpose is to check the robustness of the results. In all three specifications, all the coefficients have the right signs. Both the inflation term and the GDP-gap term are always significant. However, the exchange rate term is mostly not significant; its t-statistic is barely in the basic specification. There are some differences in the coefficient estimates, but most of them seem to be caused by the different coefficient estimates (γ) on the lagged dependent variable. The long-run reaction coefficients, calculated as $b_i/(1 - \gamma)$, are much closer over the specifications. The basic specification has a smaller estimate of γ, which reflects the stronger explanatory power

A similar treatment can be found in Clarida, Gali, and Gertler (1998). The optimal weight matrix and robust standard errors are computed using Newey and West's (1987) covariance matrix with the truncation of four lags. We also employ two and three lags, but the results are unaffected.

8. Ordinary least squares (OLS) is used for these estimations.

Figure 6.3 Exchange rate and its 10-year average



AVEEX1 = Average exchange rate
LOGEX1 = Log exchange rate

Table 6.1 The "good" policy rule in 1975-85

Specification		Estimation						R^2
π	**y** and **x**	**method**	b_0	b_1	b_2	b_3	γ	**SEE**[a]
Current value	Current value	GMM	1.39 (0.34)	0.27 (0.14)	1.14 (0.37)	0.03 (0.02)	0.39 (0.14)	0.87 (1.21)
1-quarter lagged value	1-quarter lagged value	OLS	1.01 (0.21)	0.17 (0.06)	0.70 (0.20)	0.01 (0.01)	0.65 (0.08)	0.92 (0.97)
Forecast[b] current value	Forecast[b] current value	OLS	1.02 (0.21)	0.25 (0.09)	0.68 (0.22)	0.01 (0.01)	0.66 (0.08)	0.91 (0.97)
1-year lead value	Current value	GMM	1.13 (0.34)	0.17 (0.16)	0.62 (0.26)	0.03 (0.01)	0.57 (0.11)	0.88 (1.15)

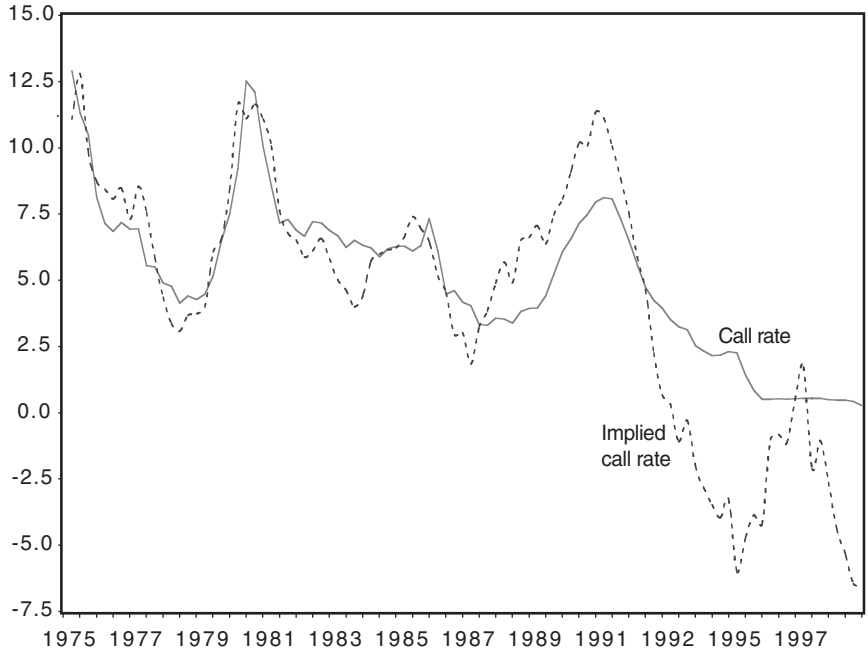
GMM = Generalized Method of Moments.
OLS = Ordinary least squares regression.

a. SEE = standard error of estimation.

b. Forecast values are based on autoregressive equations.

Note: Empirical specification: $r_t = b_0 + b_1(\pi_t - \pi_t^*) + b_2(y_t - y_t^*) + b_3(x_t - x_t^*) + \gamma r_{t-1} + e_t$ (see text for explanation). Numbers in parentheses are standard errors.

Figure 6.4 Call rate and the rate implied by the ''good'' policy rule



of the contemporary variables compared with those of the 1-period lags or the AR forecasts. Thus, hereafter we adapt the basic specification.

Further, we tried one more specification, which uses the actual 1-year lead value for inflation. Several researchers have adapted this, because the variable may represent the inflation forecasts. The result is reported in the last row of table 6.1. It shows that the 1-year lead value for inflation is not significant. This may suggest that 1-year lead value is not close to the inflation forecast the BOJ used at the time.

Delayed Policy Actions: Identifying Deviations from the ''Good'' Policy Rule

Next, we apply the estimated ''pre-bubble'' policy rule to the ''bubble'' and the ''post-bubble'' periods. We followed Taylor's (1998) ''historical'' approach. We try to find the major deviations of the actual monetary policy from the estimated ''good'' policy rule. The result is depicted in figure 6.4, which shows the call rate implied by the good policy rule.

There seem to be four major deviations:

1. The delay in policy restraint, 1987-88.

2. Insufficient policy restraint, 1990-91.

3. The delay in easing policy restraint, 1992 to early 1995.

4. The delay in easing policy restraint, 1997 to early 1998.

The first deviation is the well-known policy mistake. Three factors are often mentioned as the main reasons for this prolonged delay. The typical argument goes as follows. First, in the implementation of ''international policy coordination'' after the Plaza Accord of 1985, the BOJ was pushed to keep a low interest rate. Second, market instability caused by the US stock market crash in October 1987 kept the BOJ from tightening policy in late 1987. Third, in 1988, the domestic political requirements pushed the BOJ to delay restraint until the sales tax was successfully introduced in April 1989.[9]

The second deviation seems to be against the popular opinion that monetary policy overkilled the bubble in 1990-91. However, in the final stage of restraint, a couple of major nonmarket restrictions were mobilized by the Ministry of Finance, such as the total volume limit on the lending to the real estate business. Thus, this result might be interpreted as suggesting that, in 1990-91, monetary policy was not too restrictive but that direct credit control was.

The third delay has not been much argued. The BOJ eased rapidly after the bubble burst but stopped further easing in 1994. However, figure 6.4 suggests that the BOJ should have continued to ease more. Further easing in 1994 might have blocked the abnormal appreciation of the yen in March 1995. The BOJ lowered rates quickly to below the 1 percent level after the appreciation.

The fourth deviation was the focus of debate at the time. The BOJ finally adopted the so-called zero interest rate policy in February 1998. However, the result suggests that it should have done so in early 1997, when the short-lived recovery, which was caused mainly by the unusual fiscal policy, ended.

It should be noted that the focus of this essay is monetary policy and that therefore we will not dig deeper into fiscal policy. Of course, few would doubt that fiscal policy played as big a role in the current depression as monetary policy.[10] However, its examination requires another essay.

We further discuss the reasons for these deviations in the next section, using a ''narrative'' approach based on BOJ publications. We found sub-

9. Some discussions that emphasize the first and third factors can be found in Shimizu (1997).

10. For example, see Posen (1998).

stantial material for the first and third deviations. The first deviation is confirmed again below through the structural test in the cointegration analysis.

Explanation from a Narrative Analysis

In this section, we utilize a ''narrative'' approach.[11] We examined the publications of the BOJ in order to search for the reasons behind the policy-action delays, which we identified as the deviations of the actual policy from the ''good'' rule. We first deal with the period of 1986-87 when ''international policy coordination'' was much emphasized. Second, we look at the period from 1988 to early 1989. The delay in monetary restraint is attributed to the shift in the relative weights of the policy goals. The third period is the first half of the 1990s, when the policymakers could have been misled by the delay in their judgment of the economic situation.

International Policy Coordination, 1986-87

Monetary Policy Stance in 1985 and the Plaza Accord

Loose money policy—which was followed beginning in August 1980 to ride out the recession caused by the second oil crisis in 1979—brought about relatively low but stable growth. Real GDP grew 3 percent on average in the first half of the 1980s, and even faster in 1984.

The BOJ's statements show that the Japanese economy was enjoying relatively good performance in 1985: ''Production and shipment are still increasing'' (*Monthly Bulletin,* January 1985, 23). ''Domestic demand such as capital investment and consumer expenditure steadily increase'' (*Monthly Bulletin,* March 1985, 28). ''The business firms' judgment on the economic situation is still cautiously optimistic'' (*Monthly Bulletin,* June 1985, 32). Monetary growth, measured in M2 + CD, was also effectively managed and well controlled in a reasonable range (around 7-8 percent) for most of the early 1980s.

The BOJ ascertained these situations and did not plan to change its policy stance. Then-Governor of the BOJ Sumita told the 39th National Bankers Conference that they must check the cost against the benefit of stimulating domestic demand by monetary and fiscal policies, and of further monetary expansion to redress the trade imbalance (8 July 1985). It seems clear that he was reluctant to conduct further monetary expansion.

This policy stance, however, was obliged to change by the pressure of the Plaza Accord on 22 September. The leading countries thereby agreed

11. The narrative analysis in this section draws heavily on Kuroki (1999, chap. 6).

on a ''commitment'' to cooperative interventions in the foreign exchange market to force down the appreciated dollar and stimulate domestic demand through expansionary policy to rectify the international balance of payments situation (see table 6.2). The relatively good economic performance of Japan in those days surely depended on the weak yen, which did not correctly reflect the fundamentals of the Japanese economy, in particular large trade surpluses. The international coordination was reasonable in the sense that the attainment of economic prosperity should not involve sacrifices by other countries. However, we have to keep in mind that the policy coordination brought a change in the domestic policy stance.

Discount Rate Policy, 1986-87

The coordinated intervention in the foreign exchange market by the leading countries based on the Plaza Accord produced an upsurge in the yen. The yen's rate shifted from $1 = ¥240 in August 1985 to ¥150 in mid-1986. This rapid appreciation of the yen brought about recessionary effects, and domestic production and capital investment declined (this is the so-called yen-appreciation recession). The decline in industrial production was accelerating, and real GDP growth shifted down from 5 to 3 percent in 1986. The business circumstances of the manufacturing sector worsened, and investment in that sector rapidly cooled down.

Fortunately, the yen hike also brightened the outlook for the Japanese economy. The strong yen and the low price of imported oil encouraged consumer expenditures, such as individual consumption and housing investment, as well as capital investment by the nonmanufacturing sector. The decline in the prices of imported goods and services as well as oil also resulted in lower domestic price levels, and both consumer and retail prices were moving in a stable direction. These benefits, driven by the appreciation of the yen, helped make the 1986 recession relatively mild.

Under these economic conditions, the BOJ reduced the official discount rate five times between January 1986 and February 1987. The discount rate was pushed down from 5 percent to 2.5 percent, which was the lowest level up to that time. These successive reductions aimed to (1) stabilize exchange rates and (2) redress the trade imbalance by stimulating domestic demand. Monetary policy goals, then, emphasized the importance of external affairs. It is not legitimate to assert that Japan's economic structure is solely export oriented, that is, imports are hard to increase and exports are hard to decrease. A monetary policy stance that stimulates the domestic economy might be useful in recovering from a mild recession. However, the issue here is whether revisions in the policy stance and the timings of these revisions were based upon the BOJ's own judgment. We will solve this problem by investigating the circumstances that led to the policy change.

Table 6.2 Aims of changes in the discount rate level

Date of change in discount rate	Tight or loose discount rate level (percent)	Targets	Statements by chairman of policy board (extracts)
29 January 1986	Loose, 5.0-4.5	Redress trade imbalance	''Redress the trade imbalance by stimulating domestic demand.''
		Stabilize exchange rates	''Closely watch the movement of exchange rates.''
7 March 1986	Loose, 4.5-4.0	Redress trade imbalance	''Redress of the trade imbalance by stimulating domestic demand.''
		Stabilize exchange rates	''Avoid drastic exchange fluctuations.''
19 April 1986	Loose, 4.0-3.5	Redress trade imbalance	''Take more steps to correct the trade imbalance by stimulating domestic demand in coordination with the government's package of economic policies.''
		Stabilize exchange rates	''Contribute to stabilizing the yen exchange rate.''
31 October 1986	Loose, 3.5-3.0	Redress trade imbalance Stabilize exchange rates	''Since the government has prepared a supplementary budget for this fiscal year for the package of economic policies, the BOJ . . . eagerly expects stable exchange rates to lead to continuous economic growth.''
20 February 1987	Loose, 3.0-2.5	Redress trade imbalance	''Lately, Japan and the United States reconfirmed their cooperation in solving problems of the foreign exchange market, and we expect that the leading countries will closely coordinate efforts to stabilize exchange rates.''
		Stabilize exchange rates	''Contribute to stabilizing exchange rates and encourage steady expansion of domestic demand.''
30 May 1989	Tight, 2.5-3.25	Redress trade imbalance	''Redress our trade imbalance and promote sound development of the world economy.''
		Stabilize domestic prices	''Contribute to attaining continuous economic growth based on the expansion of domestic demand, and keeping prices stable as well.''

Tables 6.3 and 6.4 show the discount rate policy in 1986-87 and both international and domestic political trends at the time. These tables imply that the third to the fifth reductions of the discount rate were brought about by the political pressure of international policy coordination.

First, let us look at the reduction of 19 April 1986. In March, the US Federal Reserve demanded the third reduction from the BOJ right after the second reduction of the discount rate (*Nikkei* newspaper, 2 April 1986). On 8 April, the Japanese government prepared the package of economic policies, and an additional expansionary move in monetary policy was listed in the first place to stimulate domestic demand. Moreover, the Takeshita-Baker meeting reached an agreement on 9 April that both countries were in a favorable environment for coordinated reduction of the discount rate.

During the course of these political movements, however, the BOJ started moral suasion to reduce bank lending, and BOJ Governor Sumita stated that he was closely watching the speculative transactions of land and the hike of stock prices based on loose money (*Nikkei* newspaper, 3 April 1986).

We can see the same kind of political pressure on domestic monetary policy in the cases of the fourth and fifth reductions in the rate. The conference of G-7 finance ministers agreed that the country bearing the trade surplus should attain the faster economic growth (27 September). At the IMF-World Bank annual meetings, Japanese Finance Minister Miyazawa pledged publicly to stimulate domestic demand and US Secretary of the Treasury Baker requested that Japan and Germany further reduce their discount rates (1 October).

Again, the BOJ had a different policy stance. Governor Sumita stated that we would not need further monetary loosening (*Nikkei* newspaper, 5 October 1986). The BOJ's *Monthly Bulletin* said, ''We will continue to watch carefully the movements of economic situations, including the money supply. We hope that financial institutions will keep a deliberate lending attitude'' (''Kouteibuai hikisageni tsuite'' [On the reduction of the discount rate], *Monthly Bulletin,* November 1986).

Table 6.4 shows the BOJ's judgment of the economic situations and political trends in 1987. We can see from this table that the BOJ sounded the alarm about the dangers of the financial and economic conditions. For example, ''The money supply is considerably high compared with real economic activities. . . . The discount rate is at the lowest level up to today'' (*Monthly Bulletin,* January 1987). ''Excessive monetary expansion, however, does not contribute to real economic growth, but will quite possibly support speculative transactions of existing assets'' (*Monthly Bulletin,* April 1987). ''The deflationary shock can be widespread once asset prices start falling, since the hike in those prices has been aided by

Table 6.3 Policy stance of the Bank of Japan and political trends as reported in the *Monthly Bulletin*, 1986

Month	Judgments of the economic situations by the Bank of Japan	Monetary policy (discount rate)	Political trends (international and domestic)
January	''The quantity of exports clearly hit a peak because of the yen appreciation.'' ''Production of the mining and manufacturing sectors is now gradually decreasing.'' ''Domestic demand has been basically steady.'' ''Wholesale prices declined again in December, and consumer prices were stable.''	Reduction (29 January 1986)	
March	''Mining and manufacturing production are tending to mildly decline.'' ''Increase in capital investment in manufacturing has been slowing down.'' ''Wholesale prices declined drastically.'' ''The yen has further appreciated.'' ''The current account has been running a large surplus.''	Reduction (7 March 1986)	(6 March) Bundesbank: cooperative reduction of the discount rate. (7 March) US Federal Reserve Board: Cooperative reduction of discount rate.
April	''Mining and manufacturing production are tending to mildly decline.'' ''Domestic demand has been still steady as a whole.'' ''Wholesale prices declined further in March.'' ''Stock prices continue to soar.'' ''The current account surplus was still high in February.''	Reduction (19 April 1986)	(8 April) The Japanese government prepared the package of economic policies. (9 April) Takeshita-Baker meeting reached an agreement—'' Both countries are in a favorable environment for cooperative reduction of the discount rates.''
September	''Consumer prices have fallen for 3 consecutive months.'' ''Money supply grows even faster than it did last month.'' ''Flow of money into the stock market goes on.''		(19 September) The Japanese government prepared a package of economic policies. (27 September) G-7 finance ministers conference.
October	Almost the same as above.	Reduction (31 October 1986)	

Table 6.4 Policy stance of the Bank of Japan and political trends as reported in the *Monthly Bulletin*, 1987

Month	Judgments of the economic situations by Bank of Japan	Political trends (international and domestic)
January	"Money supply is considerably high compared with real economic activities." "The discount rate is at the lowest level up to today." "Business finance has been getting easier." "Monetary policy stance supporting speculative transactions of assets can damage long-run price stability."	(21 January) Miyazawa-Baker meeting—" The Japanese government would urge BOJ to make a fifth reduction of the discount rate." (22 January) Bundesbank decided to reduce discount rate.
February	Reduction of the discount rate (22 Feb.).	(20 February) Louvre Agreement at G-6 conference asserted that the BOJ would reduce the discount rate by 0.5 percent.
April	"The velocity of money has been declining." "It is appropriate to keep today's stance of easy money for a while to attain continuous expansion of domestic demand and stable exchange rates." "Excessive monetary expansion, however, does not contribute to real economic growth, but will quite possibly support speculative transactions of existing assets."	(8 April) G-7 conference reconfirmed the Louvre Agreement. (24 April) Package of economic policies is decided on to conduct appropriate and mobile monetary policy such as reducing deposit rate to the Fund Management Bureau (Shikin Unyoubu) at the Ministry of Finance.
May	"The deflationary shock can be widespread once asset prices start falling, since the hike in those prices has been aided by speculative transactions." "Excessive monetary expansion will have an adverse effect on sound and stable economic growth in the long run, although it is appropriate to maintain today's easy-money policy for a while."	(1 May) Nakasone-Reagan meeting—Nakasone referred to open-market operations to reduce short-term interest rates. (29 May) Package of urgent economic policies is decided on to conduct appropriate and mobile monetary policy and reduce policy interest rates.
July	"Decline of the velocity of money is now larger than that in 1971-72." "Money stock becoming inactivated in comparison with the activity level of the real economy."	

(continued next page)

Table 6.4 *(continued)*

Month	Judgments of the economic situations by Bank of Japan	Political trends (international and domestic)
July *(cont.)*	"Lending by financial institutions has come to be active." "Prevent harmful effects of excessive expansion while keeping policy stance of today."	
September	"Monetary growth has fairly accelerated."	(4 September) US Federal Reserve Board raised the discount rate.
October	"We do not have to worry about the effects of Black Monday in October." "Money supply has been accelerating faster than the real economy." "The velocity of money has declined drastically." "Activity of financial institutions is firmly expanding."	(26 September) G-7 communiqué—Some of the countries bearing current account surplus need to attain further increase in domestic demand. Each country needs to stabilize exchange rates around current levels. (October) Black Monday
December	"Monetary growth has fairly accelerated."	

speculative transactions. . . . Excessive monetary expansion will have an adverse effect on sound and stable economic growth in the long run, although it is appropriate to maintain today's easy-money policy for a while'' (*Monthly Bulletin,* May 1987, 5-7).

Contrary to these alarms, though, the BOJ reduced the discount rate again on 20 February and also started lowering short-term interest rates. The Miyazawa-Baker meeting agreed that the Japanese government would urge the BOJ to make a fifth reduction of the discount rate (21 January 1987). The Louvre Agreement at the G-6 conference asserted that the BOJ would reduce the discount rate by 0.5 percent (20 February). The G-7 conference in April reconfirmed the Louvre Agreement. The package of economic policies decided on by the government included the appropriate and flexible monetary policy, as well as the reduction of the deposit rate to the Fund Management Bureau (*Shikin Unyoubu*) at the Ministry of Finance (8, 24 April). At the Nakasone-Reagan meeting on 1 May, Prime Minister Nakasone referred to open-market operations to reduce short-term interest rates.

As we now have seen, it is clear both that the BOJ had a policy stance against further monetary expansion and that there is a common pattern in these episodes. Requests from foreign governments and public commit-

ments between foreign and domestic governments preceded the monetary decision of the BOJ, and the BOJ then changed its policy stance and undertook excessive monetary expansion. The third to the fifth reductions of the discount rate were brought about by political pressure. Both domestic and international political pressure, based on international policy coordination, distorted monetary policy from mid-1986 to 1987.

Change in Policy Judgment, 1987-88

Bank of Japan's Judgment of the Financial Situation, 1986-87

As we saw above, the BOJ comprehended that monetary growth was in a reasonable range and did not plan to change its policy stance in 1985. After the spring of 1986, the BOJ came to sound the alarm about the monetary growth. ''The cumulative decline of the velocity (nominal aggregate demand / M2 + CD) is larger than that of the last easy-money period. . . . We cannot deny the speculative aspects of land transactions based on the quantitative ease of money'' (*Monthly Bulletin,* April 1986, 17). ''Backed up by the increasing funds' inflow to the stock market, those prices are going higher, regardless of business prospects'' (*Monthly Bulletin,* July 1986, 17). ''Money supply is considerably high compared with real economic activities'' (*Monthly Bulletin,* September 1986, 25).

The BOJ's caution regarding excessive monetary loosening had become fairly clear by 1987. ''A large proportion of the increased money supply is used in speculative transactions, with the result that the velocity has been drastically declining. . . . These are] supported by the aggressive lending attitude of financial institutions'' (*Monthly Bulletin,* May 1987, 5). ''We are afraid that there will be widespread deflationary shocks, which will include financial institutions.'' (*Monthly Bulletin,* May 1987, 45).

It is in fact remarkable that the BOJ was aware that monetary policy, distorted by political pressure, caused the bubble and already pointed out the danger of widespread ''debt-deflation,'' including that of the overall financial system in the early stage of 1987.

Change in Bank of Japan's Judgment, 1988

Despite the alarms by the BOJ, the excessive loosening stance continued in the first half of 1987, due to the political pressures. Then came the US stock market crash in October 1987—known as Black Monday—and this led to a further delay of a preemptive tightening in Japan. Nevertheless, it is fortunate that Black Monday did not have crucial negative effects on the Japanese economy. In fact, domestic demand grew faster than before, and real GDP growth was 6-7 percent in 1988, which was the highest level since the middle of the 1970s. Business profits, in both manufacturing

and nonmanufacturing sectors, rapidly recovered, and fixed investments were also active. Exchange rates were largely stable, and the world economies were steadily expanding on the basis of the reasonable monetary conditions.

Under the circumstances, the Bundesbank decided to raise its discount rate on 30 June and 25 August 1988. Some of the other European countries followed this decision, and the Federal Reserve also raised its discount rate in August 1988. The reasons the Bundesbank decided to raise the rate were (1) powerful expansion of the economy, (2) rapid increase of the money supply, and (3) depreciation of the deutsche mark. This was a precautionary tightening to avoid the inflationary pressures brought on by easy money theretofore.

Why, then, did the BOJ not move on to monetary tightening in early 1988? The Japanese economy faced almost the same situation in which the Bundesbank decided to raise the rate, and the yen-dollar exchange rate was stable. The political pressures to maintain loose money policy were still observed, for example, in Prime Minster Takeshita's announcement at the US-Japan leaders' meeting in January 1988 and in the G-7 communiqué in September 1988. The second and more important factor, however, is that the BOJ changed its policy stance and that the relative weight of its policy concerns shifted from asset prices and possible debt deflation to the prices of goods and services.

In the very beginning of 1988, the BOJ was still worried about the financial situation. ''We cannot ignore the fact that excessive monetary expansion can disturb the financial and capital markets'' (*Monthly Bulletin,* January 1988, 3). However, the alarm about the hazardous by-products of the redundant monetary expansion almost disappeared in the spring of 1988. Instead, the basic stance of the BOJ became: ''Monetary policy that attaches weight to price stability will contribute to the long-lasting expansion of domestic demand. . . . The BOJ will take appropriate and mobile actions with closely monitoring movements in prices and exchange rates'' (*Monthly Bulletin,* April 1988, 2). At the time, the money supply was large enough compared with the real economy, and this inactivated part of money, which did not reflect the real activities, had still pushed up the bubble of existing assets.[12]

The mistake of the BOJ in 1988 is that it slighted the movements of asset prices (prices of ''stock'' variables) and their possible disastrous effects and stressed the prices of ''flow'' variables. In the next section, we will see, using time-series analyses, that the relative policy weight on GDP relative to inflation goals decreased in the second quarter of 1987. Here, the narrative approach can give fairly robust explanations for the statistical result.

12. Monetary growth was still high, and the velocity of money continued to decline in 1988. Meanwhile, the liquidity of businesses (as scaled by monthly sales) was drastically increasing.

Optimistic Policy Operations and Delays in Judgment in the Early 1990s

Bursting of the Bubble and Optimistic Policy Operations

In May 1989, the BOJ abandoned the easy-money policy that had lasted for a decade and started monetary contraction. Its goal was to maintain price stability and contribute to continuous growth based on domestic demand. The BOJ raised the discount rate five times, and its level reached 6 percent in August 1990, which was higher than the level at the time of the Plaza Accord. The policy stance of the BOJ at the time was to prevent a rise in inflationary expectation in the early stage to attain price stability (*Monthly Bulletin,* May 1990, 35). Again, the BOJ's policy stance emphasized stabilizing prices of goods and services.

The Ministry of Finance also introduced restrictive laws and regulations to land transactions. These devices possibly triggered the bursting of the bubble. The increasing rate of stock prices hit a peak in 1989 and turned negative in the second half of 1990. Land prices also started reducing their increase rates in the middle of 1990, and recorded negative rates in the fourth quarter of 1991.

In the face of this situation, the BOJ began loosening monetary conditions in July 1991. However, the BOJ's judgment of the situation was quite optimistic, and hence it did not recognize that the bubble had already burst and that the economy was at the entrance gate of the debt-deflation cycle. For instance, ''Since economic activities are still high, we shouldn't fail to watch price movements'' (''On the Reduction of the Discount Rate,'' *Monthly Bulletin,* July 1991). ''The policy action of this time hopefully contributes to continuous growth based on price stability. . . . We will conduct deliberate policy operations pursuing price stability'' (''On the Reduction of the Discount Rate,'' *Monthly Bulletin,* December 1991). ''This will contribute to our country's smooth and steady movement toward a balanced economy based on price stability'' (''On the Reduction of the Discount Rate,'' *Monthly Bulletin,* January 1992).

It is clear that the BOJ did not recognize the prospect of debt deflation at that time and pursued an ''optimistic anti-inflation policy.'' In the early summer of 1992, we can see that the BOJ recognized that the situation was more serious than it had expected and also used the expression ''the bursting of the bubble'' in the *Monthly Bulletin* (see, for example, *Monthly Bulletin,* June 1992, 37-39).

Delays in Judgment in the Early 1990s

After April 1992, the BOJ reduced the discount rate five times in addition to the previous reductions. Finally, the discount rate was reduced to 0.5 percent, the lowest level in the BOJ's history, in September 1995. Its goal, of course, was to recover from the prolonged stagnation. However, the

large amount of debt that had accumulated during the period of the bubble put a heavier burden on consumers, business firms, and financial institutions than the BOJ had expected. Many economic indicators and indices showed pessimistic figures. We do not need to show each figure here, since Japan's economic conditions in the 1990s are well known. Consumption and business investments have declined. The unemployment rate has been rising. The long-range prospects for households and businesses have been doubtful and gloomy.

While the Japanese economy has suffered from prolonged stagnation for almost a decade, the situation was not monotonic. There was a faint but favorable sign that the economy would improve in 1994 and 1995. The confidence indices on consumption and the index of business prospects hit bottom in the last quarter of 1993 and started to improve. The ratio of current profits to sales of firms also turned upward in the same year, although the growth rate was still stagnating.

In these situations, the BOJ maintained a loose money policy. The problem was that the BOJ might have misjudged how serious the economic situation was, so that the pace of monetary loosening lagged events. Of course, the BOJ knew that the large amount of debt prevented the economy from recovering and that the economy was still in a severe condition. We can read this fact in the *Monthly Bulletins* for those days, in which the BOJ referred to a ''demand-supply gap.'' However, as far as we can tell, the BOJ did not use the expression ''deflationary gap'' or ''debt deflation'' in the early 1990s. This fact would seem to suggest that the BOJ did not recognize the potential seriousness of debt deflation, and it therefore can be interpreted as a delay in judgment by the BOJ during that time. A further loosening in 1994 might have prevented the abnormal yen appreciation in March 1995 and might have accomplished stronger recovery afterward. This is the possible explanation for the delay in loosening in 1992-95 that we observed above (figure 6.4).

Explanation from Time-Series Analyses

In this section, we seek another explanation for the delayed policy actions documented above by reexamining the time-series characteristics of the policy rule relationship. The motivation for this exercise is as follows. The coefficients of a monetary policy reaction function are in general determined by the structural parameters of the underlying economy and the relative weight placed on the policy objectives (say, inflation and output) in the loss function of the central bank. If there is a shift in the underlying economic structure, or if there is a shift in the relative weight on the central bank's goals, then the optimal policy response should change accordingly, and we should observe some shift in the coefficients in the policy rule relationship. This would cause the observed deviations

of the actual call rate from the rate computed by the Taylor rule with fixed coefficients. We document time-series evidence of a possible shift in the policy reaction function of Japan and examine these possible sources for that shift.

Reaction Function Implied by Svensson

For our purpose, we employ a policy reaction function implied by the theoretical framework of Svensson (1997). In Svensson's (1997) framework, the economy is characterized by a simple Phillips curve and aggregate demand relationships together with the central bank's intertemporal loss function. As we illustrate in the appendix, the framework is quite useful for explaining the link between structural parameters and the implied reaction function. The optimal policy reaction function in this setting can be written as:

$$i_t = b_0 + b_1\pi_t + b_2 y_t + e_t, \tag{2}$$

where i_t is the monetary policy instrument (here the nominal call rate), π_t is the inflation rate, y_t is real output, and b_1 and b_2 are policy rule coefficients (b_0 denotes a constant, and e_t is a disturbance term). The coefficients b_1 and b_2 are in particular linked with the slope coefficient of the Phillips curve and the relative policy weight set by the central bank between inflation and output stabilization. These two parameters are denoted as a and λ, respectively, in the appendix and will be used as primary factors in the interpretation of our empirical results below.

This reaction function appears similar to the Tayloresque reaction function we used above in equation (1). In the specification above, the real call rate was used, and all the explanatory variables were expressed in ''gap'' terms. Here, the call rate is in nominal terms, and the explanatory variables are not specified in gap terms. The important advantage in using the present Svenssonesque specification is that, as we will argue below, we are able to apply the idea of cointegration to the present policy reaction function and therefore to make more reliable statistical inferences about a possible shift in the reaction function.[13]

13. Above, the GMM analysis of a Clarida-Gali-Gertler type reaction function hinges on the validity of the assumption that all the variables, including gap variables on the lefthand side, are $I(0)$. As we discuss in footnote 7, the issue of whether this assumption is really supported by the actual evidence is not completely resolved, especially due to the short sample period of 1975-85. Here, we examine the reaction function and its possible shift using the full sample of 1975-95, and in fact the unit root test results below lend consistent support to employing the idea of cointegration in equation (2). And when cointegration really exists here, the estimates of the cointegrating vector (i.e., the coefficients in the reaction function [2]) have a favorable property that is known as ''superconsistency,'' so that we can make fairly reliable statistical inferences for the estimation results.

Time-Series Evidence

We now examine time-series evidence on the policy rule relationship (equation [2]) that is implied by Svensson's (1997) inflation targeting framework.

The econometric procedure consists of the following four steps. In the first step, we run unit root tests for each of the variables in the reaction function, i_t, π_t, and y_t. Here two unit root tests are performed—the augmented Dickey-Fuller (1979) tests of a unit root against no unit root (ADF); and a modified Dickey-Fuller test based on GLS detrending series (DF-GLS), which is a powerful univariate test proposed by Elliot, Rothenberg, and Stock (1996). The sample period is the first quarter of 1975 through the fourth quarter of 1995 (these and other similar periods are hereafter abbreviated ''1975:1-1995:4'').[14] For each of the variables in levels, these two tests do not reject the null of a unit root, and for the variables in first differences, both tests find strong rejections. Thus each of the variables can be characterized as a unit root $I(1)$ process.[15]

In the second step, we examine whether there is a ''long-run'' or cointegrating relationship among these variables. A standard trivariate model of cointegration can be applied to the policy reaction function of equation (2) above to examine whether the inflation forecast targeting framework implied by Svensson (1997) is consistent with the Japanese data.

Here, two conventional cointegration tests are performed: the augmented Dickey-Fuller (1979) test of no cointegration against cointegration (denoted as ADF) and Johansen's (1988) and Johansen and Juselius's (1990) maximal eigenvalue test of no cointegration against one cointegrating vector (denoted as JOH).[16] The second and third columns of table 6.5 show the cointegration test results. Each of the ADF and JOH tests does not reject the null of no cointegration, suggesting that there is no cointegrating policy rule relationship in Japan.

The third step of our analysis concerns the cointegration analysis that allows for a possible structural shift. Although the evidence from conventional ADF and Johansen procedures does not support the presence of cointegration, there is some possibility that cointegration is detected when a struc-

14. The sample ends in 1995:4 because the call rate was lowered to a decimal level in late 1995 and there has been virtually no movement in this policy instrument since 1996.

15. Detailed results can be obtained upon request.

16. Note that all the tests are detrended. The lag length for ADF is chosen based on the step-down procedure of Campbell and Perron (1991) with the maximum lag length equal to six. For the Johansen test, the lag length is set to four. Since Johansen's procedure has a well-known problem of large size distortions in finite samples (see, e.g., Stock and Watson 1993), we correct critical values to avoid a possible over-rejection of the test as proposed by Cheung and Lai (1993).

Table 6.5 Cointegration test statistics

Sample	ADF	JOH	ADF*	Break date
1975:1-1995:4	−2.71(1)	16.96	−4.30(5)	
1978:1-1995:4	−3.30(5)	11.74	−5.65(0)*	87:2 (0.53)
1980:1-1995:4	−3.88(5)	13.79	−6.36(0)**	87:2 (0.47)

Note: ADF is the augmented Dickey-Fuller test of no cointegration against cointegration (detrended case). JOH is Johansen's maximal eigenvalue test of no cointegration against one cointegrating vector (detrended case). ADF* is the augmented Dickey-Fuller test of the null of no cointegration against the alternative of cointegration with a structural break, proposed by Gregory and Hansen (1996). The lag lengths for ADF and ADF* are chosen based on the step-down procedure, with the maximum lag length equal to six and shown in parentheses, and the lag length for JOH set to four. The estimated break date is indicated in the last column (and the corresponding fraction of the total sample is shown in parentheses). Critical values for each of the three tests are tabulated by MacKinnon (1991) for ADF, by Osterwald-Lenum (1992, table 1) for JOH with Cheung and Lai's (1993) correction method, and by Gregory and Hansen (1996, table 1) for ADF*. Superscripts to statistics †, *, and ** indicate rejections at the 10 percent, 5 percent, and 1 percent significance levels, respectively.

		10 percent (†)	5 percent (*)	1 percent (**)
ADF	1975:1-1995:4	−3.95	−4.26	−4.89
	1978:1-1995:4	−3.96	−4.29	−4.94
	1980:1-1995:4	−3.98	−4.31	−4.97
JOH	1975:1-1995:4	21.60	24.42	29.72
	1978:1-1995:4	22.27	25.18	30.64
	1980:1-1995:4	22.90	25.90	31.52
ADF*		−5.23	−5.50	−5.97

tural break is appropriately incorporated into the analysis. This in fact corresponds to a shift in the policy rule relationship we are interested in here.

To examine this possibility, we apply Gregory and Hansen's (1996) residual-based test for cointegration with a regime shift, where the null of no cointegration is tested against the alternative of cointegration, with a break in the cointegrating vector in an unknown timing. In Gregory and Hansen's procedure, the following dummy variable is defined to introduce a regime shift:

$$D_{\tau t} = \begin{cases} 1.0 \ (t > [\tau T]) \\ 0.0 \ (otherwise), \end{cases} \tag{3}$$

where τ is the unknown timing of the structural break in a relative term defined over the (0, 1) interval and $[T]$ is its integer part. Therefore, $[\tau T]$ denotes the break date. Using this dummy variable, we consider the cointegration model where a possible break occurs in both constant and slope coefficients (C/S model):

$$i_t = b_0 + b_1\pi_t + b_2 y_t + c_0 D_{\tau t} + c_1 \pi_t D_{\tau t} + c_2 y_t D_{\tau t} + e_{\tau t}, \quad (4)$$

where c_0, c_1, and c_2 denote the shifts in the intercept and the policy rule coefficients.

Under this model, Gregory and Hansen's procedure can be implemented as follows. We first estimate the above regression model with a break by ordinary least squares regression (OLS) for each possible breakpoint τ, and obtain the estimated residual $\hat{e}_{\tau t}$. For the actual computation, we consider τ as a step function over (0.15, 0.85) that jumps every $1/T$ period. Thus, the possible breakpoints here consist of all integers over ([0.15T], [0.85T]), and corresponding to each of these points we compute the residual $\hat{e}_{\tau t}$. Then an augmented Dickey-Fuller (ADF) test is applied to each of those residual series, and the ADF statistic is calculated (in each round, we select an optimal lag length using Campbell and Perron's step-down procedure, with the maximum lag equal to six). In the end, we obtain a time series of the ADF statistics corresponding to all possible break dates. We report the minimum value in the ADF series as the test statistic of the Gregory-Hansen procedure.

The third and fourth columns of table 6.5 display the Gregory-Hansen test results. (See the notes to the table for critical values tabulated by Gregory and Hansen 1996, table 1, 109.) Using the sample of 1975:1-1995:4, we cannot reject the null hypothesis of no cointegration. On the other hand, when the sample period starts at 1978:1 or at 1980:1, we detect strong rejection results. The estimated break dates are consistently 1987:2 for both rejection cases. The evidence here is in fact indicative of the presence of a cointegrating policy rule relationship in Japan that includes a shift in the coefficients in the middle of 1987.

Finally, in the fourth step, we estimate the policy rule coefficients before and after the structural break. To estimate the shift, we use a dynamic OLS (DOLS) procedure proposed by Stock and Watson (1993). Under the maintained hypothesis that the short-run dynamics stay constant, the regression model can be written as:

$$\begin{aligned} i_t = {} & b_0 + b_1\pi_t + b_2 y_t + c_0 D_{\hat{\tau}t} + c_1 \pi_t D_{\hat{\tau}t} + c_2 y_t D_{\hat{\tau}t} \\ & + d_1(L)\Delta\pi_t + d_2(L)\Delta y_t + e_t, \end{aligned} \quad (5)$$

where $D_{\hat{\tau}t}$ is a dummy variable equal to 1.0 after the estimated break point $\hat{\tau}$, and $d_j(L)$ ($j = 1, 2$) is a polynomial of the lag operator, which contains both leads and lags ($d_j(L) = \Sigma_{j=-K}^{K} d_{rj} L^j$), and K is the number of leads and lags. Therefore (b_1, b_2) is the optimal policy rule coefficient before the break, and (c_1, c_2) represents the structural shifts in these coefficients. We compute DOLS estimates for the sample period of 1978:1-1995:4 with the break date equal to 1987:2 (or $\hat{\tau}$ equal to 0.53) using two leads and lags ($K = 2$). Standard errors are computed using Newey and West's (1987) covariance matrix with the truncation of two lags.

Table 6.6 Estimates for policy rule coefficients with a break

b_1	b_2	c_1	c_2	Wald statistic
1.134	0.132	0.940	−0.251	104.73
(0.176)	(0.038)	(0.214)	(0.044)	(0.000)

Note: All the estimates are computed using the dynamic OLS procedure of Stock and Watson (1993) with two leads and lags. The sample period is 1978:1-1995:4, and the break date is 1987:2. Standard errors, shown in parentheses, are calculated using the Newey and West (1987) covariance matrix with truncation of two lags. The Wald statistic in the last column tests the hypothesis that all the shift parameters (c's) are jointly equal to zero and have χ^2 (3) distribution. Below the coefficients, the p-value is shown in parentheses.

Table 6.6 summarizes the estimation results. Before the break of 1987:2, the point estimates for b_1 and b_2 are positive and significant. In particular, b_1 is estimated to be larger than 1, which corresponds to the prediction of the theoretical framework. After 1987:3, the inflation coefficient rises and the output coefficient falls, both significantly (positive c_1 and negative c_2). The Wald statistic of the last column of table 6.6 tests the null hypothesis that the shift parameters (c's) are jointly equal to zero and have $\chi^2(3)$ distribution. We clearly reject the null hypothesis (see p-value shown in parentheses).

Interpretations

Interpreting these empirical results, we first note that the evidence above suggests the possibility that Japanese monetary policy was largely consistent with Svensson's (1997) framework of ''inflation forecast targeting.'' The call rate was (at least until recently) regarded as the best monetary policy instrument in Japan (see, e.g., Okina 1993; Ueda 1993). And we obtain the time-series evidence in support of a long-run cointegrating relationship among the policy instruments, inflation, and output in Japan (with a break), which suggests that the BOJ may have adopted *implicit* inflation targeting (again with a break) after the late 1970s. This in fact sounds plausible. Japan's monetary policy in the early 1970s is often viewed as a ''mistake'' that led to double-digit inflation in 1973-74.[17] It is conceivable that the BOJ learned some lessons from the experience of the early 1970s and has adopted a strategy of implicit inflation targeting since then.[18]

17. See, e.g., Ito (1992) for details of the mistake of Japanese monetary policy in the early 1970s. Ito (1992, 127) states that ''In retrospect, it was a mistake to put forward a particular exchange rate as an absolute target with priority over considerations of inflation and growth.''

18. The success of the Bank of Japan's monetary management for the late 1970s-early 1980s was also acknowledged by Friedman (1985) and Hamada and Hayashi (1985) in terms of holding down money supply growth for that decade.

Having said that, let us now discuss the implications of the estimated shift in the policy reaction function in 1987, namely, the rise in the inflation coefficient and the fall in the output coefficient. Using Svensson's (1997) framework, we may be able to interpret these changes from two perspectives—a shift in some parameters in the underlying structural model, such as α and β's; and a shift in the policy weight placed by the central bank λ. Among other things, we provide the following two interpretations that would seem most plausible.

The first interpretation is that there may be a significant decline in α, which implies that the aggregate supply/Phillips curve relationship becomes flatter. As seen in equation (A7) in the appendix, if there is a decline in α, this leads to a rise in θ and thus a decline in a_2 unambiguously. This is also followed by a direct negative impact on the denominator of a_1. If this direct effect through the denominator is larger than the indirect effect on the numerator, then a_1 will increase. It appears that these shifts in a_1 and a_2 explain the result of table 6.6. A recent study by Nishizaki and Watanabe (1999) also finds evidence that the short-run Phillips curve in Japan became flatter in the 1990s than before, which seems to support this interpretation.

The second interpretation incorporates a shift in the weights on monetary policy goals into the first interpretation. In addition to the shift in the Phillips curve (the decline in α), we consider the case of a possible decline in λ. This implies that the central bank places a lower weight on output fluctuations and a higher weight on inflation (i.e., "stricter," or more "rule-like," inflation targeting). The decline in λ is followed by a decline in θ and therefore a rise in a_1 and a_2. Accordingly, this strengthens the rise in a_1 and weakens the decline in a_2, which is suggested in the first interpretation. Note that the narrative section above actually lends support to the change in the BOJ's policy judgment in 1988, which corresponds to the shift in the BOJ's policy weight in this interpretation. Adding the shift in the policy weight λ would seem to account for such a large significant increase in the inflation coefficient and a relatively small decline in the output coefficient shown in table 6.6.

These two interpretations should not be viewed as definitive. Nevertheless, we argue that the second interpretation, which builds on the first one, seems to explain the situation in the late 1980s reasonably well and therefore is quite suggestive. By a downward shift in the slope of the aggregate supply/Phillips curve relationship, fluctuations in aggregate demand lead to the relatively small movements in prices and inflation and large fluctuations in real output that were actually observed in the late 1980s and early 1990s. At the very time when the shift in the economic structure took place, the BOJ shifted its relative weight on the policy objectives toward stricter, more rule-type inflation targeting. Imposing a larger weight on inflation under a low and stable inflation environment

implies that the central bank is simply content with the fact of low and stable inflation and does little to stabilize the real economy. Consequently, with both factors combined, the business fluctuations could actually become unprecedentedly large, as we observed they did in the late 1980s and early 1990s.

Conclusion and Current Policy Discussions

This essay has documented arguable delays in BOJ monetary policy responses to macroeconomic events in the late 1980s and early 1990s using a Taylor-rule-type reaction function, and has sought explanations. In the narrative analysis based on the Bank of Japan's *Monthly Bulletins,* we have argued that the political pressure resulting from international policy coordination is a major factor in explaining the policy delays to tighten policy of the late 1980s. In the time-series analysis, where we have employed Svensson's (1997) model of inflation forecast targeting, we have indicated that there may have been a shift in the cointegrating policy rule relationship in mid-1987, which may have led to the post-1987 deviations detected in figure 6.4. Then we have interpreted the time-series evidence as suggesting that in the late 1980s there may have occurred both a shift in the underlying economic structure (flatter Phillips curve) and a shift in the monetary policy weight toward stricter inflation targeting. We have argued that the BOJ's shift in policy weight destabilized Japan's real economy and unnecessarily amplified the business fluctuations from the late 1980s to the early 1990s.

The literature on inflation targeting actually lends support to this conclusion. Adopting inflation targeting as a strict rule (or ''inflation-only targeting'') would destabilize the real economy and therefore would lead to a suboptimal outcome (see, e.g., Rogoff 1985). Friedman and Kuttner (1996) raised a serious concern regarding the ''Economic Growth and Stability Act'' that was then proposed to impose the constraint of exclusive price level (or inflation) targeting on US Federal Reserve policy. Because of this concern, the literature emphasizes again and again that inflation targeting should be implemented not as a strict, absolute rule, but as a flexible ''framework'' in which output stabilization should also be appropriately targeted in the policy decision (see, e.g., Bernanke and Mishkin 1997; Bernanke et al. 1999). As we have shown, Japanese monetary policy in the late 1980s provides an actual example in which the problem of strict, rule-type inflation targeting is indeed a serious one.

The conclusion of this essay has an important implication for current discussions of Japan's monetary policy.[19] The requests for further monetary easing are in many cases accompanied by a proposal for inflation

19. See, e.g., Krugman (1999), Posen (1998), and Okina (1999).

targeting. The most extreme proposal would be known as ''managed inflation,'' through which the central bank should make an exclusive commitment to raise inflation to a targeted level for some period of time (according to Krugman 1999, 4 percent inflation for 15 years). Whatever the targeted level of inflation is (4 percent or, say, 2-3 percent), the absolute commitment to hit the target would in fact imply ''inflation-only'' targeting, which is severely criticized in the literature. The problem of strict inflation targeting should also be obvious from our main conclusion. Thus, managed inflation is not a realistic option to take.

Then how about a more moderate proposal of inflation targeting as a ''framework''? As long as inflation targeting is carried out as a flexible framework and output stabilization is also appropriately taken into consideration, this would presumably raise the accountability and discipline of monetary policy and therefore may be recommended in normal times (see, e.g., Kuttner and Posen 1999 for a recent empirical study).

Under present circumstances in Japan, however, there is a calculated risk that explicit inflation targeting as a framework would be confused with inflation targeting as an absolute rule. There are increasing requests for further monetary loosening by the BOJ from inside and outside the country. As expansionary fiscal policy measures almost reach a limit, these requests from the political sector will come in a more extreme fashion, such as demanding that the central bank purchase newly issued government bonds, stocks, and even real estate (or sometimes real estate abroad).

The requests for further monetary loosening would be legitimate if in fact the Japanese economy faced further (and serious) downside risks, or actually was in a deflationary spiral situation. We tend to agree that Japan's current recovery will not be strong because it will take more time to resolve the balance sheet problem in Japan. But it is safe to say that the crisis-like situation of 1997-98 is over and that the economy is not currently in a deflationary spiral situation, and probably will not be for some time to come. Given these observations, requests for further expansionary measures at any cost may not be relevant. Put differently, the expected advantage of avoiding a serious deflationary spiral may not be greater than the expected disadvantage that would occur should monetary policy turn out to be too expansionary and destabilize the economy.

With the call rate and other short-term interest rates staying at virtually 0 percent, what is left for the central bank is an unfamiliar, less reliable policy instrument, such as excess reserves or the monetary base. More important, the transmission mechanism of monetary policy in Japan is quite uncertain at present. The conventional transmission through the banking sector does not and will not function with nonperforming loans and the associated balance sheet problem for some time to come. Accordingly, further monetary easing would affect aggregate demand and prices

with an uncertain, much longer lag than usual. Then the political pressures requesting that the BOJ meet the inflation target would possibly become intense, even under the flexible framework.

Let us elaborate on the issue of the credit channel. It was shown that the credit channel in Japan was significant before 1990 (e.g., Kuroki 1997). Bank credit was the imperfect substitute for other assets or liabilities for both banks and business firms. However, the following observations suggest the possibility that the credit channel has been severed and the massive liquidity supply by the BOJ does not flow into real investment activity. First, banks' lending attitude, as judged by business firms, has been severe since the last half of 1997. The recent lending attitude toward small business is the most strict in the past 25 years. Financial conditions have also been tight for them since 1990, and have gotten even worse since 1997. Second, business firms have increased the issuance of commercial paper and borrowing from public financial institutions since 1997. These facts imply that firms face the reduction in bank lending and try to offset it by raising funds from other sources; but it seems to be unsuccessful. It is clear that bank credit is still an imperfect substitute for other sources of finance for business firms. On the other hand, commercial banks have been reducing their credits since 1998 despite the massive injection of liquidity by the BOJ. The growth rate of commercial bank lending (total of city banks, local banks, second-tier local banks, trust banks, and long-term-credit banks) has been negative for the past 2 years, and the negative rate in absolute terms has been increasing. At the end of 1999, it reached approximately -6 percent, and there is no sign of reversal of this negative growth trend.[20]

The Japanese banks are now shrinking their business loans and total assets to meet the Bank for International Settlements standard and to reduce nonperforming loans. The massive liquidity injected by the BOJ has been used to purchase marketable assets, such as government bonds, and to reinforce their capital account, but has not led to the increase of credit supply. It has also piled up in the deposit account of call market dealers. All these observations are indicative of the fact that the credit channel in Japan has broken down in the supply side of credits in recent years.[21]

---

20. This number is taken from a figure of commercial bank lending in the BOJ's *Monthly Bulletin* (January 2000), which is also available at the download section of the BOJ Web site http://www.boj.or.jp.

21. The Japanese banks have refused making loans because of the shortage of collaterals of firms. However, city banks now plan to increase loans to small and medium-sized firms in the IT sector from the end of 2000, based on their growth prospects (*Nikkei* newspaper, 31 July 2000).

Given that the conventional credit channel is not working and that the effects of other channels through foreign exchange rates or asset prices are also unknown quantitatively, it would be reasonable to assume that, despite the massive quantitative easing, actual inflation will stay below the given target, if it is, say, in the 2-3 percent range. This would then make the pressure to request further monetary easing more intense. The BOJ would not easily overcome such pressures, because it is all the more difficult to provide a convincing estimate for the path of future inflation—which is needed to defend its own policy stance—under the present circumstances, where structural changes are widely under way. After all, a moderate inflation targeting framework within the 2-3 percent target range may end up being treated as an absolute rule, and this would destabilize the economy once again.

Let us elaborate our argument by making two observations. First, Krugman's managed inflation proposal has had a big impact on the policy discussion in Japan, and an influential national newspaper (as well as some other media outlets) has made a big campaign to support the proposal. Yet, Krugman's policy is in essence "strict rule" type inflation targeting, especially as it has been described in Japan. So, although it has not been implemented, strict inflation targeting actually has become very familiar to the public as a policy alternative, especially in certain media circles. Second, it is quite arguable that a 2-3 percent inflation target would be difficult to achieve due to the ongoing balance sheet problem, and the associated breakdown in the credit channel, as well as the likelihood of generally weak demand for another year or so. Given these two conditions, it is highly likely that a failure by the BOJ to meet an announced target would lead to a media campaign calling for still further monetary loosening to achieve the target at any cost. This likely scenario is why we argue that a moderate inflation targeting framework may be treated (or mistaken) as a strict rule in Japan today. This is a situation in which the setting of policy instruments would be determined as much by public or media pressures as by the BOJ's own judgment. In this sense, then, instrument independence would be seriously undermined.

This scenario would also jeopardize the instrument independence that was finally assured in the new Bank of Japan Law of April 1998. Article 3 of the new law states that "the BOJ's autonomy regarding currency and monetary control shall be respected," which implies the instrument independence of the BOJ. In retrospect, there was no clear assurance of central bank independence in the late 1980s. Consequently, the BOJ's policymaking was quite vulnerable to domestic and international political pressures at that time, which actually led to the unnecessary easing of early 1987. As we argued above, the current proposal for explicit inflation targeting, if it is mistaken as an absolute rule, would lead to further

requests for loosening with extreme policy measures, and this would seriously undermine the instrument independence of the BOJ.

The new BOJ law clearly states its policy goal in Article 2: ''Currency and monetary control shall be aimed at, through the pursuit of price stability, contributing to the sound development of the national economy.'' In our view, the policy goal for which the BOJ must be accountable is indeed given by this passage in the law. Yes, there is no numerical inflation target, but we do not view this as fundamentally deficient. Rather, it would be more hazardous to set a hard-to-achieve numerical goal because it might cause dangerously large fluctuations in macroeconomic conditions. This danger would be especially likely in the current zero-inflation environment with a flat Phillips curve. Obviously, such destabilization would be undesirable in the achievement of the ultimate policy goal: ''the sound development of the national economy.''

Before we conclude, let us stress again the main findings that are related to the current discussions of inflation targeting. An inflation targeting strategy was implicitly implemented in Japan after the late 1970s and worked well until the mid-1980s. Then the central bank appeared to change its behavior and set a wrong policy weight in the late 1980s that implied too strict inflation targeting. We view this suggested shift in the policy weight as a mistake that since then has actually led to destabilizing the real economy. This mistake has nothing to do with the fact that inflation targeting was implicit at that time. Even if explicit inflation targeting had been adopted in the late 1980s, the mistake would have been likely because inflation was actually reduced to a very low level at that time (CPI inflation was below 1 percent in 1987-88), resulting from favorable supply shocks associated with the decline in the oil price. What is important for the central bank is an appropriate balance between inflation and output stabilization objectives in its policymaking. Japan's experience in the late 1980s was an actual example of such an inappropriate balance that implies the strategy of ''too strict'' inflation targeting.

From all these issues raised above, it is still premature to conclude that Japan should adopt an explicit inflation targeting framework in the present environment with very low (virtually zero) inflation. Further discussions are definitely needed. Especially, how the central bank should maintain an appropriate balance between inflation and output stabilization objectives in a low-inflation environment seems to be a more important issue than the introduction of explicit inflation targeting itself.

References

Aoki, Kosuke. 1999. On the Optimal Monetary Policy Response to Noisy Indicators. Photocopy. Princeton, NJ: Princeton University.

Bernanke, Ben S., and Mark Gertler. 1999. Monetary Policy and Asset Price Volatility. In *1999 Symposium: New Challenges for Monetary Policy*, 77-128. Kansas City: Federal Reserve Bank of Kansas City.

Bernanke, Ben S., Thomas Laubach, Frederic S. Mishkin, and Adam S. Posen. 1999. *Inflation Targeting.* Princeton, NJ: Princeton University Press.

Bernanke, Ben S., and Frederic S. Mishkin. 1997. Inflation Targeting: A New Framework for Monetary Policy? *Journal of Economic Perspectives* 11: 97-116.

Campbell, John Y., and Pierre Perron. 1991. Pitfalls and Opportunities: What Macroeconomists Should Know about Unit Roots. *NBER Macroeconomics Annual* 6: 141-201. Cambridge, MA: National Bureau of Economic Research.

Cheung, Yin-Wong, and Kon S. Lai. 1993. Finite-Sample Sizes of Johansen's Likelihood Ratio Tests for Cointegration. *Oxford Bulletin of Economics and Statistics* 55: 313-28.

Chinn, Menzie D., and Michael P. Dooley. 1997. *Monetary Policy in Japan, Germany, and the United States: Does One Size Fit All?* NBER Working Papers 6092. Cambridge, MA: National Bureau of Economic Research.

Clarida, Richard, Jordi Gali, and Mark Gertler. 1998. Monetary Policy Rules in Practice: Some International Evidence. *European Economic Review* 42: 1033-67.

Dickey, D. A., and W. A. Fuller. 1979. Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association* 74: 427-31.

Elliot, Graham, Thomas J. Rothenberg, and James H. Stock. 1996. Efficient Tests for an Autoregressive Unit Root. *Econometrica* 64: 813-36.

Friedman, Benjamin M., and Kenneth N. Kuttner. 1996. *A Price Target for U.S. Monetary Policy? Lessons from the Experience with Money Growth Targets*. Brookings Papers on Economic Activity 1: 77-146. Washington: Brookings Institution.

Friedman, Milton. 1985. Monetarism in Rhetoric and in Practice. In *Monetary Policy in Our Times,* eds. A. Ando, H. Eguchi, R. Farmer, and Y. Suzuki. Cambridge, MA: MIT Press.

Fuller, W. A. 1976. *Introduction to Statistical Time Series.* New York: John Wiley and Sons.

Gregory, Allan W., and Bruce E. Hansen. 1996. Residual-Based Tests for Cointegration in Models with Regime Shifts. *Journal of Econometrics* 70: 99-126.

Hamada, Koichi, and Fumio Hayashi. 1985. Monetary Policy in Postwar Japan. In *Monetary Policy in Our Times*, eds. A. Ando, H. Eguchi, R. Farmer, and Y. Suzuki. Cambridge, MA: MIT Press.

Ito, Takatoshi. 1992. *The Japanese Economy*. Cambridge, MA: MIT Press.

Johansen, Soren. 1988. Statistical Analysis of Cointegrating Vectors. *Journal of Economic Dynamics and Control* 12: 213-54.

Johansen, Soren, and Katarina Juselius. 1990. Maximum Likelihood Estimation and Inference on Cointegration—With Application to the Demand for Money. *Oxford Bulletin of Economics and Statistics* 52: 169-210.

Krugman, Paul R. 1999. It's Baaack: Japan's Slump and the Return of the Liquidity Trap. *Brookings Papers on Economic Activity* 2: 137-205.

Kuroki, Yoshihiro. 1997. The Significance of Credit Rationing on Real Investment Activity: A Test for the Significance of Capital-Market Imperfection in Japan. *Japanese Economic Review* 48: 424-44.

Kuroki, Yoshihiro. 1999. *Kinyu Seisaku no Yukousei* [The Effectiveness of Monetary Policy]. Tokyo: Toyo Keizai Shinposha (in Japanese).

Kuttner, Kenneth N., and Adam S. Posen. 1999. Does Talk Matter After All? Inflation Targeting and Central Bank Behavior. Photocopy. Institute for International Economics Working Paper 99-10, September. Washington: Institute for International Economics.

MacKinnon, James G. 1991. Critical Values for Cointegration Tests. In *Long-Run Economic Relationships*, eds., R. F. Engle and C. W. J. Granger. Oxford: Oxford University Press.

Miyao, Ryuzo. 1999a. The Effects of Monetary Policy in Japan. RIEB Discussion Paper 107. Kobe: Kobe University.

Miyao, Ryuzo. 1999b. The Role of Monetary Policy in Japan: A Break in the 1990s? Photocopy. Kobe: Kobe University.
Newey, Whitney K., and Kenneth D. West. 1987. A Simple, Positive Semi-Definite, Heteroscedasticity and Autocorrelation Consistent Covariance Matrix. *Econometrica* 55: 703-08.
Nishizaki, Kenji, and Tsutomu Watanabe. 1999. Output-Inflation Tradeoff at Near-Zero Inflation Rates. Paper presented at NBER-CEPR-TCER conference on monetary policy in a low-inflation environment, Tokyo (16-17 December).
Okina, Kunio. 1993. Market Operations in Japan: Theory and Evidence. In *Japanese Monetary Policy*, ed. K. J. Singleton. Chicago: University of Chicago Press.
Okina, Kunio. 1999. *Monetary Policy under Zero Inflation: A Response to Criticisms and Questions Regarding Monetary Policy*. Discussion Paper 99-E-20. Tokyo: Institute for Monetary and Economic Studies, Bank of Japan.
Osterwald-Lenum, M. 1992. A Note with Quantiles of the Asymptotic Distribution of the Maximum Likelihood Cointegration Rank Test Statistics. *Oxford Bulletin of Economics and Statistics* 54: 461-72.
Phillips, P. C. B., and S. Ouliaris. 1990. Asymptotic Properties of Residual Based Tests for Cointegration. *Econometrica* 58: 165-93.
Posen, Adam S. 1998. *Restoring Japan's Economic Growth.* Washington: Institute for International Economics.
Rogoff, Kenneth. 1985. The Optimal Degree of Commitment to an Intermediate Monetary Target. *Quarterly Journal of Economics* 100: 1169-89.
Shimizu, Yoshinori. 1997. *Makuro Keizaigaku no Shinpo to Kinyu Seisaku* [The Progress of Macroeconomic and Monetary Policy]. Tokyo: Yuhikaku (in Japanese).
Stock, James H., and Mark W. Watson. 1993. A Simple Estimator of Cointegrating Vectors in Higher Order Integrated Systems. *Econometrica* 61: 783-820.
Svensson, Lars E. O. 1997. Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets. *European Economic Review* 41: 1111-46.
Taylor, John. 1993a. Discretion Versus Policy Rules in Practice. *Carnegie-Rochester Conference Series on Public Policy* 39: 195-214.
Taylor, John. 1993b. *Macroeconomic Policy in a World Economy: From Econometric Policy Design to Practical Application.* New York: W. W. Norton.
Taylor, John. 1998. An Historical Analysis of Monetary Policy Rules. In *Monetary Policy Rules*, ed. J. Taylor. Chicago: University of Chicago Press.
Ueda, Kazuo. 1993. A Comparative Perspective on Japanese Monetary Policy: Short-Run Monetary Control and the Transmission Mechanism. In *Japanese Monetary Policy*, ed. K. J. Singleton. Chicago: University of Chicago Press.

Appendix 6A
Svensson's Framework of Inflation Forecast Targeting

In this appendix, we illustrate the theoretical framework of inflation forecast targeting developed by Svensson (1997). Svensson's model is used to derive the reaction function above.

The economy is characterized by the following Phillips curve and aggregate demand relationships:

$$\pi_{t+1} = \pi_t + \alpha y_t + \epsilon_{t+1} \tag{A1}$$

$$y_{t+1} = \beta_1 y_t - \beta_2 (i_t - \pi) + \eta_{t+1}, \tag{A2}$$

where π_t is the inflation rate, y_t is real output, i_t is the monetary policy instrument (here the call rate), and ϵ_t and η_t are structural disturbances of the economy. α, β_1, and β_2 are structural parameters of the underlying economy.

Suppose further that the central bank conducts monetary policy with an inflation target π^* as well as an output stabilization target. Then one period loss function of the central bank can be written as

$$L(\pi_t, y_t) = \frac{1}{2}\left[(\pi_t - \pi^*)^2 + \lambda y_t^2\right], \tag{A3}$$

where λ denotes the relative weight on output stabilization (the natural rate of output is normalized as zero here). The intertemporal loss function is expressed as

$$E_t \Sigma_{j=t}^{\infty} \delta^{j-t} L(\pi_j, y_j). \tag{A4}$$

Now the central bank is considered to determine the policy instrument $\{i_j\}_{j=t}^{\infty}$ by minimizing (A4) subject to (A1), (A2), and (A3). Then the derived first-order condition implies that

$$\pi_{t+2|t} = \pi^* + \theta(\pi_{t+1|t} - \pi^*), \tag{A5}$$

where $\pi_{t+i|t}$ is the i-year inflation forecast ($= E_t \pi_{t+i}$, $i = 1, 2$) and the coefficient θ can be shown as a function of λ, α, and δ and, in particular, increasing in λ and decreasing in α. Then the optimal policy reaction function in this setting can be written as

$$i_t = \pi_t + a_1(\pi_t - \pi^*) + a_2 y_t, \tag{A6}$$

where

$$a_1 = \frac{1 - \theta}{\beta_2 \alpha}, \quad a_2 = \frac{1 - \theta + \beta_1}{\beta_2}. \tag{A7}$$

The optimal monetary policy rule derived by Svensson can be used to discuss the possible effects of a change in structural parameters such as α and a change in the central bank weight λ. This reaction function can be further rewritten as

$$i_t = b_0 + b_1 \pi_t + b_2 y_t + e_t, \tag{6.2}$$

where b_0 denotes a constant, b_1 and b_2 are policy rule coefficients corresponding to a_1 and a_2, and e_t is an $I(0)$ disturbance term. This is an empirical specification we used above.