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Central Bank Behavior and the Strategy of Monetary Policy: Observations from Six Industrialized Countries*

1. Introduction

In the United States, it has long been the practice of central bankers to meet periodically with outside consultants, including academic and business economists, in order to discuss the current economic situation. In the authors' experience as invited consultants, these meetings invariably end with a "go-round," in which each consultant is asked to give his or her views on current monetary policy. Often the go-round is prefaced by a question of the following sort: "The Federal Open Market Committee [the group that determines U.S. monetary policy] meets next Tuesday. What actions do you recommend that we take?"

We have each found it quite difficult to give a good answer to this type of question, not only because, as ivory-tower academics, we tend to have a less-detailed knowledge of current conditions than do the central bankers. The larger problem is that the question lacks context:

Implicitly, it asks for advice on tactics without specifying the strategy. Probably the most enduring lesson of Lucas's (1976) famous critique is that the effects of any given policy action depend greatly on the expectations it engenders: Is the policy intended to be temporary or permanent? Under what circumstances will it be changed? Expectations about policy in turn depend on the public's perceptions of the authorities' policy strategy, as determined both by policymakers' explicit choices and by deeper political and institutional factors. Thus, if we hope ever to give a really satisfactory answer to the central banker's question, we must first develop some clear views about monetary policy strategy as well as tactics. These concerns motivate our paper.

What is the optimal strategy for the monetary authorities to follow? There is a large and venerable academic literature on this question, which has tended to cast the central banker's options rather starkly as following either *rules* or *discretion*. A monetary rule specifies future monetary actions as a *simple* function of economic or monetary conditions[1]; at least in principle, monetary rules do not allow the monetary authorities to respond to unforeseen circumstances. Examples of rules are Milton Friedman's $k\%$ money growth rule and (strict) nominal GNP targeting. Fischer (1990) describes the rationales that have been advanced for rules: The most compelling is probably Kydland and Prescott's (1977) argument that rules increase the central bank's ability to precommit to avoiding monetary surprises, which in turn permits a lower steady-state rate of inflation.

In contrast to rules, the strategy of discretion[2] puts no prior restrictions on the actions that the central bank can take at each date. The basic rationale for discretion, as discussed by Fischer (1990), is that the benefit of allowing the central bank to respond flexibly to unanticipated contingencies is greater than any advantage gained from precommitment.

The debate about rules and discretion, although motivated by real policy concerns and some (mostly U.S.) experience, has been cast largely in abstract and ahistorical terms. An alternative, and complementary, research strategy is simply to observe what central bankers at different places and times have actually done, and to see what results they have obtained. This more flatly empirical approach is taken by the

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1. The requirement of simplicity is essential. Any monetary strategy at all could in principle be specified as a sufficiently complex contingent rule.
2. In what sense is discretion a strategy, rather than the absence of a strategy? If we interpret discretion as the best time-consistent (no-precommitment) policy, then it is a strategy in the formal sense, because in principle, one could calculate the policy action to be taken in every future contingency. In practice, of course, such a calculation would be difficult or impossible to carry out, so that the strategy implied by discretion is much less transparent than the strategy implied by rules.

present paper. We use a simple case study methodology to analyze the conduct and performance of monetary policy in six industrialized countries for the period from the breakup of the Bretton Woods system until the present. In doing so, we hope to gain some insight into the objectives and constraints that determine central bank behavior and—at this stage, in a very tentative way—to develop some hypotheses about the attributes of successful monetary strategies.

The case study method has a poor reputation in economics, largely because of the tendency of its users to treat anecdotes as evidence. We fully agree that case studies are not a substitute either for more systematic empirical work or formal theoretical modeling. However, in our opinion, this approach can be a valuable preliminary to the more standard types of research. First, case studies can help establish the historical and institutional context, an essential first step in good applied work. Second, historical analysis of actual policy experiences is a natural way to find substantive hypotheses that subsequent work can model and test more formally. We believe that the method of developing initial hypotheses exhibited here is superior to the more typical, implicit method of developing hypotheses, which relies on introspection or on knowledge of only a few episodes.

The bulk of our paper consists of brief narrative discussions of recent monetary policy-making in the United States, the United Kingdom, Canada, Germany, Switzerland, and Japan. From these case histories, as well as from our reading of central bank reports and the commentaries of observers, we distill a number of hypotheses—candidate empirical regularities, if you will—about central bank behavior, policy strategies, and policy outcomes. These hypotheses are of two types. *Positive hypotheses,* which receive most of our attention, are based on observations that hold for all or nearly all of the cases examined; to the extent that these observations are confirmed by additional research, they need to be explained by positive theories of central bank behavior. *Normative hypotheses,* in contrast, are about differences in the characteristics of monetary policy strategies between more and less successful economies. We call these hypotheses normative because—despite the great difficulties involved in inferring causation from correlation—we believe that these cross-sectional differences ultimately may help to provide useful lessons about the design of monetary policy. We emphasize again, though, that at this stage both the positive and normative hypotheses are to be treated not as conclusions but as suggestive propositions that are advanced for further discussion, analysis, and testing.

Of the various positive hypotheses that we extract from the case studies, three of the most important are the following:

First, in their conduct of monetary policy, central bankers appear to

be pursuing multiple economic objectives; they care not only about the behavior of inflation and unemployment but sometimes also, independently, about the behavior of variables such as exchange rates and interest rates. Further, instead of giving equal weight to all objectives, a large part of the monetary policymaker's attention at any given time is devoted to the variable that is currently "in crisis," to the neglect of other concerns.

Each of the central banks we consider has employed official money growth targets over all or a substantial part of the recent period. A second positive hypothesis is that—consistent, perhaps, with their "crisis mentality"—central bankers are more likely to adopt targets for money growth, or to increase their emphasis on meeting existing targets, when inflation is perceived as the number one problem.

This tendency of central bankers to retreat to money growth targets when inflation increases is something of a puzzle. For example, as we discuss later, this behavior is not easily explained by Poole's (1970) classic analysis of target choice. We conjecture (based in part on what the central bankers themselves say) that there are two reasons why central bankers cling to money targets when inflation threatens: (1) High inflation causes policymakers to become less confident in their ability to assess the stance of policy; intermediate targets such as money growth targets are perceived to be useful as *guideposts* or compasses that aid in choosing the appropriate policy setting. (2) Perhaps more important, money growth targets may be particularly useful as *signals* of the monetary authorities' intention to get tough on inflation. As we explain later, signalling its anti-inflationary intentions may help the central bank both to manage the public's expectations and to defend its policies against political pressures for more expansionary policies.

A third positive observation is that—although banks occasionally conduct policy using a strategy approaching pure discretion—they never adhere to strict, ironclad rules. Indeed, a common strategy resembles most nearly a hybrid of rules and discretion, in which the central bank attempts (with varying degrees of success) to apply rules to its medium-term and long-term policies, while retaining "flexibility" or discretion to respond to developments in the economy in the short run. We view this observation as quite interesting because it challenges the simple view of much of the received literature that pure rules and pure discretion are the only policy strategies available.

Perhaps the most intriguing normative hypothesis suggested by our case studies is that—contrary to what might be inferred from Kydland and Prescott (1977)—hybrid monetary strategies of the type just described appear to be consistent with low and stable inflation rates. For example, as we will see, Germany and Switzerland—and to a lesser

extent, Japan—have been able to pursue money growth targets as an intermediate-term objective, while at the same time maintaining considerable short-run discretion to meet objectives such as exchange rate stabilization. Several factors seem to be associated with successful use of a hybrid strategy, each of which can be construed as helping to make credible the central bank's claim that it will follow rules in the medium run, though not in the short run:

First, we observe particularly in the German and Swiss cases that the central bank's intermediate targets are explicitly linked, via a simple and public calculation, to the ultimate goals of policy (e.g., the desired inflation rate). In principle, this explicit linkage of targets to goals allows the central bank to adjust its targets when the target–goal relationship changes, without compromising its credibility.

Second, the central banks who successfully use the hybrid strategy tend to conduct policy in a more straightforward and transparent way, avoiding devices such as multiple targets, "base drift," and irregular changes in targets or target growth rates.

Finally, achieving low inflation via the hybrid strategy seems to require some commitment by the central bank to reverse short-term deviations from target over a longer period. In the case of a money growth rule, for example, periods of above-target money growth tend to be compensated for (in low-inflation countries) by subsequent money growth reductions.

The rest of the paper is organized as follows. Section 2, the bulk of the paper, presents the six case studies of monetary policy-making. Section 3 lists and discusses our positive hypotheses about central bank behavior. Section 4 both discusses our normative hypotheses and addresses important issues that remain unresolved.

2. The Conduct of Monetary Policy in Six Industrialized Countries, 1973–1991

To provide some empirical basis for discussing the conduct of monetary policy, this section provides brief narrative descriptions of monetary policy in six industrialized countries over the period since the breakdown of the Bretton Woods system. The countries discussed are the United States, the United Kingdom, Canada, Germany (representing the EMS bloc), Switzerland, and Japan. These six countries represent "independent" observations in the sense that, for most of the period, no two of them belonged to a common system of fixed exchange rates.[3]

3. On this basis we exclude France and Italy, whose exchange rates are tied to the deutschemark through the Exchange Rate Mechanism (ERM). (The U.K. did not join the

Other countries with independent monetary policies, such as Sweden and Australia, would be interesting to study but are excluded because of space and data limitations.

Our focus here is on general strategies and approaches used by monetary policymakers; where possible, we abstract from the fine institutional details of monetary policy operations in the various countries, except as they impinge on the broader issues.[4] In discussing the experiences of the various countries, however, it is useful to draw the familiar distinctions among policy goals, instruments, and intermediate targets (see, e.g., McCallum, 1989, or Friedman, 1990). *Goals* are the final objectives of policy, for example, price stability and economic growth. *Instruments* are variables that the central bank controls closely on a daily or weekly basis, such as nonborrowed reserves or the interbank lending rate; the choice of instruments and the mechanisms by which they are controlled determine the central bank's *operating procedure*. *Intermediate targets*—monetary aggregates are the most common example—are variables that are neither under the direct day-to-day control of the central bank nor are the ultimate goals of policy, but that are used to guide policy. Values for instruments are usually set so that, given estimates of behavioral parameters such as the interest elasticity of money demand, intermediate targets for variables such as M1 growth are reached in the longer term (quarter-to-quarter or year-to-year). In turn, intermediate targets are set or reset periodically so as to be consistent with the central bank's ultimate economic objectives.

The narrative discussions that follow are supplemented by two types of more quantitative evidence. First, Tables 1–6 present, for each country separately, the record of announced targets for money growth, the actual money growth outcomes, and the implied excess money growth (actual growth less the midpoint of the target range). Second, comparisons across countries of the behavior of several key monetary and macroeconomic variables are provided by Figures 1–7 at the end of the paper. The monthly data shown in the figures are as follows:[5]

(Fig. 1)—money growth rates (from 1 year earlier) of both the narrow and the broad monetary aggregate focused on by the central bank in each country (M0, M1, M2, or M3).

(Fig. 2)—the variability of narrow and broad money growth (e.g., SDM1

ERM until 1990.) Of course, attempts to stabilize nominal exchange rates have affected monetary policy at various times in all of these countries; as we discuss later, Canada in particular has often subordinated its monetary policy to exchange rate objectives.

4. Excellent discussions of the "microstructure" of monetary institutions and policy operations can be found in Kneeshaw and Van den Bergh (1989), Batten et al. (1990), and Kasman (1991).

5. See the notes to the figures for details and sources.

or SDM2); measured as the standard deviation over the previous 12 months of the money growth rates in Figure 1.[6]

(Fig. 3)—interest rates on overnight interbank loans (RS) and on long-term government bonds (RL).

(Fig. 4)—the variability of changes in overnight interbank and long-term interest rates (SDRS or SDRL); measured using the same 12-month moving-average procedure as in Figure 2.

(Fig. 5)—indices of nominal exchange rates (ER); measured as the Federal Reserve's effective exchange rate index for the United States and as the value of the currency in U.S. dollars for other countries (an increase in the index always implies an appreciation).

(Fig. 6)—inflation rates (PI); measured as the log-change of consumer prices over the last 12 months.

(Fig. 7)—unemployment rates (UN); civilian labor force, national definitions.

The United States.[7] We begin with the United States because it is the best documented case and because the U.S. experience has played an important role in setting the agenda for previous analyses of monetary policy.

The conduct of monetary policy in the United States since the early 1970s is conventionally divided into three regimes. During the first regime (approximately 1970–1979), the federal funds rate—the interbank lending rate—was the primary instrument of monetary policy, serving in various degrees as a target of policy as well. Open market operations were used to keep the funds rate within a narrow target band (usually on the order of 50–75 basis points); over time, the band was adjusted smoothly (usually in 25 or 50 basis point increments) in response to general macroeconomic conditions.[8]

6. Huizinga and Mishkin (1986) have pointed out potential problems with moving-average measures of volatility. Thus we have also calculated volatility measures using a procedure suggested by Pagan (1984), which effectively assumes an autoregressive conditional heteroscedasticity (ARCH) specification for the variability of money growth. The results using this procedure yield similar conclusions to those provided by Figures 2 and 4.

7. Numerous sources discuss recent monetary policy and the policy process in the United States. See, e.g., Lombra (forthcoming), Karamouzis and Lombra (1989), Friedman (1988), Poole (1988), and Heller (1988). For a longer-term overview, see Meulendyke (1990). In this and all subsequent case studies we also made use of the OECD's *Economic Surveys*.

8. Bernanke and Blinder (forthcoming) present evidence for the veiw that, during this period, changes in the funds rate (or the spread between the funds rate and other rates) were the best signal of a changing stance of monetary policy. Cook and Hahn (1989) provide a record of funds rate target changes and show that, during the 1975–1979 period, open-market interest rates responded sensitively to changes in the Federal Reserve's target for the funds rate.

Table 1   MONEY GROWTH TARGETS AND OUTCOMES: UNITED STATES

Year	Aggregate	Target	Outcome	Outcome less target
1975	M1	5.0–7.5	5.3	− 1.0
	M2	8.5–10.5	9.7	+ 0.2
	M3	10.0–12.0	12.3	+ 1.3
1976	M1	4.5–7.5	5.8	− 0.2
	M2	7.5–10.5	10.9	+ 1.9
	M3	9.0–12.0	12.7	+ 2.2
1977	M1	4.5–6.5	7.9	+ 2.4
	M2	7.0–10.0	3.8	− 4.7
	M3	8.5–11.5	11.7	+ 1.7
1978	M1	4.0–6.5	7.2	+ 2.0
	M2	6.5–9.0	8.7	+ 1.0
	M3	7.5–10.0	9.5	+ 0.8
1979	M1	3.0–6.0	5.5	+ 1.0
	M2	5.0–8.0	8.3	+ 1.8
	M3	6.0–9.0	8.1	+ 0.6
1980	M1	4.0–6.5	7.3	+ 2.1
	M2	6.0–9.0	9.6	+ 2.1
	M3	6.5–9.5	10.2	+ 2.2
1981	M1	3.5–6.0	2.3	− 3.0
	M2	6.0–9.0	9.5	+ 2.0
	M3	6.5–9.5	11.4	+ 3.4
1982	M1	2.5–5.5	8.5	+ 4.5
	M2	6.0–9.0	9.2	+ 1.7
	M3	6.5–9.5	10.1	+ 2.1
1983	M1	4.0–8.0	10.0	+ 4.0
	M2	7.0–10.0	8.3	− 0.2
	M3	6.5–9.5	9.7	+ 1.7
1984	M1	4.0–8.0	5.2	− 0.8
	M2	6.0–9.0	7.7	+ 0.2
	M3	6.0–9.0	10.5	+ 3.0
1985	M1	4.0–7.0	11.9	+ 6.4
	M2	6.0–9.0	8.6	+ 1.1
	M3	6.0–9.5	7.4	− 0.4
1986	M1	3.0–8.0	15.2	+ 9.7
	M2	6.0–9.0	8.9	+ 1.4
	M3	6.0–9.0	8.8	+ 1.3
1987	M2	5.5–8.5	4.3	− 2.7
	M3	5.5–8.5	5.6	− 1.4

Table 1 MONEY GROWTH TARGETS AND OUTCOMES: UNITED STATES

Year	Aggregate	Target	Outcome	Outcome less target
1988	M2	4.0–8.0	5.2	− 0.8
	M3	4.0–8.0	6.1	+ 0.1
1989	M2	3.0–7.0	4.7	− 0.3
	M3	3.5–7.5	3.3	− 2.2
1990	M2	3.0–7.0	3.8	− 1.2
	M3	2.5–6.5	1.5	− 3.0
1991	M2	2.5–6.5	2.7	− 1.8
	M3	1.0–5.0	1.5	− 1.5

Notes: Growth rates (%) are measured fourth quarter to fourth quarter. Outcome less target equals the outcome less the midpoint of the target range. Data reflects definitions of aggregates current at times of announcements. Target ranges are those announced at the beginning of the year (midyear changes occurred in 1979, 1983, 1985, and 1990). Target and outcome for 1981 M1 growth are adjusted for shifts into NOW accounts.

Sources: Isard and Rojas-Suarez (1986) and Fischer (1987); updates from annual "Monetary Report to Congress," March or April issues of *Federal Reserve Bulletin.*

In principle, during this period, the Fed paid attention to money growth as well as to interest rates: Beginning in 1970, the FOMC selected weekly tracking paths for M1 and indicated its preferred behavior for M2 (Meulendyke, 1990), and in 1975, in response to a congressional resolution, the Fed began to announce publicly its targets for money growth (Table 1). In practice, however, the Fed did not consider meeting money growth targets to be of high priority, placing greater weight on reducing unemployment while maintaining a relatively smooth path for interest rates. Devices employed by the Fed to avoid being overly constrained by money growth targets included the setting of targets for more than one aggregate, which usually allowed it to claim that it was hitting at least some target; and the frequent resort to "base drift," that is, the ignoring of past deviations of money growth from target when setting new targets.[9]

As can be seen from Table 1 or Figure 1a, M1 growth had an upward trend after 1975 despite declining target ranges. With hindsight, the

9. Walsh (1986) defends base drift as the correct response to nonstationary shocks to money demand. It seems to us that this case requires that the central bank clearly identify—and explain to the public—the source of these nonstationary shocks, otherwise base drift will be perceived as a ploy. The fact that inflation rose significantly in the late 1970s is evidence against the view that the Fed was optimally offsetting nonstationary money demand shocks.

money expansion of 1975–1978 appears to have been excessive: Unemployment came down steadily during the 1975–1978 period (Fig. 7a), but the dollar fell (Fig. 5a) and inflation heated up sharply (Fig. 6a), even in advance of the second oil shock.

The funds rate targeting regime—or its first act—came to an end with the dramatic news conference of Fed Chairman Paul Volcker on October 6, 1979, in which Volcker signalled a new commitment to reduce inflation by a change in Fed operating procedures. The new regime that followed the 1979 announcement was described by the Fed as targeting nonborrowed bank reserves, an operating procedure sometimes characterized (e.g., by Lombra, forthcoming) as intermediate between the perfectly elastic supply of reserves associated with an interest rate target and the inelastic supply of reserves associated with a strict money target. Under a system of targeted nonborrowed reserves, increases in the overall demand for reserves, arising, for example, from an increase in money demand, are reflected both by an increase in the money stock (as banks increase borrowed reserves) and by an increase in the funds rate (which must increase to make banks indifferent between borrowing more from the discount window and purchasing more federal funds on the interbank market).

Because nonborrowed reserves targets were not set far in advance and were often adjusted, however, the 1979 change in operating procedure did not in itself necessarily require a major change in the conduct of U.S. monetary policy, except perhaps at very high (daily or hourly) frequencies. For example, nonborrowed reserve targets could in principle have been set week to week to keep the funds rate from straying far from a preferred range. However, the change in operating procedures seems to have been accompanied by a decision by the Fed to place greater weight on monetary targets and to tolerate high and volatile interest rates (see Figs. 3a and 4a) in order to bring down inflation.[10] The change in interest rate behavior was particularly dramatic: Instead of smoothing the funds rate in its customary way, after the October 1979 announcement, the Fed whipsawed the financial markets; the funds rose by more than 500 basis points to exceed 17% in March 1980, fell to below 10% after real GNP declined in the second quarter, and then rose to nearly 20% in 1981. M1 growth was noticeably lower during

10. Fed reaction functions estimated by McNees (1986) and by Karamouzis and Lombra (1989) show that the Fed placed a greater weight on deviations of the money supply from target during 1979–1982, relative to earlier and later periods. Cook (1989), in an excellent discussion of 1979–1982 policy, argues that high-interest rates were not an accidental byproduct of the nonborrowed reserves procedure but that nonborrowed reserves targets were intentionally adjusted so as to produce high interest rates.

the 1979–1981 period than in previous years, but there also was a significant (and permanent) increase in the volatility of M1 growth (Fig. 2a).[11]

What are we to make of the sharp changes in Fed operating procedures that occurred during and after 1979? The most likely explanation of these changes is political rather than technical. The Fed had decided that inflation had reached crisis levels and had to be controlled at almost any cost. As many authors have noted,[12] the new operating procedures and the greater (putative) attention to monetary targets were a useful smokescreen that obscured the link between the Fed's actions and the painful increases in interest rates. At the same time, the changes in procedure signalled to the public that they should not expect business as usual with respect to the Fed's attitude toward inflation.

Volcker's policy shift achieved its disinflationary goals but contributed to a deep recession in 1981–1982. Velocity instability associated with financial innovation and other factors also raised concerns (based on the traditional Poole, 1970, analysis) about whether monetary targets would continue to be of any value for guiding policy. In the fall of 1982, the Fed switched tactics again, this time to a borrowed reserves operating procedure. Simultaneously, it adopted a decidedly easier policy, despite the fact that money growth was above its targeted range (Table 1). Money targets were deemphasized after 1982. In particular, M1 was allowed to deviate quite far from its targets and after 1986 was no longer targeted at all.

Because there is a close link between desired borrowed reserves and the funds rate, the borrowed reserves procedure adopted in 1982 is, in practice, quite similar to funds rate targeting.[13] Thus, the third regime of post-1973 monetary policy in the United States is a return to an emphasis on interest rate smoothing, as in the pre-1979 monetary regime (note from Fig. 4a that after 1982, interest rate volatility returned to pre-1979 levels). During the 1990–1991 recession, the degree to which

11. Added complexity in the use of M1 as a policy guide was created by a redefinition of M1, to include other checkable deposits such as NOW accounts but to exclude foreign-held deposits, in 1980.

12. For example, see Greider (1987), Mussa (forthcoming), and Mishkin (1992).

13. The demand for borrowed reserves is usually taken to be an increasing function of the spread between the federal funds rate and the discount rate, reflecting the equilibrium condition that banks must be indifferent between obtaining funds from the federal funds market and from the discount window. If this demand function is stable, then targeting borrowed reserves is equivalent to targeting the excess of the funds rate over the discount rate. See Thornton (1988). Thornton also presents evidence that, on those occasions when the demand for borrowed reserves appeared to shift, the Fed typically shifted its borrowed reserve target so as to stabilize the funds rate.

Fed policy has been guided by and expressed in terms of interest rate targets rather than money or reserve growth targets has been particularly striking. For example, the Fed's "shock treatment" of December 1991 was couched solely in terms of funds rate and discount rate reductions.[14]

While the Fed concentrated relatively more on stabilizing interest rates after 1982, it also pursued several other goals. One key objective during the latter part of the 1980s was exchange rate stabilization: The sharp appreciation of the dollar during the Volcker regime (Fig. 5a) had contributed to a massive increase in the U.S. current account deficit. Beginning in early 1985, the Fed attempted to bring down the dollar by driving up both M1 and M2 growth rates (Fig. 1a). By 1987, policymakers at the Fed agreed that the dollar had fallen enough, and money growth rates were brought back down. These actions by the Fed were supported by attempts at international policy coordination embodied by the Plaza Accord in September 1985 and the Louvre Accord in February 1987.

Other objectives that influenced monetary policy during the 1980s included financial market stability (particularly following the October 1987 stock market crash; see Brimmer, 1989, Mishkin, 1991) and the maintenance of Volcker's inflation gains. On the price stability front, the Fed was particularly successful, as for the first time since the early 1960s, inflation in the latter part of the 1980s remained low and stable. Whether the good inflation performance of recent years was due primarily to good luck (e.g., falling oil prices) or agile policy is controversial.

The United Kingdom.[15] As has often been discussed, there are some broad parallels between the recent histories of British and U.S. monetary policies, as there were for general economic policies under Thatcher and Reagan.

As in the United States, the British introduced money targeting in the mid-1970s in response to mounting inflation concerns. Also as in the United States, the Bank of England used interest rates as operating instruments and was committed to interest-rate smoothing during this period. Informal targeting of a broad aggregate, sterling M3 (hereafter M3), began in late 1973, and formal publication of targets began in 1976 (Table 2), following a spike in inflation and in conjunction with an IMF

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14. A principal reason for the deemphasis of money growth was the perception that the "credit crunch" in banking had interfered with the normal relationship between aggregates such as M2 and nominal GNP; see Bernanke and Lown (1991) for a discussion of the credit crunch and its implications for monetary policy.

15. Good recent descriptions of U.K. monetary policy are to be found in Fischer (1987), Minford (forthcoming), and Temperton (1991).

Table 2   MONEY GROWTH TARGETS AND OUTCOMES:
          UNITED KINGDOM

Period	Aggregate	Target	Outcome	Outcome less target
April 1976–April 1977	M3	9–13[1]	8.0	−3.0
April 1977–April 1978	M3	9–13	15.1	+4.1
April 1978–April 1979	M3	8–12[2]	11.4	+1.4
October 1978–October 1979	M3	8–12[3]	13.7	+3.7
June 1979–October 1980	M3	7–11[4]	17.2	+8.2
February 1980–April 1981	M3	7–11[5]	19.4	+10.4
February 1981–April 1982	M3	6–10	12.8	+4.8
February 1982–April 1983	M1	8–12	12.4	+2.4
	M3	8–12	11.2	+1.2
	PSL2	8–12	11.6	+1.6
February 1983–April 1984	M1	7–11	14.0	+5.0
	M3	7–11	9.5	+0.5
	PSL2	7–11	12.6	+3.6
February 1984–April 1985	M0	4–8[6]	5.4	−0.6
	M3	6–10	11.9	+3.9
March 1985–March 1986	M0	3–7	3.4	−1.6
	M3	5–9[7]	16.7	+9.7
March 1986–March 1987	M0	2–6	4.4	+0.4
	M3	11–15[8]	19.0	+6.0
March 1987–March 1988	M0	2–6	5.6	+1.6
March 1988–March 1989	M0	1–5	6.1	+3.1
March 1989–March 1990	M0	1–5	6.3	+3.3
March 1990–March 1991	M0	1–5	2.6	−0.4
March 1991–March 1992	M0	0–4	—	—

Notes: M3 refers to sterling M3, or M3 less residents' deposits abroad. PSL2, private sector liquidity, is a broader aggregate than M3. Outcome less target equals the outcome less the midpoint of the target range. [1]Target of 12% growth for M3 set in July 1976 superseded by 9–13% target for M3 in December 1976 'letter of intent' to IMF. [2]New target after 6 months. [3]New target after 8 months. [4]Original target was to April 1980. Target was extended in October 1979 for 1 year, but then new target was set for period beginning February 1980. [5]From 1980 to 1986, target ranges for M3 were also set for a 3–4-year horizon. [6]Beginning in 1984, target ranges for M0 were also set for a 4-year horizon. [7]Target suspended in October 1985. [8]Target suspended in October 1986.

Sources: Temperton (1991), supplemented by *OECD Economic Surveys*, various issues.

support arrangement. To help ensure that M3 targets were met, the Supplementary Special Deposits Scheme—the infamous "corset"—was introduced in December 1973. The corset scheme attempted to reduce M3 growth essentially by taxing a component of M3, high-interest bank deposits.

Elementary economic analysis suggests that a scheme to reduce the growth rate of monetary aggregate artificially through tax policy would also distort the relationship between that aggregate and macroeconomic

variables such as nominal income and inflation. Thus, the reliance on the corset is evidence that, during the pre-1979 period, the British monetary authorities were like their U.S. counterparts in not taking their money growth targets very seriously. It is interesting that, despite the assistance of the corset, the Bank of England had great difficulty in meeting its M3 growth targets during this period: Not only were announced targets consistently overshot, but the Bank of England frequently revised its targets midstream or abandoned them altogether (Table 2). One result of these policies was that British monetary aggregates had greater volatility than even those in the United States (Fig. 2b). For example, the volatility of U.S. monetary base growth (not shown in the figures) was on average well less than half that of British monetary base growth in the pre-1979 period, and the same is true for M3 growth.

Although inflation fell subsequent to the 1973 oil price shock, beginning in 1978 prices in the United Kingdom began to accelerate again, with inflation ultimately reaching nearly 20% by 1980. As in the United States, the perception of an inflationary crisis led to a change in strategy in 1979. Prime Minister Thatcher's Medium-Term Financial Strategy (MTFS, formally introduced in the government's second budget in March 1980) included three main components: a gradual deceleration in M3 growth, elimination of various controls on the economy (including the corset, exchange controls, and incomes policies), and a reduction of the PSBR (the public sector borrowing requirement, or deficit). A central goal of this program was the restoration of credibility for the government's anti-inflationary policies; it was in order to enhance the credibility of proposed reductions in money growth that the government opted for reduced government deficits instead of lower taxes, à la Reagan.[16]

Unfortunately, the British disinflationary strategy in the 1979–1982 period ran into a technical problem similar to that experienced in the United States, namely, that the relationship between the targeted aggregate and nominal income became very unstable. M3 velocity fell sharply, and M3 grew at rates well above the target ranges (Table 2, Fig. 1b), even as other indicators—the value of the pound, the growth rates of narrower money aggregates, and the unemployment and inflation rates—all began to signal that monetary policy was very tight (Figs. 1b–7b). In retrospect, the instability of M3 is not surprising, because

16. Another difference with the U.S. approach was that the British did not significantly reduce their commitment to interest rate smoothing with the change in strategy in 1979 (Fig. 4b). This confirms the earlier point that there is no necessary connection between the operating procedure and the general stance of monetary policy.

the removal of the corset induced banks to market high-interest deposits aggressively. Other factors, such as the phasing out of exchange controls and an increased pace of financial innovation, also affected the growth rate of M3. The monetary authorities tried several strategies in response to this instability, including the setting of multiyear target ranges (which, for the most part, were not met) and the targeting of several aggregates simultaneously.[17]

Subsequent to 1983, arguing that financial innovation was wreaking havoc with the relationship between broad money and income,[18] the Bank of England began to deemphasize M3 in favor of narrower aggregates, particularly M0 (the monetary base). The target for M3 was temporarily suspended in October 1985 and finally dropped in 1987, leaving M0 as the only money aggregate to be targeted. Generally, the attempt to target M0 was more successful than earlier attempts to target M3: Target ranges have been announced on a regular basis and have been gradually reduced over time. Also, since 1984, actual M0 growth has generally fallen within or close to the target ranges, with under- or overshootings tending to be reversed in subsequent years.

The major exception to the assertion that M0 growth has been on target occurred in the 1987–1988 period, during which the authorities became concerned about appreciation of the pound and informally "capped" sterling at 3.00 DM to the pound, resulting in more rapid money growth (see Fig. 1b and Table 2). Some economists, such as Belongia and Chrystal (1990), have argued that this episode was less an attempt to manage the exchange rate per se than it was an attempt to find a new nominal anchor for monetary policy, given the problems experienced with monetary aggregates. If so, in this instance the Bank of England backed the wrong horse, because following the period of the cap, inflation rose sharply, a development that was predicted by rapid growth of the monetary base during the period of the cap. Whatever interpretation one places on the "capping" episode, however, in October 1990—after much debate—the United Kingdom decided to accept the discipline of a fixed nominal exchange rate by joining the European Exchange Rate Mechanism (ERM).

Overall, a comparison with the United States and the other countries examined here does not put British monetary policy in a favorable light. As Figures 6 and 7 indicate, not only has British inflation had the highest mean and the greatest volatility of any of these countries, but the unem-

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17. Besides M0 and M3, the Bank of England also targeted a broad measure of private sector liquidity, PLS2; see Table 2.
18. Leigh-Pemberton (1986).

ployment rate has also been high and variable. However, in the 1980s, British inflation performance did improve considerably, remaining well below the 1970s level and becoming significantly less variable.

Canada.[19] Recent Canadian monetary experience bears some close parallels to that of the United States and Britain. This parallel experience is not purely a coincidence, of course, as Canadian monetary policy has often—although not always—been driven by the goal of maintaining a stable exchange rate with the United States (Fig. 5c). As a result, interest rates (Fig. 3), interest rate volatility (Fig. 4), and inflation (Fig. 6) have followed generally similar patterns in the two countries.

Like the other countries discussed here, Canada experienced significant inflation problems in the mid-1970s, problems that were clearly exacerbated by its attempt to contain the appreciation of its currency after the breakdown of the Bretton Woods system. Like the other countries, Canada responded by adopting money growth targets. In 1975, as part of a larger government initiative that included the imposition of wage and price controls, the Bank of Canada introduced a program of "monetary gradualism," under which M1 growth would be controlled within a gradually falling target range (Table 3). The change in monetary strategy did not extend to a change in operating procedures, however, which continued to emphasize an interest rate instrument.

Monetary gradualism was no more successful in Canada than were initial attempts at money targeting in the United States and the United Kingdom, and arguably—as in the other two countries—a lack of seriousness on the part of the central bank was a contributing factor. Announcements of new money targets were made irregularly and employed base periods for the measurement of money growth that were as much as 6 months earlier than the date of the announcement (Table 3). Although actual M1 growth was often very close to target, and the goal of reducing M1 growth was achieved during the latter part of the decade, subsequent to the adoption of gradualism Canada suffered a sharp depreciation of its currency and, like the United States and the United Kingdom, a resurgence in inflation.

In defense of the Bank of Canada, many of the same problems that plagued attempts to target money growth in other countries were present in Canada as well, including financial innovation (see Howitt, forthcoming), velocity instability of the targeted aggregate, and radically different signals of policy stance from narrow and broad money aggregates (Fig. 1c). Overlaying these standard problems were the distortions

19. Principal sources for this section are Howitt (forthcoming), the OECD *Economic Surveys*, and various issues of the Bank of Canada *Review*.

Table 3   MONEY GROWTH TARGETS AND OUTCOMES: CANADA

Announcement date	Base period	M1 growth target	Outcome	Outcome less target
November 1975	April–June 1975	10–15	9.3	−3.2
August 1976	February–April 1976	8–12	7.7	−2.3
October 1977	June 1977	7–11	9.3	+0.3
September 1978	June 1978	6–10	5.1	−2.9
December 1979	April–June 1979	5–9	5.9	−1.1
February 1981	August–October 1980	4–8	0.4	−5.6
November 1982	M1 target withdrawn			

Notes: Outcomes are annualized growth rates (%) of seasonally adjusted M1 between the base period and the next announcement of new targets, for example, the outcome corresponding to the November 1975 announcement is the annualized growth rate of M1 between May and June 1975 and August 1976. Outcome less target equals the outcome less the midpoint of the target range.

Source: OECD Economic Surveys and Bank of Canada *Review,* various issues.

caused by the imposition and eventual elimination of wage and price controls.

By 1978, only 3 years after money targeting had begun, the Bank of Canada began to distance itself from this strategy. A dominant factor was concern about the exchange rate, which as we have noted had been depreciating (Fig. 5c). Exchange rate worries intensified as the U.S. dollar began its rapid appreciation of the early 1980s, threatening Canada with an inflationary shock from import prices. The Bank of Canada responded by tightening policy more than needed to meet the M1 targets; indeed, M1 growth was negative in 1981 even though the target range was for growth between 4 and 8% (Fig. 1c and Table 3). Because of their conflict with exchange rate goals, as well as ongoing money demand instability, the M1 targets were canceled in November 1982. Canada thus became the only country examined here to abandon formal money growth targeting completely in the early 1980s.

The period following 1982 was one of groping. In 1984 the emphasis on the exchange rate (which had been largely unchanged since 1978) was lessened, so that the Bank of Canada could attempt to assist recovery from the very deep recession that had begun in 1981. Unemployment did fall after 1984 (Fig. 7c), and by 1988 the Canadian "misery index" (the inflation rate plus the unemployment rate) was at its lowest point in many years. Still, inflation had begun to edge up again, to some minds threatening a possible return to the 1970s pattern.

In a rather dramatic reversal of the evolving ad hoc monetary strategy,

in January 1988 Governor John Crow announced that the Bank of Canada would subsequently pursue an objective of "price stability," that is literal elimination of inflation.[20] In February 1991 the Bank and the Minister of Finance jointly announced a series of declining inflation targets. Although this strategy implied that inflation itself, not money growth, would be the target of monetary policy, it was indicated that M2 would be used to guide policy. (Attention is also to be paid to an index of monetary conditions based on interest rates and exchange rates.) It is not completely clear to what degree this new commitment to price stability implies abandonment of other objectives, but it does seem that attention to those other goals has been reduced: For example, during 1987 through 1989, the Bank of Canada permitted a much greater increase in interest rates and appreciation of the currency than would have normally been expected under previous regimes.

Germany.[21] Germany's central bank, the Bundesbank, also responded to rising inflation in the early 1970s by adopting a strategy of targeting money growth, with the first targets being announced for 1975 (see Table 4). The monetary aggregate chosen for targeting was central bank money (denoted as M0 in Figure 1d), the sum of currency in circulation and bank deposits held by residents, with each category of bank deposits weighted by its 1974 required reserve ratios. As Fischer (1987) points out, central bank money can be interpreted as approximating the "required monetary base," and for convenience, we label it as a narrow money aggregate in Figure 1d. However, the Bundesbank has noted that it views central bank money as a broad rather than narrow measure of money, arguing that the required reserve ratio weights are reasonable proxies for the relative liquidities of the various components.

Monetary targets have been announced annually and are reviewed at midyear in light of macroeconomic developments, although midyear revision of targets has been extremely unusual. (The usual function of the midyear review is to use interim information to reduce the size of the target range.) The method by which the Bundesbank's monetary targets are set is p⸏rticularly interesting: The calculation of target ranges is a public rather than a clandestine exercise. The setting of targets explicitly takes into account the Bundesbank's long-term inflation goal, estimated potential output growth, and expected velocity trends, which

20. As in a similar recent debate in the United States, advocates of "zero inflation" suggest that, because of difficulties in adjusting for quality change and other index number problems, zero inflation may be interpreted as a small positive rate of measured inflation.

21. This section draws on Fischer (1987), Kahn and Jacobson (1989), von Hagen (1989), and Neumann and von Hagen (forthcoming).

Table 4   MONEY GROWTH TARGETS AND OUTCOMES: GERMANY

Year	Aggregate	Target	Outcome	Outcome less target
1975	CBM	8.0	9.8	+1.8
1976	CBM	8.0	9.2	+1.2
1977	CBM	8.0	9.0	+1.0
1978	CBM	8.0	11.5	+3.5
1979	CBM	6.0–9.0	6.4	−1.1
1980	CBM	5.0–8.0	4.8	−1.7
1981	CBM	4.0–7.0	3.6	−1.9
1982	CBM	4.0–7.0	6.1	+0.6
1983	CBM	4.0–7.0	7.0	+1.5
1984	CBM	4.0–6.0	4.6	−0.4
1985	CBM	3.0–5.0	4.5	+0.5
1986	CBM	3.5–5.5	7.7	+3.2
1987	CBM	3.0–6.0	8.0	+3.5
1988	M3	3.0–6.0	6.8	+2.3
1989	M3	5.0	4.7	−0.3
1990	M3	4.0–6.0[1]	5.5	+0.5
1991	M3	4.0–6.0[2]	—	—

Notes: Growth rates are measured year over year for 1975–1978 and fourth quarter to fourth quarter thereafter. Outcome less target equals the outcome less the midpoint of the target range. CBM is central bank money. [1] The target was lowered to 3–5% in July. [2] As of 1991, targets apply to all-German M3.

Source: Kahn and Jacobson (1989), updates from *OECD Economic Surveys,* various issues.

are combined using the quantity-theory equation to determine the desired money growth rate. In theory, this explicit linkage of targets to goals has the important benefit of allowing targets to be adjusted when the target–goal relationship changes, without compromising the central bank's commitment to meeting its targets.

"Short-term" considerations such as the unemployment rate and expected transitory deviations in inflation or velocity are not formally included in the Bundesbank's target-setting exercise. Nevertheless, there is some scope for shorter-term considerations to affect monetary policy. For example, the Bundesbank freely acknowledges that one purpose of specifying target ranges[22] rather than single numbers is to give itself some scope for short-run discretionary activism. The size of the target range has varied over time—it was zero in 1989—indicating changes in the amount of short-term flexibility the Bundesbank thinks it needs.

The Bundesbank has also shown that it is willing to accept money

22. In 1975–1978 targets were expressed as single numbers. Since 1979 targets have been set as ranges of varying size (see Table 4).

growth outside of the target range for periods of 2–3 years. In principle, deviations of money growth from targets are supposed to be reversed subsequently, so that short-term considerations do not detract from the Bundesbank's preeminent goal of low and stable inflation in the long run. Table 4 shows that periods of money growth over target, such as 1975–1978, have tended to be followed by periods of slower growth, as in 1979–1981. In general, though, Table 4 suggests that the Bundesbank has not always succeeded in fully reversing short-term deviations from the money growth targets.

Over the last two decades, the principal object of short-term discretionary policy by the Bundesbank has been the exchange rate. In particular, money growth targets were exceeded during 1975–1978 and again during 1986–1988 in order to dampen an appreciating mark. The Bundesbank's concern about the exchange rate has a number of sources: First, under international agreements including the European Exchange Rate Mechanism, the Plaza Accord, and the Louvre Accord, Germany has accepted some responsibility for stabilizing its exchange rate within agreed-upon ranges. Second, the large size of the German export sector makes the exchange rate a politically sensitive variable. Finally, maintenance of a strong and stable mark is viewed as a precondition for achieving inflation goals.

Central bank money remained the money target through 1987. In 1988, the Bundesbank adopted simple-sum M3 (the equal-weighted sum of currency in circulation, demand deposits, time deposits less than 4 years, and savings deposits). The rationale for the switch was that central bank money put too much weight on a rapidly growing currency component and thus overstated monetary ease—the so-called currency bias problem. Despite the switch in targets, Germany has not experienced nearly as much instability in the relationship between targeted aggregates and nominal income as have a number of the other major countries.

In achieving short-run money control, the Bundesbank has typically relied heavily on interest rate indicators (including the call, or overnight, rate and the repurchase rate), much in the spirit of the Federal Reserve's use of federal funds rate targeting as a mechanism for hitting monetary targets in the medium term. However, while the Bundesbank has attempted to keep interest rates stable in the short run, it has not gone so far as to set explicit targets for interest rates (Batten et al., 1990, p. 11). It is notable that the Bundesbank has consistently achieved very low variability of both interest rates (Fig. 4d) and money growth rates (Fig. 2d), contrary to the simple view that suggests a tradeoff between these two quantities.

German monetary policy has been quite successful in maintaining a

low and stable inflation rate (Fig. 7d), but, unlike Switzerland and Japan, Germany has not avoided a serious and persistent unemployment problem (Fig. 7d). Fischer (1987) and others have pointed to inflexibilities in the labor market (relative to, say, Japan) as a potential cause of persistent German unemployment.

Most recently, the reunification of Germany has posed some novel problems for the Bundesbank. The exchange of West German currency for East German currency at reunification at rates favorable to the East has created nascent inflationary pressures, at the same time that the tremendous uncertainties created by the reunification have made the forecasting of prosaic items like velocity quite tricky. In addition, the political pressures to support strong real growth at the early, delicate stages of reunification are strong. It remains to be seen how well the Bundesbank's traditional policy strategy can deal with this new set of circumstances.

Switzerland.[23] The fixed-exchange-rate regime ended in Switzerland in January 1973. The Swiss National Bank began to announce money stock targets, with M1 the targeted aggregate, at the end of 1974. Like the Germans, the Swiss set money growth targets based on explicit inflation goals and forecasts of potential output and velocity growth. Announced targets were and have continued to be single-valued rather than ranges, a practice based on the interesting rationale that "from a psychological point of view, missing a target band is worse than missing a point target" (Schiltknecht, 1982, p. 73).

An unusual feature of the conduct of Swiss monetary policy has been the Swiss National Bank's consistent use of the monetary base directly as an operating instrument. Control of M1 during the early years of targeting therefore required the central bank to predict the value of the money multiplier (the ratio of M1 to the base). Perhaps because of the use of the monetary base as an instrument, Switzerland has generally had higher volatility in short-term interest rates than have other countries (Fig. 4). However, this volatility has not carried over to long-term rates, as Switzerland has had the lowest volatility of long-term interest rates of the six countries studied here (again see Fig. 4). Presumably, the low volatility of long-term rates reflects Switzerland's success at keeping its inflation rate low and stable in the longer term.

As in other countries, the idea underlying money targeting in Switzerland was to reduce money growth gradually in order to eradicate inflation over the longer term. However, according to the Director of the Swiss National Bank: ". . . the policy of well controlled, stable monetary

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23. Historical discussions of Swiss monetary policy may be found in Schiltknecht (1982), Beguelin and Rich (1985), Rich (1987), and Yue and Fluri (1991).

Table 5   MONEY GROWTH TARGETS AND OUTCOMES: SWITZERLAND

Year	Aggregate	Target	Outcome	Outcome less target
1975	M1	6	4.4	− 1.1
1976	M1	6	7.7	+ 1.7
1977	M1	5	5.5	+ 0.5
1978	M1	5	16.2	+ 11.2
1979	—	—	—	—
1980	M0	4[1]	− 0.6[1]	− 4.6
1981	M0	4	− 0.5	− 4.5
1982	M0	3	2.6	− 0.4
1983	M0	3	3.6	+ 0.6
1984	M0	3	2.5	− 0.5
1985	M0	3	2.2	− 0.8
1986	M0	2	2.0	0.0
1987	M0	2	3.0	+ 1.0
1988	M0	3	− 3.9	− 6.9
1989	M0	2	− 4.9	− 6.9
1990	M0	2	− 2.6	− 4.6
1991	M0	1	—	—

Notes: Growth rates are measured as mean of monthly year-on-year growth rates until 1988; after 1988 growth rates are measured fourth quarter to fourth quarter. M0 is the monetary base adjusted to exclude end-of-month bulges in Swiss National Bank credit to banks. [1] Average percentage increase over the November 1979 level.

Source: Rich (1987), with updates from OECD Economic Surveys, various issues.

growth was never viewed as a policy which should be adhered to rigidly year after year, or even month after month, at all costs. Rather, it was viewed as a medium- to long-term constraint, with the necessity for short-run flexibility, especially in view of exchange rate developments" (Schiltknecht, 1982, p. 72).

This approach to targets as a medium- to long-term constraint but not an impediment to short-term discretion is similar to the approach taken in Germany. Indeed, in practice the Swiss have been even more success-ful than the Germans in reversing deviations of money growth from target: Between 1975 and 1986, the *cumulative* excess of money growth over target in Switzerland (the sum of the "outcome less target" column in Table 5) was only about 1.6%.

An example of short-run monetary "flexibility" occurred in 1978, when the Swiss franc began to appreciate (Fig. 5e). In response, the Bank eased monetary policy significantly: M1 growth in 1978 was above 16% (Fig. 1e and Table 5), compared to a target of 5%. While rather an extreme episode, the 1978 actions illustrate the general willingness of the Swiss National Bank to subordinate money targets, at least in the

short run, to exchange rate considerations. Swiss concern about the exchange rate reflects not only the extreme openness of the Swiss economy, but the fact that a stable franc is an important component of Switzerland's prominence as an international financial center.

After containment of the 1978 exchange rate emergency, the bank returned to an (unannounced) policy of money targeting in the spring of 1979. However, because of problems with forecasting the money multiplier, beginning in 1980 the monetary base rather than M1 became the targeted aggregate (as well as the policy instrument).

In 1980 and 1981 money growth was low and below target, in reaction to increased inflation and the overshooting of money targets in the previous few years. The period from 1982 to about 1987, though, was remarkably halcyon: Money growth targets were routinely met (Table 5). The short-term volatility of Swiss money growth remained comparatively high (Fig. 2), however, implying that the Swiss were acting quickly to offset high-frequency deviations of money growth from target. Inflation fell to low levels (Fig. 6e), and unemployment remained insignificant (Fig. 7e).[24] Monetary policy was assisted considerably during the early 1980s by the fact that the link between money growth and nominal magnitudes in Switzerland appeared stable, despite transient velocity fluctuations.

In 1986 there was a significant decline in the inflation rate (from over 3% almost to zero) and in 1989 a sharp increase in inflation (from about 2% to nearly 5%), neither of which was predicted by the behavior of the monetary base (see Yue and Fluri, 1991, for a discussion). Swiss central bankers have suggested that the problem is a structural break in the demand for base money, brought about by the introduction of an electronic interbank payments system and a reduction in legal reserve requirements. In attempting to offset this fall in base money demand, the Swiss National Bank permitted negative money growth for 3 years (Table 5). The instability in the demand for base money has led the Swiss National Bank to deemphasize money base targeting and, recently, to contemplate fundamental changes in its monetary strategy.

Japan.[25] The increase in oil prices in late 1973 was a major shock for Japan, with substantial adverse effects on inflation, economic growth, and the government's budget. In response to an increase in the inflation

24. However, the Swiss reliance on "guest workers," who are repatriated when labor market conditions worsen, makes Swiss unemployment data more difficult to interpret.

25. Among the many useful general sources on Japanese monetary policy are Cargill and Hutchison (1987), Dotsey (1986), Hutchison (1988), Batten et al. (1990), Kasman and Rodrigues (1991), and Ueda (1991).

rate to a level above 20% in 1974 (Fig. 6f)—a surge facilitated by money growth in 1973 in excess of 20% (Fig. 1f)—the Bank of Japan, like the other central banks we have considered, began to pay more attention to money growth rates. In 1978 the Bank began to announce "forecasts" at the beginning of each quarter for the growth rate of M2 (changed to the growth rate of M2 + CDs when CDs were introduced in 1979) from 1 year earlier to the current quarter (Table 6).

The use of the word *forecast* rather than *target* suggests that the Bank of Japan was committed only to monitoring rather than to controlling money growth.[26] However, after 1978 there did appear to be a substantive change in policy strategy, in the direction of being more "money-focused." Particularly striking was the different response of monetary policy to the second oil price shock in 1979: Instead of allowing extremely high money growth, as occurred in 1973, the Bank of Japan quickly reduced M2 + CDs growth in 1979 and 1980 to quite a low level (Fig. 1f). The difference in the inflation outcome in this episode was also striking, as inflation increased only moderately with no adverse effects on the unemployment situation. More generally, the Bank of Japan's forecasts and actual money growth followed a declining trend into the mid-1980s (except in 1981; see Table 6). Thus, in contrast to the German and Swiss practice of clearly specifying central bank intentions in advance, the Japanese seemed to follow an "actions speak louder than words" approach. As we discuss further later, however, in recent years both forecasts and actual money growth in Japan have become much more variable, weakening the presumption that the Bank of Japan practices "closet monetarism."

From an institutional point of view, it was no doubt fortunate that the Bank of Japan began to focus on money at the time that it did. Traditionally, Japanese central bank policy had emphasized the control of bank credit, which proved an effective instrument in a highly regulated financial environment in which borrowers had few substitutes for bank loans. However, a slow but steady process of liberalization of financial markets began around 1975, resulting ultimately in the introduction of new financial instruments and markets and a weaker tie between bank lending and economic activity.[27]

In a financial environment that over time has become more and more similar to that of the United States, the Bank of Japan's methods of conducting monetary policy have also evolved in the direction of the

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26. Much has been written on whether and to what degree the Bank of Japan implicitly targets money growth. See, e.g., Hutchison (1986), Ito (1989), and Ueda (1991).
27. Kasman and Rodrigues (1991) provide an excellent discussion of Japanese financial liberalization and its effects on monetary policy.

Table 6   MONEY GROWTH TARGETS AND OUTCOMES: JAPAN

Year	Aggregate	Target[1]	Outcome	Outcome less target
1978	M2	12–13	12.6	+ 0.1
1979	M2 + CD	11	10.3	− 0.7
1980	M2 + CD	8	7.6	− 0.4
1981	M2 + CD	10	10.4	+ 0.4
1982	M2 + CD	8	8.3	+ 0.3
1983	M2 + CD	7	6.8	− 0.2
1984	M2 + CD	8	7.9	− 0.1
1985	M2 + CD	8	9.0	+ 1.0
1986	M2 + CD	8–9	8.3	− 0.2
1987	M2 + CD	11–12	11.8	+ 0.3
1988	M2 + CD	10–11	10.6	+ 0.1
1989	M2 + CD	10–11	10.6	+ 0.1
1990	M2 + CD	ca. 11	10.0	− 1.0
1991	M2 + CD	ca. 4	—	—

Notes: Growth rates are measured fourth quarter to fourth quarter. Outcome less target equals the outcome less the midpoint of the target range. [1]Announced at the beginning of the fourth quarter and are referred to as forecasts rather than targets by the Bank of Japan.

Source: Fischer (1987) and Bank for International Settlements, *Annual Report,* various issues.

U.S. example.[28] Abandoning quantitative credit controls, the Bank of Japan has moved gradually to a system emphasizing open-market operations in the interbank market,[29] more attention to money growth, and the use of interbank interest rates as the primary instruments of monetary control. However, unlike the United States, Japan has always used interest rate instruments of some type and has never experimented with the targeting of bank reserves. The outcome of these operating procedures is that the volatility of interest rates in Japan has generally been low in relation to other countries (Fig. 4), while the volatility of the M2 + CDs aggregate focused on by the Bank of Japan has been comparable to the volatility of U.S. M2 (Fig. 2).

Also in parallel to the United States, ultimately financial innovation and deregulation in Japan began to reduce the usefulness of the broad money target: In particular, introduction of money market certificates and large time deposits in 1985, and the repeated reductions in the minimum denominations of these assets over 1986–1989, led to in-

28. The similarity of Japanese and American central bank operating procedures is discussed by Dotsey (1986).
29. Open-market operations are supplemented by discount window lending, as in the United States. Unlike the United States, in Japan open-market operations are conducted in a number of other financial markets, including the CD market and (recently) the commercial paper market.

creases in the demand for M2 (see, e.g., Yoshida and Rasche, 1990). In response to increased money demand, and also because of concern about appreciation of the yen, the Bank of Japan significantly increased the rate of money growth in 1987–1989 (Table 6).

Beginning in 1989, monetary policy became oriented toward trying to arrest what many Japanese policymakers considered to be a bubble in land and stock prices, without causing a crash that might have disastrous financial consequences. Asset prices did come down as money growth slowed, but economic activity weakened also. Another factor that has recently complicated monetary policy is a slowdown in lending by Japanese banks associated with the increase in bank capital requirements mandated by the Basle Accord. In responding to these developments, as we have mentioned, the Bank of Japan has permitted a considerable increase in the variability of broad money growth since late 1990 (Fig. 2f), and in general has engaged in a much more "discretionary" style of policy-making.

3. Conduct of Monetary Policy in Six Countries: Some Positive Hypotheses

What do we learn from these case studies of monetary policy-making? In this section, we discuss some positive hypotheses, so called because they seem to apply generally across the case studies. We state these hypotheses as if they were conclusions but remind the reader once again that they (as well as the more normative observations discussed in Section 4) are intended only as propositions worthy of further examination.

(1) *Central bankers have multiple objectives and a "crisis mentality."* It is a commonplace that central bankers care about both economic growth and inflation, which may force them to confront difficult tradeoffs. But the behavior of central bankers suggests that other variables enter their objective function as well. The leading example from the case studies is the nominal exchange rate: In all six cases examined, central bankers modified their policies in order to arrest what they considered to be undesirable exchange rate trends. Arguably, in some of these cases (when the United Kingdom "capped" the pound in 1987, e.g.) the exchange rate played the role of an intermediate target, that is, the central bank's intervention reflected concern not about the exchange rate per se but about what the exchange rate was signalling about the stance of monetary policy. However, in many of the cases, the exchange rate clearly functioned as a goal of policy, reflecting central bank concerns about the health of the traded goods sector or international commitments to meet exchange rate targets.

Interest rate stability has also in many cases been an independent objective of policy. For example, in the 1970s the Federal Reserve chose to tolerate high rates of money growth in order to avoid sharp increases in interest rates (a policy that was dramatically reversed in 1979). Japan, Germany, and to some extent Great Britain have all attempted to keep interest rate volatility low even as the economic environment and monetary policy strategies have changed (Fig. 4). Several writers (e.g., Goodfriend, 1987; Howitt, forthcoming) have suggested that central banks view interest rate stability as important for maintaining "orderly" financial markets free from excessive speculation.

Although they have multiple objectives, over time central bankers do not devote constant proportions of their attention to each objective. Rather, at any given time, the lion's share of the central bank's attention is typically devoted to the one or two objectives that are furthest from desired levels. A possible explanation of this "crisis mentality" is that the marginal social cost of, say, high inflation really does increase sharply with the inflation rate. Alternatively, central bankers may feel that their independence and perquisites are threatened more by a public perception that some aspect of the economy is "out of control" than by a record of generally mediocre performance.

The fact that central banks have multiple objectives creates obvious tensions in the monetary policy process. For example, as Goodfriend (1987) has pointed out, the preference of the central bank for maintaining a stable nominal interest rate may lead to nonstationarity in money and prices. Multiplicity of objectives and the crisis mentality can also make even the most competent and purposeful central bank appear at best to be muddling through, or at worst to be lurching from one strategy to another. As we discuss further later, the complexity of central bank objectives and behavior may increase the value of clear communication with the public about the goals and direction of monetary policy.

(2) *The greater is the central bank's concern about inflation, the stronger will be its tendency to employ monetary aggregates as intermediate targets.* All six of the countries discussed here adopted monetary targeting in the 1970s in response to a worldwide increase in inflation and persisted with money targets until disinflation was achieved.[30] The central banks most "hawkish" on inflation, such as those of Germany and Switzerland,

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30. This statement requires that we interpret the Japanese "forecasts" as indicating a targeting strategy. It should also be noted that several central banks (notably the United States and United Kingdom) initially adopted money targets only under some external pressure; in both the U.S. and British cases, however, the seriousness with which money targets were treated increased markedly when the second oil shock worsened the inflation problem.

have been the most consistent in maintaining a money targeting strategy, while more "dovish" monetary authorities like those of the United Kingdom, Canada (before 1988), and the United States have been the least consistent.

The natural first place to look for an explanation for this aspect of central bank behavior is Poole's (1970) well-known theory of target choice, which argues essentially that the optimal intermediate target is the one with the most stable relationship with the goal variables. Unfortunately, Poole's model is of limited help in this instance, because it predicts that money targets will be preferred over interest rate targets during periods when money demand is relatively stable. What we observe is the reverse: In the halcyon pre-1974 days of stable money demand, central banks were more likely to focus on interest rate targets, while in many countries, the switch to money targets occurred and persisted during a period of severe velocity instability. Further, central bankers have typically reacted to unstable velocities not by reverting to interest rate targeting but instead by changing the particular monetary aggregate that they target—in some cases switching from a narrower to a broad aggregate (the United States, Germany) and in others from a broader aggregate to a narrower one (the United Kingdom, Switzerland).

Why then do central banks adopt money growth targets when faced with inflationary crises? The next two points discuss possible reasons.

(3) *One function of an intermediate target such as money growth, as perceived by central bankers, is to act as a guidepost or compass for monetary policy.* Central bankers face considerable uncertainty not only with regard to the state of the economy and the nature and timing of the monetary transmission mechanism, but also about the stance of policy itself. In pursuing intermediate targets, the policymakers hope to improve their measurement of their policy stance and, thus, reduce the probability of inadvertently choosing the wrong settings for their instruments. Thus, the adoption of money growth targets in the late 1970s by many central banks was intended to help avoid the overexpansionary tendencies of the earlier part of the decade. In particular, it was hoped that money growth would prove a more reliable indicator of monetary conditions than variables that had been employed earlier, such as interest rates[31] and free reserves.

The use of monetary aggregates as guideposts has been problematic

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31. One might construct an argument on Poole-like grounds that nominal interest rates are a bad target during periods of unstable inflation, because high nominal interest rates could indicate either too tight or too easy money.

in practice, however, and for some of the same reasons suggested by Poole's original analysis: The relationship between individual aggregates and macroeconomic variables has often been unstable, and different aggregates have as often as not given conflicting information, as for example in the United Kingdom in the 1979–1982 period when narrow and broad aggregates gave very different readings of the tightness of policy.

There is still a deeper question about the use of monetary aggregates as guideposts, however, which also follows from the logic of the Poole model: If the central bank is searching for a guidepost for monetary policy, why confine the search to one or two economic variables? Why not instead use a forecast that optimally weights all available information about the likely effects of policy on the economy? As we discuss further below, the answer to this question may be that there is a complementarity between using a money growth target as a guidepost and using it as a signal to the public about monetary policy intentions.

(4) *The second and probably more important reason that central bankers adopt money growth targets is to signal the central bank's goals and intentions— particularly those concerning inflation—to the public.* Both central bankers and the public consider the control of inflation to be one of the most important objectives of monetary policy. Yet of central banks' many objectives, inflation is perhaps the one related to policy actions with the longest lag. Thus, it is particularly difficult for the public to evaluate the inflationary impact of current policies. An advantage of money targeting is that—because of the simple and widely understood quantity-theory prediction that money growth and inflation will be proportional— money growth targets may be perceived as being informative about the central bank's goals and intentions with respect to inflation.[32]

Central bankers see several potential benefits to using money growth targets to signal medium- and long-term inflation strategy. One potential benefit is that explicit targets for money growth may aid the management of inflationary expectations. If the central bank can reassure the public through a targeting procedure that it is committed to controlling inflation in the longer run, it may reduce financial market volatility and conceivably (although we have no evidence on this point) improve short-run policy tradeoffs.

Another potential benefit to the central bank of emphasizing money growth targets is that this practice keeps the central bank's inflation

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32. The empirical fact of velocity instability implies, of course, that the relationship between money growth and inflation is really not so simple. We return to this issue in Section 4.

objectives "on the front burner" and makes the central bank more accountable to the public for keeping inflation low. Theories of bureaucratic behavior might seem to imply that a bureaucracy like a central bank will want to avoid accountability. But in fact, a central bank may want to make itself more accountable for achieving price stability because it values the price stability goal more than do politicians in the legislative and executive branches.[33] For example, if the central bank is able to point to money growth above target (with its implied inflationary consequences), it may be able to enlist public support in resisting political pressures for excessive short-run expansion. Elements of this strategy can be seen in almost all the major disinflations of the early 1980s, in which central bankers emphasized the importance of meeting money growth targets in order to deflect political demands for rapid reflation.

The notion that central banks seek to bind their own hands is of course closely related to Kydland and Prescott's (1977) seminal argument for rules, with the difference that we here emphasize an intragovernmental variant of Kydland and Prescott's precommitment game. However, as the next point emphasizes, in practice central bankers reject the notion of rigid rules in favor of looser types of precommitment.

(5) *Central banks never and nowhere adhere to strict, ironclad rules for monetary growth. Central banks' attachments to specific targets for specific monetary aggregates is at best modest and is alwyas hostage to new developments in the economy.* As is evident from the case studies and Tables 1–6, all central banks deviate significantly from their monetary targets to pursue short-term objectives, and are most explicit about their willingness to be "flexible" and "pragmatic" in the short run. Further, money growth targets and the targeted aggregates themselves may be changed fairly often.

Clearly, central banks have never taken seriously the literal "precommitment through rules" strategy implied by Kydland and Prescott's analysis of the time inconsistency problems. If money growth rules are adopted at all, they are intended to apply only in the medium and long

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33. Differences in the horizons of politicians and central bankers are sufficient to create this difference in preferences. For example, as suggested by work of Rogoff and Sibert (1988), in order to signal their economic competence, politicians may have an incentive to create an inflationary boom prior to an election. If the central banker is not up for re-election and fears that the central bank will be blamed for long-run increases in inflation, he will resist political demands for preelection increases in money growth. In a Rogoff–Sibert-style game, all the central banker needs to do to diffuse the pressure from the politicians is to give the public full information about monetary policy—for example, announce the money growth targets consistent with noninflationary growth —thereby ensuring that the politicians receive no credit for output increases arising from excessive monetary expansion.

term. Of course, as it has been said, the long term is just a succession of short terms. Thus, for a longer-term money growth target to be meaningful, the central bank must at some point demonstrate its willingness to offset short-term deviations from the target path.[34] The feasibility and value of "hybrid" strategies, containing elements of both rules and discretion, is discussed further in the next section.

4. What Works? Some Normative Hypotheses and Issues for Future Research

The case studies showed that, although national experiences with monetary policy in the last two decades are diverse, a dominant theme is the adoption of money targeting strategies as a response to increased inflation. In the last section we argued that central bankers adopted money growth targets for two reasons: as guideposts, helping them to measure policy stance; and as signals, communicating to the public the medium-term goals of policy. Despite what was to some degree a common approach to monetary policy, however, some central banks have fared much better than others in meeting their ultimate policy objectives, particularly in achieving low and stable inflation.

Why have some central banks been more successful in their use of money growth targets? The case studies provide some clues that may help answer this question. We list some hypotheses suggested by the case studies that we view as being worth serious exploration in future research.

(1) *Successful use of money growth targets in conducting monetary policy seems to require that the central bank does not "play games" with its targeting procedures.* A major reason for using money growth targets, we have seen, is to communicate with the public. Hence, clarity, openness, and consistency in the targeting procedure are potentially almost as important as whether the targets are met. Central bank actions that increase the clarity of its policies include: targeting only one aggregate at a time, announcing targets on a regular schedule for a specified horizon, being as consistent as possible in the choice of aggregate to be targeted, and

34. The basic Kydland–Prescott (1977) analysis suggests that central bank promises to meet money growth targets in the long run but not the short run would never be credible. However, this conclusion is dependent on the assumption that the central bank values unemployment below the natural rate. If the central bank does not view its mandate as reducing unemployment, or is content with unemployment at the natural rate, then it may be possible to make credible promises about future money growth. Further, the central bank may be able to develop a reputation for meeting its medium-term targets; see Rogoff (1987) for a comprehensive discussion of reputation and central bank credibility.

giving clear explanations of the reason for and expected duration of deviations of money growth from target.

A particularly interesting way in which central banks can clarify their intentions is by means of a public calculation of target ranges that makes explicit the central bank's goals and its assumptions about how the target is tied to those goals. In principle, this explicit linkage of targets to goals might have the important benefit of allowing the central bank to adjust its targets when the target–goal relationship changes, without compromising its credibility.

Generally, Germany and Switzerland did well on the above criteria over the last two decades, while the United States, the United Kingdom, and Canada did less well. The most egregious game-player was the Bank of England, with its multiple targeted aggregates, extreme base drift, erratic changes in targets and target horizons, and its use of artificial means (the corset) to bring down the growth of a targeted aggregate. The U.S. Fed and the Bank of Canada also did not take their targets very seriously, at least at first, as evidenced by the Fed's multiple targets and base drift and the Bank of Canada's practice of announcing targets irregularly for horizons that were not clearly specified.[35] Improved inflation performance in a number of the countries studied here coincided with the adoption of more serious and straightforward targeting procedures. The clearest example is Britain, which achieved more stable inflation after it abandoned the corset and multiple targets to focus on a regularly announced target for a single aggregate.

Japan is an interesting intermediate case, in that it has had a very successful monetary policy despite the opacity of its targeting (or non-targeting) procedure.[36] On the other hand, Japan is the only country to have focused on a single monetary aggregate (M2 + CDs) over the entire period; it has announced its money growth "forecasts" on a consistent and regular basis; and it achieved a relatively steady slowdown of money growth between the mid-1970s and mid-1980s, despite the occurrence of a second oil shock in 1979. Thus—at least prior to its recent switch to a more discretionary mode—the Bank of Japan created a degree of predictability about its medium-term policies.

From the perspective of the literature on central bank credibility, it is not surprising that game-playing in targeting procedures—which leads the public to believe the central bank is not serious—is counterproductive. A straightforward approach to conducting monetary policy ap-

35. We should be careful of attributing the relatively less good performance of Canadian monetary policy solely to such game-playing, however; as we have noted, the degree to which Canadian monetary policy is independent from U.S. policy is problematic.

36. At least it is opaque to U.S. academics. Perhaps it is clearer to Japanese business and financial leaders.

pears to be quite useful for increasing the central bank's credibility and improving policy outcomes.

(2) *Short-run adherence to money growth targets may not be necessary for the successful use of a money targeting strategy as long as there is some commitment by the central bank to reverse deviations of money growth from target over the longer term.* As the example of Switzerland most clearly illustrates, a money targeting strategy apparently can be used successfully even if money growth rates have large fluctuations and are frequently outside of target ranges. However, the success of Swiss monetary policy in keeping inflation low seems to have required a commitment by the Swiss National Bank to compensate for high rates of money growth in one period by subsequent offsetting low rates of money growth in future periods. In other words, it looks as if the Swiss have successfully used a hybrid strategy, in which rules are used to guide policy in the long term but not in the short term. The German and Japanese central banks have similarly demonstrated their willingness to make up for periods of excessive money growth by subsequent periods of slow money growth, although to a lesser extent than the Swiss. Again the worst record belongs to the British, who consistently missed targets in the same direction.

A cynic might ask, "What is the difference between a policy of reversing deviations from target and the highly criticized 'stop-go' policies of the 1960s and early 1970s, which also involved alternating periods of low and high money growth?" The difference, which is admittedly subtle, is that the policy of reversing deviations from target takes place in a larger framework, one that provides a basis for expecting that short-term expansions or reductions in money growth will be subsequently offset. In contrast, although the earlier regime sometimes involved reversals ex post (stop-go policies), there was no basis for people to expect ex ante that such reversals would occur. Thus—as again is consistent with the literature on credibility—it is the nature of the expectation engendered by a policy that appears to be critical to its success.

Complementary to a strategy of reversing short-term deviations from target is a policy of adjusting targets when their relationship with goal variables changes, as is practiced (in principle at least) by Germany and Switzerland. It would not be desirable to offset a deviation in money growth arising from a permanent shock to velocity, for example. Under the German–Swiss method of setting targets, a permanent shock to velocity would result in a change in the money growth target. In an unconditional money targeting scheme, by contrast, the central bank could accommodate the velocity shock only by sacrificing its commitment to the target.

(3) *The outcomes of monetary policy do not appear to be dependent on the*

details of the operating procedure or the choice of instruments. A wide variety of operating procedures has been observed across the six countries studied here, but there is no evident correlation between the type of procedure and the effectiveness of monetary policy. For example, the most common procedure—using the interbank interest rate as an instrument for achieving medium-term targets for money growth—seemed to work poorly for the United States in the 1970s but has been used quite successfully by Japan and Germany.

In addition, as a comparison of operating procedures between Switzerland and Germany indicates, focus on a monetary aggregate as an operating instrument does not guarantee a more successful adherence to monetary targets. Indeed, Switzerland (which has used the monetary base as its operating instrument) has had among the most variable rates of money growth, while Germany (which employs an interbank interest rate as its instrument) has had among the lowest money growth variability (Fig. 2). It is also interesting that, although the Swiss operating procedure has resulted in high volatility of short-term interest rates, Swiss long-term rates have shown less volatility than in any of the other countries studied here (Fig. 4). Because it is the volatility of long-term interest rates that would seem to be the more relevant to the stability of the financial system, the Swiss example suggests that the use of the monetary base as an operating instrument need not create problems even with respect to the goal of interest rate smoothing.

This irrelevance of the operating procedure is not surprising from a theoretical viewpoint, because any of a number of procedures can be used to achieve any given set of values for the central bank's targets and goals—and it is the latter that should matter for the macroeconomy. If operating procedures are macroeconomically unimportant, why then do central banks pay so much attention to them? The "smokescreen" argument may be relevant here. For example, by focusing on the change in operating procedure in 1979, Fed Chairman Volcker partly diverted attention from a more fundamental change in policy. Also, the Swiss example notwithstanding, the details of operating procedures may have important effects on certain segments of financial markets (banks, bond traders) which the central bank considers to be an important part of its clientele.

Although these observations about what works well in promoting successful monetary policy are suggestive, further research on several problematic points is needed.

A first troublesome issue turns on the nature of the empirical relationship between money and other economic variables. Our review of central banks' experience suggests that money growth targeting, if treated as a flexible constraint on medium-term policy, can be a useful tool.

However, even the best-handled money targeting strategy requires that there be some predictable relationship between money growth and the goal variables of policy; it has been argued (most persuasively by Friedman and Kuttner, 1990) that the relationship between money and the economy is empirically so unstable that monetary aggregates are of essentially no value in guiding monetary policy. Isn't this instability fatal to the case for any type of money targeting?

This issue is of first-order importance and needs further investigation in a cross-national context. Several responses can be made at this point, however:

First, it is possible that the velocity instability that has plagued the monetary policy of countries such as the United States and the United Kingdom is itself partly endogenous, a result of erratic monetary policies that have created highly variable inflation and interest rates. Our case studies show that countries with more stable monetary policies, while not immune to velocity instability, do suffer from it to a smaller degree. In particular, Japan's ability to provide monetary stability despite major changes in its financial institutions is striking. Thus, longer-run money growth targeting might also lead to a more stable relationship of money to other variables.

Second, as we have already discussed, there are reasons to believe that the German–Swiss technique of adjusting money growth targets for expected changes in velocity is preferable to unconditional money growth targeting. If adjustments for expected velocity changes are made, then stability of velocity is not a prerequisite for successful policy, only some degree of conditional predictability of velocity. Of course, it may be that even conditional prediction is not possible; empirical work should be directed toward finding out.

A third response that can be made to the Friedman–Kuttner objection is that it does appear to be useful to central bankers to have *some* variable or variables to signal the medium-term stance of policy; for reasons of both theory and simplicity, money growth is a natural candidate. However, if velocity unpredictability disqualifies money as an appropriate target—as might have been the case in the United States and Britain during 1979–1982, for example—then one would want to consider alternative anchors for policy, such as the exchange rate, nominal GNP, or inflation forecasts. Unfortunately, as a large literature discusses, the obvious alternatives to money growth also have shortcomings, including unstable relationships with the economy and inadequate controllability and observability.

Besides the question of stability of the money-output link, another broad unresolved issue concerns the degree to which successful monetary policies are the result of a more favorable political environment,

Figure 1 GROWTH RATES OF NARROW AND BROAD MONETARY AGGREGATES
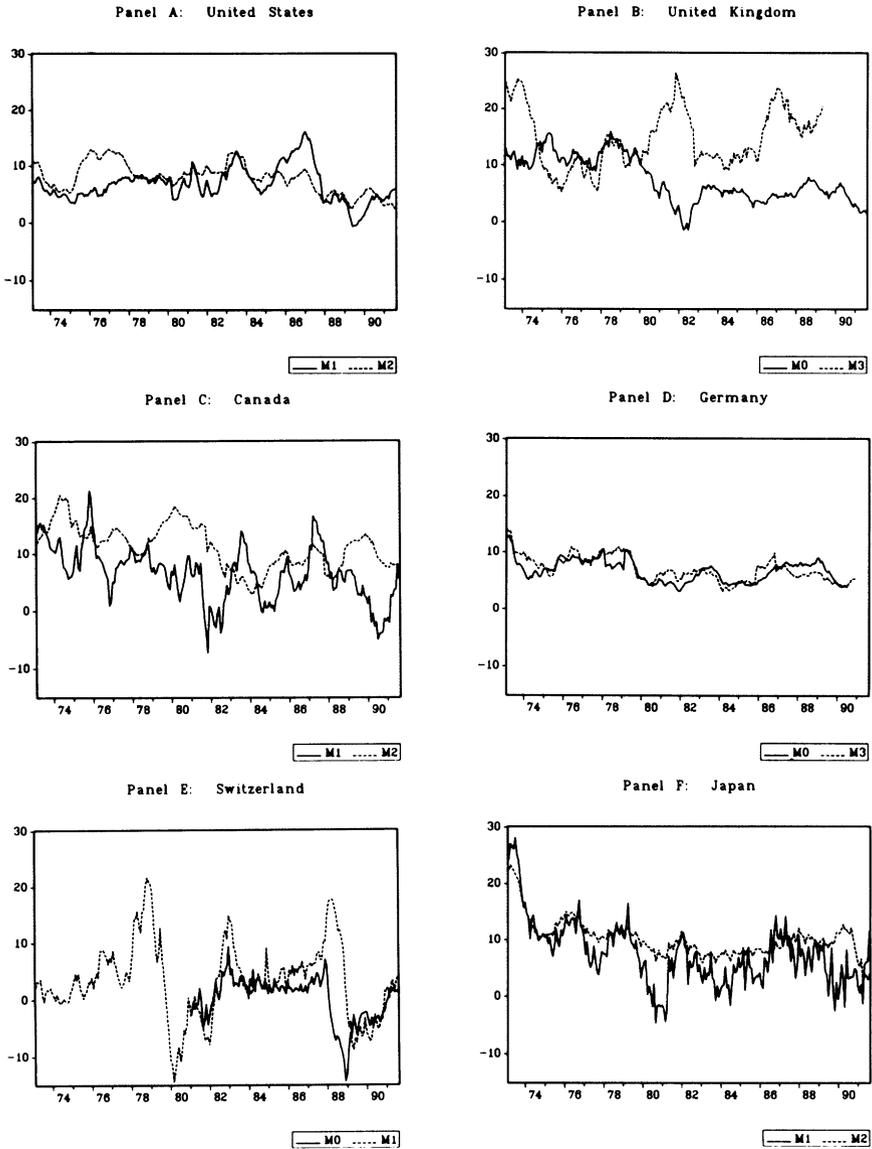
Data are the growth rates (log changes) from one year earlier of monetary aggregates. M0 refers to the monetary base for the United Kingdom and Switzerland and to central bank money for Germany. M1, M2, and M3 refer to conventional national definitions.

Sources: Federal Reserve Bulletin and releases; *Bank of England Quarterly Bulletin* (Tables 11.1 and 2); *Bank of Canada Review* (Table E.1); *Bundesbank Monthly Reports* (Tables I.2, I.3; supplement 4, Table 33); Banque Nationale Suisse, *Bulletin mensuel* (Tables 9 and 11); Bank of Japan, unpublished.

Figure 2 VARIABILITY OF NARROW AND BROAD MONEY GROWTH RATES

Panel A: United States

Panel B: United Kingdom

Panel C: Canada

Panel D: Germany

Panel E: Switzerland

Panel F: Japan
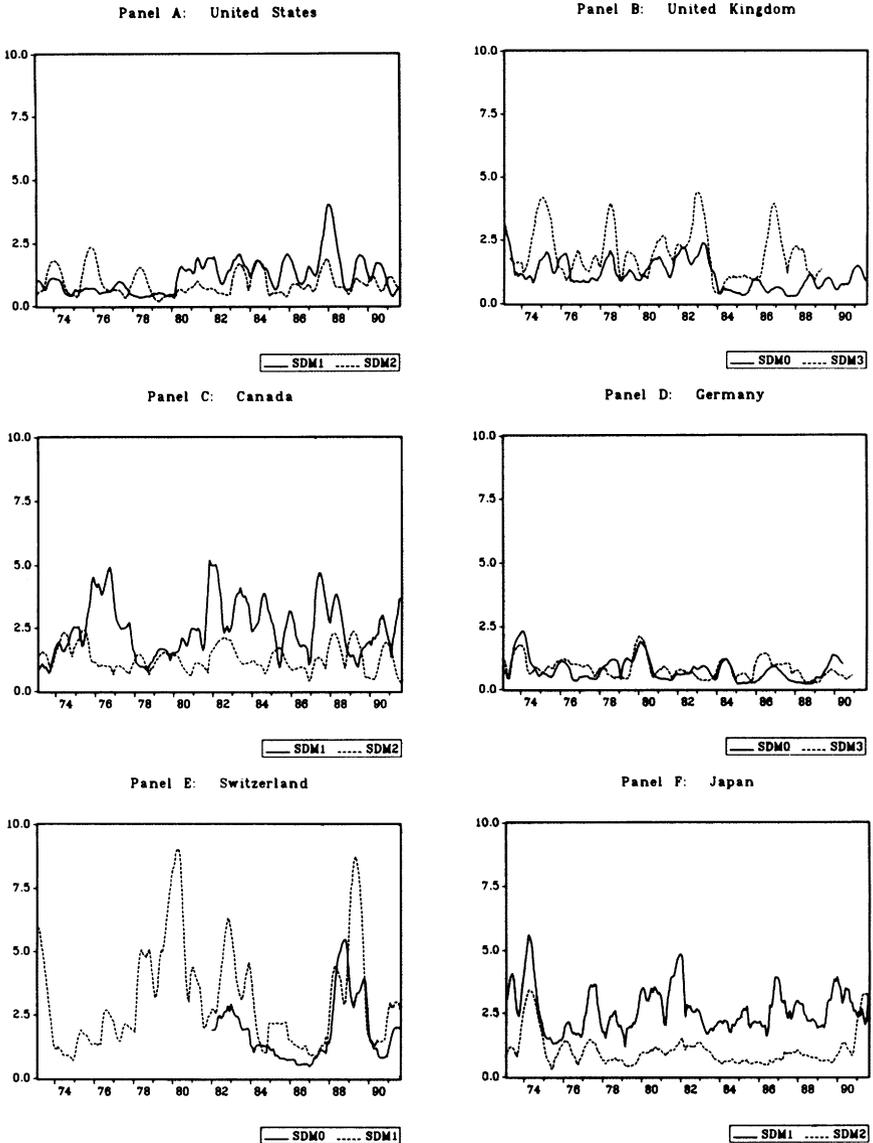
SDM0, SDM1, SDM2, and SDM3 are the standard deviations over the previous 12 months of the growth rates of the monetary aggregates M0, M1, M2, and M3, as shown in Figure 1.
*Sources:* Same as Figure 1.

Figure 3 INTEREST RATES ON OVERNIGHT BANK LOANS (RS) AND ON
LONG-TERM BONDS (RL)
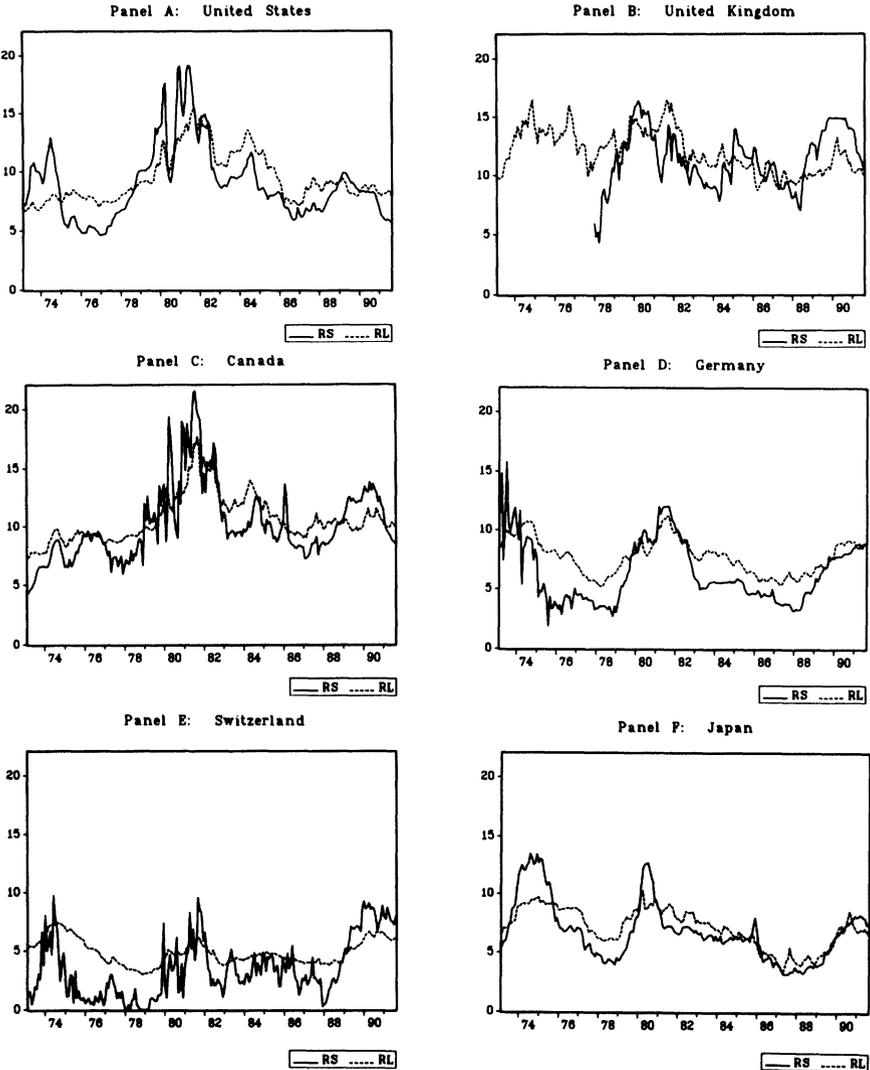
Interest data by country are as follows: United States—federal funds rate (RS), 10-year Treasury bonds
and notes (RL); United Kingdom—call money with discount market (RS), medium-dated (10-year)
government bonds (RL); Canada—overnight money market financing (RS), government bonds, over
10 years (RL); Germany—day-to-day money (RS), federal government bonds, all maturities (RL);
Switzerland—day-to-day money (RS), confederation bonds (RL); Japan—call money (unconditional)
(RS), government bonds, interest-bearing (RL). RS for Switzerland refers to Euromarket rate, other
short rates are money market rates. Long rates are secondary market rates. Rates are monthly averages,
except the U.K., Canadian, Swiss, and Japanese long rates and the Canadian short rate, which are
month-end.
Sources: Federal Reserve Bulletin; Bank of England Quarterly Bulletin (Tables 9.2 and 9.1); *Bank of Canada
Review* (Table F.1); *Bundesbank Monthly Reports* (Table TV.6; supplement series 2, table 8.b); Banque
Nationale Suisse, *Bulletin mensuel* (Tables T.20 and T.24); Bank of Japan, *Economic Statistics Monthly*
(Table 63) and Tokyo Stock Exchange, *Monthly Statistics Report*

Figure 4 VARIABILITY OF CHANGES IN SHORT- AND LONG-TERM
   INTEREST RATES

Panel A: United States

Panel B: United Kingdom

Panel C: Canada

Panel D: Germany

Panel E: Switzerland

Panel F: Japan
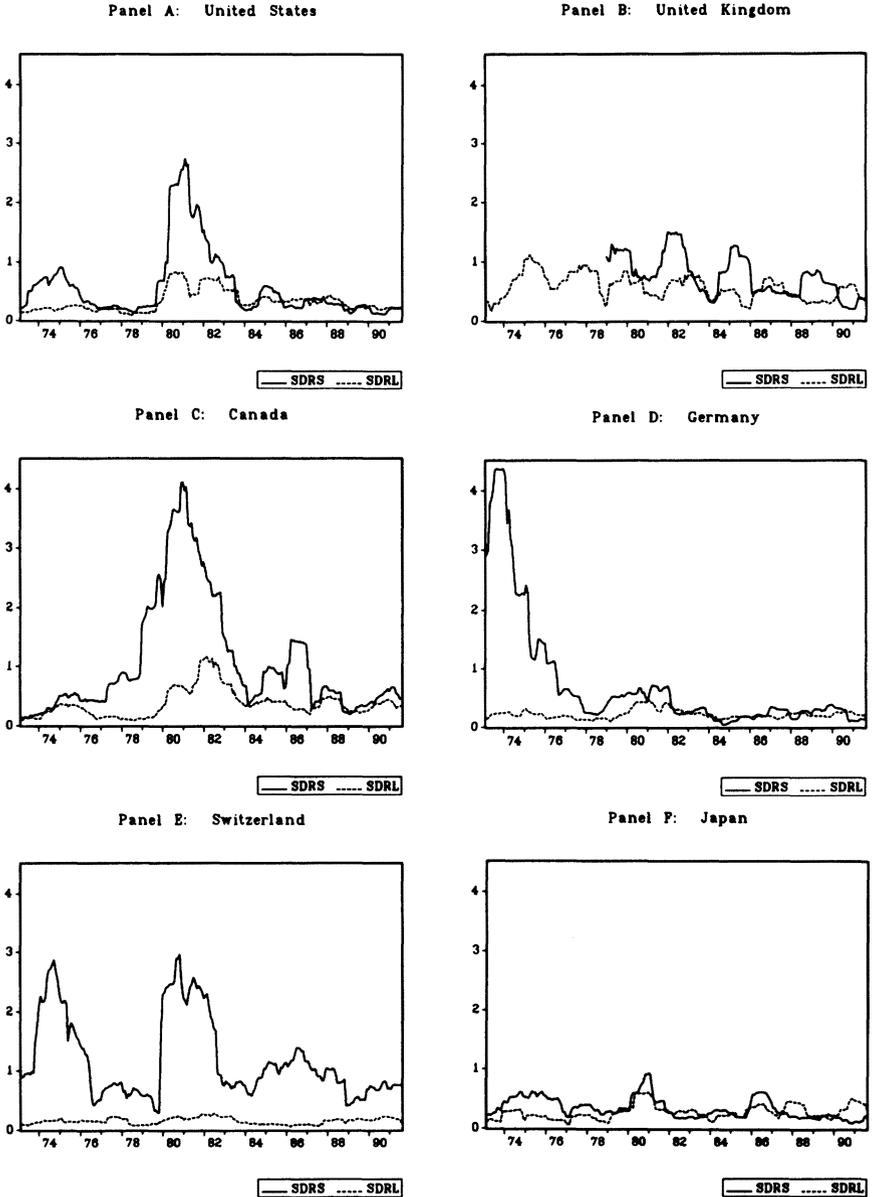
SDRS and SDRL are the standard deviations over the previous 12 months of RS and RL, as shown in
Figure 3.
*Sources:* Same as Figure 3.

Figure 5 INDICES OF NOMINAL EXCHANGE RATES (MARCH 1973 = 100)
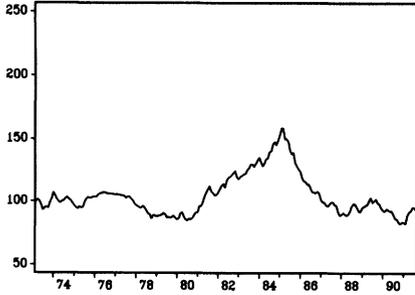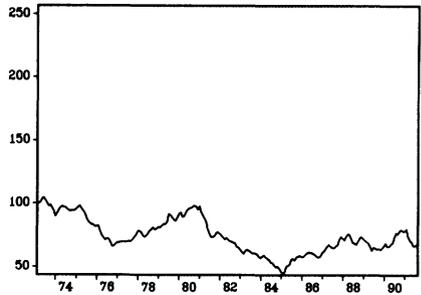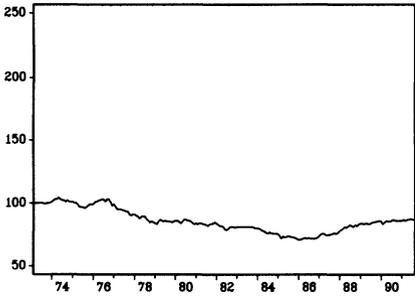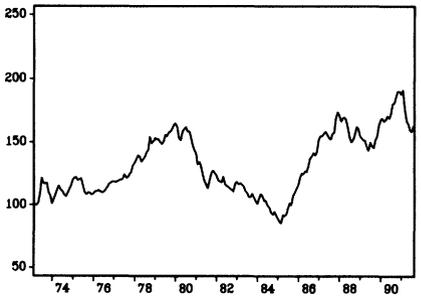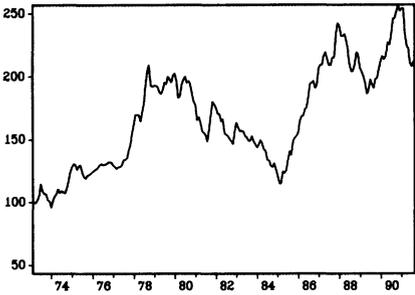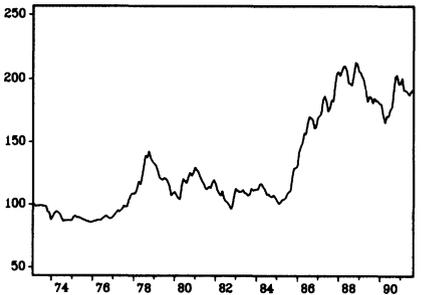
Shown are indices of nominal exchanges rates, March 1973 = 100, with an increase indicating an appreciation. For the United States the exchange rate is the Federal Reserve's effective exchange rate index; for other countries the value of the currency in U.S. dollars is used.
*Source: Federal Reserve Bulletin.*

Figure 6 INFLATION RATES

Panel A: United States

Panel B: United Kingdom

Panel C: Canada

Panel D: Germany

Panel E: Switzerland

Panel F: Japan
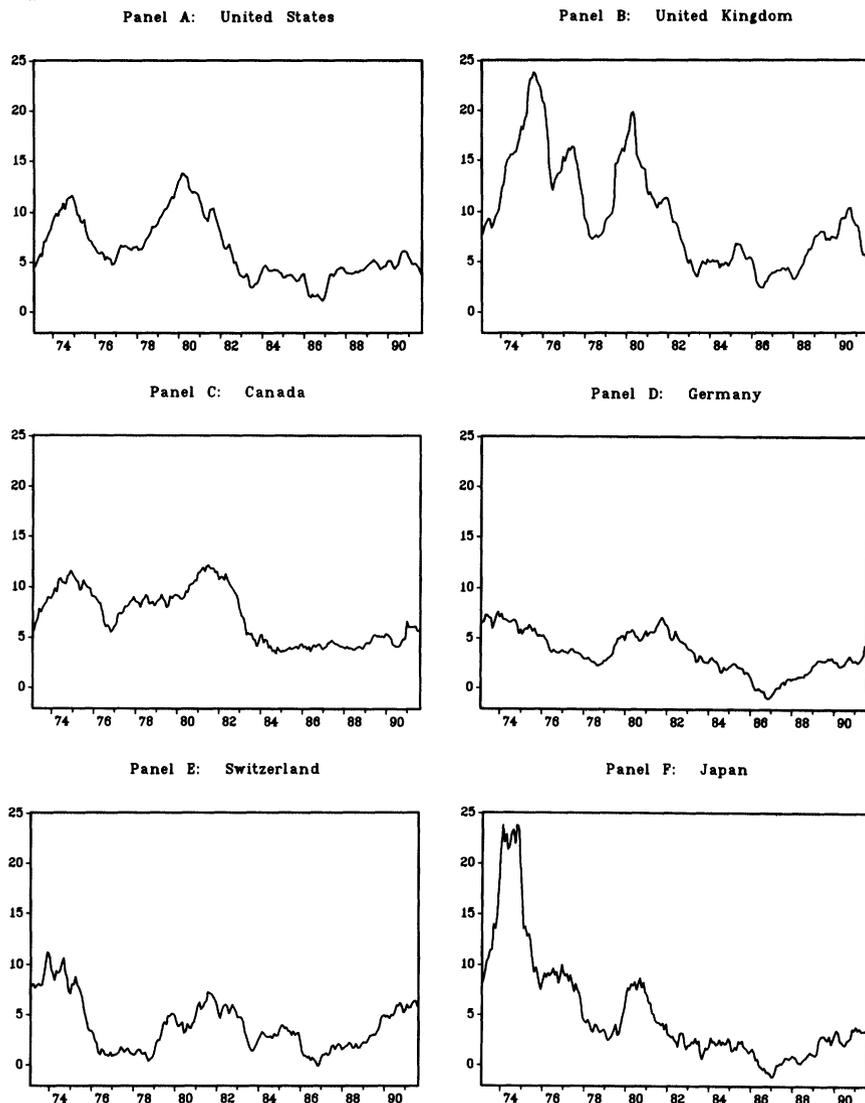
Inflation rates are measured as the growth over the last 12 months of the broadest available measure of consumer prices, as follows: United States—CPI-U, all items; United Kingdom—retail price index, all items; Canada—CPI, all items; Germany—cost-of-living index, all households; Switzerland—consumer prices, all items; Japan—CPI, all households, excluding farmers, fishermen, and single persons.
Sources: U.S. Bureau of Labor Statistics; U.K. Central Statistical Office, *Monthly Digest of Statistics*, Table 18.1; *Bank of Canada Review*, Table H.12; *Bundesbank Monthly Reports*, Table V.III; (Swiss) Dept. Fed. L'Economie Publique, *La Vie Economique*, Table B5.1; Bank of Japan, unpublished.

Figure 7 UNEMPLOYMENT RATES

Panel A: United States

Panel B: United Kingdom

Panel C: Canada

Panel D: Germany

Panel E: Switzerland

Panel F: Japan
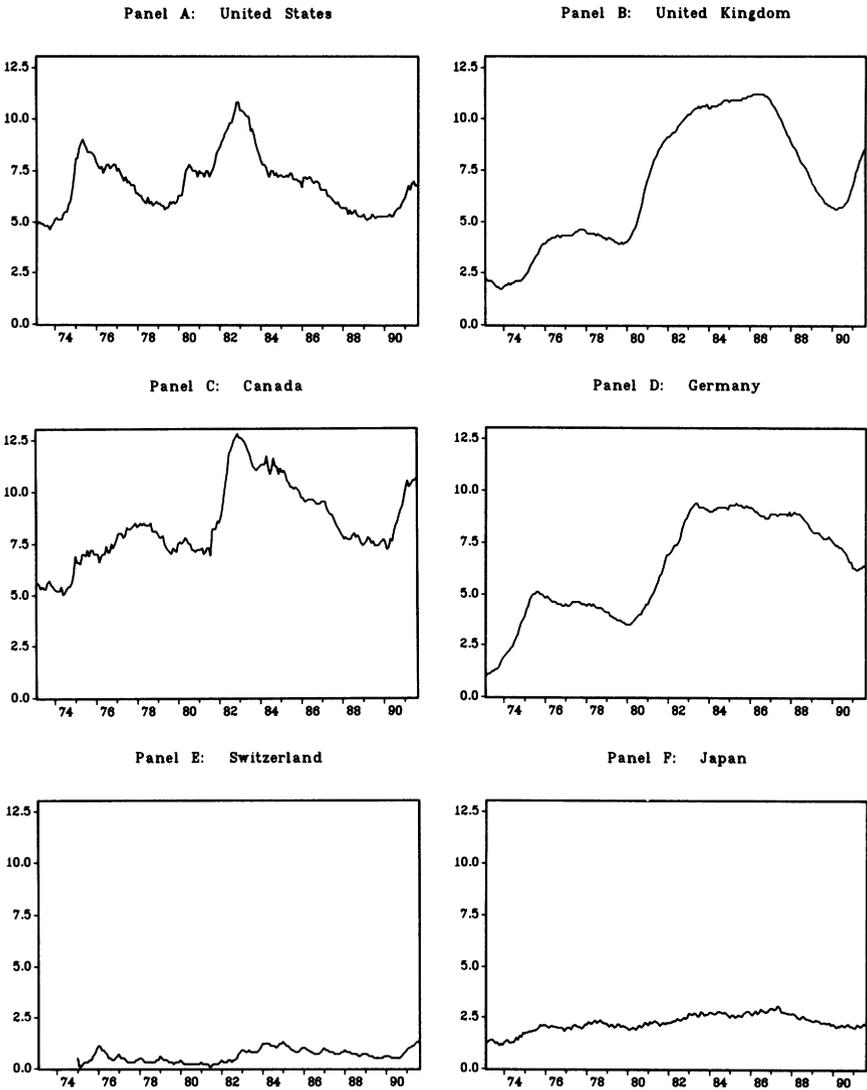
Data are civilian unemployment rates, national definitions. U.K. rate excludes school leavers.
Sources: U.S. Dept. of Labor, *The Employment Situation*, Table A.1; U.K. Central Statistical Office, *Economic Trends*, Table 36, col. 5; *Bank of Canada Review*, Table H.7; Bundesbank, supplement to the *Monthly Reports*, series 4, Table 7; (Swiss) Dept. Fed. L'Economie Publique, *La Vie Economique*, p. 3; (Japan) Labor Force Survey, Economic Planning Agency, *Japan Economic Indicators*.

rather than superior policy techniques. To ask the question more con-
cretely: Is the superiority of German or Swiss monetary policy over,
say, British policy really due to better and more coherent policies by the
Bundesbank and Swiss National Bank? Or is the better German and
Swiss performance a necessary consequence of institutional factors
(such as greater central bank independence) and greater political sup-
port for low inflation? If the latter is true, then the features of policy
that we have observed to be associated with more successful outcomes
may in fact be either endogenous or irrelevant.

Despite the obvious importance of political and institutional factors,
it still seems plausible that, given their environments, central banks
have considerable latitude to deliver successful or unsuccessful mone-
tary policies. Some evidence for this proposition is that the effectiveness
of monetary policy within given countries has changed substantially
over time. British and U.S. monetary policies seem noticeably more
successful in the 1980s than in the 1970s. Japan made the transition
from high and erratic inflation in the mid-1970s to a low and stable
inflation rate (despite the fact that the Bank of Japan is probably less
politically independent than, say, the Bank of Canada). Political condi-
tions (e.g., the public's aversion to inflation) can also change over time,
but such changes are likely to be more gradual than the observed
changes in policy outcomes. Thus, while the political dimension needs
to be explored further, it remains likely that how the central bank
chooses to handle monetary policy is also a major factor determining
macroeconomic outcomes.

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Comment

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This paper serves two useful functions. First, it may lay the foundations for interesting future research on the effects and design of monetary policy. Second, it displays both the advantages and disadvantages of what used to be called history but is now called the "case study approach." Despite these contributions, the paper is a difficult one to discuss. Primarily this is because neither sharp hypotheses are generated nor is the data used to discriminate between alternative theories, either positive or normative.

In this comment I discuss three issues: (1) some of the advantages and disadvantages of the case study approach, (2) the substance of the paper's findings regarding the motivation for central bankers' behavior, and (3) the substance of the paper's policy recommendations.

According to the authors, "[A] more flatly empirical approach is taken by the present paper. We use a simple case study methodology to analyze the conduct and performance of monetary policy in six industrialized countries for the period from the breakup of Bretton Woods until

the present" pp. 2–3. While I'm not exactly sure why case studies are more or less "flatly empirical" than unconstrained Vector Autoregressions (VAR's), it is useful to think about some of the pluses and minuses of the proposed methodology. The pluses are obvious. I can't imagine anyone arguing that the only source of information that is useful to an economist is the CITIBANK data tape. Surely it's important to understand the institutional reality and the political environment within which economic decisions are reached.

The issue is what, if any, are the minuses of the case study approach. My own sense is that the single biggest problem has to do with the problem of sample selection bias. Of course, if the sample selected is *defined* to be the population of interest, sample selection bias won't be an issue. If what you're interested in is the history of a particular country over a particular time period, then that is what you ought to study.

But unless this is the case, sample selection bias is a potentially important problem. To pursue this idea it is worth defining some notation. Let Y denote a vector of outcomes of interest and let X denote a vector of "control" or explanatory variables. Also denote the joint density of Y and X by $f(x,y)$. In practice, economists are typically interested in objects like $f(x,y)$ or marginal density functions like $f(y|x)$. The sample selection issue arises because $f(x,y)$ and $f(y|x)$ must be estimated using a sample of observations on the y's and x's.

The key advantage of random sampling rules where all individuals are equally likely to be sampled is that it produces a description of population characteristics that becomes increasingly accurate as sample size expands. However to the extent that we are not interested in the population distribution of x, and we only care about the conditional density of y given x, i.e., $f(y|x)$, then certain types of nonrandom sampling rules can be justified. Specifically, it is well known that if samples are selected solely on the basis of the x variables, then inference regarding $f(y|x)$ won't be affected. Sample selection distorts inference regarding $f(y|x)$ only if selection occurs on the basis of y, or y in conjunction with x.

Unfortunately this result provides very little solace for macroeconomists. This is because, to a first approximation, no aggregate variable is both exogenous and observable. All that we get to see are current and lagged Y's. It is simply very hard to think of plausible candidate X variables. Indeed it's exactly the absence of measurable exogenous variables that leads macroeconomists to talk about things like technology shocks, animal spirits, and seasonal shocks as the driving variables in business cycles. It is also the reason that VAR analysts spend so much time worrying about how to decompose innovation covariance matrices into underlying structural disturbances. Exactly identified VAR's, struc-

tural or otherwise, are attempts to impose just enough restrictions on the relationships between endogenous variables to find dynamic analogs to the X's.

Is it the case that the "case study methodology" somehow avoids these problems? The answer is clearly no. If, to a first approximation everything is endogenous, sample selection inevitably occurs on the basis of "dependent" variables. What this means is that if case studies are going to be useful, we are going to have to be explicit about articulating the purpose of these studies and the way samples are selected, i.e., why we are studying a particular time period or group of countries. If and when this is done, case studies can be enormously useful, precisely because the kind of information they bring to bear on arguments about what can and cannot be viewed as exogenous are often more compelling than running regressions on the usual list of suspects from CITIBANK. Indeed, this, I suspect, is the reason that the Romer and Romer (1989) study of monetary policy shocks in the postwar United States has received so much attention.

How well do Bernanke and Mishkin meet this challenge? In my view, not well at all. Can we think of the countries included in their study as having been selected on the basis of some list of X's. The answer is clearly no. The existence of inflation in the countries that they study can hardly be viewed as exogenous. The fact that monetary targets existed in these countries, and were sometimes even paid lip service to, also cannot be viewed as exogenous events or plausible candidates for "controls."

The only statement about their sample selection rule is contained on page 187 where the authors inform us that the six countries to be studied represent "independent" observations in the sense that, for most of the period, no two of them belonged to a common system of fixed exchange rates. Other countries with independent policies, such as Sweden and Australia, were excluded because of space and data limitations. Perhaps even more troubling is the fact that no mention whatsoever is made of the countries that Dornbusch and Fischer (1991) characterize as being afflicted by moderate inflations. Perhaps Bernanke and Mishkin feel that there is nothing in the experience of those countries that is relevant to the questions being asked in this paper. If so they ought to tell us why. I for one find it troubling that Dornbusch and Fischer managed to write a whole paper on moderate inflation and analyze eight countries in great detail without once mentioning monetary targets. In sharp contrast, Bernanke and Mishkin manage to analyze the monetary history of six countries over the postwar era without once mentioning fiscal policy.

Even conditioning on Bernanke and Mishkin's choice of countries, I do not know what to make of their decision to study six countries over exactly the same time period, when many were subject to the same disruptions like the oil shocks of 1973 and 1978. In what sense do these six countries constitute independent observations? Surely no one believes that the countries happened to experience rises in inflation and recessions over the same time period by coincidence.

Let me now turn to the authors' substantive findings. Consider first their results about what motivates central bankers. The authors reach three main conclusions: (1) Central bankers have multiple objectives; (2) the greater is the central bank's concern about inflation, the stronger will be its tendency to employ monetary targets; and (3) central bankers never and nowhere adhere to strict, ironclad rules for monetary growth.

As far as I can tell, the first claim is devoid of empirical content other than the proposed list of variables that central bankers sometimes care about. Granted it's useful to be reminded that the simple objective functions attributed to monetary authorities in theoretical models are, at best, useful pedagogical devices. But surely no one thought otherwise. For a statement like (1) to be useful, the authors need to argue that some representation of bankers' preferences or decision rules that has been adopted in the literature has led us seriously astray.

The evidence for (2) is that "All six of the countries here adopted monetary targeting in the 1970s in response to a worldwide increase in inflation and persisted with money targets until disinflation was achieved" (see p. 209). While this may or may not be true in a broader sample of countries and time periods, I am vague on exactly what is being claimed. Perhaps what the authors mean is that central banks actually take monetary targeting seriously when inflation attains some critical level. If so, the claim is certainly false as applied to the post-war United States. While much controversy surrounds the conduct of monetary policy during the period 1979 to 1982, one thing is perfectly clear. The Federal Reserve Board was no more successful in meeting monetary targets after 1979 than before 1979. Certainly the Fed must be given credit for pursuing restrictive monetary policy action that made the reduction in inflation between 1980 and 1982 possible. But the relevant question here is what role did monetary targeting play in achieving this reduction?

To answer this question it is useful to look at the Figure 1 taken from Broaddus and Goodfriend (1984). Notice that M1 overshot the upper bound of the Fed's target ranges in 1977 and 1978 and came within the upper third of its range in 1979. After renewing its commitment to disinflationary policy in October 1979, the Fed again let M1 overshoot

Figure 1 ANNUAL TARGET RANGES FOR M1 AND CORRESPONDING
ACTUAL M1 GROWTH, 1975–1985
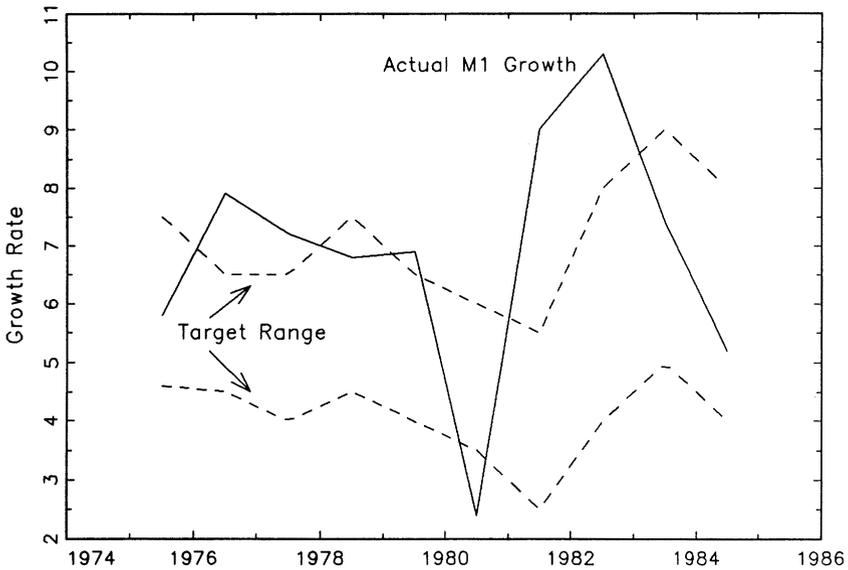
its target in 1980, and the inflation rate remained high throughout that year. Then, in sharp contrast to the preceding 4 years, effective M1 substantially undershot its range in 1981.

To me the data suggests that the "discipline" of monetary targeting did not contribute significantly to the reduction in inflation. The reduction was due to the shock of M1 significantly undershooting its target after a 4-year period during which growth either exceeded or came in well in the upper end of the range. I conclude that the issue of monetary targeting in the United States just isn't very interesting from a positive point of view. We never had it. What the Fed targeted in 1979 was high nominal interest rates, not low growth rates of M1. Surely no one believed otherwise—now or then.

Finally, I wish to comment on the main normative conclusion of the paper, that "Short run adherence to money growth targets may not be necessary for the successful use of a money targeting strategy as long as there is some commitment by the central bank to reverse deviations of money growth from target over the longer term" (see p. 215). Here Bernanke and Mishkin are implicitly advocating a monetary rule according to which the monetary authority responds to various exogenous shocks that impact upon the system, but subject to the constraint that, over some (unspecified) horizon of time, the actual growth rate of some (unspecified) monetary variable equal its target rate.

Stated at this level of abstraction, it's hard to disagree. After all, aside from the time consistency issue, there is little theoretical reason to recommend a $k\%$ rule. This class of rules is clearly suboptimal in the presence of nominal wage or price rigidities. Nor would it be optimal in the presence of the types of frictions in financial markets emphasized in recent work by Lucas (1990), Fuerst (1992), or Christiano and Eichenbaum (1992). One needn't be a Keynesian to argue that $k\%$ rules are suboptimal.

At the same time, though, it is worth emphasizing that the types of frictions that render $k\%$ rules suboptimal do not argue for discretion per se. They simply argue for complicated rules. The problem is that even if we felt confident that we actually knew the optimal rule, how could we set up institutions in ways that would ensure that the monetary authority followed the optimal rule and didn't revert to discretionary policy?

Indeed, this is the question that the time consistency literature has been struggling with for years. Presumably what is attractive about a $k\%$ rule is that deviations from it are easy to spot. In particular, the probability of reverting to discretionary policy is lowered by moving to relatively simple rules. And in the minds of some, this advantage is sufficiently important to outweigh the disadvantages of not responding to the various shocks that impact on modern economies.

In light of these problems, how should we interpret Bernanke and Mishkin's policy recommendation? Their entire argument consists of an appeal to the historical experience of Switzerland and, to a somewhat lesser extent, Germany and Japan. Implicit in their analysis is the notion that at least the Swiss have solved the conundrum facing the time consistency literature. Fine, but how? Until we know the answers to this question, Bernanke and Mishkin's advice amounts to saying that we should be like the Swiss. The real issue is just how should we change our institutions so that more complicated rules could be implemented in a way that mitigates the time consistency problem. Until we know the answer to that question, we will not have made much progress regarding the central issue in the debate about rules versus discretion.

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Comment

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Ben Bernanke and Rick Mishkin have put together a useful data base on money growth, targets for money growth, and monetary policy decisions in six different countries during the 1970s and 1980s. The tables, charts, and narrative—based on central bank reports and contemporary commentaries—have great potential to help students of monetary economics and monetary policy sort out macroeconomic events during this period.

An example of this potential is Bernanke and Mishkin's demonstration that money growth accelerated in Japan and Germany in the late 1980s, and that in both countries, attempts to stabilize exchange rates led to this acceleration. This finding deserves careful analysis by those interested in the conduct of monetary policy. According to many macroeconomic theories, these increases in money growth should have brought about an acceleration of inflation and perhaps another boom–bust cycle. In fact, inflation did accelerate in the late 1980s and early 1990s. Hence, exchange rate stabilization in the 1980s could be a cause for the deterioration in macroeconomic performance in Japan and Germany in the early 1990s. A careful analysis of the data could determine whether the timing, magnitudes, and absence of other factors affecting inflation could establish such a causal connection. There are many other examples offering a wealth of interesting research projects.

1. The need for a theoretical framework

Bernanke and Mishkin, however, do more than simply present the facts. They use their data base to develop *positive* and *normative* "hypotheses." They carefully distinguish between the two types of hypotheses.

The positive hypotheses are verbal descriptions of the empirical regularities that they observe in the time series data and in the central bank records. In general, I have little disagreement with their informal characterizations of the data in these positive hypotheses. I would prefer, however, that they use statistical methods to establish these regularities,

rather than relying solely on an "eyeball" approach. For example, one of their positive "hypotheses" is that central banks tend to adopt money targeting when inflation increases; in other words, Bernanke and Mishkin argue that there is a time series correlation between the strictness of money targeting—perhaps measured by the size of the deviation between money growth and target—and the inflation rate. If so, one should be able to establish this correlation for each of the countries with time series methods.

The author's normative hypotheses are more troublesome, in my view. To be sure, Bernanke and Mishkin are cautious in emphasizing that their normative hypotheses are "not to be treated as conclusions," but rather as "suggestive propositions that are advanced for further discussion, analysis and testing." Nevertheless, the development of even preliminary hypotheses from raw data requires a theoretical framework—a model that unfortunately the authors do not provide. Without such a model, I must admit I find it difficult to assess the causal connection between their data and their hypotheses, and thereby even discuss the results. I do not mean to say a full-blown econometric model, or even a set of equations, is necessary to establish the plausibility of such a connection. Presumably that would come in later research, perhaps along the lines being pursued at the Brookings Institution multicountry model comparison project. But to establish even a preliminary causal relationship, it is necessary to provide at least a few words on such things as the relationship between money growth, inflation, and real output. By way of comparison, in an earlier case study of monetary policy—the Friedman and Schwartz monetary history, models were used to make the connection between the facts and the policy hypotheses.

Bernanke and Mishkin refer to papers by Poole as well as Kydland and Prescott in their analysis. Yet these two papers use entirely different macroeconomic frameworks—one Keynesian and the other new classical—which have very different implications concerning the relationship between money growth inflation and real output.

2. Definition of policy rules

Bernanke and Mishkin set the stage for their analysis with a discussion of the rules versus discretion debate. This is a good place to begin, but unfortunately I disagree with their characterization of policy rules and their distinction between rules and discretion. Their definition of a policy rule includes only rules with *fixed* settings, such as a $k\%$ rule for money growth. They state, e.g., that, "Monetary rules do not allow the monetary authorities to respond to unforeseen circumstances."

If there is anything we have learned from modern macroeconomic research it is that rules need not entail fixed settings as in constant

money growth rules. Bernanke and Mishkin appear to relegate feedback rules to the discretion class. Perhaps it is because they restrict themselves to such a narrow definition of policy rules that they feel that previous research on policy rules has been cast in "abstract and historical terms." Many papers, however, have explored the effectiveness of feedback policy rules in practically oriented empirical models fit to historical data. In these papers the monetary authorities do react to unforeseen circumstances. Indeed, the "optimal" policy of Kydland and Prescott or the "rules" solution of Barro and Gordon in the time inconsistency literature can entail adjustment of the instruments in response to unanticipated shocks.

Eliminating contingency rules from consideration makes it difficult for me to interpret their concept of a hybrid policy, later in the paper. Is a hybrid policy simply a feedback rule? Or does it entail discretion in the sense of Kydland and Prescott?

3. Discussion of the normative hypotheses

Bernanke and Mishkin observe that monetary policy has been run differently in the six countries and draw their "normative hypotheses" from these differences. The first hypothesis is that money growth targets are a useful medium term strategy as long as central banks do not "play games." According to the authors, the countries that have most effectively resisted playing games are Germany and Switzerland, while the worst have been the United States, the United Kingdom, and Canada. Japan is an intermediate case.

Yet in terms of macroeconomic performance—low output variability and low and stable inflation—Japan would be ranked first, not in the middle. By some measures the United States would be ranked better than Germany: The recovery from the 1981–1982 recession was faster, and the inflation rate is currently lower. Hence, even the correlation between central bank policy and macroeconomic performance does not correspond with this first normative hypothesis.

Their second hypothesis is that the central bank should reverse the direction of money growth if it deviates from its target. Put differently, they argue that the central bank should avoid base drift. The only hard evidence in favor of this hypothesis that I could find in the paper is Switzerland, where money growth overshot in the late 1970s and then was offset by negative money growth in the early 1980s. On the other hand, research by Carl Walsh (referred to in the paper) has shown that whether base drift is a good policy depends on the nature of the shocks.

The third normative hypothesis is that central bank operating procedures do not matter much. I take this to mean that as long as the central bank is targeting money, it does not matter whether interest rates or

reserves are used as the means of controlling money. Clearly this conclusion depends on the regulatory environment and the stability of money demand. It cannot hold generally. Moreover, the hypothesis does not apply to monetary policies where money targeting is not essential. Clearly it makes a big difference how responsive the central bank's interest rate targets are to economic conditions. An operating strategy that focuses on interest rates rather than reserves usually leads to slower movement in interest rates.

4. Concluding remarks

When the editors of this volume asked me to comment on this paper, they suggested that it would be nice if I could draw on my recent experience in Washington to give a policy perspective to Bernanke and Mishkin's technial analysis of monetary policy. Having read the paper and completed my comments, I find the roles of the paper writers and this discussant to be the reverse of the editors' suggestion. The researchers, Bernanke and Mishkin, have written a paper that eschews models and technique, which endeavors to go directly to a policy-making perspective. This discussant, the former policymaker, is crying out for a model and techniques, prior to providing policy suggestions. My experience is that there are far too many policy papers in government that do not pay enough attention to economic models and theory. Policy papers with explicit empirically based theories are still a rare commodity. Perhaps future research can make use of the useful data base Bernanke and Mishkin have assembled to provide the technical analysis that is I feel greatly needed by policymakers.

Discussion

Bernanke responded to the Comment by John Taylor that the reversal of deviations from monetary targets would be bad policy by noting that monetary targets generally reflect changes in the underlying state of the economy. For example, monetary targets in Germany and Switzerland depend explicitly on predictions of velocity. Reversals of deviations should, of course, take into account changes in the targets. In response to the Comment by Martin Eichenbaum on sample selection bias, Bernanke explained that the sample was chosen simply based on the availability of data in the Federal Reserve Bank's database.

Catherine Mann echoed another concern expressed in the Comment by Martin Eichenbaum that the paper draws conclusions while lacking formality and an underlying theoretical framework. In response, Bernanke and Mishkin each emphasized that the point of their case study

method was not to write down a model, set up formal tests, and use the data to test the model empirically. Such a formal process assumes that the hypothesis to be tested is known ahead of time. Rather, the goal of this paper, they argued, is to broaden the base of stylized facts that economists use to develop testable hypotheses.

Olivier Blanchard noted that the observation that monetary targets represent signals is followed by the informal discussion of a positive model of Central Bank behavior along the lines of the Kydland–Prescott model. Blanchard asked if such a model could be written down more formally. In response, Bernanke suggested that a model employing reputation effects and recognizing that both the Central Bank and the executive branch of government are players could be developed and would likely fit well with the stylized facts documented in the paper. David Wilcox wondered whether the evidence in the paper could be useful for determining how important monetary signals are empirically.

Robert Gordon argued that a key omission from the paper is a discussion of the response of output to monetary policy. As an example, Gordon pointed to two episodes in U.S. experience: the 1978–1979 period and the 1985–1986 period. In both cases, monetary policy overshot its targets, according to Table 1 in the paper. However, monetary policy in the first instance was arguably unsuccessful because nominal gross national product as well as money overshot any reasonable target. In contrast, monetary policy was extremely successful during 1985 and 1986 as the double-digit growth of M1 prevented the economy from slipping into a recession. In one instance the overshooting of the monetary target was harmful, and, in the other instance, the overshooting of the monetary target was beneficial. According to Gordon, it is important to distinguish between these outcomes when discussing monetary policy in the context of targets.

Martin Baily suggested that the output–inflation tradeoff is likely to depend on the type of policy implemented by the Central Bank and on the institutional structure of the economy, for example, the presence of strong unions in the United Kingdom. He argued that distinguishing between the endogenous effects from the operating procedure of the Central Bank and the exogenous influences of the institutional structure is necessary before we can understand the output–inflation tradeoff.

Christina Romer noted that a key distinction between the methodology in the seminal case study by Friedman and Schwartz and the methodology in the current paper is that Friedman and Schwartz used their case study as the historical test of a maintained hypothesis. After examining the evidence from six countries, Bernanke and Mishkin now seem to have developed a working hypothesis, and Romer suggested that their case study could be redone in the tradition of Friedman and Schwartz.