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# Lessons from the Experience of Japan and the United States under Fixed and Fluctuating Exchange Rates\*

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## I. Introduction

From the early postwar years to August 1971, Japan maintained a fixed exchange rate against the dollar. After August 1971, 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.

My comments are confined to the working of the fixed and fluctuating rate systems prior to the recent change. Most of my discussion concerns Japan. There are four reasons. First, Japanese monetary experience is less familiar to us than U.S. experience. The experience is very different, in part I believe, reflecting differences in policy.

Second, and more importantly, Japanese experience offers some lessons that policymakers here can study with profit for all of us. Japan succeeded in reducing the rate of inflation (GNP deflator) from more than 20% in 1974 to between 0% and 2% in recent years. Although real output fell in 1974, at the time of the First Oil Crisis, the growth rate of output remained between 3 and 5% during most of the disinfla-

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tion. Japan followed a policy of consistent, gradual reductions in the rate of monetary 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. I have already noted one 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 monetary growth. Japan was able to achieve relatively stable growth, declining inflation and high employment by following stable pre-announced policies. This contrasts, markedly, with the experience of the United States, 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 are considerably lower under fluctuating than under fixed exchange rates. This finding calls into question many official (and unofficial) statements about some of the alleged costs of fluctuating exchange rates.<sup>1</sup> Evidence that is more relevant comes from relatively efficient *ex ante* forecasts and computed forecast errors. These data show that the variance of forecast errors of prices and output has been lower in Japan under fluctuating than under fixed exchange rates. Together, the evidence suggests that output and prices became more stable and more predictable following the shift to fluctuating exchange rates.

## II. Financial Policy

Japan's postwar, financial history includes 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>

1. 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.
2. Suzuki (1980) has a more complete discussion of these arrangements.

During the first postwar decades, Japan favored economic development over economic freedom. A relatively high rate of saving was used to develop capital in favored sectors. While the description of Japan as a monolith run by a central planning group at one of the ministries 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. Currently, Japan is a market economy with a disciplined and effective monetary policy. 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. Recently, open market operations have become a more important means of implementing monetary policy; “window guidance” now has a smaller role than in the past.

The Bank of Japan has increased the emphasis on the control of money in the last ten years. Bank officials prefer to use the term “projections” and to avoid the term “targets” in discussions of monetary control practices.<sup>3</sup> From 1975 to 1979, the Bank projected the growth rate of  $M_2$ . Since 1979, projections have been made for  $M_2 + \text{CDs}$ . Each quarter the Bank announces the projected annual rate of growth of  $M_2 + \text{CDs}$  for the four quarters ending one quarter ahead. There is only one projection. The Bank does not announce banks and does not shift the base from which projections start to give the illusion of a less expansive policy, as is common in the United States. Projections generally show a declining trend. Actual rates of monetary growth are close to the projected rates for most years.

In contrast, the Federal Reserve announces many targets with upper and lower bands for each. The base, or starting point for the projected growth rates, changes annually and, at times, adjustments are made at mid-year. Statements and interpretations of the announcements are used to give the impression of more precise control than the Federal Reserve has been able to achieve.<sup>4</sup> These procedures and statements increase uncertainty about monetary policy and the Federal Reserve’s intentions.

Another contrast between Japan and the United States is in observer’s response to announcements. Federal Reserve announcements are followed by speculation and interpretation by so-called Fed watchers. Much of the speculation questions the intentions of the Federal Reserve and the credibility of the announcements.<sup>5</sup> The Bank of Japan’s announcements have been more accurate indicators of future ac-

3. Suzuki (1985) discusses practices used before the September 1985 agreement.

4. Examples are statements the policy will aim for the upper (or lower) end of the target band.

5. An analysis of the credibility problem when there are announced targets is Cukierman - Meltzer (1986).

tions, so there is much less speculation following announcements.

A principal reason for 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%. Under the policy of announcing monetary projections and gradually, persistently decelerating monetary growth, inflation was reduced to about 1% without a recession.<sup>6</sup> During the years of declining inflation, Japan, like the United States experienced the oil crisis following the ouster of the Shah of Iran in 1979 and the demand shock following President Carter's use of credit controls in 1980. Japan, like the United States, has moved to a less regulated financial system, although at a slower rate (Suzuki (1986)). Japan, like the United States, had shifted earlier from a fixed to a fluctuating exchange rate. While the Bank of Japan regularly buys and sells 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 monetary growth. This evidence, like the more detailed studies in Meltzer (1986), suggests that the Bank of Japan did not intervene to affect the value of its currency. The principal exceptions are periods in which they were pressed by the Carter, and more recently by the Reagan, administration to appreciate the yen relative to the dollar.

Table 1 shows the actual and announced rates of monetary growth in Japan and the United States for the years 1979 to 1984. In all years shown, Japanese monetary

**Table 1 Projected and Actual Rates of Monetary Growth (%)**

Year*	Japan ( $M_2$ or $M_2 + \text{CDs}$ )		United States ( $M_1$ or $M_1 B$ )	
	Projection	Actual	Projection	Actual
1979	11	11.2	3-6	7.5
1980	8	7.8	4-6.5	7.3
1981	10	10.6	6-8.5	5
1982	8	8.1	2.5-5.5	8.5
1983	7	7.2	5-9	10.4
1984	8	7.9	4-8	5.2

\*Years ending in fourth quarter

Source: Bank of Japan and International Monetary Fund

6. 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.

growth rates are close to projections and are generally declining. In contrast, U.S. monetary growth is hardly ever within the target band, and usually monetary growth exceeded the target. U.S. growth rates are projected a year in advance, however, while Japanese growth rates are made after most of the year has passed.

Suzuki (1985) presents evidence on thirty years of Japanese performance. Figure 1 reproduces the growth rates of money, nominal and real output from his paper. The rate of change of the price deflator can be read from the vertical distance between nominal and real output, as shown on the figure. Rates of change shown on the figure 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.

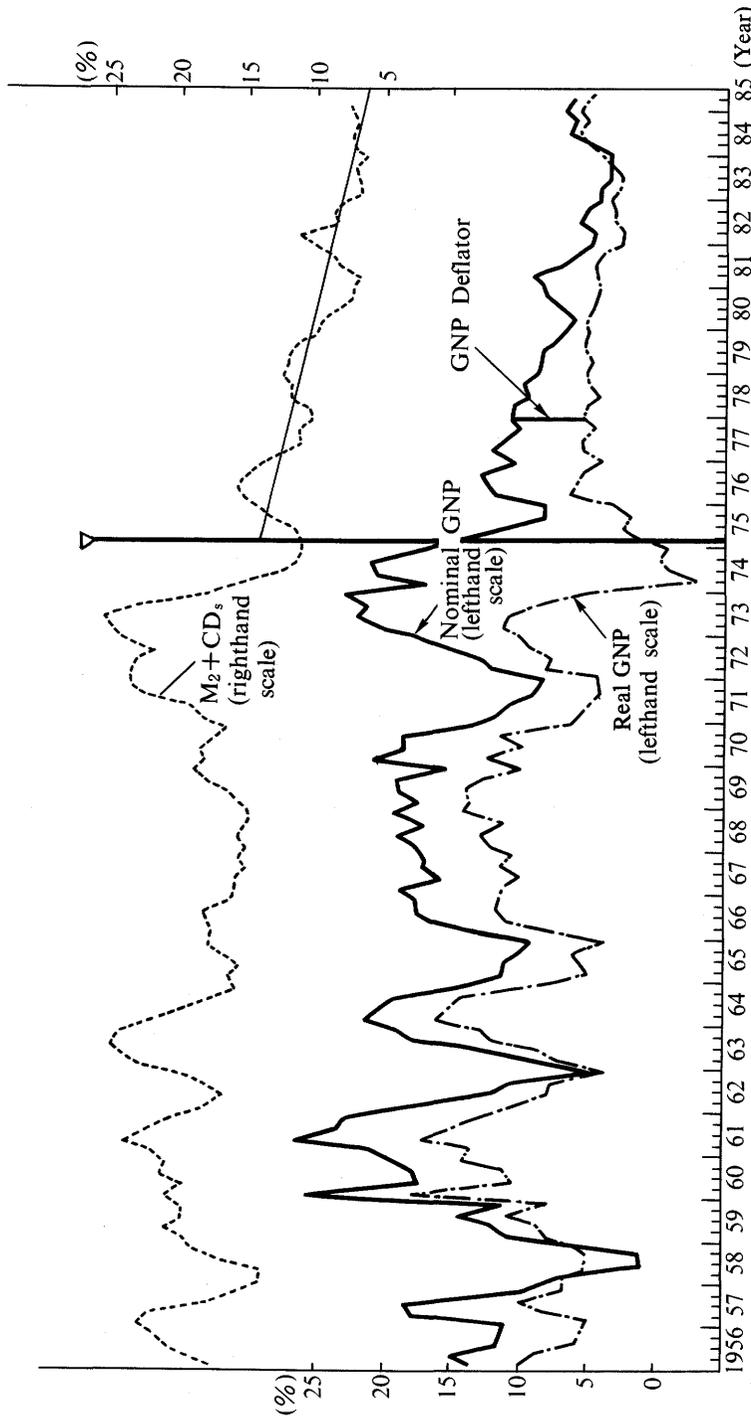
The vertical line on Figure 1 with the small triangle at the top marks the date in early 1975 when the Bank of Japan shifted to a policy of monetary control and pre-announced monetary projections. Three major changes are apparent following the change in policy procedures. First, the variability of money 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, Suzuki has drawn a trend line showing the persistent decline in the rate of monetary growth. Growth of nominal GNP follows approximately the same trend rate of decline, while real growth remains approximately constant. The clear implication is that the rates of monetary 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 (III) and fourth (IV) quarters of each year. Annual rates of price change reached a peak of 20% in third quarter 1974, following the First Oil crisis. The end of the one-time shock and the sharp reduction in monetary growth produced a return to the previous average rate of inflation within a year. Thereafter, steady reduction in monetary 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.

### III. Forecast Errors

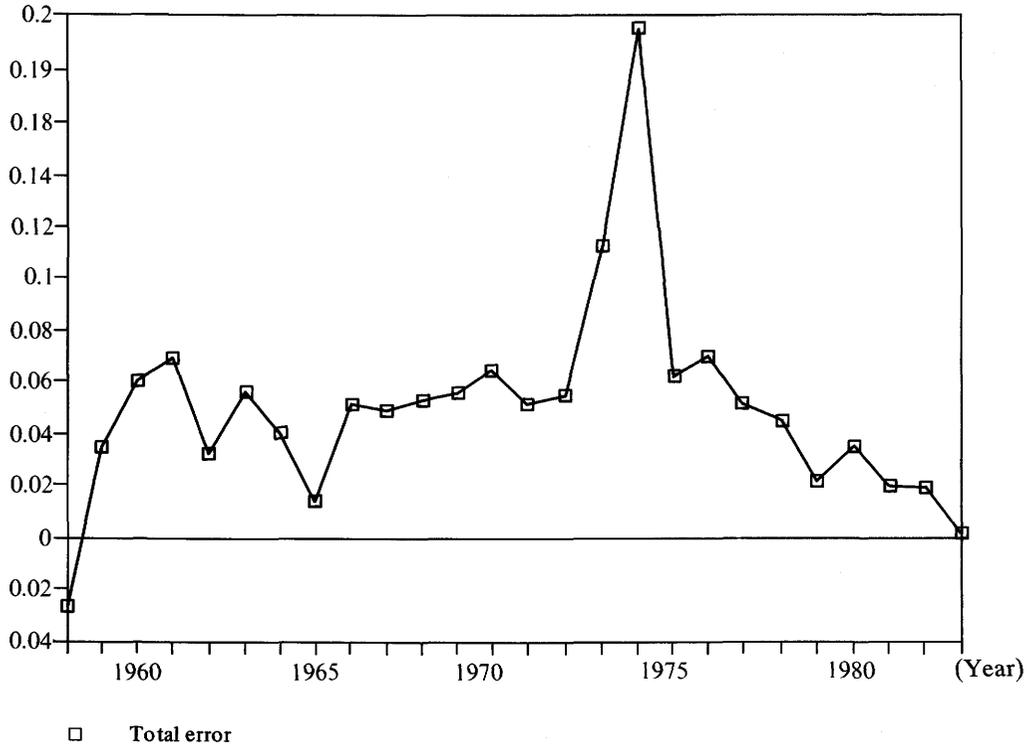
Comparison of the reported rates of change provides evidence of the reduction in variability in Japan under the fluctuating exchange rate regime. Reduced variability of actual values does not assure, however, that consumers and producers bear less uncertainty. A more relevant measure of comparative uncertainty 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

Figure 1 Money Stock and GNP (Nominal and Real) in Japan

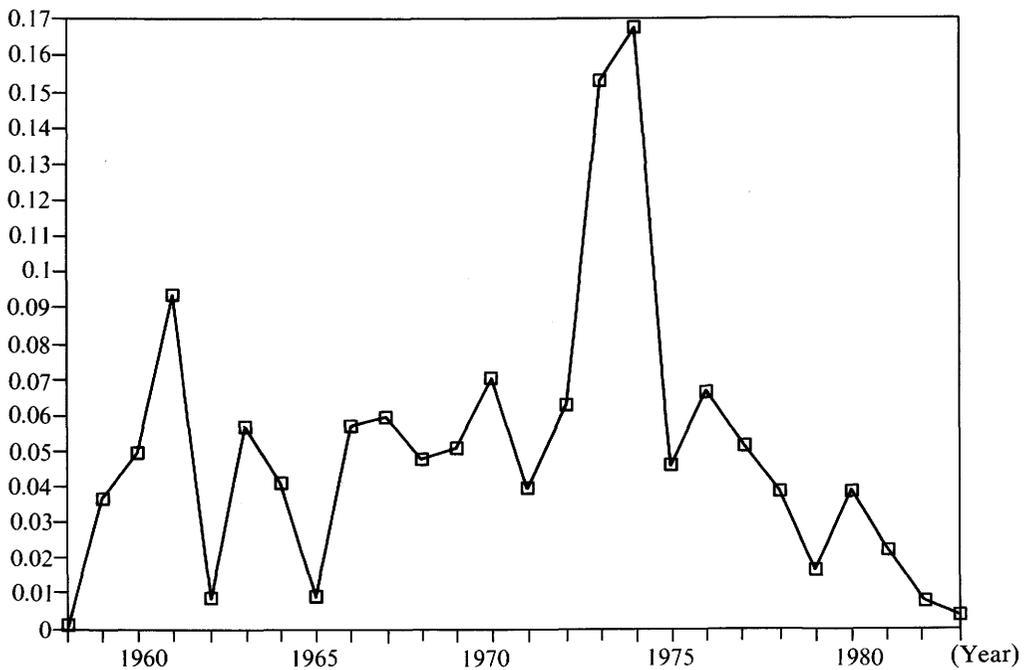


Notes: 1. Growth rates of money stock and GNP are calculated not against the previous quarter, but against the same quarter in the previous year.  
 2. "M<sub>2</sub>+CDs" data (before 1979.1, "M<sub>2</sub>" data) are an average of end-of-month observation. For example, the first quarter is an average of the data of the end of January, February and March.

**Figure 2 Growth in Price (Japan)**  
**a. 1957 III – 1983 III**



**b. 1957 IV – 1983 IV**



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 to 1983 for Japan and 1960 to 1985 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> Bomhoff (1983) gives a description of the forecasting model.

Figures 3-4 show the forecast errors for the logarithm of real output in the two countries under the two monetary 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 (Figure 3) is the measure of output for Japan, while real GNP (Figure 4) is used for the United States.

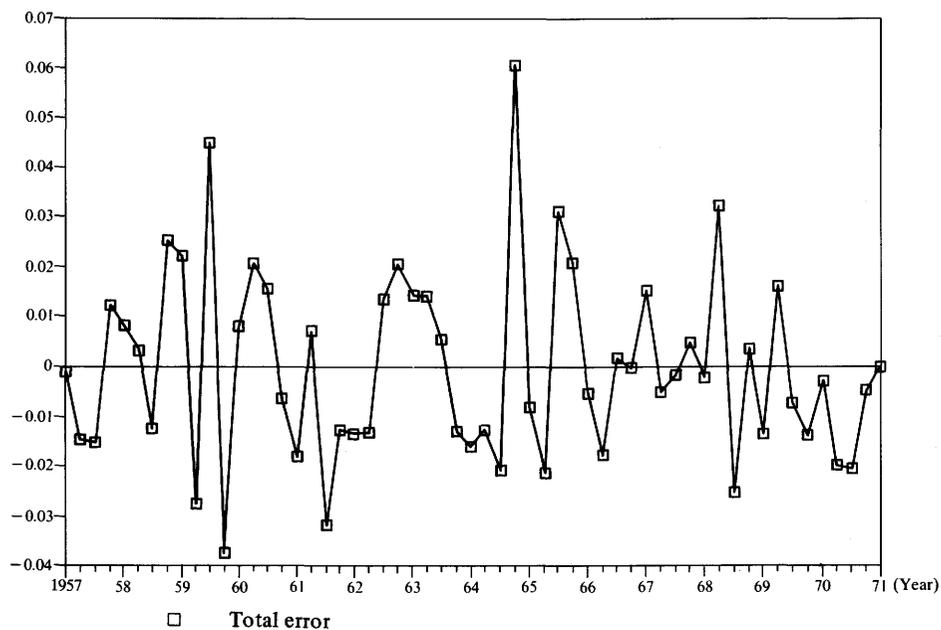
Comparison of the figures shows a striking decline in the forecast error for Japan. The standard deviation of the forecast error declined from more than twice the standard deviation of the U. S. forecast error under fixed exchange rates to less than 60% of the standard deviation for the United States 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 and, like the United States and other countries, Japan has experienced financial deregulation and the effects of variable exchange rates. These events have not increased the variability of real output growth 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.

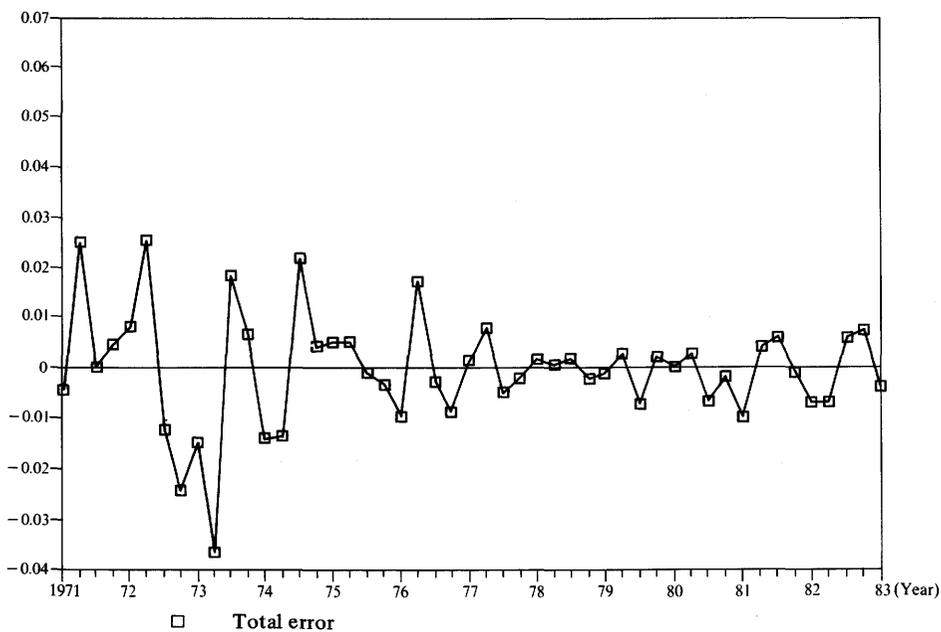
The figures for the United States suggest that the variability of forecast errors rose in the United States after 1971, and computations confirm that the standard deviation of the forecast error increased by 40%. The relative decline in the variability of the forecast error for Japan is, then, a mixture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

7. 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 combines these forecasts.
8. The United States started announcing monetary targets in April 1975, about the same time that the Bank of Japan began making projections.

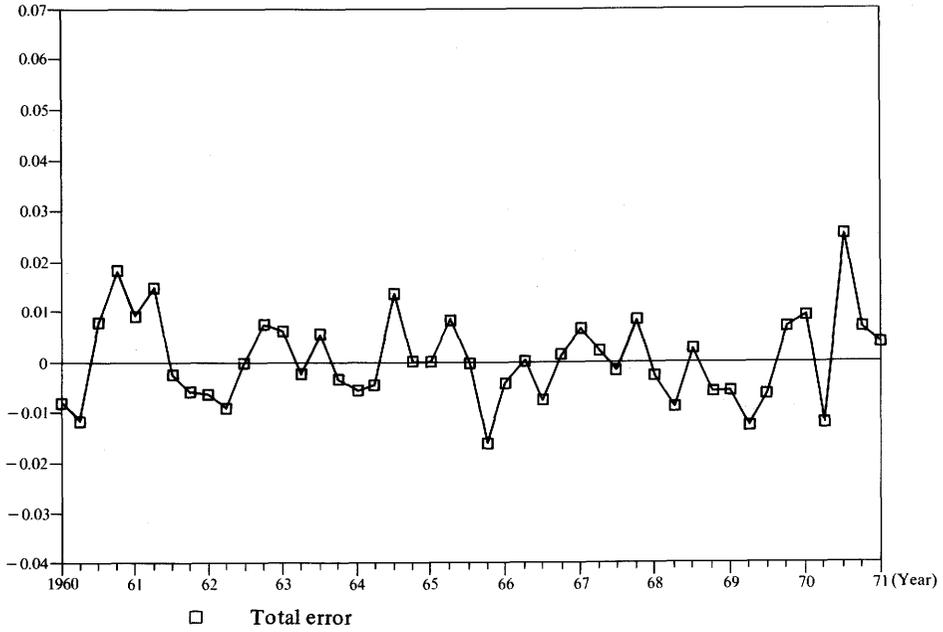
**Figure 3 Errors in Real GDP (Japan)**  
**a. 1957 III – 1971 III**



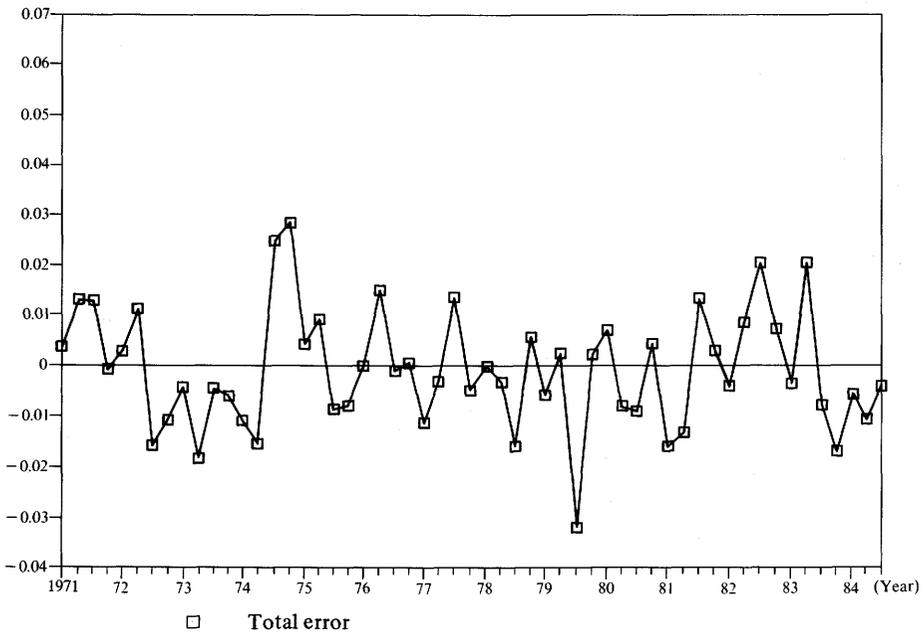
**b. 1971 IV – 1983 IV**



**Figure 4 Errors in Real GNP (U.S.)**  
**a. 1960 III – 1971 III**



**b. 1971 IV – 1985 II**



deviation for Japan and the rise in the standard deviation for the United States.

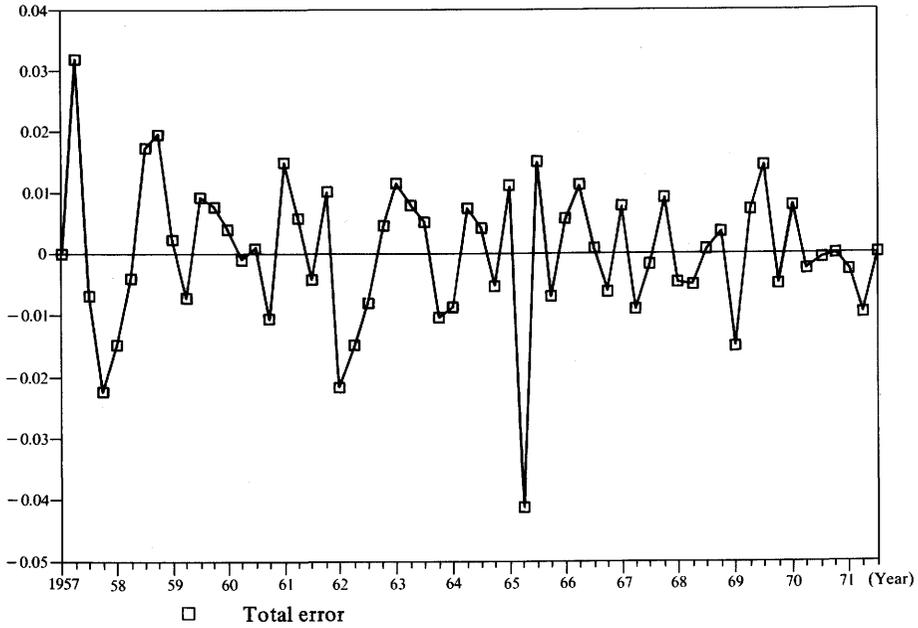
A plausible explanation of the change in the comparative variability of output in the two countries under different regimes starts with the different effects of the change in monetary regime on the two countries. For Japan, the shift from fixed to fluctuating exchange rates provided an opportunity to increase control over the money stock, and it used the opportunity to reduce variability and increase predictability. The Bank of Japan announced, and generally produced, rates of monetary growth close to its projections. The credibility of monetary policy increased. The turn from dirigible 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, the shift to fluctuating exchange rates is much less important. Federal Reserve policy focussed mainly on domestic interest rates under both regimes. Under fluctuating rates, the Federal Reserve typically ignored its announced targets, as shown in Table 1, just as it had ignored its commitments to respond to the capital outflow, in the interest of exchange rate stability, 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 Federal Reserve talked about monetary targets but, generally, continued the policy of controlling short-term interest rates, free reserves or member bank borrowing.

The next Figures 5-6, showing standard deviations for the forecast errors of the logarithm of the price deflator in each country, tell a similar story. In reading these figures, notice that the scale for Figure 4c differs from the others; 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; if we compare the fixed exchange rate period to the period of fluctuating rates and monetary projections, 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 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.

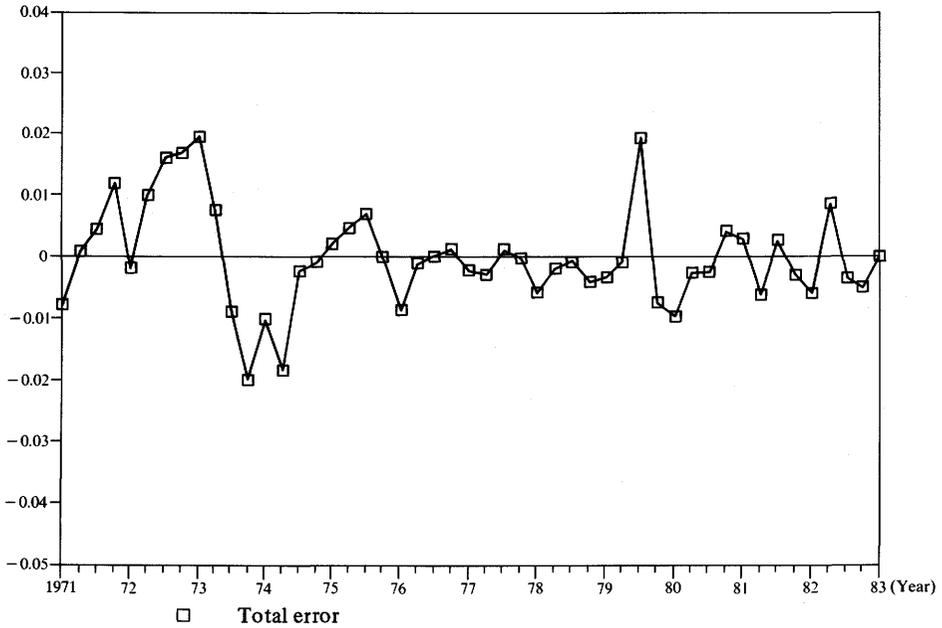
The reduction in the variability of prices and output in Japan is not the result of reduced variability of money. Although the Bank of Japan announced values of  $M_2 + \text{CDs}$ , I used  $M_1$  to compare to the United States. This has the benefit of keeping the concept of money more nearly comparable 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

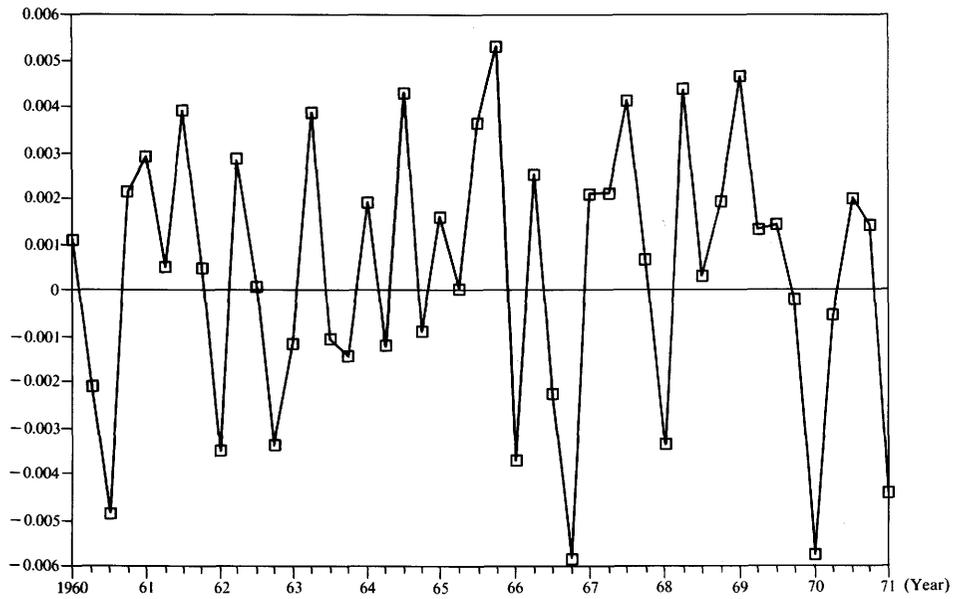
**Figure 5 Errors in Price (Japan)**  
**a. 1957 I – 1971 III**



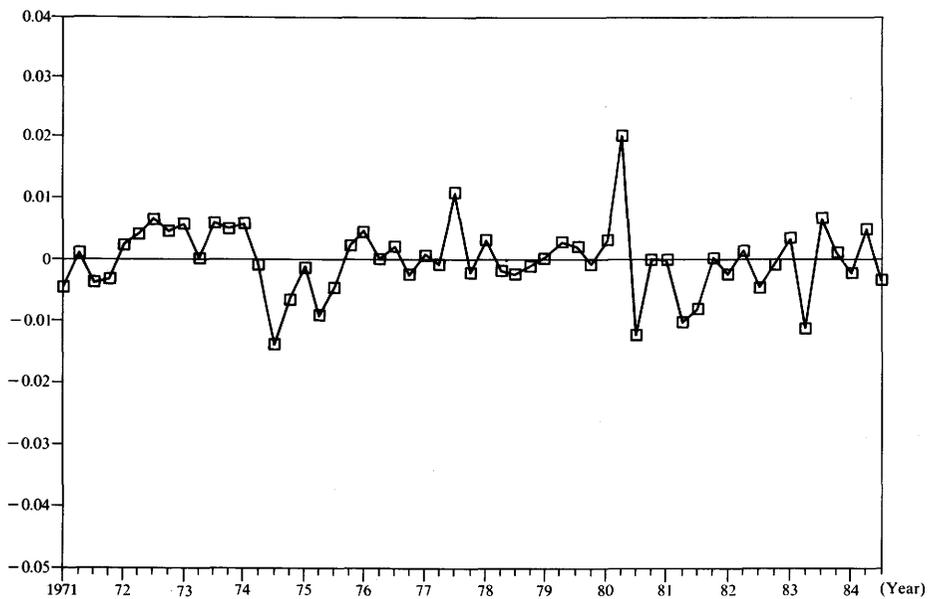
**b. 1971 IV – 1983 IV**



**Figure 6 Errors in Price (U.S.)**  
**a. 1960 III – 1971 III**



**b. 1971 IV – 1985 II**



quarterly forecast errors for  $M_1$  either for Japan or the United States. The standard deviations are smaller for the United States than for Japan under both fixed and fluctuating rates. The difference between the two countries is not relevant, however. The reason is that data for the United States are based on quarterly averages, while data for Japan are not.

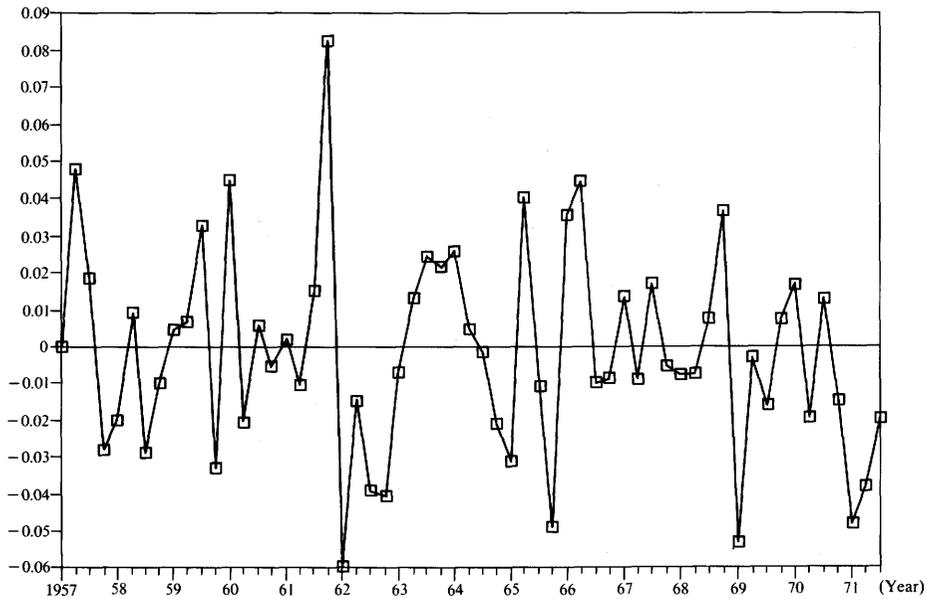
What, then, is the explanation of reduced variability in Japan and of the differences between Japan and the United States following the change in monetary regime? My procedure does not provide a complete answer to the question, since the univariate estimates do not constrain the forecasts of money, velocity, prices and output to be consistent. Nevertheless, the calculations 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 (see Figure 7) declined by more than 20% in Japan but rose by 25% in the United States. The decline for Japan is consistent with 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. Bank of Japan actions reinforced these anticipations, and perhaps they were reinforced 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, 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 in the low inflation period of the sixties. Substantially greater resources were allocated to Fed watching during the years of inflation and disinflation, and these costs are still incurred. It would not be surprising to find that, if policy actions were more stable and predictable, the variability of velocity changes would be reduced and the predictability of velocity increased.

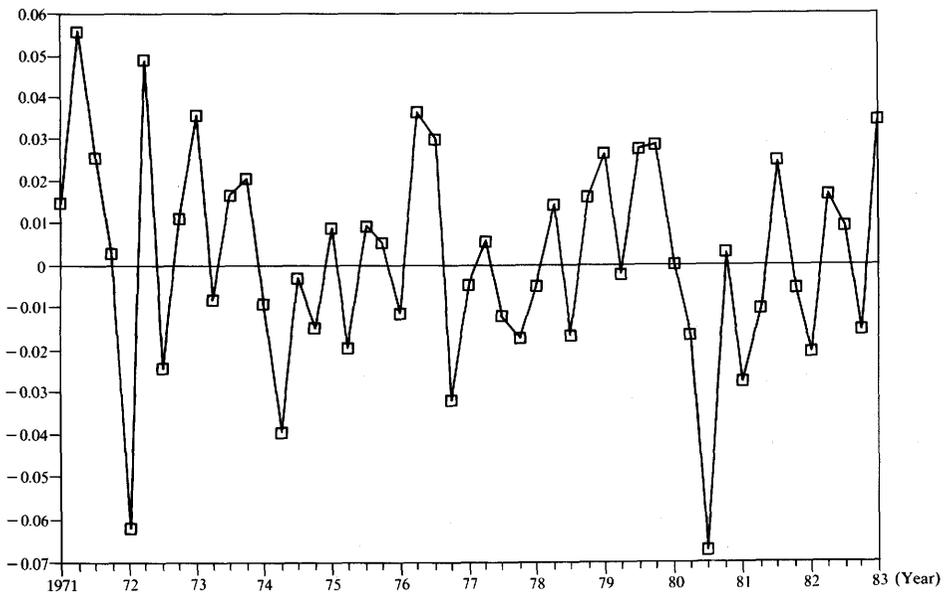
Second, for Japan, the covariance between price and output errors decreased in magnitude and became negative after 1971. Estimates of the correlation between the forecast errors are 0.04 and  $-0.37$  for Japan in the two periods and 0.08 and  $-0.08$  for the United States (Meltzer (1985, p.25)). The negative covariances doubtless reflect the influence of the oil crisis. 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 price and output shocks. In fact, the

9. Y. Suzuki of the Bank of Japan comments that "people have become confident in the Bank of Japan's will and ability to prevent homemade inflation and to keep price stability." See Suzuki (1985, p.8).

**Figure 7 Errors for Velocity (Japan)**  
**a. 1957 I – 1971 III**



**b. 1971 IV – 1983 IV**



variability of velocity shocks fell in Japan, as noted earlier.<sup>10</sup>

If the Bank of Japan had responded to the oil crises 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 crises would have made money, prices and output more variable and, thus, 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.

#### IV. 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 achieving projections for monetary growth. For the United States, the variability of forecast errors of prices and output were higher under fluctuating than under fixed exchange rates. The Federal Reserve generally did not achieve announced targets for monetary 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 welfare declined. Since both Japan and the United States 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. Conversely, the more variable policies in the United States reduced predictability and increased uncertainty.

Japan has reduced the power of the central bank of allocate resources but increased its power to control aggregates. In the early postwar years, and during

10. 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.

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 many 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 monetary 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 may represent a change toward multiple targets for monetary policy and greater uncertainty. Past experience in Japan suggests that a renewed attempt to control or influence exchange rates, should it occur, will increase variability, reduce the predictability of prices and output and lower welfare.

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