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Limits of Short-Run Stabilization Policy

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By

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LIMITS OF SHORT-RUN STABILIZATION POLICY PRESIDENTIAL ADDRESS TO THE WESTERN ECONOMIC ASSOCIATION, JULY 3, 1986

ALLAN H. MELTZER

The tradition in which many of us were raised is that policymakers should adjust policy actions based on forecasts of the future path of the economy and their best judgments. While some have become increasingly skeptical about our ability to forecast and some have long favored policy rules, here, as elsewhere, traditions die slowly.[1] Policy in the United States and in many other countries continues to be guided by policymakers' beliefs about the future, and their beliefs are often based on some type of forecast. The reader of the financial press frequently finds statements by economists and others linking forecasts to discretionary policy actions. Some recent examples comment on the current state of the economy.

> The economy needs more monetary stimulus to keep unemployment from rising. Fresh evidence of the economy's 'weakness' provides an additional reason for the Fed to ease credit conditions.[2]

We need not look to policymakers, the financial markets or newspapers. Some of the most distinguished members of our profession regularly propose adjustments of monetary and fiscal policy actions in response to forecasts of current or future conditions.

The case for rules has been stated many times, usually as an argument about the superiority of rules [Friedman 1948; 1959]. The thesis I will present is that forecasts of main economic aggregates are so inaccurate—so wide of the mark on average—that discretionary policies based on forecasts are unlikely to stabilize the economy. The thesis does not depend on any particular method of forecasting. It applies to all methods of forecasting that have been studied, including some based on judgment and some that are entirely mechanical. Nor does it depend on the choice of a particular time period. It appears to be true of all the recent time periods for which forecasts have been compared. Nor is it intended as a criticism of economists. Their forecasts, though wide of the target, may be the best available.[3]

The record of more than twenty years of economic forecasting is summarized by the finding that, on average, the most accurate forecasters cannot

1. The case for policy rules is made by Henry Simons [1948] and by Milton Friedman in many places (but notably Friedman [1948; 1959]).

2. The quotations are from *The Wall Street Journal* article on credit markets for June 9, 1986. Similar comments are reported almost daily in recent months. Other comments may suggest that the economy is growing rapidly and recommend or forecast higher interest rates.

3. Bernstein [1986] compares forecasts of output by businessmen, consumers, a stock market index and economists. He reports that economists are more accurate, but his comparison is casual. The non-economists' forecasts have little information.

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predict at the beginning of the quarter whether the economy will be in a boom or a recession that quarter. Although forecasting improves as the quarter passes and additional information becomes available, the statement remains true: after more than half of the current quarter has passed, forecasters cannot distinguish, on average, between an above average expansion and a recession.

The size of average forecast errors poses a major problem for those who base discretionary policy on forecasts. A study of forecast errors suggests that the problem is likely to remain. No single method or model seems to be superior to others. Indeed, we should not expect one method to completely dominate the others or for significant differences in forecast accuracy to persist. We would have difficulty explaining the survival of inferior models or methods in a competitive market for valuable information about the future.

One plausible explanation of the size of forecast errors is that, for the best forecasts, the average errors that remain mainly reflect unpredictable, random shocks that hit the economy. The shocks may result from real events—changes in productivity, weather, and the like—or they may result from unanticipated or misperceived policy actions. Each model or method may weight the responses to a particular surprise or change in a particular time period differently; but the resulting differences, while important for explaining differences in forecasts for a particular quarter, appear to have little effect on the variance of forecast errors. A difficult but central issue to resolve is whether discretionary policy action reduces or increases uncertainty and the size of forecast errors. This paper presents some evidence on that issue.

A main objective of economic stabilization policy is, or should be, to reduce the uncertainty faced by consumers and producers to the minimum inherent in nature and trading arrangements. As always, there are two types of errors. Policy may be so active that uncertainty is increased. This can occur if policy actions are so unpredictable that observations of past behavior mislead the public or provide them with little information to guide current decisions. Activist policies can increase uncertainty and variability also, if policymakers act on misjudgments—for example, mistake transitory for permanent changes, misinterpret nominal shocks as real shocks, or base decisions on unreliable forecasts. On the other hand, policymakers can be too passive, as they were in the U.S. monetary collapse of the 1930s or in Europe and Japan when they maintained the Bretton Woods arrangement after it had become clear that fixed exchange rates transmitted U.S. inflation to the rest of the world.

The main alternative to discretionary policies based on forecasts is nondiscretionary policy, based on some kind of policy rule. In my conclusion, I propose an adaptive rule that does not depend on forecasts. If the rule is adopted by three or four major countries, it would provide an international public good.

THE SIZE OF FORECAST ERRORS

A standard conclusion in the literature on decision making is that actions should be based on all available information. Applications of this proposition

TABLE I
Root Mean Squared Errors (percent per annum) 1980/2–85/1

Variable[a]	Number of Forecasts	Current Quarter Range	Current Quarter Median	Four Quarters Ahead Range	Four Quarters Ahead Median
Real GNP	12	3.1–4.4	3.8	2.2–3.4	2.7
Price deflator	12	1.4–2.2	1.6	1.1–3.3	1.6
M_1	4	4.0–4.8	4.2	2.9–3.3	3.1
Real non-residential investment	8	10.3–15.3	11.2	8.4–11.7	10.2

[a] All forecasts are for annualized percent rates of change. See McNees [1986] tables 1, 3, 4, 5.

to economic policy use the argument to show that a policymaker who maximizes social welfare will follow a contingent rule. The rule replicates the actions that would be chosen by a policymaker with complete discretion who acts to maximize social welfare.[4]

Let me put aside discussion of the conflict between social welfare and the personal benefit-cost calculation of a policymaker who seeks reelection to concentrate on the association between forecasts and information useful for policy action. Assume that the policymaker seeks to stabilize the economy and reduce uncertainty. To say that the policymaker should not neglect current information is not the same as saying that he should rely on predictions or forecasts. Inaccurate forecasts can cause well-intentioned policymakers to increase variability and uncertainty, to destabilize rather than stabilize.

Most of the research on forecast errors on which I rely was done within the Federal Reserve System and published in their periodicals. A recent paper by McNees [1986] compares the accuracy of thirteen forecasts of the growth rate of real GNP, prices, money, investment and other variables that were made before the middle of the current quarter. Table I shows the root mean squared errors for the current quarter and four quarters ahead for some of these variables.[5]

The mean growth rate of real GNP is about 3 percent for the period. Using twice the median value of the root mean squared errors of forecast, the range within which real growth is predicted to fall is 10.6 to −4.6 percent for the current quarter and 8.4 to −2.4 percent for four quarters ahead. The root mean squared error is smaller for the rate of inflation, but it is large relative to typical changes in the measured quarterly or annual rate of inflation. Growth

4. I have made such statements also. See Cukierman and Meltzer [1986]. Our paper goes on to show, however, that this conclusion no longer holds if the policymaker has more information than the public and chooses to maximize his own objective function. In our model, his objective function includes the probability of his reelection.

5. Where the same forecaster made forecasts early and in mid-quarter, I used the earlier forecast. Below, I consider forecasts made late in the quarter.

TABLE II

Root Mean Squared Errors for Three "Late Quarter" Forecasts (percent per annum)[a]

Variable (rate of change)	Current Quarter		Four Quarters Ahead
	Range	Median	Median
Real GNP	2.0–2.8	2.4	2.5
Price deflator	1.4–2.5	1.4	1.4
Money	2.1–2.6	2.1	2.6
Real non-residential investment	9.0–10.4	9.7	9.3

[a]See the description in Table I.

of real non-residential fixed investment is more variable than inflation or real GNP growth, and the standard error of the forecast is larger also.

Several comments are in order. The period 1980/2 to 1985/1 that McNees used for the computation is relatively short. A few large errors during this period of relatively high variability could introduce atypical errors. It is worth noting in this regard that late in the quarter, after some monthly data on prices, industrial production, money, sales, jobless claims, employment and other variables had been released, forecast accuracy improved. McNees reports the root mean squared errors for three "late quarter" forecasts. Table II summarizes these data for the same four variables.

There is substantial reduction in the errors reported for the growth rates of real GNP, money and investment and a small reduction for the rate of inflation. All errors for the current quarter are at about the level of four quarters ahead. For real GNP and real investment, the root mean squared errors do not differ markedly from the average quarterly rate of growth at annual rates. For money growth and inflation, the average errors are one-fourth to one-third of the annual rates of growth. Economists who propose that monetary policy actions adjust to forecasts of real (or nominal) GNP growth should take note of the size of the errors in the data to which they would adjust.

The errors we have examined come from different models and methods that cover the range of techniques in common use. McNees compared judgmental forecasts, compiled by the American Statistical Association and the National Bureau of Economic Research, large-scale econometric model forecasts sold commercially, forecasts issued by banks, the Federal government's Bureau of Economic Analysis, economic consulting firms, university research groups and the Bayesian vector autoregression model developed by Robert Litterman [1985].

Webb [1985] compared seven mechanical forecasting procedures that use the autoregressive properties of economic time series to forecast interest rates, real GNP growth and inflation, the latter measured by the rate of change of the price deflator. One of his forecasting models is Litterman's Bayesian vector

TABLE III

Root Mean Squared Errors[a] (percent per annum) 1970/1–84/4

Variable	One Quarter Ahead		Four Quarters Ahead	
	Range	Median	Range	Median
Real GNP growth	4.4–5.4	4.7	2.0–3.2	3.0
Inflation	1.8–2.1	1.9	1.9–3.1	1.9

[a] Based on seven models summarized in Webb [1985] tables 1 and 3.

autoregression model used in McNees's comparisons. McNees shows that Litterman's model gives one of the smallest forecast errors for real GNP growth and one of the largest errors for inflation. I concentrate on Webb's data for real GNP growth from 1970 to 1984 but report the inflation data also. Table III shows the range of forecast errors for the seven models based on the sixty values of one quarter ahead forecasts (and the fifty-seven four quarter ahead forecasts) for each of the models during the period 1970/1 through 1984/4. Each model was reestimated after each forecast.

The one quarter ahead forecasts of real GNP are less accurate than the forecasts for the later period reported in Table I. The four quarter ahead forecasts are comparable. Uncertainty associated with the period 1980–85 does not appear to be a main reason for the relatively large standard errors of forecast in Table I. Errors for the longer period are at least as large.

At times, policymakers and their staffs have access to information that is not available to others. They have earlier access to some data of particular importance; for example, they know more about current policy than the public. Can they use this advantage to forecast more accurately than outsiders?

Lombra and Moran [1983] compared quarterly forecasts by the staff of the Board of Governors for 1970–73 to an earlier study of forecast accuracy by McNees covering six private forecasts. Lombra and Moran use mean absolute error of forecast for their comparisons, but they also report root mean squared errors for the Federal Reserve staff forecasts. The use of the mean absolute error in the comparison is a problem. A large or small error by one forecaster may bias the comparison in favor of or against the Federal Reserve staff. Nevertheless, I used their data. Table IV shows the mean absolute errors for the two groups and the root mean squared error for the Federal Reserve.

The Federal Reserve staff's forecasts of real GNP growth and inflation are slightly better for the period than the mean of the comparative forecasts made one quarter ahead (or less). The advantage disappears for the four quarter ahead forecasts. The root mean squared error of the staff's one quarter ahead forecasts, though still large relative to the average change, is much smaller than the root mean squared errors reported in earlier tables. Again, this advantage disappears for the four quarter ahead forecasts.

There are many reasons why comparisons of this kind are at best suggestive.

TABLE IV
Forecast Errors by Federal Reserve Staff and Others (annual rates in percent) 1970–73[a]

Variable	Mean Absolute Error: Federal Reserve	Mean Absolute Error: Others	Root Mean Squared Federal Reserve
Real output	1.6	1.7	2.1
Inflation	1.2	1.4	1.4
	Four Quarters Ahead		
Real output	2.8	2.7	3.5
Inflation	2.6	2.6	3.4

[a] From Lombra and Moran [1983] tables 2 and 3.

Forecast periods differ; the forecasters in the comparison group change; and forecast errors often reflect more than differences in models and methods, since many forecasters use information or intuition to adjust their forecasts. These well-known problems probably do not affect the main conclusion drawn from the comparisons.

Neither the Federal Reserve staff nor private forecasters, using the techniques currently available, has been able to forecast, on average, whether the economy will be in a boom or a recession one or four quarters ahead. Given that econometric research has been relatively unsuccessful at determining whether the lag between policy action and its effect is short or long, it is not clear whether more accurate forecasts could be used to reduce variability and uncertainty even if economists were capable of producing them.[6] While one should never neglect the possibility that new research may change the opportunity set, reliance on forecasts to change policy action does not seem useful in the current state of knowledge. Efforts (even well-intentioned efforts based on forecasts) to dampen fluctuations may, in fact, have the opposite effect of increasing fluctuations and the uncertainty borne by consumers and producers.

DOES STABILIZATION POLICY INCREASE VARIABILITY?

The similarity between minimum values of forecast errors, using different models and methods and different time periods, suggests that the best forecasts remove most of the systematic information in past data. Forecasters reestimate, adjust lag length and change equations to keep the forecasts relatively accurate.

6. Rosenbaum [1985] summarizes research on lags in monetary policy. She concludes [1985, 32] that knowledge of timing is "problematic," that our knowledge is "imprecise" and that there are unresolved "differences of opinion" about the length of lags despite much research over many years.

The remaining errors may not be entirely random. The managers of large econometric models often adjust their forecasts to reflect current information or beliefs. These adjustments do not appear to have much value on average; they do not reduce measured mean squared errors for real GNP and investment relative to the autoregressive models. Possibly the adjustments affect errors in particular periods without changing the root mean squared error or other measures of forecast accuracy.

Evidence showing negative correlation between the forecast errors obtained using different procedures would suggest that forecast errors can be reduced either by combining procedures or forecasts. Evidence of positive correlation is consistent with the hypothesis that the errors remaining in the most accurate forecasts are mainly random deviations that are missed by different models. While I have not attempted a systematic study, some work suggests that forecast errors are positively correlated.

The data used are from three models of the *levels* of real GNP, the price deflator, the money stock and the nominal exchange rate. One model is Litterman's Bayesian vector autoregression (BVAR). Forecasts were made using his current, revised model.[7] Litterman's model has been found to be relatively efficient at forecasting real GNP, but less so for prices, as noted earlier. The second model is the multi-state Kalman filter (MSKF) described in Bomhoff [1983, appendix 1]. These forecasts are univariate forecasts based on past data for each series. The MSKF model combines forecasts of permanent and transitory components of each series' level and growth rate, and revises the weights on each component each period. The third model is a random walk. Table V shows the root mean squared errors for each model and the correlation between the errors made using the BVAR and the MSKF models.

The BVAR and MSKF errors are similar, but the BVAR is lower for three of the four variables studied. For real GNP and nominal exchange rates, the models are only marginally better than the random walk, suggesting that the forecast errors may be random and that the models do not produce big reductions in the size of the random component. The correlations between the errors from the BVAR and the MSKF models are positive and significant at the 5 percent and in some cases at the 1 percent level, further evidence that the errors may reflect mainly random shocks that are not detected by the most accurate methods currently available.[8]

7. I am grateful to Robert Litterman for sending his forecasts. The forecasts and errors are made using currently available data, not the data available at the time.

8. The 1985 decline in oil prices provides some perspective on the size of shocks. Setting aside the redistribution from domestic producers to domestic consumers, we can estimate the transfer from abroad. With imports of 4 million barrels a day and a $14 per barrel decline in price, the transfer is a one-time permanent change in the level of GNP valued at approximately $20 billion. The oil shock is usually described as a large shock. Relative to annual GNP, the shock is about one-half percent for one year. For real shocks to produce errors in each quarter, or on average, of the magnitude shown in Table V of the text, the number of small real shocks hitting the economy in a quarter must be relatively large and positively correlated. A real theory of fluctuations requires an explanation for the repetitive pattern of many correlated disturbances.

TABLE V
Root Mean Squared Errors from Three Forecasting Models (in percent)
1970/1–85/2[a]

Level of Variable	BVAR	MSKF	Correlation	Random Walk
Real GNP	1.1	1.2	.66	1.3
Price deflator	0.5	0.6	.41	1.4
M_1	0.5	0.6	.77	1.7
Nominal exchange rate	3.4	3.0	.62	3.5

[a] Exchange rate is 1971/3 to 1984/4. BVAR is Bayesian vector autoregression; MSKF is multi-state Kalman filter.

Even if forecast errors are random, the size of errors can be reduced by changing policy procedures. The reason is that policy can increase or reduce variability and increase or reduce uncertainty. Litterman [1985] provides some evidence on the relation of errors to policy actions. He computed the effect of unanticipated policy changes in 1985 on his forecast for 1986 by comparing the model forecasts for 1986 made late in 1984 to the forecasts made approximately one year later. Since Litterman's BVAR forecasting model adjusts only to past errors, changes in forecast values occur only when there are unanticipated changes—changes that were unanticipated from the past history of the series and related series at the time of the previous forecast. If there were no unanticipated changes in 1985, the forecast for 1986 would remain the same.

After adjusting for the relatively small changes in forecast values arising from the major revision of historical time series, Litterman [1985, table 5] shows that most of the new information in 1985 was information about unanticipated monetary policy actions. Specifically, he reports that 80 percent of the change in his forecast of real growth and 50 percent of the change in the forecast of inflation were the consequence of differences between expected and actual monetary actions in 1985. These estimates suggest that monetary policy actions account for a large part of the uncertainty and variability experienced during the sample period. Holding monetary policy constant, or making policy more predictable, would reduce this source of variability.

Litterman's quantitative estimates overstate the influence of unanticipated monetary policy action, however. The reason is that Litterman includes common stock prices, the value of the dollar and bond yields as well as monetary aggregates and short-term interest rates in his measure of monetary policy action. Several of these variables are affected by real shocks and by foreign nominal shocks.

Estimates of the variability of unanticipated money and real GNP obtained from the Kalman filter are made using univariate time series procedures, so information in related series is neglected. Since the forecast errors from the Kalman filter are positively correlated with Litterman's forecast errors and not very different on average, the MSKF model may come close to the lower bound that mechanical forecasts can now reach for variables like real GNP. This boundary is set by the state of knowledge, variability in nature, non-monetary institutional arrangements, the fluctuating exchange rate system and procedures for changing policy actions.[9]

Data cannot tell us what errors would have been observed under a less activist monetary policy, as shown in Lucas [1976]. We can, however, treat a change to a less activist policy as an experiment and compare the variability experienced before and after the experiment to the change in variability observed elsewhere. There are few experiments of this kind. One occurred in Japan in the seventies at about the same time that the Federal Reserve began to announce targets for monetary growth.

Japan made a major change in its monetary policy rule in 1975. Earlier, in the fifties and sixties, the Japanese government controlled interest rates, allocated bank credit, subsidized credit expansion through the banking system and maintained fixed exchange rates under the Bretton Woods agreement. In 1975, Japan introduced a system of pre-announced monetary projections. The government began to deregulate interest rates and the credit market. Exchange rates fluctuated and, until the September 1985 agreement, evidence suggests that generally exchange rates were freely fluctuating [Meltzer 1985]. A comparison of the variability of output and prices under the different policy regimes in Japan shows that variability of univariate forecast errors, estimated using the Kalman filter, is lower under the more liberal regime with fluctuating exchange rates and pre-announced monetary projections.

U.S. experience differs. The shift from fixed to fluctuating exchange rates was followed by an increase in the variability of forecast errors. The U.S. also announced projected rates of money growth beginning in 1975, but instead of announcing a single projection, as in Japan, the Federal Reserve announced targets for several monetary aggregates and gave ranges for each. The Federal Reserve, unlike the Bank of Japan, regularly shifts the base from which growth is measured. In practice, the Federal Reserve often fails to meet its targets, while the Bank of Japan has kept actual money growth very close to projections. When deciding how to act or react, the Federal Reserve relies much more than the Bank of Japan on short-term forecasts.

Both the United States and Japan experienced common shocks—the oil shocks, major changes in exchange rates, the Carter shock following imposition of credit controls in 1980, and other surprises. These common shocks are

9. To investigate the loss of power resulting from the use of the univarate MSKF procedure, Meltzer [1986] uses vector autoregressions to relate forecast errors (unanticipated shocks) to money, prices and output. Domestic and foreign shocks are used together, and in some cases exchange rate shocks also. For Canada, Germany and the U.S. the estimated root mean squared error for one period ahead forecasts is reduced in some cases, but for the U.S. the remaining error is not much different from the errors reported for Litterman's model. For the price level, Litterman's model appears to be less efficient. The errors from the VAR for the three countries are reduced as low as 0.35. Estimates computed for Great Britain are larger.

TABLE VI
Root Mean Squared Errors of Forecast, Japan and the United States (in percent)

	Japan			United States		
	(1)	(2)	(3)	(1)	(2)	(3)
Real output	1.9	1.1	0.7	0.8	1.2	1.2
Price level	1.2	0.8	0.6	0.3	0.6	0.6

Col. (1) fixed exchange rates, Japan 1957/3–71/3; U.S. 1960/3–71/3.
Col. (2) fluctuating rates, Japan 1971/4–83/4; U.S. 1971/4–85/2.
Col. (3) monetary announcements, Japan 1975/1–84/3; U.S. 1975/1–85/2.

at least as important for Japan as for the United States. It seems reasonable, therefore, to attribute much of the *relative* improvement in forecast accuracy to the stability of Japan's policy in recent years.[10] Table VI shows the variability of forecast errors of real output and the price deflator for the two countries under fixed and fluctuating exchange rates. Forecasts were computed using the multi-state Kalman filter.

Japan was able to reduce variability of forecast errors for prices and output both absolutely and relative to the U.S. Much of the reduction was achieved after 1975, during the period of monetary announcements and fluctuating exchange rates, shown in column 3. In the U.S., the variability of forecast errors rose under fluctuating exchange rates, and there is no change in variability in the years of monetary announcements. The comparisons suggest that Japan used monetary control to give domestic consumers and producers the benefit of lower variability and less uncertainty.

In the U.S., variability and uncertainty increased. For Japan, the change in policy arrangements provided an opportunity to reduce inflation and increase the credibility of economic policy. The Bank of Japan achieved rates of money growth close to projections, thereby enhancing credibility and reinforcing its commitment to lower inflation. The growth rate of money declined gradually but persistently, and the inflation rate fell from above 20 percent in 1974 to about 0 to 2 percent in the eighties. Government spending was tightly controlled, so government spending and the budget deficit declined as a share of GNP. A period of stable growth with no recessions followed. During most of the past eight years, growth of real output remained between 3 and 5 percent annually.

The Federal Reserve concentrated attention mainly on domestic interest rates, free reserves and member bank borrowing under both fixed and fluc-

10. Some have suggested that the reduction in forecast errors for Japan is the result of lower average growth. This explanation does not account for the rise in the forecast error for the U.S. Further, computation of the ratio of the root mean squared error to the average quarterly growth of real GDP for Japan shows a smaller value for 1975–83 (.0065) than for 1957–71 (.0077). For the U.S., the ratios are 1975–85, .0170; and 1960–71, .0093.

tuating exchange rates. Typically the Federal Reserve ignored the announced targets for money growth, just as it had ignored its commitment to pursue policies consistent with the fixed exchange rate regime in the sixties. Shifting and ambiguous policies based on changing current conditions and forecasts of future conditions left a residue of skepticism. Although inflation declined in the eighties, the annual growth rate of output fluctuated between −2 and 6 percent. Short spurts of relatively fast growth were followed by recessions or periods of slow growth. Fiscal policy changed frequently and contributed to uncertainty.

Since forecasts are conditional on policy and outcomes depend on policy, it would not be surprising if differences in the stability of policy are a principal reason for the observed differences in the variability of output and prices and the differences in the size of forecast errors. The comparative experience of Japan and the United States in recent decades suggests that stable policies reduce variability and uncertainty. The experience also suggests that, contrary to often repeated statements about the fluctuating exchange rate system, Japan experienced less variability of prices and output under the fluctuating rate regime.

CONCLUSION

The data presented here show that, on average, forecast errors for output growth are so large relative to quarterly changes that it is generally not possible to distinguish consistently between a boom and a recession either in the current quarter or a year in advance. The data on which I have relied to reach this conclusion are not new, and they are not unusual. The same conclusion applies to other periods. It is a general implication of many studies of forecasting accuracy using different methods and models.

Many of the forecast errors for growth of real output or for inflation that I have considered fall within a relatively small range. No single technique or model seems capable of substantially reducing the size of forecast errors. A plausible inference, considered here, is that the forecast errors we observe are close to the minimum we are likely to find with current forecasting techniques and models under current policy procedures. Remaining errors appear to be mainly random variation caused by myriad unanticipated real shocks, changes in expectations, foreign influences, and actual, perceived or anticipated changes in government policy action.

These findings and interpretations, if correct, reinforce doubts about the possibility of using forecasts to guide discretionary policy action to reduce fluctuations. They do not imply that variability cannot be reduced. The size of forecast errors depends on policy rules. Alternatives to discretionary policy based on judgments and forecasts are available. More stable, predictable policies may be more successful in reducing fluctuations than well-intended activism.

Japan provides an example. Beginning in 1975, Japan abandoned many of the activist, discretionary policy actions that had characterized the early years of fluctuating exchange rates. The new policy regime included as major elements fluctuating exchange rates, pre-announced monetary projections, and reductions in government spending relative to aggregate output. The aim of the policy was to reduce the rate of price increase from 20 percent in 1974 and 8 percent in 1975, and to increase economic stability. Fluctuating exchange rates gave Japan the opportunity to control money growth, and the Bank of Japan succeeded in the task of keeping money growth close to the (generally) declining projections that were announced to the public.

Disinflationary monetary policy reduced the rate of inflation gradually and achieved low inflation and price stability. During most of the period growth of output remained in a narrow range—between 3 and 5 percent per annum. Japan is that rare example, a country that was able to reduce an entrenched inflation without experiencing a recession during the years in which the policy remained in effect.

Computed root mean squared forecast errors for the level of output and the price level in Japan fell below the forecast errors for the U.S. Under fixed exchange rates, the forecast errors show that U.S. output and price level were more predictable; under fluctuating exchange rates with pre-announced monetary growth, root mean squared forecast errors were higher in the U.S., while forecast errors in Japan were lower. Since both countries were affected by similar external shocks, it seems plausible that the relative and absolute decline in variability and uncertainty of Japan's economy was, at least in part, a result of increased stability of policy and enhanced credibility of policymakers' commitment to stability. Correspondingly, the relative and absolute increase in forecast errors in the U.S. seems to reflect the greater policy activism and lack of correspondence between the policies announced and the actions taken.

A frequent response to arguments for policy rules is that decision makers have information about current events that can be used to improve performance. The evidence in this paper suggests that this appealing argument is not applicable to the choices between rules and discretionary action. The forecasts on which discretionary action is based may be the best available, but they are, on average, so inaccurate as to be useless. For the same reason, a policy rule that relies on forecasts is likely to increase variability relative to a rule that does not depend on forecasts.

On several occasions I have proposed a policy rule that adapts to changes in intermediation, economic growth and other innovations. The rule achieves price stability on average by setting the annual growth rate of the monetary base equal to the moving three year average growth rate of output minus the moving three year average growth rate of base velocity. The three year moving average is arbitrary. A shorter or longer period may be more desirable. The three year moving average gives time to learn whether shocks are permanent or transitory. It provides for faster money growth relative to output in a cyclical recession and slower money growth relative to output in a cyclical expansion. Money growth adjusts to maintained changes in the growth rate of output or in the growth rate of monetary velocity. The rule does not rely on forecasts. Unlike a rule prescribing a fixed rate of money growth, the proposed rule keeps the expected price level constant.

The rule can be adopted unilaterally, but greater benefits are achieved if several major nations adopt the same rule—to maintain the rate of money growth consistent with an anticipated zero rate of inflation for that country. If the rule is adopted by Japan, Germany and perhaps Britain as well as the United States, these nations will form a cartel of financial stability. Each nation achieves a high degree of domestic price stability, on average, by following the rule; together, the group increases the stability of nominal and real exchange rates by reducing uncertainty arising from changes in countries' anticipated rates of inflation.

An additional advantage accrues to smaller nations. By fixing their exchange rates to the currencies in the cartel of financial stability, they gain the benefits of greater price and exchange rate stability. In effect, they import price and exchange rate stability from the cartel.

Prices and exchange rates would continue to fluctuate, although the average anticipated rate of price change would be zero.[11] Some of the calculations reported here suggest that the size of fluctuations in real GNP would be reduced to about one-half percent of the level of real GNP. Estimates of this kind cannot be firm, and they will vary with the period chosen for study, but the experience of Japan is encouraging. Japan was able to reduce unanticipated fluctuations in output to about 50 percent of the U.S. level by following relatively stable, pre-announced rules for monetary and fiscal policy.

There are opportunities for cheating, as with any cartel. A country may choose to expand money growth to gain some temporary increase in output and employment. Cheating cannot be wholly avoided. Monitoring is improved, however, by the choice of the monetary base as the policy variable and by requiring prompt publication of the central bank's balance sheet. The base can be closely controlled by the central bank. Prompt publication of the central bank's balance sheets provides the market with the information required to compute the base. This helps to enforce compliance with the rule.

A by-product of this examination of forecast errors is some preliminary but perhaps useful quantitative estimates of the magnitude of the reduction in variability that could be achieved from more stable, predictable policies. The reduction appears to be substantially larger than any prospective reduction in variability from improvement in forecasting performance, improvements in forecasting models, or any gain likely to be achieved on average by discretionary policies based on forecasts.

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