

# MONETARY AND EXCHANGE RATE REGIMES: A COMPARISON OF JAPAN AND THE UNITED STATES

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## Introduction

From the early postwar years to August 1971, Japan maintained a fixed exchange rate against the dollar. After that date, and particularly after March 1973, both the dollar and the yen were on a fluctuating exchange rate standard, and generally rates were freely fluctuating in both Japan and the United States. This system of freely fluctuating rates was modified, or changed, in September 1985 when the finance ministers of the five largest economies agreed to intervene to influence exchange parities. The content of the September agreement is unclear, perhaps deliberately so, and it is too soon to evaluate the effects of whatever change occurred.

This article is limited to examining the working of the fixed and fluctuating rate systems prior to the September agreement. My discussion is primarily focused on Japan, for four reasons. First, Japanese monetary experience is less familiar to us than U.S. experience. The Japanese experience is very different, I believe, because it reflects in part differences in policy. Second, and more important, Japanese experience offers some lessons that U.S. policymakers can study with profit for all of us. Japan succeeded in reducing the rate of inflation (GNP deflator) from more than 20 percent in 1974 to between 0 and 2 percent in recent years. Although real output fell in 1974, at the time of the first oil shock, the growth rate of output remained between 3 and 5 percent during most of the disinflation.

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Japan followed a policy of consistent, gradual reductions in the rate of money growth and achieved a relatively steady decline in the rate of inflation without a recession.

Third, Japan's experience provides evidence on some propositions of economic theory—for example, that the rate of growth of Japan's real output appears to be independent of the annual rate of inflation. Japan's experience also provides evidence on the role of the policy mix. The government of Japan did not combine monetary deceleration with fiscal expansion; instead the budget deficit declined at the same time as the rate of money growth. Japan was able to achieve relatively stable growth, declining inflation, and high employment by following stable preannounced policies. This contrasts markedly with the U.S. experience, where frequent changes in policy produced alternating periods of expansion and recession and of rising and falling rates of inflation.

Fourth, experience in Japan shows that the variability of prices and output is considerably lower under fluctuating exchange rates than under fixed rates. This finding calls into question many official (and unofficial) statements about the alleged costs of fluctuating exchange rates.<sup>1</sup> Additional evidence, drawn from relatively efficient *ex ante* forecasts and computed forecast errors, shows that the variance of forecast errors of prices and output has been lower in Japan under fluctuating than under fixed exchange rates. Together, this evidence suggests that output and prices became more stable and more predictable following the shift to fluctuating exchange rates.

### Financial Policy

The financial history of postwar Japan has seen substantial change in the regulation of financial markets and in the rules and procedures governing monetary decisions. In the early postwar years interest rates were set by the central bank and the exchange rate was maintained at 360 yen per dollar. Consumers faced a very restricted choice of financial assets, and the rate of interest paid on these assets was often below the rate of inflation. Rates of interest paid by borrowers were kept low to encourage investment, and exchange controls inhibited the search for high real returns. The central bank allocated credit and subsidized banks by lending to them at preferential rates.<sup>2</sup>

During the immediate postwar decades, Japan favored economic development over economic freedom. A relatively high rate of saving

<sup>1</sup>Some of the criticisms concern the level of real (price-level-adjusted) exchange rates but many concern what is called excessive variability of prices and output

<sup>2</sup>Suzuki (1980) has a more complete discussion of these arrangements.

was used to develop capital in favored sectors. While the description of Japan as a monolith run by a central planning group is misleading and overstated even for the early postwar period, quantitative allocations and government control were more important in the past than in more recent years. In the past, the Bank of Japan relied heavily on influence and persuasion—known as window guidance—to supplement or substitute for changes in interest rates and the discount rate. Currently, Japan has a market economy with a disciplined and effective monetary policy. Its open market operations now have become a more important means of implementing monetary policy, and “window guidance” has a smaller role.

The Bank of Japan has increased its emphasis on controlling money aggregates in the last 10 years. However, bank officials prefer to use the term “projections” and to avoid the term “targets” when discussing monetary control practices.<sup>3</sup> From 1975 to 1979, the Bank projected the growth rate of M2. Since 1979, projections have been made for M2 + CDs. Each quarter the Bank announces the projected annual rate of growth of M2 + CDs for the four quarters ending one quarter ahead. There is only one projection. The Bank does not announce bands, nor does it shift the base from which projections are calculated in order to give the illusion of a less expansive policy, as is common in the United States. Projections in general show a declining trend. Actual rates of money growth are close to the projected rates for most years.

In contrast to Japanese practice, the Federal Reserve announces many targets with upper and lower bands for each. The base, or starting point for the projected growth rates, is changed annually, and adjustments sometimes are made at mid-year. The Fed issues statements and interpretations of its announcements that are intended to give the impression of more precise control than it has been able to achieve.<sup>4</sup> But the effect of such procedures and statements has been to increase uncertainty about monetary policy and the Fed’s intentions.

Another contrast between Japan and the United States is in observers’ responses to announcements. In the United States, so-called Fed watchers interpret and speculate on every Fed announcement, and much of the speculation questions the intentions of the Fed and the credibility of its announcements.<sup>5</sup> The Bank of Japan’s announcements,

<sup>3</sup>Suzuki (1985) discusses practices used before the September 1985 agreement.

<sup>4</sup>Examples are statements that the policy will aim for the upper (or lower) end of the target band.

<sup>5</sup>See Cukierman and Meltzer (1986) for an analysis of the credibility problem when there are announced targets.

on the other hand, have been more accurate indicators of future actions, so there is much less speculation following its announcements.

The greater credibility of the Bank of Japan's announcements is almost certainly related to the greater consistency of monetary policy in Japan. Japan adopted its system in 1975, after the annual rate of price change had reached 20 percent. Under a policy of announcing monetary projections and gradually, persistently decelerating money growth, inflation was reduced to about 1 percent without a recession.<sup>6</sup> During the years of declining inflation, Japan, like the United States, experienced the oil shock following the ouster of the Shah of Iran in 1979 and the demand shock following President Carter's use of credit controls in 1980. Moreover, Japan, like the United States, has moved to a less regulated financial system, although at a slower rate (Suzuki 1986), and has shifted from a fixed to a fluctuating exchange rate. While the Bank of Japan regularly buys and sales foreign exchange, until September 1985 purchases and sales generally were not used to change the growth rate of monetary aggregates or to produce large differences between projected and actual money growth. This evidence, along with the more detailed studies in Meltzer (1986), suggests that the Bank of Japan generally did not intervene to affect the value of its currency.

Table 1 shows the actual and announced rates of money growth in Japan and the United States for the years 1979 to 1984. The largest deviation for Japan came in 1980. In all other years shown, Japanese

*TABLE 1*  
PROJECTED AND ACTUAL RATES OF MONEY GROWTH  
(IN PERCENT)

Year <sup>a</sup>	Japan (M2 or M2 + CDs)		United States (M1 or M1B)	
	Projection	Actual	Projection	Actual
1979	11	11	3-6	7.5
1980	10	7.8	4-6.5	7.3
1981	10	10.4	6-8.5	5
1982	8	7.8	2.5-5.5	8.5
1983	7	7.5	5-9	10.4
1984	8	7.7	4-8	5.2

<sup>a</sup>Years ending in fourth quarter.

SOURCE: International Monetary Fund.

<sup>6</sup>Japan's success in this respect is evidence that a gradual policy of disinflation can be carried through with costs of disinflation that appear to be low.

money growth rates are close to projections and are generally declining. In contrast, U.S. money growth was hardly ever within the target band, and usually money growth exceeded the target. U.S. growth rates are projected a year in advance, however, while Japanese growth rates are calculated after most of the moving four-quarter period has passed.

Yoshio Suzuki (1985) presents evidence on 30 years of Japanese economic performance. Figure 1 reproduces Suzuki's data on the growth rates of money and nominal and real output. The rate of change of the price deflator can be read from the vertical distance between nominal and real output. Rates of change shown in Figure 1 are annual rates computed from the same quarter of the previous year. Note that these are not quarterly changes at annual rates; they are annual changes for the four quarters ending on the specified date.

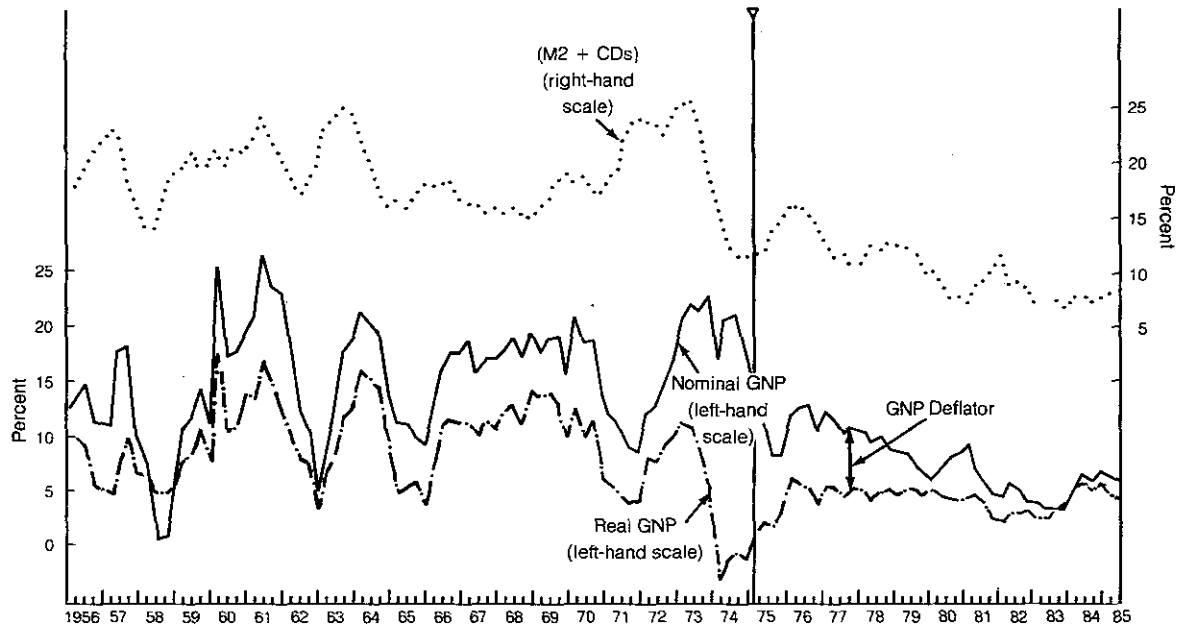
The vertical line on Figure 1 with the small triangle at the top marks the date in early 1975 when the Bank of Japan shifted to a policy of monetary control and pre-announced monetary projections. Three major changes are apparent following the change in policy procedures. First, the variability of money and GNP growth declined. Second, as already noted, the rate of inflation was reduced to low levels without any visible change in the rate of growth of real GNP. Third, there was a persistent decline in the rate of money growth, as indicated by the trend line in Figure 1. Growth of nominal GNP follows approximately the same trend rate of decline, while real growth remains about constant. The clear implication is that the rates of money growth and price change declined at approximately the same pace.

Figure 2 shows the decline in the rate of inflation more clearly. The data are annual rates of price change for the year ending in the third (Q3) quarter of each year. (Other quarters show a similar pattern.) Annual rates of price change reached a peak of almost 20 percent in the third quarter of 1974, following the first oil shock. The end of the one-time shock and the sharp reduction in money growth produced a return to the previous average rate of inflation within a year. Thereafter, steady reduction in money growth was followed by steady reduction in the rate of inflation. By the end of 1983, price stability had been restored. The policy prescription advocated by the Shadow Open Market Committee seems to have worked well in Japan.

### Forecast Errors

Comparison of the reported rates of change provides evidence of the reduction in variability in prices and output in Japan under the

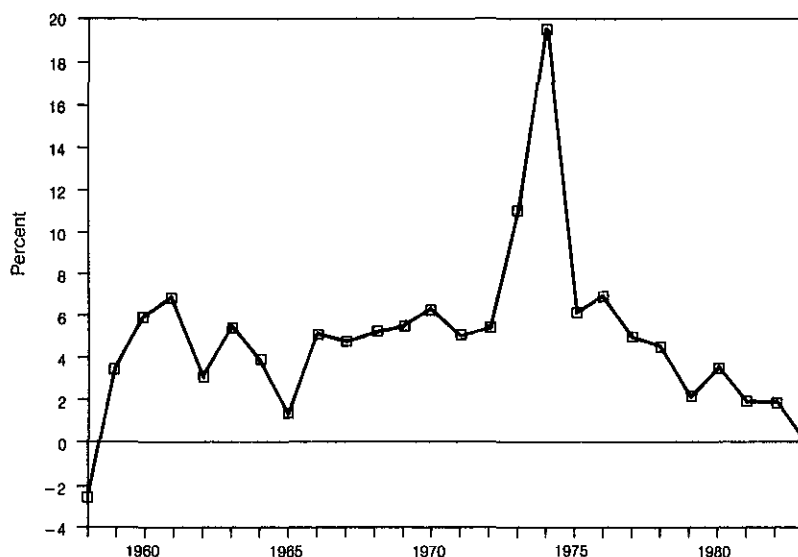
**FIGURE 1**  
**MONEY STOCK AND GNP (NOMINAL AND REAL) IN JAPAN**



Notes: Growth rates of money stock and GNP are calculated not against the previous quarter, but against the same quarter in the previous year. Data on M2 + CDs (before 1979/1, "M2" data) are an average of end-of-month observations. For example, the first quarter is an average of the data at the end of January, February, and March.

SOURCE: Suzuki (1985).

FIGURE 2  
ANNUAL RATES OF PRICE CHANGE IN JAPAN (Q3), 1957-83



fluctuating exchange rate regime. Reduced variability of actual values does not assure, however, that consumers and producers bear less uncertainty. A more relevant measure of comparative uncertainty under fixed and fluctuating exchange rates comes from a comparison of the quality of forecasts of prices and output under the two regimes. This section compares the variance of forecast errors in the United States and Japan under fixed and fluctuating exchange rates.

Forecasts are made using a univariate Kalman filter to predict the level of prices, output, and other variables one quarter ahead. The period studied is 1957-83 for Japan and 1960-85 for the United States. The forecasting model uses Bayesian learning to revise the statistical model quarterly after the forecast error is known. Forecasts do not rely on any data for the period beyond the date of the forecast; in this sense, they are true forecasts that could have been made if the statistical model had been available.<sup>7</sup> Eduard Bomhoff (1983) gives a description of the forecasting model.

<sup>7</sup>Comparison with forecasts made using econometric models of the economy and other techniques suggests that the forecasts are relatively efficient. The forecasting model estimates the probability of changes in growth rate, permanent changes in level, and transitory changes in level, and then combines these forecasts.

Figures 3A through 3D show the forecast errors for the logarithm of real output in Japan and the United States under different monetary and exchange rate regimes. I have ended the fixed exchange rate regime in third quarter 1971 with the closing of the U.S. gold window. A reasonable case can be made that the fluctuating rate regime did not begin before first quarter 1973, but I have used fourth quarter 1971 as the start of fluctuating exchange rates. Real GDP is the measure of output for Japan (JAPRGDP), and real GNP is used for the United States (USRGNP).

Comparison of the charts shows a striking decline in the forecast error for Japan. The standard deviation of the forecast error declined from more than twice the standard deviation of the U.S. forecast error under fixed exchange rates to less than 60 percent of the standard deviation for the United States in the periods of pre-announced monetary projections and fluctuating exchange rates.<sup>8</sup> For the fluctuating rate period as a whole, the standard deviations of forecast errors are slightly smaller for Japan than for the United States.

Japan experienced many of the same shocks as the United States and, like the United States and other countries, Japan has experienced financial deregulation and the effects of variable exchange rates. These events, however, have not increased the variability of real output growth in Japan or increased the difficulty of forecasting. On the contrary, Japan has succeeded in reducing variability of output both relative to its own past and relative to the United States. As output in Japan became more predictable, risks faced by consumers and producers fell.

Figures 3C and 3D suggest that the variability of forecast errors rose in the United States after 1971, and computations confirm that the standard deviation of the forecast error increased by 40 percent. The relative decline in the variability of the forecast error for Japan is, then, a mixture of the decline in the standard deviation for Japan and the rise in the standard deviation for the United States.

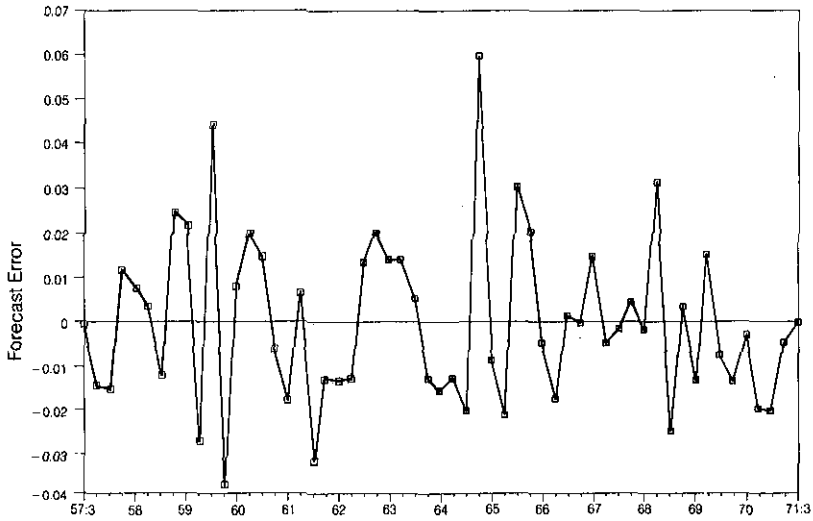
A plausible explanation of the change in the comparative variability of output in Japan and the United States under the different monetary and exchange rate regimes begins with the different effects of the change in monetary regime on the two countries. For Japan, the shift from fixed to fluctuating exchange rates provided an opportunity to increase control over the money stock; Japan used the opportunity to reduce variability in prices and output, and to increase predictability. The Bank of Japan announced, and generally

<sup>8</sup>The United States began announcing monetary targets in April 1975, about the same time that the Bank of Japan began making projections.

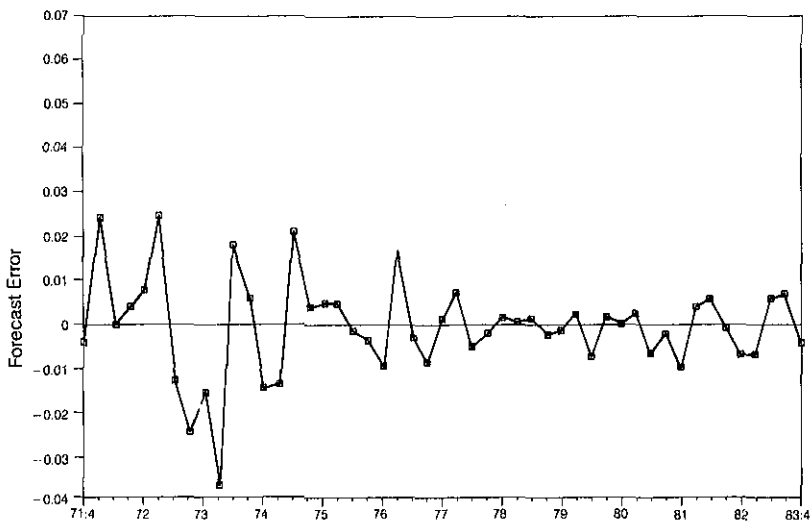


MONETARY AND EXCHANGE RATE REGIMES

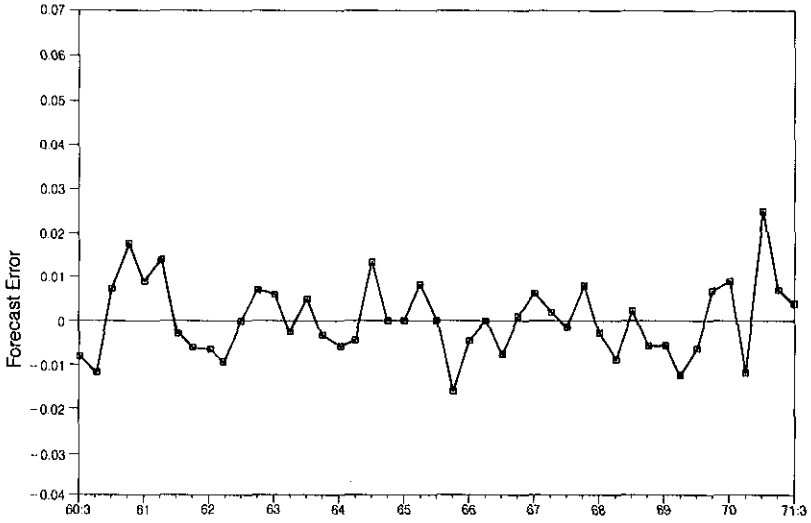
**FIGURE 3A**  
FORECAST ERRORS IN JAPRGDP,  
1957:3-1971:3



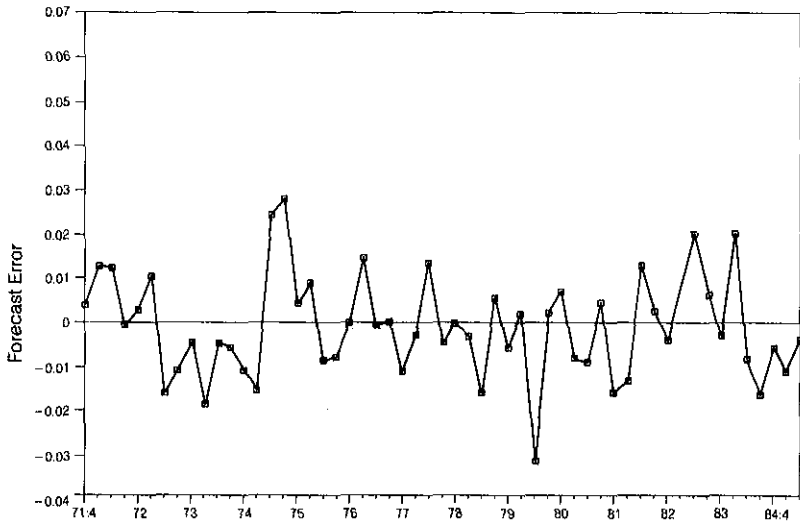
**FIGURE 3B**  
FORECAST ERRORS IN JAPRGDP,  
1971:4-1983:4



**FIGURE 3C**  
**FORECAST ERRORS IN USRGNP,**  
**1960:3-1971:3**



**FIGURE 3D**  
**FORECAST ERRORS IN USRGNP,**  
**1971:4-1985:2**



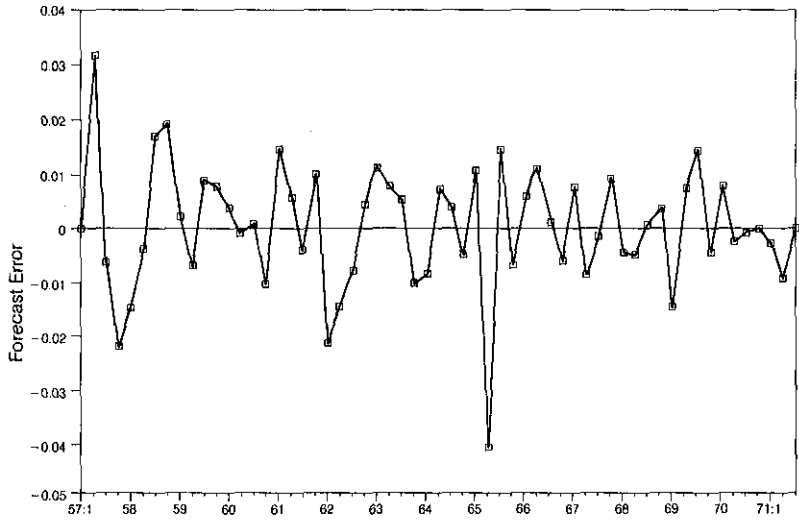
produced, rates of money growth close to its projections. As a result, the credibility of monetary policy increased. The switch from dirigiste policies of credit allocation to increased emphasis on market allocation and smaller budget deficits probably reinforced the effects of monetary change. For the United States, on the other hand, the shift to fluctuating exchange rates was much less important; the Federal Reserve continued to focus on domestic interest rates under the new exchange rate regime. Under fluctuating rates, the Fed has typically ignored its pre-announced monetary targets (as shown in Table 1), just as it had ignored its commitments to respond to the capital outflow during the fixed exchange rate regime. Before 1971, the capital account of the balance of payments and the growing stock of dollars had great influence on Federal Reserve statements but little influence on its actions. After 1975, the Fed talked about monetary targets but, generally, continued the policy of controlling short-term interest rates, free reserves, or member bank borrowing.

Figures 4A through 4D, which show standard deviations for the forecast errors of the logarithm of the price deflator in Japan and the United States, tell a similar story. Notice that the scale for Figure 4C differs from the others; the variability of forecast errors for U.S. prices under the fixed exchange rate system is much lower than under fluctuating rates. The standard deviation of the forecast error approximately doubled following the shift to fluctuating rates. For Japan, the results are exactly opposite; a comparison of the fixed exchange rate period with the period of fluctuating rates and monetary projections indicates that the standard deviation of forecast errors for the latter period is approximately half the standard deviation for the earlier period. The standard deviation for Japan reaches the same level as that for the United States under fluctuating exchange rates and monetary announcements. Despite the many changes in the external environment, Japan was able to achieve lower price variability and greater predictability both absolutely and relative to the United States.

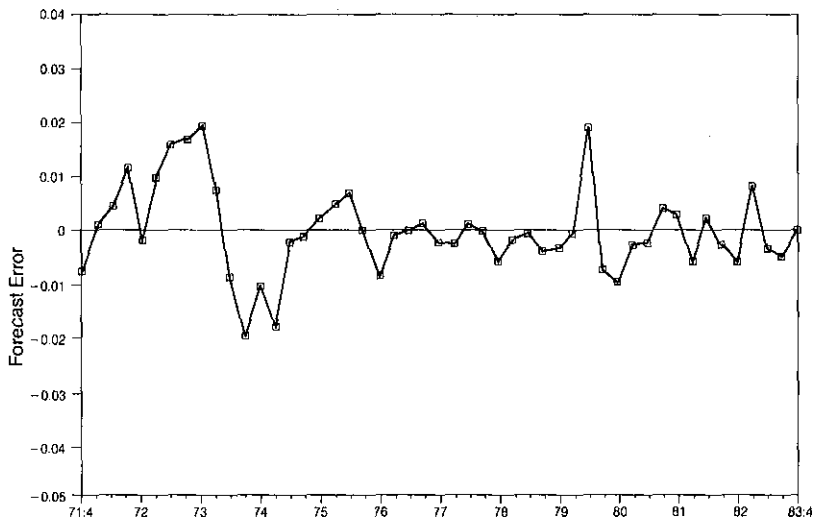
The reduction in the variability of prices and output in Japan is not directly the result of reduced variability of money. Although the Bank of Japan announced values of  $M2$  or  $M2 + CDs$ , I used  $M1$  for comparability with the United States data. This has the benefit of keeping the concept of money more nearly comparable for the two countries, but it has the disadvantage of emphasizing a different measure of money than the one used by the Bank of Japan.

The shift to fluctuating exchange rates did not change the standard deviation of quarterly forecast errors for  $M1$  either for Japan or the United States. The standard deviations are smaller for the United

**FIGURE 4A**  
**FORECAST ERRORS IN JAPANESE PRICE DEFLATOR,**  
**1957:1-1971:3**

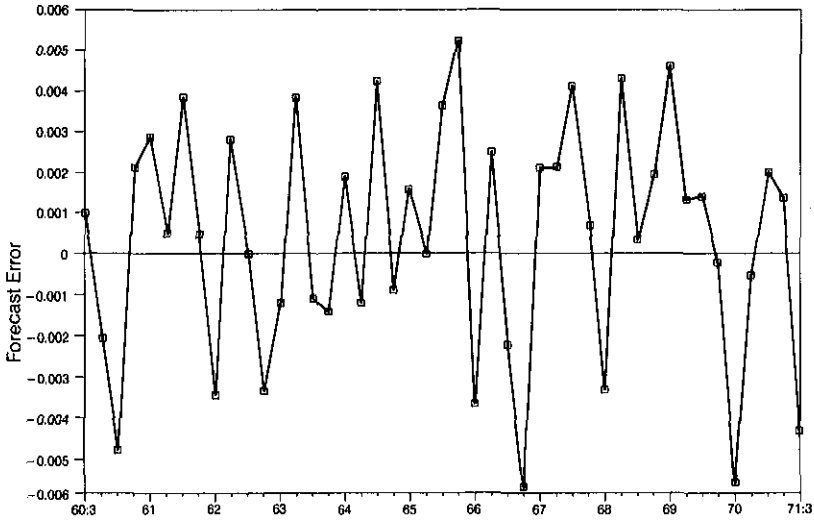


**FIGURE 4B**  
**FORECAST ERRORS IN JAPANESE PRICE DEFLATOR,**  
**1971:4-1983:4**

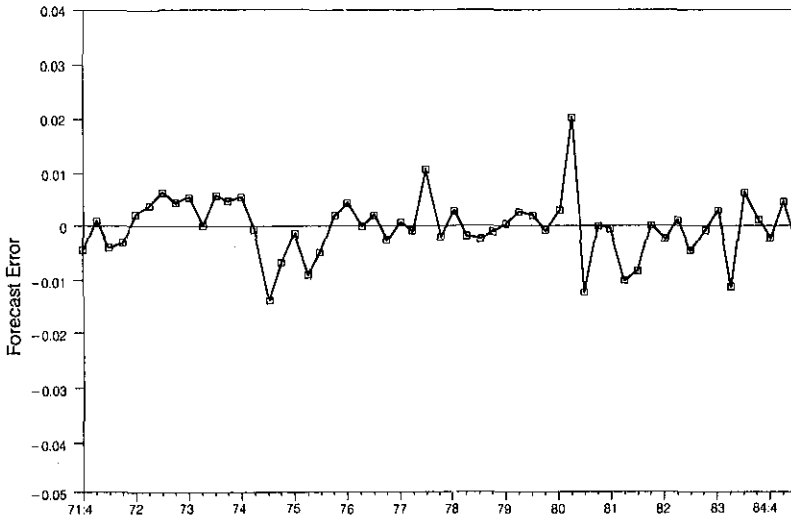


MONETARY AND EXCHANGE RATE REGIMES

**FIGURE 4C**  
FORECAST ERRORS IN U.S. PRICE DEFLATOR,  
1960:3-1971:3



**FIGURE 4D**  
FORECAST ERRORS IN U.S. PRICE DEFLATOR,  
1971:4-1985:2



States than for Japan under both fixed and fluctuating rates. However, the difference between the two countries is not relevant because the U.S. data are based on quarterly averages, while data for Japan are not.

What, then, is the explanation of reduced variability in Japan and of the differences between Japan and the United States following the change in monetary regimes? My procedure does not provide a complete answer to the question, since the univariate estimates do not constrain the forecasts of money, velocity, prices, and output to be consistent. Nevertheless, my calculations do point to two changes that accompanied the reduced forecast errors for prices and output in Japan and contributed to the reduced variability in Japan.

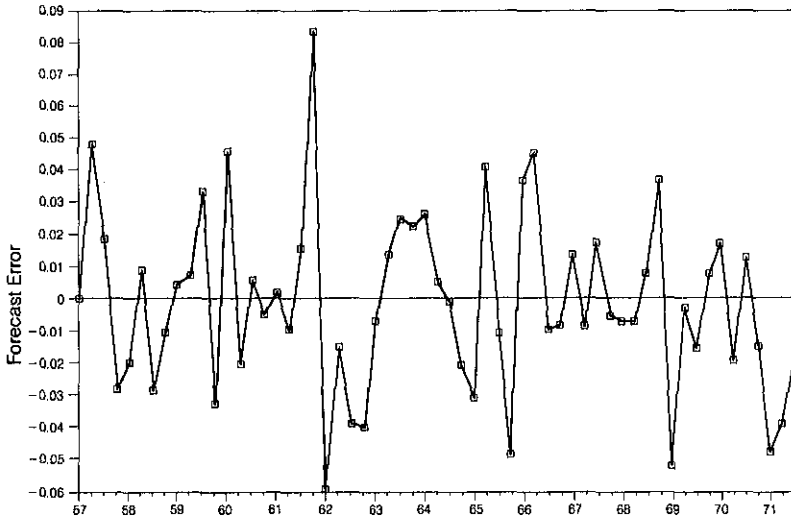
First, the variability of forecast errors for velocity declined by more than 20 percent in Japan (see Figures 5A and 5B) but rose by 25 percent in the United States. The decline for Japan is consistent with the increased credibility of monetary policy in Japan. With increased credibility, people act on the belief that the Bank of Japan will maintain monetary policy on the projected path and achieve price stability or low inflation. Such beliefs have been reinforced by the Bank's actions and perhaps also by the decline in government spending as a share of GNP. With increased credibility, fluctuations in the money stock and other disturbances are followed by smaller and less frequent shifts in the demand for money per unit of output, thereby reducing the variability of changes in velocity and of forecast errors of velocity.<sup>9</sup> The credibility of monetary policy in the United States, while perhaps higher now than in the late 1970s, is probably lower than it was during the period of low inflation in the 1960s. Substantially greater resources were allocated to Fed watching during the years of inflation and disinflation, and these costs are still being incurred. The variability of velocity changes no doubt would be reduced in the United States, and the predictability of velocity increased, if the Fed's policy actions were more stable and predictable.

Second, the covariance between Japanese price and output errors increased in magnitude and became negative after 1971. Estimates of the correlation between the forecast errors are .04 and  $-.37$  for Japan in the two periods and .08 and  $-.08$  for the United States (Meltzer 1985, p. 25). The negative covariances doubtless reflect the influence of the oil shocks. A larger negative covariance of price and output shocks (or errors of forecast), with unchanged variance of monetary and velocity shocks, is consistent with lower variability of

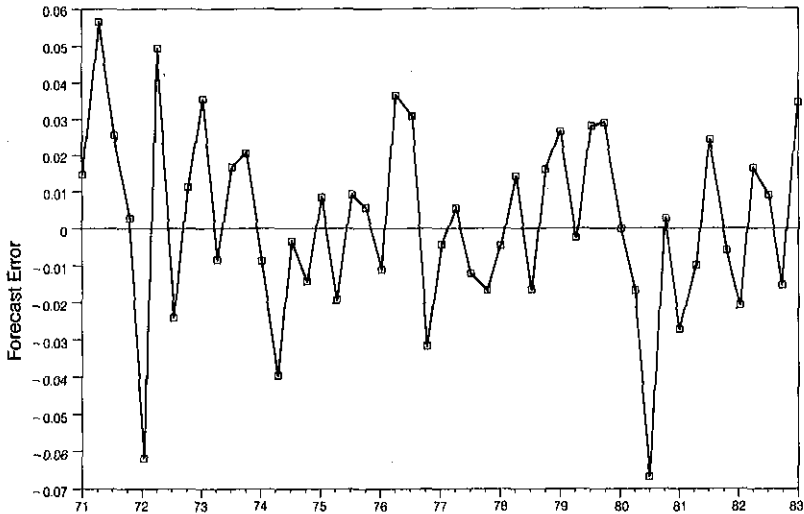
<sup>9</sup>According to Suzuki (1985, p. 8): "people have become confident in the Bank of Japan's will and ability to prevent homemade inflation and to keep price stability."

MONETARY AND EXCHANGE RATE REGIMES

**FIGURE 5A**  
**FORECAST ERRORS IN JAPANESE V1,**  
**1957:1-1971:3**



**FIGURE 5B**  
**FORECAST ERRORS IN JAPANESE V1,**  
**1971:4-1983:4**



price and output shocks.<sup>10</sup> In fact, the variability of velocity shocks fell in Japan, as noted earlier.

If the Bank of Japan had responded to the oil shocks by expanding money and aggregate demand, the covariance between price and output shocks would have been less negative. We have no way of assigning a magnitude to the hypothetical change in covariance, but it is not implausible that an effort to raise aggregate demand by monetary means following the oil shocks would have increased the variability of money, prices, and output, and increased the variability of forecast errors. U.S. experience is consistent with this interpretation. In this sense, Japan's monetary policy contributed to the observed negative covariance by maintaining a relatively stable, predictable path of disinflation, and allowing the shocks to pass through.

## Conclusion

The experience of Japan and the United States under fixed and fluctuating exchange rates has been dissimilar. The variability of forecast errors of prices and output in Japan declined following the shift to fluctuating exchange rates. Variability in Japan declined further after the Bank of Japan adopted a policy of announcing and then achieving projections for monetary growth. For the United States the variability of forecast errors of prices and output was higher under fluctuating exchange rates than it was under fixed rates. The Federal Reserve generally did not achieve announced targets for money growth, and variability did not decline after announcements began.

Comparison of these different experiences suggests two conclusions. The first concerns the effect of fluctuating exchange rates on the variability of prices and output and on the choice of policy. The second concerns the result achieved under different policy arrangements and different roles assigned to the policymaker.

If the variability of consumption is positively related to the variability of income, as may be expected, the shift to fluctuating exchange rates was followed by increased consumer welfare in Japan. For the United States, this reasoning suggests that consumer welfare declined. Since both countries were subject to similar large shocks, the explanation of the difference must lie elsewhere. This paper suggests that the more credible monetary policies in Japan contributed to lower variability and improved forecasting accuracy, in part by reducing fluctuations in the demand for money and monetary velocity. Con-

<sup>10</sup>Using logarithms and standard notation,  $M + V = p + y$ . The variance of each sum is equal to the sum of the variances plus twice the covariance. Taking square roots of each side leads to the proposition in the text.



## MONETARY AND EXCHANGE RATE REGIMES

versely, the more variable policies in the United States reduced predictability and increased uncertainty.

Japan has reduced the power of the central bank to allocate resources but increased its power to control aggregates. In the early postwar years, and during much of the fixed exchange rate period, the Bank of Japan had responsibility for allocating credit, controlling interest rates on a wide variety of assets, allocating foreign exchange, and regulating many of the details of financial activity. Deregulation of interest rates and other aspects of financial activity reduced these allocative powers. In recent years, under fluctuating rates, the Bank of Japan has sought to control a particular definition of money so as to reduce inflation or maintain price stability. By gradually reducing money growth, Japan was able to reduce inflation without experiencing a recession. Instead of trying to coordinate fiscal expansion with monetary contraction, Japan reduced both monetary and fiscal stimulus. Output continued to grow along a relatively stable path, and both prices and output were more predictable and less variable than under the previous, more dirigiste regime.

Japan has been able, much of the time, to resist pressures from the United States for more activist, less stable policies. The recent multinational effort to influence bilateral exchange rates suggests that the period of stable, predictable policies has ended for the present. Past experience in Japan suggests that a renewed attempt to control or influence exchange rates will increase variability, reduce the predictability of prices and output, and lower consumer welfare.

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