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DISCRETION VERSUS POLICY RULES IN PRACTICE

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Abstract

This paper examines how recent econometric policy evaluation research on monetary policy rules can be applied in a practical policy-making environment. According to this research, good policy rules typically call for changes in the federal funds rate in response to changes in the price level or changes in real income. An objective of the paper is to preserve the concept of such a policy rule in a policy environment where it is practically impossible to follow mechanically any particular algebraic formula that describes the policy rule. The discussion centers around a hypothetical but representative policy rule much like that advocated in recent research. This rule closely approximates Federal Reserve policy during the past several years. Two case studies--the 1990 oil price shock and German unification--that had a bearing on the operation of monetary policy in recent years are used to illustrate how such a policy rule might work in practice.

The econometric evaluation of monetary and fiscal policy rules using new methods of "rational expectations" macroeconomics has been the subject of substantially increased research in recent years.[1] A number of factors have motivated this research: the Lucas critique showing that traditional econometric policy evaluation was flawed, the recognition that rational expectations does not imply monetary policy ineffectiveness, the finding that credibility has empirically significant benefits, and the time inconsistency demonstration that policy rules are superior to discretion. Although one can find precursors of the new research on policy rules, the recent analysis has been made possible by new solution and estimation techniques for economy-wide equilibrium models, the development of empirical models of expectations-consistent wage and price dynamics, and the ability of multicountry empirical frameworks to handle international capital flows in efficient world markets.

The preferred policy rules that have emerged from this research have not generally involved fixed settings for the instruments of monetary policy, such as a constant growth rate for the money supply. The rules are responsive, calling for changes in the money supply, the monetary base, or the short-term interest rate in response to changes of the price level or real

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[1] The forthcoming volume by Bryant, Hooper, Mann and Tryon (1993) summarizes much of the empirical research with large multicountry models. A recent Federal Reserve System conference summarized in Taylor (1992) was largely devoted to the analysis of policy rules. A prototype empirical analysis was provided by Taylor (1979) with a full multicountry analysis described in Taylor (1993). Research by McCallum (1988) has also generated considerable interest in econometric evaluation of policy rules.

income. Some of the research has been quite precise about this response; the coefficients in the algebraic formulas for the policy rules provide exact instructions about how much the Fed should adjust its instruments each quarter in response to an increase in the price level or an increase in real GDP. While the exact coefficients differ from study to study, recently there has been some indication of a consensus about the functional forms and the signs of the coefficients in the policy rules.

Despite the emphasis on policy rules in recent macroeconomic research, the notion of a policy rule has not yet become a common way to think about policy in practice. Policymakers do not, and are not evidently about to, follow policy rules mechanically. At least with the current state of economic knowledge and technique, they have good reasons. Some of the reasons are purely technical. For example, the quarterly time period of most econometric models which have been used to evaluate policy is probably too short to average out blips in the price level due to such factors as temporary changes in commodity prices. On the other hand, a quarter is too long to hold the federal funds rate fixed between adjustments. For example, when the economy starts into recession, sharp and rapid interest rate declines are appropriate. Many of these technical problems could be corrected, in principle, by modifications of these policy rules. A moving average of the price level over a number of quarters, for example, would be a way to smooth out temporary price fluctuations. Averaging real output--or nominal output--could

also be considered. Going to a monthly model--and taking even longer moving averages--would be a way to make the interest rate more responsive in the very short term. Such generalizations are an important task for future research.

However, these modifications would make the policy rule more complex and more difficult to understand. And even with many such modifications, it is difficult to see how such algebraic policy rules could be sufficiently encompassing. For example, interpreting whether a rise in the price level is temporary or permanent is likely to require looking at several measures of prices (such as the consumer price index, the producer price index, or the employment cost index). Looking at expectations of inflation as measured by bond prices, surveys, or forecasts from other analysts is also likely to be helpful. Interpreting the level and the growth rate of the economy's potential output--which frequently is a factor in policy rules--involves predictions about productivity, labor force participation and changes in the natural rate of unemployment. While the analysis of these issues can be aided by quantitative methods, it is difficult to formulate them into a precise algebraic formula. Moreover, there will be episodes where monetary policy will need to be adjusted to deal with special factors. For example, the Federal Reserve provided additional reserves to the banking system after the stock market break of October 19, 1987 and helped prevent a contraction of liquidity and restore confidence. The Fed would need more than an interest rate rule as a policy

guide in such cases.

Does all this mean that we must give up on policy rules and return to discretion? In fact, arguments like the one in the previous paragraphs sound much like those used by advocates of discretion rather than rules. And even some of those who have advocated the use of rules in the past seem to have concluded that discretion is the only answer. For example, David Laidler (1991) argues, "We are left, then, with relying on discretionary policy in order to maintain price stability."

But if there is anything about which modern macroeconomics is clear--and on which there is substantial consensus--it is that policy rules have major advantages over discretion in improving economic performance. Hence, it is important to preserve the concept of a policy rule even in an environment where it is practically impossible to follow mechanically the algebraic formulas economists write down to describe their preferred policy rules.

The purpose of this paper is to begin to consider how the recent research on policy rules might apply in such an environment. Section 1 starts with some important semantic issues. Section 2 describes recent results on the design of policy rules that form the basis for this research. Sections 3 and 4 consider the use of such policy rules in practice. For concreteness, I center the discussion around a hypothetical but representative policy rule that is much like that advocated in recent research. This policy rule also describes recent Fed

policy surprisingly accurately. I also discuss two case studies -- the 1990 oil price shock and German unification -- that had bearing on the operation of monetary policy in recent years.

1. Semantic Issues.

There is considerable agreement among economists that a policy rule need not be interpreted narrowly as entailing fixed settings for the policy instruments. Although the classic rules versus discretion debate was usually carried on as if the only policy rule was the constant growth rate rule for the money supply, feedback rules in which the money supply responds to changes in unemployment or inflation are also policy rules. In the area of fiscal policy, the automatic stabilizers--transfer payments that automatically rise with the unemployment rate and tax revenues that automatically grow more slowly--can be interpreted as a "policy rule". In the area of exchange rate policy, a fixed exchange rate system is clearly a policy rule, but so are adjustable or crawling pegs.

Moreover, in my view, a policy rule need not be a mechanical formula, but here there is more disagreement among economists. A policy rule can be implemented and operated more informally by policymakers who recognize the general instrument responses that underlie the policy rule, but who also recognize that operating the rule requires judgment and cannot be done by computer. This broadens the definition of a policy rule significantly and

permits the consideration of issues that would be excluded under the narrower definition. By this definition, a policy rule would include a nominal income rule in which the central bank takes actions to keep nominal income on target, but it would not include pure discretionary policy.

In broadening the definition beyond mechanical formulas, I do not mean to lose the concept of a policy rule entirely. Under pure discretion, the settings for the instruments of policy are determined from scratch each period with no attempt to follow a reasonably well-defined contingency plan for the future. A precise analytical distinction between policy rules and discretion can be drawn from the time consistency literature. In the time consistency literature (Kydland and Prescott (1977), Barro and Gordon (1983) or Blanchard and Fischer (1989)), a policy rule is referred to as either the "optimal," the "rules" or the "precommitted" solution to a dynamic optimization problem. Discretionary policy is referred to as the "inconsistent," the "cheating" or the "shortsighted" solution. That literature demonstrates the advantages of rules over discretion which is one of the reasons that researchers have focused on policy rules in recent normative policy research.

If a policy rule is to have any meaning it must be in place for a reasonably long period of time. For a macroeconomic policy rule, several business cycles would certainly be sufficient, but for many purposes several years would do just as well. Policymakers need to make a commitment to stay with the rule if

they are to gain the advantages of credibility associated with a rule. If economic analysis is to predict how the economy will perform with a policy rule, some durability of the rule is obviously required. Econometric evaluation of policy rules is of little use if the policy rule is constantly changing.

By the above definitions, the term "policy rule" does not necessarily mean either a fixed setting for the policy instruments or a mechanical formula. Saying so, however, does not change common usage. Among most policymakers the term "policy rule" connotes either a fixed setting for the policy instruments or a simplistic mechanical procedure. An alternative terminology would help focus attention on the concept of a policy rule as defined here. For example, one alternative terminology was adopted in the 1990 Economic Report of the President. "Policy **rule**" was replaced by "**systematic** policy" or sometimes by "policy **system**" when a noun seemed more appropriate. For example, in the 1990 economic message to Congress, President Bush stated, "My Administration will...support a credible, *systematic* monetary policy program that sustains maximum economic growth while controlling and reducing inflation." (p. 4, italics added). The adjective "systematic" is defined in the Oxford American Dictionary as "methodical, according to a plan, and not casually or at random." Hence, this word connotes the important properties of a policy rule without bringing along the baggage of fixed settings or mechanical formulas.

A final semantic point relates to how different types of

policy questions can be described using the language of policy rules. I find it useful to distinguish between three types of policy issues related to policy rules: (1) the design of a policy rule, (2) the transition to a new policy rule once it is designed, and (3) the day-to-day operation of a policy rule once it is in place. As I will describe below certain policy actions that appear to be discretionary can be interpreted as transitions from one policy rule to another or even as part of the operation of an existing policy rule.

2. Policy Design: The Search for a Good Monetary Policy Rule.

The policy design issues I consider in this paper focus entirely on monetary policy. The study of fiscal policy rules--automatic stabilizers or budget balancing strategies--could be considered using the same approach. The design of fiscal policy rules is an important element of macroeconomic policy analysis despite problems with discretionary fiscal policy. Automatic stabilizers remain an important part of macroeconomic policy and help mitigate recessions. However, automatic stabilizers are affected by goals that go well beyond macroeconomic policy. For example, changes in the progressivity of the tax system affect the responsiveness of the automatic stabilizers but are not made with stabilization policy in mind.

The forthcoming volume by Bryant, et al (1993) compares what nine different multicountry econometric models say about the performance of different monetary policy rules. Seven of the

nine models are estimated rational expectations models. The models were developed by the International Monetary Fund, the Federal Reserve Board, the Department of Finance in Canada, and several individual researchers.

All the policy rules evaluated in the Bryant comparison are interest rate rules. The monetary authorities are assumed to adjust their interest rate in response either to either (1) deviations of the money supply from some target, (2) deviations of the exchange rate from some target or (3) a weighted deviations of the inflation rate (or the price level) and real output from some target.

There are substantial differences from model to model, and there is no agreement on a particular policy rule with particular parameters. Yet there is some consensus. The policy rules that focus on the exchange rate or policies that focus on the money supply do not work as well as policies that focus on the price level and real output directly. In other words, monetary policy rules in which the short term interest rate instrument is raised by the monetary authorities if the price level and real income are above a target and is lowered if the price level and real income are below target, seem to work well. By how much the interest rate should change is still uncertain, but that a consensus is emerging about a functional form is very promising.

My own research on policy rules reported in Taylor (1993) is generally consistent with these results. Using my multicountry rational expectations model, I simulated economic performance of

the G-7 countries under several different monetary policy rules. The shocks for the stochastic simulation were drawn from the estimated distribution of shocks. Economic performance was then examined under the different policy rules. The policy rules were ranked according to how successful they were in achieving price stability and output stability. The approach deals explicitly with several issues raised by the Lucas critique of traditional econometric policy evaluation methods. In fact the three examples used in the original critique paper of Lucas--consumption demand, price determination, and investment demand--are part of my multicountry model. Endogenizing expectations using the rational expectations assumption, as Lucas did in his original paper, is precisely what automatically happens in this model. To be sure, the equations of the model could benefit from more theoretical research, but the approach does seem appropriate for estimating the long term effects of different policy regimes.

The approach uses an empirically estimated distribution of shocks. Theoretical studies are useful for highlighting key parameters that affect the answers. For example, in a static non-rational expectations model that can be put into an ISLM framework, a fixed exchange rate system will work better if country-specific shocks to the LM equations have a relatively large variance. In that case, a fixed exchange rate system has the same advantages as interest rate targeting. On the other hand, a flexible exchange rate system will work better if country-specific shocks to the IS equations have a relatively

large variance. To get any further than this requires estimates of the size of the shocks.

For the flexible exchange rate regime, I assumed that each central bank adjusts its short-term interest rate target in response to changes in the price level and real output. But for the fixed exchange rate system, the interest rates in the individual countries cannot be set independently of each other. For example, if the Fed raised the Federal funds rate above the Japanese call money rate, funds would flow quickly into the United States putting upward pressure on the dollar and threatening the fixed rate unless the Bank of Japan likewise raised the call money rate. In order to keep exchange rates from fluctuating, therefore, a common target for the "world" short-term interest rate must be chosen. Analogously with the flexible exchange rate case, it was assumed that world short-term interest rate rises if the world price level rises above the target.

My comparison of the flexible exchange rate system with the fixed exchange rate system shows that the fluctuations in real output are much larger in the United States, France, Germany, Italy, Japan, and the United Kingdom when exchange rates are fixed, compared with when they are flexible. The standard deviation of output nearly doubles in Germany and Japan under fixed exchange rates in comparison with flexible exchange rates. The fluctuations in real output in Canada are slightly less under fixed rates than under flexible rates, but there is a deterioration of price stability in Canada under fixed exchange

rates. A change in the Canadian domestic policy rule under flexible exchange rates could easily match the output stability of the fixed exchange rate case with more price stability. In this sense the flexible exchange rate system dominates for all the countries I considered.

Inflation performance is also better with the flexible exchange rate system than with the fixed rate system. Price volatility--as measured by the standard deviation of the output deflator around its target--is greater in all countries under fixed exchange rates. Japan and Germany have more than twice as much price volatility under the system that fixes their exchange rate with the dollar.

In addition to finding that it is preferable for the central banks to set interest rates individually based on economic conditions in their own country, the results show that placing a positive weight on both the price level and real output in the interest rate rule is preferable in most countries. Placing some weight on real output works better than a simple price rule, but it is not clear whether the weight on output should be greater or lesser than the weight on the price level. A general conclusion from these results is that placing some weight on real output in the interest rate reaction function is likely to be better than a pure price rule.

Although there is not a consensus about the size of the coefficients of policy rules, it is useful to consider what a representative policy rule might look like. One policy rule that

captures the spirit of the recent research and which is quite straightforward is:

$$(1) \qquad r = p + .5((Y-Y^*)/Y^*) + .5(p-2) + 2$$

where

r is the federal funds rate, (average for the quarter)

Y is real GDP,

Y^* is trend real GDP (equals 2.2 percent per year from 1984.1 through 1992.3), and

p is the rate of inflation over the previous four quarters.

The policy rule in Equation (1) has the feature that the federal funds rate rises if inflation increases above a target of 2 percent or if real GDP rises above trend GDP. If both the inflation rate and real GDP are on target then the federal funds rate would equal 4 percent, or 2 percent in real terms. (The lagged inflation rate on the right hand side of Equation (1) indicates that the interest rate policy rule is written in "real" terms with the lagged inflation rate serving as a proxy for expected inflation). The 2 percent "equilibrium" real rate is close to the assumed steady state growth rate of 2.2 percent. This policy rule has the same coefficient on the deviation of real GDP from trend and the inflation rate. The policy rule is not a simple price rule.

The policy rule in Equation 1 has the general properties of the rules that have emerged from recent research, and the

coefficients are nice round numbers that make for easy discussion. What is perhaps surprising is that this rule fits the actual policy performance during the last few years remarkably well. Figure 1 shows the actual path for the federal funds rate and the path implied by the example policy rule during the 1987-1992 period. The only significant deviation is in 1987. In this sense the federal funds rate has moved as if the Fed had been following a policy rule much like the one called for by recent research on policy rules.

For completeness the path of the two factors in the policy rule is illustrated in Figures 2 and 3. Note that according to this policy rule the economy was above trend in the late 1980s and fell below trend during the 1990-91 recession. The gap between actual GDP and trend GDP has remained constant since the end of the 1990-91 recession. The lagged inflation rate is shown in Figure 3. Clearly both the changes in inflation and real GDP influenced the path of the federal funds rate.

3. Discretion versus Transitions between Policy Rules.

Most macroeconomic research on policy rules has focused on the design of such rules, as summarized in the previous section. Questions about making a transition from one policy rule to a new policy rule have been given relatively little attention. This situation is not unique to macroeconomics. In general, economists have been better at determining what type of system works best, than determining how to make a transition to that

system. In international trade theory, not much is known about the appropriate speed at which one should move to free trade. And economists have shown the benefits of a market economy, but there is relatively little research on the transition from one system to another. Because there has been relatively little research in this area and because the problems are harder, there is less of a formal framework than there is for the design of policy rules.

Examples of Transitions

Suppose that it becomes clear that a policy in operation is not performing well and that a new policy system would work better. Suppose, for example, that the target inflation rate in the policy rule in the previous section is shown to be too high. Rather than aim for a 5 percent per year inflation rate, it is recognized that a target of 2 percent per year would be better for long-run economic performance. In this example, only the "intercept" term in the policy rule must be changed. This transition problem is, of course, none other than the problem of disinflation.

Similar examples can be given for fiscal policy rules. Analogous to a change in the intercept in the monetary policy rule would be a recognition that the budget deficit should be balanced at full-employment. Analogous to a change in the response coefficient would be a recognition that an increase in the response of the automatic stabilizers to economic conditions

would be desirable. The latter might entail a change in the unemployment compensation system that determines at what unemployment rate long-term unemployment benefits are automatically paid.

Why do we need any special treatment of these transitions? First, the research that underlies the design of policy rules assumes that expectations are rational. This makes sense when a policy is in operation for a long time. People will have adjusted their behavior to the policy in place, and expectations of policy and other variables are most likely to be unbiased. However, in the period immediately after a new policy rule has been put in place, people are unlikely to either know about or understand the new policy or to believe that policymakers are serious about maintaining it for long. Simply assuming that people have rational expectations and know the policy rule is probably stretching things during this transition period. Instead, people may base their expectations partly by studying past policy in a Bayesian way, or by trying to anticipate the credibility of the new policy by studying the past records of policymakers, or by assessing whether the policy will work.

Because expectations only gradually converge during this transition period, the impact of the policy rule on the economy may be quite different than projected by an analysis that assumes rational expectations. In most cases, uncertainty and bias in expectation formation will make the new policy work less well during a transition. In these cases, efforts to make the new

policy credible will reduce the costs associated with a transition.

This problem of learning about a new policy during a transition was worked out in the case of a change in the price level, or inflation, target in a very simple model in Taylor (1975). It is optimal to make the new policy as credible as possible, if the initial inflation rate is above the long-run inflation rate, as in the disinflation examples given above. However, in the case where initial conditions have an inflation rate lower than is optimal, a welfare function that includes both inflation and unemployment can be increased by only gradually informing the public about the plans to move to a new policy. In this unusual case, the precise amount of information to release each period can be computed using optimal control theory.

A second reason for worrying about transitions is that there are natural rigidities in the economy that prevent people from changing their behavior instantly. People may have committed to projects, plans, or contracts under the assumption that the old policy was in place. Moreover, they may have assumed that other people they deal with have similar commitments. Long-term wage-setting commitments are primary examples, but there are many others including long-term investment projects and loan contracts. Such rigidities usually suggest that the transition to a new policy rule should be gradual and announced publicly. This gives people a chance to unravel previous commitments without significant losses.

In my view there are many other examples of policy issues that can be usefully interpreted as transitions from one policy rule to another. In practice, however, there is little distinction between such transition issues and what appears to be pure discretion.

To highlight the distinction, I study these transition problems more explicitly in Taylor (1993) for two important macroeconomic cases: (1) the transition to a monetary policy rule with a zero-inflation target, and (2) the transition toward a fiscal policy rule with a balanced full-employment government budget.

4. Discretion versus the Operation of Policy Rules.

As stated in the introduction of this paper, operating monetary policy by mechanically following a policy rule like Equation 1 is not practical. But how can the constructive results of research as summarized by such a policy rule be made operational? Using Equation 1 as an example, I consider two possibilities. One is to try to make use of the specific form of the policy rule as one of the inputs to central bank decision making. A second is to list the general principles that underlie the policy rule and to leave it up to the policymakers to decide the policy setting without the guidance of the algebraic formula. Some combination of these two options could also be tried. After describing these two alternative approaches, I consider several case studies to illustrate how they might be used in practice.

Making Use of a Specific Rule.

Policymakers, such as the members of the FOMC, currently base their decisions on many factors: leading indicators, the shape of the yield curve, the forecasts of the Fed staff models, etc. There is no reason why a policy rule such as in Equation 1 could not be added to the list, at least on an experimental basis. Each time the FOMC meets, the Fed staff's briefing books could include information about how the FOMC recent decisions compare with the policy rule. Forecasts for the next few quarters--a regular part of the staff briefing--could contain forecasts of the federal funds rate implied by the policy rule. An example of a hypothetical forecast for the next two years with a corresponding row for the policy rule forecast from Equation 1 is shown in Table 1. There are many variants on this example. For instance, there could be a range of entries corresponding to policy rules with different coefficients, or perhaps a policy rule where the growth rate of real GDP rather than its level appears. Bands for the federal funds rate path could span these variants.

At a minimum, experimenting with such a format would bring attention to the concept of a policy rule. But "learning by doing" with the rule would likely bring changes and improvements in the rule and in the format for presenting and using the rule. If the policy rule comes so close to describing actual Federal Reserve behavior in recent years and if FOMC members believe that

such performance was good and should be replicated in the future even under a different set of circumstances, then a policy rule could provide some guide to future decisions. This may be particularly relevant when the membership of the FOMC changes. Such a policy rule could become a guide for future FOMCs.

Making use of General Characteristics of Policy Rules.

A second possible approach to making a policy rule operational does not try to use the details of any particular algebraic formulation. Instead it requires a characterization of the fundamental properties of the rule. Patent laws provide a useful analogy. Patent laws establish the principle that inventors who obtain a patent have the rights to market their invention for a given number of years. The details are left to patent office officials and the court system. Where one draws the line between the fundamentals and the details will depend on many factors.

For example, some of the fundamental features of a monetary policy rule like Equation 1 were summarized in the 1990 Annual Report of the Council of Economic Advisers as

> The Federal Reserve generally increases interest rates when inflationary pressures appear to be rising and lowers interest rates when inflationary pressures are abating and recession appears to be more of a threat.... Assessing just how much the policy instrument needs to be changed as

> circumstances evolve requires judgement. Thus, a policy approach that relies on the expertise of the FOMC members is appropriate and should be preserved. If the operating stance of policy is...measured by interest rates, appropriate settings vary with the interest sensitivity of aggregate demand. (p. 85)

Note that this characterization only gives the <u>signs</u> of the response coefficients of the policy rule. Rather than specifying the magnitudes of the coefficients, it states that the magnitudes should depend on the sensitivity of aggregate demand to interest rates. That is an implication of the design analysis, but it is considerably less specific than stating the magnitudes of the responses.

This characterization is not specific about the target for inflation or for real output. It only states that the federal funds rate should be adjusted when inflation rises or falls and when output rises or falls. Certainly, more is needed if the characterization is to effectively convey the fundamental properties of a policy rule like Equation 1.

Since the mid-1970s monetary targets have been used in many countries to state targets for inflation. If money velocity were stable, then, given an estimate of potential output growth, money targets would imply a target for the price level; given velocity and a real output target, the target price level would obviously fall out algebraically from the money supply target. Even though

the 1980s have shown that money velocity is not stable in the short run, the long-run stability of the velocity of some monetary measures allows one to state targets for the price level. For example, with an estimated secular growth of real output of 2-1/2 percent and steady velocity, a money growth range of 2-1/2 percent to 6-1/2 percent--the Fed's targets for 1992--would imply that the price level target grows at 0 to 4 percent per year. Given biases such as index number problems in measuring prices, the 2 percent per year implicit target inflation rate is probably very close to price stability or "zero" inflation.

Case Study One: The Oil Price Shock of 1990

Operating a monetary policy rule in the face of an oil price shock is difficult and deserves particular study. It is even more difficult if the shock occurs during a transition to a new policy rule. I focus here on the events that followed the Iraq invasion of Kuwait on August 2, 1990.

The oil price shock occurred as the U.S. economy was growing slowly following the 1988-89 monetary tightening--increases in the federal funds rate that had been aimed at containing and reducing the rate of inflation (see Figure 1). If one characterizes Fed actions in terms of the policy rule described above, then the increase in the federal funds rate can be interpreted as occurring for two reasons. First, economic growth in 1987 and 1988 was very strong and inflation was rising; both

factors would call for an increase in the Federal funds rate according to a policy rule like that in Equation 1. Moreover, the Fed had indicated that its intention was to move the economy toward price stability. In other words, the Fed had been attempting to gradually disinflate--to make a transition to greater price stability. In fact, the mean of the target growth rate ranges for the M2 money supply had been reduced from 7 percent in 1987 to 5 percent in 1990, and was reduced to 4-1/2 percent in 1991. The explicit intention of reducing the growth rate targets was to reduce the rate of inflation by an equivalent amount.

Iraq invaded Kuwait on August 2, 1990. Iraq and Kuwait had together been producing 4.3 million barrels of oil a day, and there was a threat to the supply of oil from Saudi Arabia. Not surprisingly the price of oil rose sharply from $21 per barrel at the end of July to $28 on August 6 and eventually to a peak of $46 in mid-October. The monthly average price rose from $17 in July to $36 in October. The effect that this increase in oil prices might have on the economy was of great concern and major efforts were put in place to estimate the economic impacts. Tasks forces were assembled and many models--both traditional and forward-looking--were simulated to obtain estimates. The Council of Economic Advisers published a consensus estimate that a one-year temporary increase in oil prices of 50 percent could temporarily raise the overall price level (GDP deflator) by about 1 percent and with a longer lag, cause real output to fall by

about the same amount.

What should be the monetary and fiscal policy reaction to these changes? Suppose that a monetary policy rule like the one described above were in place. Taken literally, Equation 1 would say that an increase in the central bank's interest rate target--relative to what it otherwise would be--was in order: in the short run the price level would rise more than real output would fall. However, such an interest rate increase would be inappropriate if the price level rise was temporary and would soon disappear.

In fact, analysis at the time suggested that the increase would be temporary. The futures market for oil was helpful in making this assessment. Although the spot price for oil doubled by mid-October, the one-year ahead futures price changed very little. The December 1991 futures price rose only about $4 per barrel while the spot price rose by $25. Moreover, oil supply analyses suggested that increased oil production elsewhere could eventually make up most of the lost production in Iraq and Kuwait if the embargo continued. The main uncertainty was whether additional oil production facilities would be destroyed before the conflict ended. This uncertainty was dramatically resolved with the successful start of Desert Storm in mid January 1991.

For these reasons an increase in interest rates to counteract the increase in the price level brought about by the oil shock would be inappropriate--despite the literal interpretation of Equation 1. However, not adjusting interest

rates in the face of a rising price level would require some deviation from the policy rule. (Figure 1 shows that some departure from the example rule did occur but this was in early 1991. In 1990 there was some leveling off of the interest rate declines that started in 1989.)

In order to emphasize the importance of maintaining a credible policy in the face of a price shock, the experience of the 1970s was reviewed carefully. The oil price shocks that occurred in the 1970s, it was argued, occurred at a time when monetary policy had little credibility. In fact, inflation was rising at a rapid pace before both the 1973 and the 1979 oil shocks. With little credibility, monetary policymakers could not permit the oil shocks to pass through completely into the price level without causing fear that they were continuing to tolerate even higher inflation.

The experience in Japan in the first and second oil shocks provided a useful example of the payoff from a credible monetary policy stance. The 1973 oil price shock occurred in Japan while inflation was rising rapidly. However, the 1979 oil price shock occurred after the bank of Japan had adopted a more credible monetary policy with a much lower rate of money growth and a much lower rate of inflation. It turned out that the 1979 oil price shock had much less effect on inflation and real output in Japan than the 1973 oil shock and a remarkably smaller effect than in the United States and other countries.

In most countries the oil price rise was not viewed as

requiring short-term changes in monetary policies. With central banks following monetary strategies that focused on adjustment of interest rates, this position is best interpreted as a policy response like the one discussed above for the United States: interest rates should follow the path that would have occurred without the oil price shock. There was also a broad consensus that the credibility of economic policies that had been built up in the 1980s should be maintained, and that a clear message be sent that this was the intention of policymakers.

The role of fiscal policy was also discussed. The automatic stabilizers of fiscal policy provide some built-in response to any negative effects on real output and employment that an oil shock might have, and it was certainly the intention in the United States in the summer of 1990 to allow this response to work to mitigate the impact of the oil price shock on the economy. Some international policy officials raised the possibility of over-riding the automatic stabilizers--offsetting them by increasing taxes or reducing expenditures elsewhere--but others raised strong opposition to such over-rides. Surprisingly, therefore, there was less consensus about continuing to keep "systematic" fiscal policies in place than there was about monetary policy.

The Gramm-Rudman-Hollings budget law that was still in force in the United States in the summer of 1990 did not allow for the automatic stabilizers. Increases in the budget deficit whether caused by new programs or by the automatic stabilizers were

against this law, and would result in across the board cuts in spending. The deficit targets would not change even if an oil price shock worsened economic conditions. Hence, changes in this law were needed if the automatic stabilizers were to be allowed to help stabilize the economy. The revisions in the budget law worked out in the weeks following the oil price shock required that the budget targets be adjusted for changes in the economy.

Case Study Two: The Bond Market, Inflation and German Unification

Assessing whether an increase in long-term interest rates is due to an increase in expected inflation or to an increase in the real interest rate is part of the task of operating a systematic monetary policy rule. For example, if the policy is to raise interest rates when inflation picks up, then a rise in long-term interest rates might suggest an incipient rise in inflation and might make policymakers less willing to keep the short-term interest rate steady, even if actual inflation does not change. But that increase in long-term interest rates could be due to other factors, such as a shift in the demand for investment or saving.

Such a situation arose in early 1990. After declining in the latter part of 1989, long-term interest rates rose sharply in early 1990. Ten-year Treasury bond yields rose by 75 basis points. Concern about a rise in inflation could have caused this increase, and if so could have called for a postponement of declines in interest rates that the monetary policy rule would

have called for. However, considerable evidence suggested that other factors were responsible for the increase in long-term rates.

The United States was not the only country to experience an increase in long-term interest rates. Germany had even larger increases, suggesting the possibility that real factors were behind the increase in interest rates. In an integrated world capital market, an increase in interest rates in Germany could be transmitted to U.S. interest rates.

In fact, there was a major change in Germany at this time that could have had such an impact on German long-term rates--anticipations that East Germany and West Germany would be unified and that the unification would increase the demand for capital in Germany and lead to an increase in the government budget deficit in Germany. Greater investment demand would be expected to raise real interest rates in Germany later in 1990 and in 1991, and with forward-looking expectations raise long-term interest rates immediately. In fact, the anticipated increase in demand for investment and reduction in national saving occurred in 1990 as the unification took place. In 1989 the West German budget was essentially in balance, with a surplus of .2 percent of GDP. That surplus turned dramatically into a deficit in 1990 of 3 percent of GDP. Hence, the timing turned out to be correct and consistent with this explanation.

But monetary policy decisions in early 1990 could not wait until 1991 when evidence was available about unification and its

impact. In early 1990 the analysis had to rely on forecasts and model simulations to see if the magnitudes were plausible. In other words, would an increase in the demand for capital in Germany of plausible magnitudes cause an increase in interest rates of the magnitudes observed? Was it a quantitatively sufficient explanation?

Model simulations suggested that increases in interest rates of about one percentage point were consistent with plausible increases in the demand for capital. Hence, an increase in expected inflation was not needed to explain the increase in long-term interest rates. This gave some guidance that interest rate policy need not be adjusted. In terms of the example policy rule of Equation 1, the appropriate policy was to remain with the policy rule.

Concluding Remarks

This paper has endeavored to study the role of policy rules in a world where simple, algebraic formulations of such rules cannot and should not be mechanically followed by policymakers. Starting with the assumption that systematic and credible features of rule-like behavior improve policy performance, I considered several ways to incorporate rule-like behavior into actual policymaking. Clarification of terms, distinguishing between the design, the transition, and the operation of policy rules, and actually using specific rules or their general features in policy decisions are some of the ideas considered.

Two case studies and a hypothetical policy rule illustrated how the ideas could work in practice.

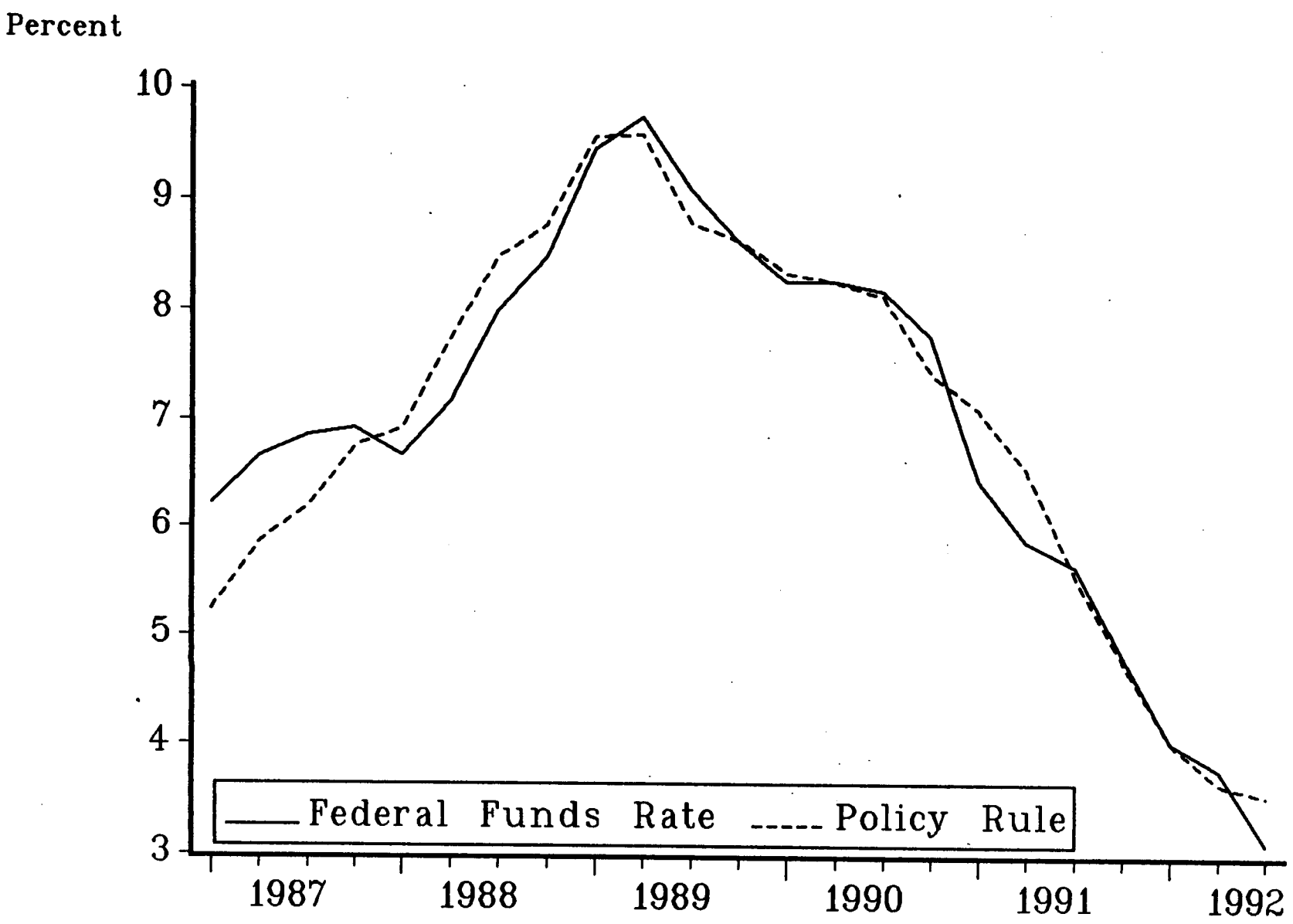

Figure 1. Federal Funds Rate and Example Policy Rule: 1987.1 – 1992.3.

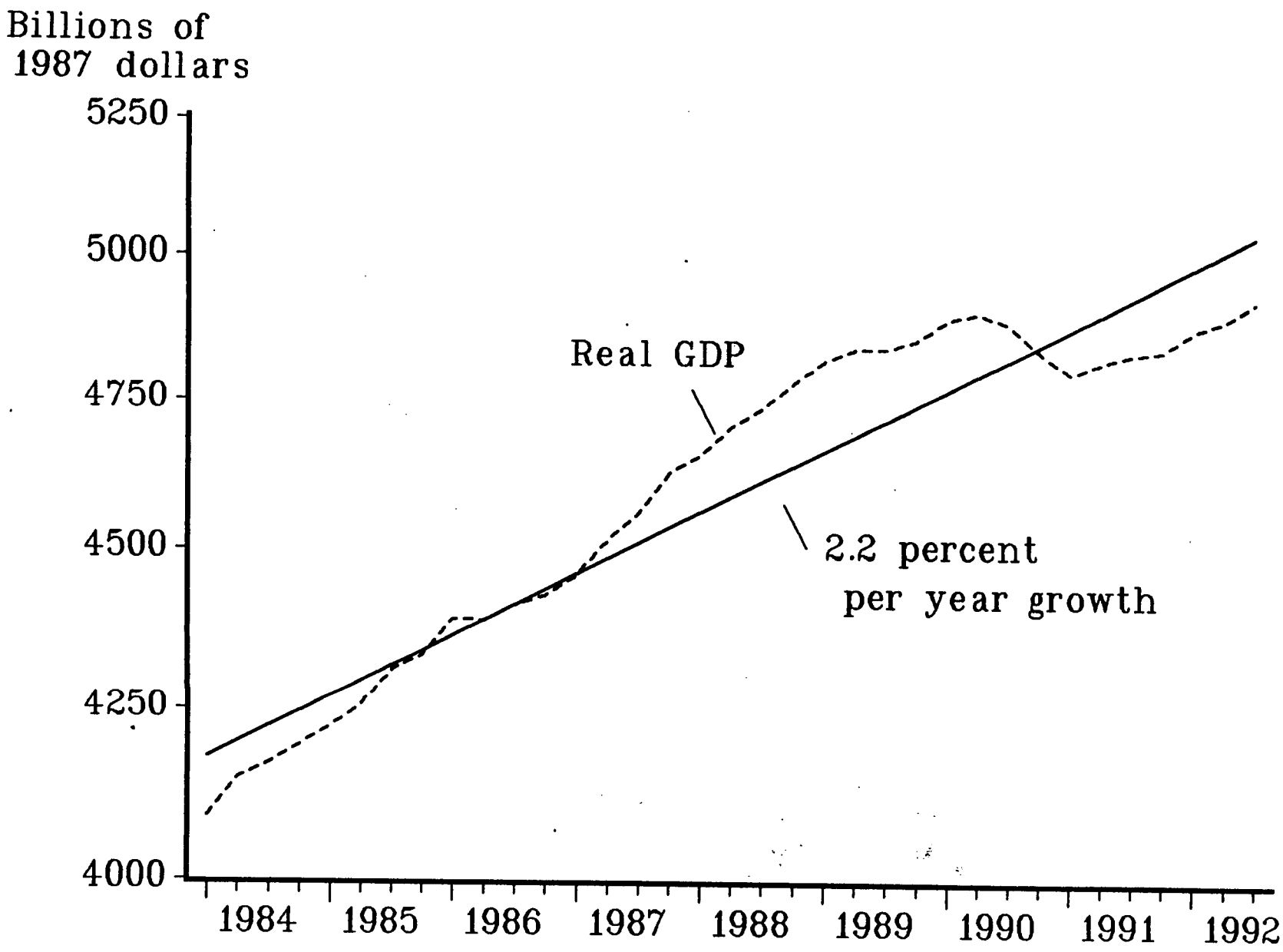

Figure 2. Real GDP and 1984.1–1992.3 trend growth.

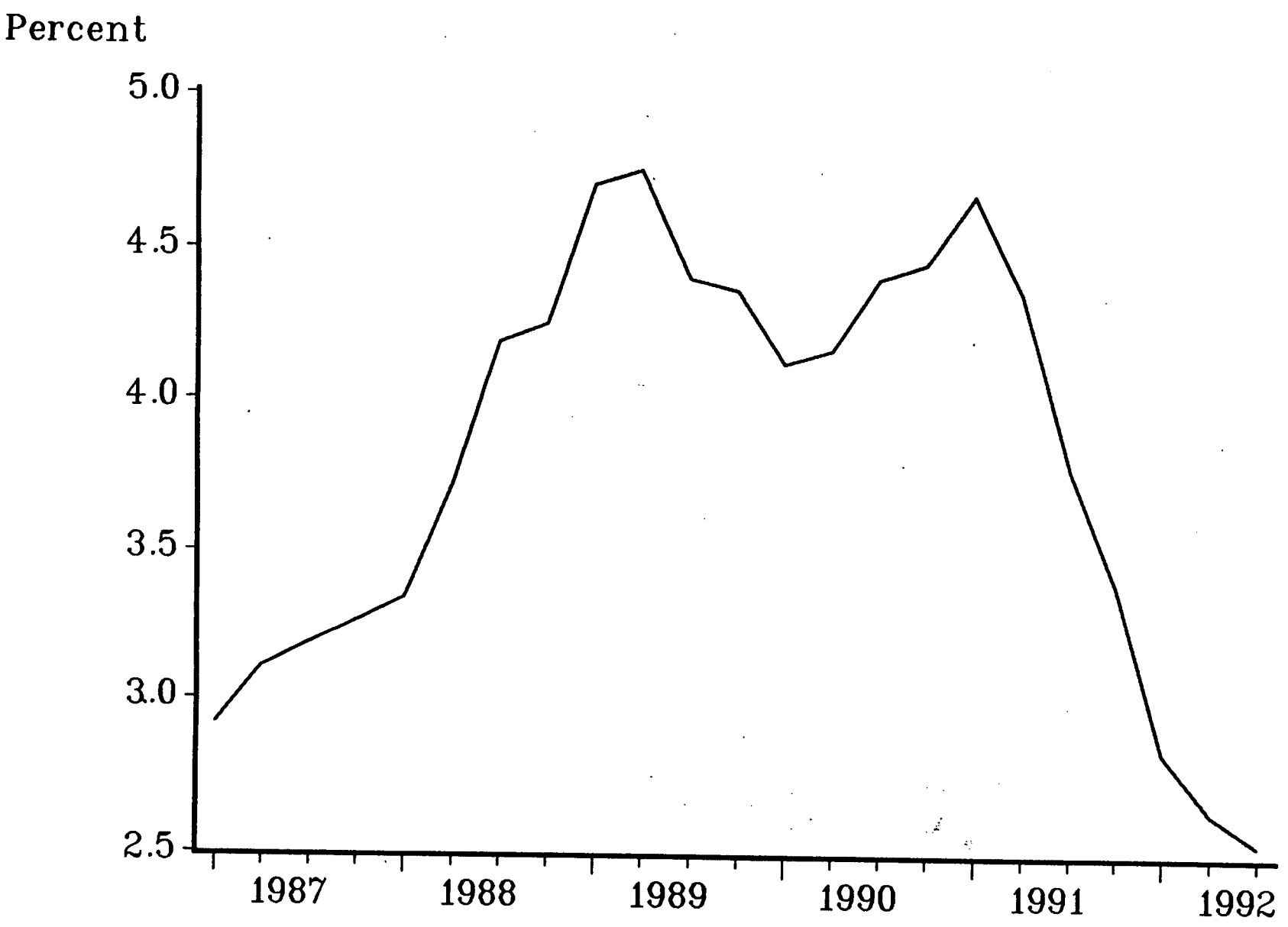

Figure 3. Inflation during previous 4 quarters (GDP deflator).

TABLE 1

HYPOTHETICAL FORECAST WITH POLICY RULE

	92.4	93.1	93.2	93.3	93.4	94.1	94.2	94.3	94.4
Main Forecast Variables:									
Gross Domestic Product % ch annual rate	2.3	2.4	2.5	2.6	2.7	3.0	3.2	3.3	3.3
GDP Deflator % ch annual rate	2.5	2.6	2.4	2.3	2.3	2.2	2.5	2.5	2.6
Policy Rule Variables:									
GDP Deviation % below trend	2.8	2.7	2.7	2.6	2.5	2.3	2.1	1.8	1.5
Federal funds rate	3.4	3.5	3.3	3.2	3.2	3.2	3.7	3.9	4.1

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