Volume Title: The Great Inflation: The Rebirth of Modern Central Banking

Volume Author/Editor: Michael D. Bordo and Athanasios Orphanides, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-006695-9, 978-0-226-06695-0 (cloth)

Volume URL: http://www.nber.org/books/bord08-1

Conference Date: September 25-27, 2008

Publication Date: June 2013

Chapter Title: The Great Inflation: Did The Shadow Know Better?

Chapter Author(s): William Poole, Robert H. Rasche, David C. Wheelock

Chapter URL: http://www.nber.org/chapters/c9156

Chapter pages in book: (p. 61 - 107)

1

The Great Inflation
Did the Shadow Know Better?

William Poole, Robert H. Rasche, and
David C. Wheelock

> The failure to control inflation was not inevitable. The policies did not fail because they were poorly executed. They failed because they were poorly conceived.
> —Shadow Open Market Committee, August 23, 1973[1]

The Shadow Open Market Committee (SOMC) held its first meeting on September 14, 1973. The SOMC was formed in response to rising inflation in the United States and the apparent failure of either the Nixon administration or the Federal Reserve to formulate effective policies to control inflation. Under the leadership of Karl Brunner and Allan Meltzer, the SOMC met twice a year to review US economic policy and discuss policy-related research. At the conclusion of every meeting, the committee issued a statement evaluating current policy and proposing an alternative course of action.[2] In this chapter, we describe the monetary policy framework of the SOMC and the statements the committee issued during the Great Inflation period. Further, we simulate a New Keynesian macroeconomic model embedding a representation of the SOMC policy rule to evaluate whether the committee's proposals could have resulted in a lower average and more stable rate of inflation than actually occurred.

William Poole is former president of the Federal Reserve Bank of St. Louis, senior fellow of the Cato Institute, and Distinguished Scholar in Residence at the University of Delaware, and was a member of the Shadow Open Market Committee from 1985 to 1998. Robert H. Rasche is former executive vice president and senior policy advisor at the Federal Reserve Bank of St. Louis, and was a member of the Shadow Open Market Committee from 1973 to 1999. David C. Wheelock is vice president and deputy director of research at the Federal Reserve Bank of St. Louis.

The authors thank the conference participants, especially Allan Meltzer and Christina Romer, and two referees, for their comments on previous versions of this chapter. The views expressed in this chapter are not necessarily official positions of the Federal Reserve Bank of St. Louis or the Federal Reserve System. For acknowledgments, sources of research support, and disclosure of the authors' material financial relationships, if any, please see http://www.nber.org/chapters/c9156.ack.

1. Invitation issued to the press and other guests to attend the first meeting of the Shadow Open Market Committee, held on September 14, 1973. Quoted in Meltzer (2000).

2. See Meltzer (2000) for a short history of the SOMC.

First, we describe the economic environment in which the SOMC was created and the policy views that the SOMC sought to counter. We then describe the SOMC policy framework by highlighting how the views of SOMC members differed from most Federal Reserve officials and many academic macroeconomists. That discussion is followed by a description of the SOMC policy rule. Importantly, the SOMC rule called for a transparent and gradual adjustment of money stock growth to a steady-state rate. We simulate a New Keynesian macroeconomic model embedding the SOMC policy rule to gauge how different the path of inflation might have been if the Federal Reserve had followed the SOMC's policy recommendations. Our simulations illustrate that a gradual adjustment of money stock growth similar to that advocated by the SOMC is likely to result in less impact on output growth and less variability in inflation or output growth than a large onetime adjustment.

1.1 The Great Inflation and the SOMC

When the SOMC first met in September 1973, the United States had already experienced eight years of rising and increasingly variable inflation. Whereas inflation averaged a mere 1.4 percent between January 1952 and December 1964, it averaged 3.9 percent between January 1965 and August 1973, and reached 7.4 percent for the twelve months ending in August 1973.[3]

The Nixon administration's response to inflation, with the strong support of Federal Reserve Chairman Arthur Burns and many academic and professional economists, was to impose controls on wages and prices.[4] A first round of controls was announced on August 15, 1971, and some controls remained in effect into 1974. Burns continued to champion wage and price controls even when most observers had concluded that they were not working. For example, in a speech on June 6, 1973, Burns argued that "the persistence of rapid advances in wages and prices in the United States and other countries, even during periods of recession, has led me to conclude that governmental power to restrain directly the advance of prices and money incomes constitutes a necessary addition to our arsenal of economic stabilization weapons."[5]

Burns attributed the inflation of the late 1960s and early 1970s mainly to rising factor costs, especially labor and energy costs, as well as to government

3. We measure the inflation rate here as the year-over-year percentage change in the seasonally-adjusted all-items Consumer Price Index (1982–84 = 100).

4. Nearly 93 percent of respondents to a 1971 survey of members of the National Association of Business Economists favored the use of wage and price controls or guidelines ("Top Economists Are Extremely Ebullient Over 1972 Prospects, Back Nixon Program," *Wall Street Journal,* September 28, 1971, 3), and 61 percent of surveyed members of the American Economics Association supported the administration's freeze on wages and prices ("President to Give Post-Freeze Plan in Speech Tonight," *New York Times,* October 7, 1971, 1).

5. "Some Problems of Central Banking." Quoted in Burns (1978, 156).

budget deficits, social programs, and regulations.[6] He argued that wage and price controls were necessary to stem "cost-push" inflation. For example, in a 1970 speech, he contended that "[g]overnmental efforts to achieve price stability continue to be thwarted by the continuance of wage increases substantially in excess of productivity gains. . . . The inflation that we are still experiencing is no longer due to excess demand. It rests rather on the upward push of costs—mainly, sharply rising wage rates." He argued, moreover, that "monetary and fiscal tools are inadequate for dealing with sources of price inflation such as are plaguing us now—that is pressures on costs arising from excessive wage increases."[7]

Burns's views about inflation were widely shared by leading economists and policymakers throughout the 1960s and 1970s. For example, Samuelson and Solow (1960, 181) argued that "the essence of the [inflation] problem" stemmed from the absence of perfect competition in factor and product markets, whereas Bronfenbrenner and Holzman (1963) cited the power of "economic pressure groups," such as labor unions and monopolistic firms. Throughout the 1960s, the *Economic Report of the President* blamed inflation on "excessive" wage and price increases. For example, the *Economic Report* for 1965 explained that "in a world where large firms and large unions play an essential role, the cost-price record will depend heavily upon the responsibility with which they exercise the market power that society entrusts to them" (1966, 179).

Like Burns, some economists and policymakers claimed that government budget deficits contributed to rising inflation. Federal Reserve Governor Sherman Maisel (1973, 12), for example, wrote that the increasing rate of inflation of the late 1960s and early 1970s was caused by "government deficits; . . . speculative investment in plant, equipment, and labor by business corporations; . . . use of economic power to raise wages and profits; . . . But most significant were the government deficits."

The SOMC was formed to promote an alternative to these widely entrenched views about the causes of inflation and to recommend policies for restoring price stability. The policy analysis and recommendations of the SOMC reflected the monetarist orientation of its members. Accepting Milton Friedman's dictum that "inflation is always and everywhere a monetary phenomenon," the SOMC argued that price stability could be restored only by slowing the growth of monetary aggregates. The SOMC advocated a policy rule characterized by an announced, gradual reduction in money growth to a rate consistent with long-run price stability. The SOMC made specific recommendations for money stock growth at its twice-yearly

6. Retrospectively, Burns (1979) cast blame for the Great Inflation widely but emphasized the effects of government budget deficits, social programs, and regulations, as well as a political and economic climate that favored the pursuit of full employment over price stability.

7. "The Basis for Lasting Prosperity" (speech, December 7, 1970). Quoted in Burns (1978, 112–13).

meetings throughout the Great Inflation period and for several years thereafter (provided in appendix A).

1.2 The Shadow's Framework

The SOMC represented a monetarist challenge to the Keynesian views that dominated the economics profession and the Federal Reserve during the 1960s and 1970s.[8] The fundamental differences between the monetarist and Keynesian views have been elaborated at length elsewhere.[9] Here we highlight key differences between the SOMC and Federal Reserve policymakers about the causes of inflation and conduct of monetary policy to bolster our contention that monetary policy would have been radically different during the 1970s under a Shadow-led Fed.[10]

1. *Inflation is a monetary phenomenon:* Fed officials often blamed inflation on labor unions, monopolistic pricing, energy price shocks, and government budget deficits and dismissed the notion that money growth and inflation are closely connected. Burns, for example, testified in 1974 that "[t]he role of more rapid monetary turnover rates . . . warns against assuming any simple causal relation between monetary expansion and the rate of inflation either during long or short periods." Burns acknowledged that "excessive increase in money and credit can be an initiating source of excess demand and a soaring price level. But the initiating force may primarily lie elsewhere, as has been the case in the inflation from which this country is now suffering."[11]

By contrast, SOMC members and other monetarists dismissed "special factors" explanations for inflation and remained adamant that inflation is caused solely by excessively rapid growth of the money stock. For example, Karl Brunner argued that "Persistent increases in the price level are hardly likely to occur . . . without a similarly persistent monetary growth. Alternatively, in the absence of persistent and excessive monetary growth we will not experience any persistent inflation. Moreover, any persistent acceleration of the money stock eventually unleashes a rising inflation. On

8. We do not wish to leave the impression that all Federal Reserve officials shared the same views. In particular, Darryl Francis, president of the Federal Reserve Bank of St. Louis from 1966 to 1975, advocated policies that were much closer to those recommended by the SOMC than to those accepted by a majority of his Fed colleagues. See Hafer and Wheelock (2003).

9. For example, see Laidler (1981) or Nelson and Schwartz (2007).

10. Romer and Romer (2004) argue that throughout the Fed's history, the success of monetary policy, or lack thereof, has been mainly due to policymakers's views about how the economy works and what monetary policy can accomplish. They attribute the Fed's inflationary policy during the 1960s and 1970s initially to a belief in a permanent trade-off between inflation and unemployment, and later to a natural rate view with a highly optimistic estimate of the natural rate of unemployment and a highly pessimistic estimate of the sensitivity of inflation to economic slack.

11. "Key Issues of Monetary Policy" (statement before the House Banking Committee, July 30, 1974). Quoted in Burns (1978, 177).

the other side, no inflation was ever terminated without lowering monetary growth to the relevant benchmark level."[12]

2. *The market system is inherently stable and economic growth reverts to a natural rate:* Keynesians often argued that expansionary fiscal or monetary policy might be required to ensure that aggregate demand is sufficient to generate full employment, especially in the face of downwardly rigid wages and prices. Samuelson (1960, 265), for example, wrote that "with important cost-push forces assumed to be operating, there are many models in which it can be shown that some sacrifice in the requirement for price stability is needed if short- and long-term growth are to be maximized, if average long-run unemployment is to be minimized, if optimal allocation of resources as between different occupations is to be facilitated." Further, Samuelson and Solow (1960) argued that policies directed at limiting inflation in the short run might increase structural unemployment and reduce economic growth over the long term. The long-run trade-off between inflation and unemployment would worsen, they argued, because an increase in structural unemployment would increase the amount of inflation required to achieve a given reduction in the unemployment rate.

Monetarists held a very different view. Brunner, for example, argued that "the market system acts as a shock absorber and tends to establish a normal level of output. This means that we consider the market system to be inherently stable." Further, he argued that the trend in output "is dominated by real conditions and shocks summarized by technology, preferences, and institutions."[13] And, "monetary impulses do not produce permanent real effects on output, employment, and real interest rates, apart from longer-run real effects exerted via the expected inflation rate or distortionary institutional constraints (e.g., tax rates specified in nominal terms)."[14] In other words, as Friedman (1968) and Phelps (1967) argued, in the long run, output growth converges to a natural rate that is independent of the rate of inflation.[15]

3. *Monetary policy should focus on price stability:* In addition to believing that monetary policy has little or no impact on output in the long run, monetarists were skeptical of using policy to "fine-tune" economic activity in the short run. Monetarists argued that the Fed's attempts to steer a path between inflation and unemployment in the face of inevitable uncertainty about the short-run impact of policy actions and other shocks had exacerbated instability in both inflation and unemployment. For example, William Poole (1975) argued that "By trying to do too much, policymakers

12. "Another View at Fashionable Fallacies." SOMC position paper, February 4, 1980. Reprinted in Lys (1997, 92–96).

13. "Conversation with a Monetarist." Quoted in Lys (1997, 6).

14. "Has Monetarism Failed?," *Cato Journal* 3 (1), Spring 1983. Quoted in Lys (1997, 24).

15. If anything, monetarists believed that inflation would depress economic growth (e.g., Friedman 1977).

have put themselves into a vicious 'stop-go' cycle with ever-widening oscillations. Each period of monetary expansion has been higher than the previous one—considering the 1965, 1967–68, and the 1972–73 expansions. Each of the inflations since 1965 has been worse than the previous one. And each setback in real activity since 1965 has been deeper than its predecessor—in the sequence 1967, 1968–70, 1974–75. This pattern must be broken, and the only method in which I have any confidence is that of stabilizing money growth."[16]

Brunner argued similarly: "The best contribution monetary policy can make to lower the variability of output relative to normal output is the committed adherence to a predictable and stable monetary control path credibly understood by the mass of price and wage setters."[17]

4. *Adverse supply shocks reduce potential output:* The SOMC members argued against basing policy actions on estimates of the gap between actual and potential output, noting that there was little evidence that doing so reduces fluctuations in output. For example, Brunner argued that "short-run adjustments of monetary growth to the magnitude of the gap in the context of an economy with long inflation experience contributes little to the closure of gaps over time." Furthermore, the occurrence of supply shocks "reminds us that we cannot infer from output movements alone whether or not a recession has occurred."[18]

The decline in output and increase in unemployment that followed the first oil shock in 1973 prompted calls for expansionary monetary policy to return the economy to full employment. Brunner, however, argued that the shock had increased the natural rate of unemployment and lowered potential output. Further, he argued that "[t]he distinction between a 'real shock decline' in output and a 'cyclic decline' in output . . . [is] important for policy making. The latter creates an 'output gap' absent from the former. A disregard of the two distinct processes thus magnifies estimates of the 'potential gap' to be removed by expansionary policies. An inadequate analysis of the decline in output observed since November 1973 thus reinforces the danger of inflationary financial responses on the part of policymakers."[19] He also argued that if a decline in output reflects a decline in potential, then "no increase in money stock whatever its magnitude will raise output again."[20] Allan Meltzer argued similarly: "Money cannot replace oil, and monetary policy cannot offset the loss of real income resulting from the oil shock.

16. Quoted by Karl Brunner in "Monetary Policy, Recovery, and Inflation" (SOMC position paper, September 12, 1975, 23).

17. "Our Perennial Issue: Monetary Policy and Inflation" (SOMC position paper, September 1979, 7). Reprinted in Lys (1997, 80–92).

18. "Our Perennial Issue: Monetary Policy and Inflation" (SOMC position paper, September 1979, 7–8). Reprinted in Lys (1997, 80–92).

19. Brunner, "Monetary Policy, Recovery and Inflation" (SOMC position paper, September 12, 1975, 15).

20. "Our Perennial Issue: Monetary Policy and Inflation" (SOMC position paper, September 1979, 8). Reprinted in Lys (1997, 80–92).

The attempt to do so converts the one-time increase in the price level into a permanently higher maintained rate of inflation."[21] Although the impact of oil shocks on potential output was noted in the academic literature (e.g., Phelps 1978), Fed policymakers seem to have relied on overly optimistic estimates of full-employment output growth produced by the Council of Economic Advisers.[22]

5. *The cost of disinflation reflects the monetary authority's credibility:* Whereas the SOMC argued that money growth should be gradually reduced to lower the inflation rate, Burns and many other economists often claimed that reducing money growth to the extent required to halt inflation would result in excessively high unemployment and lost output. For example, in testifying about the rise of inflation in the late 1960s and early 1970s, Burns argued that "an effort to use harsh policies of monetary restraint to offset the exceptionally powerful inflationary forces of recent years would have caused serious financial disorder and economic dislocation. That would not have been a sensible course for monetary policy."[23]

Brunner countered that the cost of disinflation reflects the clarity and credibility of the announced policy, and, echoing Lucas (1976), argued that estimates of the resulting loss in output associated with tighter policy generated by standard models are highly suspect: "The structural properties and response patterns of an economic system are not invariant relative to different policies and policy patterns. The mechanical simulation of a policy program substantially different from the policy patterns prevailing over the sample period used to estimate the model yield . . . little information about the consequences of the program proposed. In particular, the simulations of a model estimated over a period of accelerating inflation probably exaggerate the longer-run unemployment effects of an anti-inflationary program."[24]

Brunner (1983) argued that "[t]he social cost of a disinflationary policy is not predetermined by the magnitude or duration of monetary retardation. . . . The social cost depends crucially on the public's belief in the persistence of the disinflationary action." And, "Credibility depends . . . on the history

21. Draft of proposed statement (SOMC, September 17, 1979, 3).

22. Orphanides (2003) and Romer and Romer (2004) conclude that reliance on an overestimate of potential output can explain much of the Fed's failure to rein in inflation during the 1970s. Orphanides (2003) estimates a Taylor rule using original (i.e., real-time) data and concludes that policy was broadly consistent with a 2 percent inflation target throughout the 1960s and 1970s. Orphanides shows, for example, that estimates of potential output available to policymakers at the time suggested that during 1978 and 1979 output was far below potential when in fact revised data suggest a much smaller gap in 1975 and 1976 and little or no gap in 1977 to 1979. The SOMC estimated that the 1973 oil shock had reduced normal output by about 5 percent (SOMC policy statement, September 17, 1979). For an extended discussion, see Brunner's SOMC position paper, "Monetary Policy, Inflation and Economic Expansion" (September 13, 1976, 16–18).

23. "Key Issues of Monetary Policy" (statement before the House Banking Committee, July 30, 1974). Quoted in Burns (1978, 177–78).

24. "Assessment of Monetary Policy" (SOMC position paper, September 6, 1974, p. 10).

of policymaking and the behavior of the policy institution. Low credibility offers little incentive to modify price-wage setting behavior, and the social cost of disinflation rises correspondingly." Further, "A dominant conviction by market participants that the Federal Reserve Authorities truly, unwaveringly and persistently lower monetary growth produces a decline in the rate of inflation with a comparatively small and rapidly eroding gap [between actual and potential output]. Emergence and magnitude of a gap in the context of an anti-inflationary policy depends foremost on the credibility of the policy."[25]

6. *Policy should be rules based and transparent:* Most Fed officials rejected the call for rules-based policy, especially those involving control of monetary aggregates. Fed Governor Andrew Brimmer, for example, argued that "it would be a disastrous error for the Federal Reserve to try to conduct monetary policy on the basis of a few simple rules governing the rate of expansion of the money supply" (1972, 351). And Burns claimed that "[t]he appropriate monetary growth rates will vary with economic conditions. They are apt to be higher during periods of economic weakness . . . than when the economy is booming. . . . Special circumstances may, however, call for monetary growth rates that deviate from this general rule."[26]

By contrast, the SOMC favored rules-based policy, arguing that discretionary policy can succeed only if monetary authorities have full knowledge of the deterministic and stochastic structure of the economy. Hence, Brunner (1983) argued, "A constant monetary growth regime [is] . . . an optimal risk-minimizing strategy in a state of uncertain and shifting information" (32). Brunner's preferred policy did, however, allow changes in the monetary growth rate in response to changes in the trend of normal real growth and velocity.

7. *Money market (nominal interest rate) targeting is flawed:* The Fed used a "money market" strategy to implement its policy. This strategy evolved from the Fed's borrowed reserves strategy of the 1920s and the interest rate-pegging regime of World War II.[27] After the Fed-Treasury Accord in 1951, the Fed remained committed to maintaining an "orderly" market for government securities and policy often reflected a desire to keep the government securities market on an "even keel," especially when the Treasury was issuing new debt. Fed officials gauged the "tone and feel" of the money markets and judged the stance of policy by movements in nominal interest rates—rising rates were interpreted as reflecting tighter policy and falling rates as looser policy.[28]

Fed officials justified their focus on the money market by claiming that

25. "Another View at Fashionable Fallacies" (SOMC position paper, February 4, 1980). Reprinted in Lys (1997, 982–96).

26. "Key Issues of Monetary Policy" (statement before the House Banking Committee, July 30, 1974). Quoted in Burns (1978, 174).

27. See Brunner and Meltzer (1968), Calomiris and Wheelock (1998), and Meltzer (2003).

28. For additional discussion of Fed policy during the 1950s, see Brunner and Meltzer (1964a), Calomiris and Wheelock (1998), and Romer and Romer (2002).

"financial market behavior is too complex for simple monetary rules to work" (Gramley and Chase 1965, 1403–04). Burns explained that "we pay close attention to interest rates because of their profound effects on the working of the economy."[29]

Monetarists, however, argued that the Fed's focus on interest rates had misled policymakers into thinking that they were tightening policy in response to rising inflation when, in fact, policy was increasingly loose. Brunner, for example, noted that "[a]n interest rate target policy misleads monetary authorities and many spectators into believing that expansive (or restrictive) actions have been initiated when nothing has been done or even worse, when actually restrictive (expansive) measures have been introduced. A decline in interest rates resulting from falling credit demand possesses no expansionary meaning and simply reflects one aspect of the ongoing deflationary process. Its interpretation as an expansive action by the Fed is a dangerous illusion."[30] Allan Meltzer argued similarly in testimony before the Senate Banking Committee in 1975: "Changes in interest rates convey inaccurate information about the direction or thrust of current monetary policy." He described the use of nominal interest rates as a guide to policy as "one of the principal errors that the Federal Reserve has made throughout its history."[31]

8. *Money demand is stable:* Many economists and monetary policymakers dismissed monetary growth rules, arguing that money demand is too unstable to permit the use of such rules. Policymakers often claimed that financial innovations and changes in regulation unpredictably altered the relationship between monetary growth and nominal spending. Burns, for example, claimed that "[f]rom one month to the next, the public's demand for money is subject to variations that are usually of a short-run nature. . . . If the Federal Reserve tried to maintain a rigid monetary growth rate . . . [then] interest rates could fluctuate widely, and to no good end. The costs of financial intermediation would be increased, and the course of monetary policy would be misinterpreted."[32]

The SOMC members questioned the Fed's analysis, however, especially estimates of money demand equations that included only short-term interest rates. Brunner, for example, conjectured that "money demand functions using long term in lieu of short term interest rates supplemented with a measure of returns on equities produces different results."[33]

29. "Monetary Targets and Credit Allocation" (testimony before the Subcommittee on Domestic Monetary Policy, US House Banking, Currency, and Housing Committee, February 6, 1975). Quoted in Burns (1978, 369).

30. "Monetary Policy and the Economic Decline" (SOMC position paper, March 7, 1975, 12).

31. "The Senate Concurrent Resolution on Monetary Policy" (testimony before the Senate Committee on Banking and Currency, February 25, 1975, 3).

32. "Key Issues of Monetary Policy" (statement before the US House Banking, Currency, and Housing Committee, July 30, 1974). Quoted in Burns (1978, 175).

33. "Monetary Policy, Inflation and Economic Expansion" (SOMC position paper, September 13, 1976, 8).

9. *The money stock is controllable:* Fed officials often claimed that they had little control over the money stock and, hence, that monetary aggregate targeting would not be feasible even if it were desirable. Board staff economists Lyle Gramley and Samuel Chase (1965) argued, for example, that "[t]raditional [i.e., monetarist] analysis . . . fails to recognize that substitution between time deposits and securities may be an important source of procyclical variations in the stock of money even in the face of countercyclical central bank policy."[34] Burns argued similarly that the growth of monetary aggregates can give a misleading indication of the stance of policy. In testimony before the House Banking Committee in July 1975, he stated that "the narrowly defined money supply, M1, can actually be a misleading guide to the degree of monetary ease or restriction. For example, in periods of declining economic activity both the transaction demand for cash and the private demand for credit will tend to weaken and thus slow the growth of M1."[35]

By contrast, Brunner and other SOMC members argued that the apparent endogeneity of money to movements in income reflected the Fed's practice of targeting nominal interest rates. According to Brunner (1983), "Interest rate targeting is the most important condition contributing to 'reverse causation.' Interest rate policy converts the monetary base, and consequently the money stock, into an endogenous magnitude sensitively exposed to all ongoing shocks affecting market rates of interest. These shocks are transmitted via interest rate targeting into accelerations or decelerations of monetary growth." Further, he argued, "The effect on the base is a consequence of the Federal Reserve's interest target policy and would disappear with proper monetary control."[36]

In 1975, Congress adopted House Concurrent Resolution 133, which required the Fed to establish target ranges for monetary growth. The Fed set ranges as required, but growth frequently fell outside those ranges. Fed officials blamed the deviation of monetary growth from the target ranges on financial innovations and changes in regulation that affected money demand. The SOMC rejected that explanation, however, contending that their studies showed that by controlling the growth of the monetary base, the Fed could control the growth of the money stock at a horizon of some two to four quarters.[37] Brunner noted, however, that "effective monetary control also requires some adaptations of inherited institutions . . . [including] radical simplification of reserve requirements [and] in the manner of computing required reserves."[38]

34. Quoted in Brunner (1968, 10).

35. Quoted by Brunner in "Monetary Policy, Economic Expansion and Inflation" (SOMC position paper, March 8, 1976, 18).

36. "Monetary Policy, Economic Expansion and Inflation" (SOMC position paper, March 8, 1976, 18–19).

37. See Brunner, "Monetary Policy, Economic Expansion and Inflation" (SOMC position paper, March 8, 1976), and "Our Perennial Issue: Monetary Policy and Inflation" (Working Paper, University of Rochester, September 1979).

38. "Monetary Policy and the Economic Decline" (SOMC position paper, March 7, 1975, 14).

The preceding discussion should clarify how the SOMC's views diverged from those of the Fed. The SOMC reflected the emerging New Classical views of Friedman, Lucas, and others, many of which are features of mainstream macroeconomic models today. Although today there are few proponents of money supply policy rules, many aspects of the SOMC policy framework are now widely accepted. These include the natural rate hypothesis; the value of transparent, rules-based policies; the importance of credibility; and the notion that in the long run, inflation is determined solely by monetary policy.[39] Like many monetary economists today, the SOMC held that price stability should be the paramount objective of monetary policy, and that efforts to limit fluctuations in economic activity or to promote financial stability are unlikely to succeed in the absence of price stability.

The following section describes the SOMC policy rule and presents results from simulation of a modern macroeconomic model that embeds the SOMC rule in an effort to determine how different the path of inflation might have been if the Fed had followed such a rule.

1.3 The Shadow's Policy Rule

The SOMC articulated a consistent and transparent policy rule throughout the Great Inflation era. Karl Brunner explained the rule in a position paper written in September 1979:

> This procedure is based on an estimate of the desired target of monetary growth. This selection depends on the desired longer-rate movements of the price-level and the economy's normal real growth. A second step formulates estimates of the time profile for the monetary multiplier. These two steps imply the required growth rate of the monetary base. Projections of the source components of the base other than Federal Reserve Credit determine ultimately the anticipated path of the Fed's net open market operations over various horizons ahead. . . . [T]he "ultimate target" for the growth of the monetary base should be announced together with the stepwise reduction proceeding over the next three to five years.[40]

Although the SOMC policy rule specified a steady-state growth rate for the monetary base, it was more than a simple, fixed-rate monetary rule. As noted previously, Brunner indicated that it might be necessary to adjust the steady-state monetary growth rate in response to permanent changes

39. See McCallum (1999) for a favorable recent discussion of money supply rules. Long-run monetary neutrality is a feature many New Keynesian and hybrid macroeconomic models (e.g., Goodfriend and King 1997; Kimball 1995; King and Wolman 1996; McCallum and Nelson 1999), as well as standard real business cycle models (e.g., Prescott 1986). Clarida, Galí, and Gertler (1999); Woodford (2003); and many others emphasize the importance of credibility and of transparent, rules-based policies.

40. "Our Perennial Issue: Monetary Policy and Inflation" (SOMC Position Paper, September 1979, 5). Reprinted in Lys (1997, 80–92).

in economic growth or velocity. Moreover, the SOMC rule emphasized the transition from the current monetary growth rate to the steady-state growth rate. As the previous statement makes clear, the SOMC rule implied that the adjustment of monetary base growth to the ultimate target should be gradual and publicly announced.

The SOMC statements often called for transparent, consistent policies, and the SOMC was critical of the Federal Open Market Committee's (FOMC's) practice of announcing monetary growth targets starting from the most recently observed level of the money stock—a practice that came to be known as "base drift." In contrast, the SOMC's rule avoided base drift by establishing a growth rate from the previous target value:

$$\ln(M^T_{t,t+1}) - \ln(M^T_{t-1,t}) = \alpha_t, \tag{1}$$

where $M^T_{t,t+1}$ is the target value for the money stock at time $t + 1$ established at time t. Base drift was avoided by recognizing the most recent policy error:

$$\ln(M_t) = \ln(M^T_{t-1,t}) + \varepsilon_t. \tag{2}$$

An example of this approach can be found in the SOMC policy recommendation of March 1975:

> We renew the recommendation made at our September meeting that the growth rate of money be held at 5-1/2 percent. However growth should not start at that rate from the current low level. We recommend that the money stock be brought to a level it would have reached in March 1975, if our policy had been followed. A one-time increase in money—currency and demand deposits—to $290 billion should be announced and provided by April 15. This increase would put money growth back on the path leading the economy toward full employment at lower rates of inflation than in recent years.[41]

The SOMC's policy rule was forward-looking, extending reductions in the money growth rate into the future until a noninflationary monetary growth rate had been achieved. The SOMC never advocated an abrupt, "cold turkey" adjustment of the monetary growth rate to a long-run target. Instead, the policy rule was inherently gradualist, calling for adjustments in the monetary growth rate depending on initial conditions and the historical trend.

Typically, SOMC recommendations advocated a 1 percentage point reduction in the target growth rate of the money stock per year until a noninflationary rate of growth was achieved. At that point, the policy rule called for a constant noninflationary monetary growth rate.[42]

41. Policy Recommendations of the Shadow Open Market Committee, March 7, 1975.

42. The SOMC rule also permitted adjustments to monetary base growth for structural shifts in velocity. Note that the SOMC rule differed from that of McCallum (1988), who proposes a monetary base growth rule that responds to deviations between actual and desired growth in nominal output, as well as to long-run shifts in velocity.

$$\ln(M^T_{t,t+2}) - \ln(M^T_{t,t+1}) = \alpha_t - .01 \tag{3}$$

$$\ln(M^T_{t,t+3}) - \ln(M^T_{t,t+2}) = \alpha_t - .02 \tag{4}$$

The sequence continues over time until the constant growth rate has been achieved:

$$\ln(M^T_{t,t+n}) - \ln(M^T_{t,t+n-1}) = \alpha \tag{5}$$

$$\ln(M^T_{t,t+n+k}) - \ln(M^T_{t,t+n+k-1}) = \alpha,\ k = 1,\ldots. \tag{6}$$

For example, this approach is reflected in the policy statement of March 1978:

> One, the rate of monetary expansion in the past year was between 7% and 7.5%. We urge that the rate be maintained at 6% in 1978.
>
> Two, we recommend reductions of 1% a year in the average rate of monetary expansion until a noninflationary rate of monetary expansion is achieved.[43]

The SOMC policy statements generally specify 4 percent as the noninflationary rate of money growth.[44] We use this value in our simulation of a model of money demand discussed later.

Two equations are necessary for a complete specification of the SOMC policy rule: (a) a definition of velocity:

$$\ln(V_t) \equiv \ln(Y_t) + \ln(P_t) - \ln(M_t); \tag{7}$$

and (b) a model of the demand for money (or the monetary base).

The SOMC documents rarely articulated an explicit demand for money.[45] However, Brunner and Meltzer (1963), Meltzer (1963), and Brunner and Meltzer (1964b) present a demand for money (or velocity) that depends on a long-term interest rate. Subsequent research found evidence of a stable money demand relationship, at least through the 1970s.[46]

The relationship between base-money velocity and a long-term nominal interest rate is shown in figure 1.1, which is adapted from Anderson and Rasche (2001). This figure shows a scatter plot of annual data on the natural log of base velocity and the inverse of the Aaa bond rate over the years 1919 through 2006. The years of the Great Depression, starting in 1931 and extending until 1940, are outliers, but otherwise the relationship is highly

43. Policy statement, Shadow Open Market Committee, March 13, 1978.

44. See, for example, the SOMC policy statements of September 6, 1974 (4 percent M1 growth); March 8, 1976 (4.5 percent M1 growth is too high for price stability); September 13, 1976 (4 percent M1 growth); September 21, 1986 (3 to 4 percent base growth); March 11, 1996 (4 percent base growth); and September 14, 1998 (4 percent base growth).

45. However, see Brunner, "Monetary Policy, Inflation and Economic Growth" (SOMC position paper, September 13, 1976).

46. See, for example, Hetzel (1984), Hoffman and Rasche (1991), or Rasche (1987).

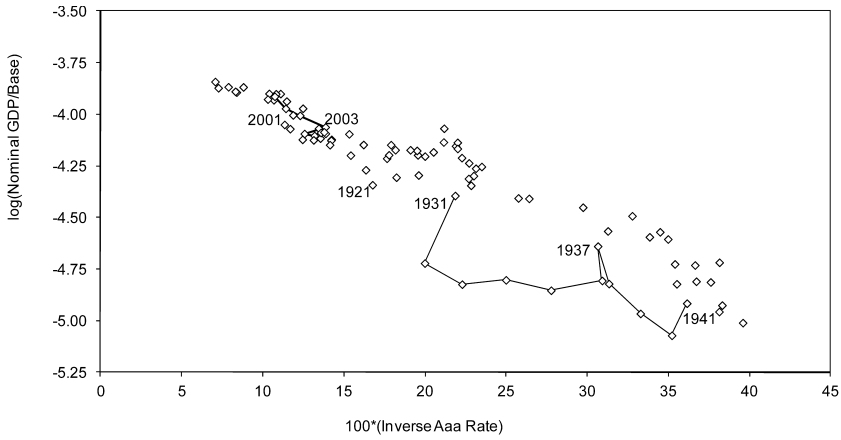

Fig. 1.1 Log base velocity and inverse Aaa bond rate, annual 1919–2006

linear. The values for the years 2000 to 2006 are also highlighted in figure 1.1. These years are after the sample that Anderson and Rasche (2001) examined. Note that the data for 2000 to 2006 fall on top of the scatter from the earlier sample. Table 1.1, reproduced from Anderson and Rasche (2001), shows the estimated values of the slope of the scatter in figure 1.1 over a sample period from 1919 through 1999. The estimated equation is also augmented with an additional variable that measures the rate of default on corporate bonds to capture the increase in risk during the Great Depression period and the flight to currency that occurred after the first wave of bank failures in 1931. The estimated slope of the relationship between the log of base velocity and the inverse of the long rate is robust across estimators and invariant to the addition of the risk variable. The lower part of the table relaxes the restriction that the income elasticity of the demand for real base money is unity. The restriction is not rejected.

Following the SOMC, and in light of the evidence from Anderson and Rasche (2001), we specify the following nonlinear demand function for base money:

$$\ln(V_t) = \zeta_1 + \zeta_2(i_t^L),^{-1} \tag{8}$$

where i_t^L is the long-term nominal interest rate.

The noninflationary rate of money growth, α, can be defined in terms of this model. If inflation is constant and expected to be constant, then, assuming that the equilibrium real rate of interest is constant, the long-term nominal interest rate is also expected to be constant. Thus, velocity is expected to be constant in this equilibrium. The noninflationary money growth rate is then the growth rate of trend output θ plus the trend inflation

Table 1.1 **Estimated linear regressions using the adjusted monetary base and the Aaa bond rate (1919–1999)**

Dependent variable: GDP velocity of the adjusted monetary base = log(GDP/adjusted monetary base)

	Coefficient estimates			
Estimation method ↓	Constant	Inverse of Aaa bond rate, times 100	Rate of new bond defaults, percent of outstanding stock	Standard error of estimate
OLS	–3.631	–0.032	—	0.144
DOLS (2 leads, 2 lags)	–3.606	–0.034	—	0.115
OLS	–3.622	–0.030	–0.0004	0.090
DOLS (1 lead, 1 lag)	–3.606	–0.031	–0.0003	0.082
FIML	—	–0.031	–0.0000[a]	

Dependent variable: Deflated adjusted monetary base = log(adjusted monetary base/GDP chain-type price index)

	Coefficient estimates				
Estimation method ↓	Constant	Real GDP (chained 1996$)	Inverse of Aaa bond rate, times 100	Rate of new bond defaults, percent of outstanding stock	Standard error of estimate
OLS	4.490	0.903	0.027	—	0.131
DOLS (2 leads, 2 lags)	3.892	0.970	0.032	—	0.091
OLS	3.452	1.019	0.031	0.0004	0.090
DOLS (1 lead, 1 lag)	3.227	1.044	0.034	0.0003	0.073
FIML	—	1.069	0.033	–0.0000[a]	

Note: OLS = ordinary least squares; DOLS = dynamic ordinary least squares; FIML = full information maximum likelihood.

[a]Coefficient estimates rounds to this value.

rate that is defined as price stability π^*. For simplicity, we assume $\pi^* = 0$. A low positive and steady trend in measured inflation could be consistent with the SOMC's position on price stability, although various SOMC policy statements explicitly advocated a target of zero inflation or a stable price level.[47] Under these conditions, the number of years expected until a return to price stability under the SOMC's rule is $n = 100^*(\alpha_t - \theta)$, and the noninflationary growth rate of money is $\alpha = \theta$.

The model of money supply and demand can be respecified in terms of deviations of money growth from the assumed trend growth of real output and in terms of an output gap. Define:

$$\ln Y_t^T \equiv \ln Y_{t-1}^T + \theta;\ \theta > 0.0$$

$$x_t \equiv \ln(Y_t) - \ln(Y_t^T)$$

$$\pi_t = \ln(P_t) - \ln(P_{t-1}).$$

Then the policy rule equations and the definition of velocity can be written in terms of deviations from trend output growth as follows:

$$(1') \quad [\ln(M_{t,t+1}^T) - \ln Y_{t+1}^T] - [\ln(M_{t-1,t}^T) - \ln Y_t^T] = m_{t,t+1}^T - m_{t-1,t}^T = \alpha_t - \theta$$

$$(2') \quad m_t = [\ln(M_t) - \ln Y_t^T] = [\ln(M_{t-1,t}^T) - \ln(Y_{t-1}^T)] - \theta + \varepsilon_t$$
$$= m_{t-1,t}^T - \theta + \varepsilon_t$$

$$(3') \quad [\ln(M_{t,t+2}^T) - \ln(Y_{t+2}^T)] - [\ln(M_{t,t+1}^T) - \ln(Y_{t+1}^T)]$$
$$= m_{t,t+2}^T - m_{t,t+1}^T = \alpha_t - \theta - .01$$

$$(4') \quad [\ln(M_{t,t+3}^T) - \ln(Y_{t+3}^T)] - [\ln(M_{t,t+2}^T) - \ln(Y_{t+2}^T)]$$
$$= m_{t,t+3}^T - m_{t,t+2}^T = \alpha_t - \theta - .02$$

The sequence continues over time until the constant growth rate has been achieved:

$$(5') \quad [\ln(M_{t,t+n}^T) - \ln(Y_{t+n}^T)] - [\ln(M_{t,t+n-1}^T) - \ln(Y_{t+n-1}^t)]$$
$$= m_{t,t+n}^T - m_{t,t+n-1}^T = \alpha - \theta = 0.0$$

$$(6') \quad [\ln(M_{t,t+n+k}^T) - \ln(Y_{t+n+k}^T)] - [\ln(M_{t,t+n+k-1}^T) - \ln(Y_{t,t+n+k-1}^T)]$$
$$= m_{t,t+n+k}^T - m_{t+n+k-1}^T = \alpha - \theta = 0.0,\ k = 1, \ldots$$

47. See SOMC policy statements of September 9, 1996; March 3, 1997; and September 14, 1998.

$$(7') \qquad \ln(V_t) \equiv [\ln(Y_t) - \ln(Y_t^T)] + \ln(P_t) - [\ln(M_t) - \ln(Y_t^T)]$$
$$= x_t + \ln P_t - m_t = x_t + \ln P_t - m_{t-1,t}^T + \theta - \varepsilon_t.$$

To complete the analysis, we embed the SOMC's policy rule and the money demand function in a model of the real economy—specifically, the New Keynesian model of Clarida, Galí, and Gertler (CGG 1999).

Investment/Savings (IS) curve (CGG, equation 2.1):

$$(9) \qquad x_t = -\varphi[i_t^S - E_t\pi_{t+1}] + E_t x_{t+1} + g_t.$$

Phillips curve (CGG, equation 2.2):

$$(10) \qquad \pi_t = \lambda x_t + \beta E_t \pi_{t+1} + u_t.$$

We augment the model with a term structure approximation from Shiller (1979):

$$(11) \qquad i_t^{L,(n)} = \frac{1-\gamma}{1-\gamma^n} \sum_{k=0}^{n-1} \gamma^k E_t(i_{t+k}^S) + \Phi_{n,t},\ 0 < \gamma < 1,$$

which for large n can be approximated as:

$$i_t^{L,(n)} \cong (1-\gamma)(1-\gamma F)^{-1} i_t^S + \Phi_n \text{ where } F^k i_t^S = E_t(i_{t+k}^S).$$

Then,

$$i_t^S \cong [1-\gamma F]\left[\left(\frac{1}{1-\gamma}\right)(i_t^L - \Phi_{n,t})\right]$$

or

$$(12) \qquad i_t^S \cong \left(\frac{1}{1-\gamma}\right)(i_t^L - \gamma E_t i_{t+1}^L) - \left(\frac{1}{1-\gamma}\right)(1-\gamma F)\Phi_{n,t}.$$

1.4 Simulation of the SOMC Policy Rule for the Great Inflation

1.4.1 Linearized Model

The only nonlinearity in the previous model is the interest elasticity of the demand for money. In the following analysis, we present a linearized version of the model, recognizing that the semielasticity of money demand (ζ_3, following) varies inversely with the nominal interest rate. We examine the sensitivity of the model to various assumptions about the value of this parameter.

We define the linear operator F such that $F^j z_t = E_t z_{t+j}$. Hence, $F^{-j} = E_t z_{t-j} = z_{t-j} = L^j z_t$. With this notation the five equations (1), (7′), (9), (10), and (11) can be written as

$$\begin{bmatrix} \ln V_t - \zeta_3 i_t^L \\ \ln V_t - x_t - \ln P_t \\ x_t + \phi i_t^s - \phi F \pi_t - F x_t \\ \pi_t - \lambda x_t - \beta F \pi_t \\ i_t^s - (1-\gamma)^{-1} i_t^L + \gamma(1-\gamma)^{-1} F i_t^L \\ \ln P_t - \ln P_{t-1} - \pi_t \end{bmatrix} = \begin{bmatrix} \zeta_1 + \eta_t \\ -m_t \\ g_t \\ u_t \\ (1-\gamma)^{-1}(1-\gamma F)\Phi_t \\ 0 \end{bmatrix}.$$

Equations (1) and (7′) can be used to eliminate $\ln V_t$ from the model; equations (11) and (9) can be used to eliminate i_t^s, and the definition of inflation to eliminate π_t, leaving a three-equation model:

$$\begin{bmatrix} 1.0 & 1.0 & -\zeta_3 \\ 1-F & \phi(1-F) & \phi(1-\gamma)^{-1}(1-\gamma F) \\ -\lambda & [-F^{-1} + (1+\beta) - \beta F] & 0 \end{bmatrix}$$

$$\begin{bmatrix} x_t \\ \ln P_t \\ i_t^L \end{bmatrix} = \begin{bmatrix} m_t + \zeta_1 + \eta_t \\ g_t + (1-\gamma)^{-1}(1-\gamma F)\Phi_t \\ u_t \end{bmatrix}$$

or

$$A(F) * Y_t = X_t.$$

Define the determinantal polynomial of $A(F)$ as $\det A(F)$ and the adjoint polynomial matrix of $A(F)$ as $\text{adj}A(F)$. Then $\det A(F)\, Y_t = \text{adj}A(F) X_t$. The determinant of $A(F)$ is

$$det[A(F)] = -\lambda\phi(1-\gamma)^{-1}(1-\gamma F) + \phi(1-\gamma)^{-1}(1-\gamma F)[F^{-1} - (1+\beta) + \beta F] + \zeta_3(1-F)[F^{-1} - (1+\beta) + \beta F] - \lambda\zeta_3\phi(1-F)$$

and the adjoint matrix of $A(F)$ is:

$$\begin{bmatrix} \phi(1-\gamma)^{-1}(1-\gamma F)[F^{-1} - (1+\beta) + F] & \zeta_3[F^{-1} - (1+\beta) + F] & \phi[(1-\gamma)^{-1}(1-\gamma F) + \zeta_3(1-F)] \\ -\lambda\phi(1-\gamma)^{-1}(1-\gamma F) & -\lambda\zeta_3 & -\phi(1-\gamma)^{-1}(1-\gamma F) - \zeta_3(1-F) \\ -(1-F)[F^{-1} - (1+\beta) + \beta F] + \phi\lambda(1-F) & [F^{-1} - (1+\beta) + F] - \lambda & -(1-\phi)(1-F) \end{bmatrix}.$$

However, $[F^{-1} - (1+\beta) + \beta F] = -(1-L)(1-\beta F)$, which when substituted into the adjoint matrix gives:

$$\begin{bmatrix} -\phi(1-\gamma)^{-1}(1-\gamma F)(1-\beta F)(1-L) & -\zeta_3(1-\beta F)(1-L) & \phi[(1-\gamma)^{-1}(1-\gamma F) + \zeta_3(1-F)] \\ -\lambda\phi(1-\gamma)^{-1}(1-\gamma F) & -\lambda\zeta_3 & -\phi(1-\gamma)^{-1}(1-\gamma F) - \zeta_3(1-F) \\ (1-F)(1-\beta F)(1-L) + \phi\lambda(1-F) & -(1-\beta F)(1-L) - \lambda & -(1-\phi)(1-F) \end{bmatrix}.$$

1.4.2 Deterministic Steady State (F = L = 1)

The value of the determinant in the steady state is $-\lambda\phi$, and the value of the steady-state adjoint matrix is

$$\begin{bmatrix} 0 & 0 & -\lambda \\ 1 & \zeta_3\phi^{-1} & 0 \\ 0 & \phi^{-1} & 0 \end{bmatrix}.$$

Hence, the steady-state solution of the model is independent of γ, and the only steady-state impact that is affected by ζ_3 is that of the price level in response to a real interest rate shock, g_t. From one steady state to another, the price level varies one-to-one with the money stock. Across steady-state equilibria with a nonzero growth of money, both the nominal interest rate and the inflation rate vary one-to-one with the growth rate of the money stock. Hence, the Fisher effect holds across steady states.

Across steady states with nonzero money growth, the only effect that depends on the value of β is the response of real output to the change in money growth. Beginning in 1968, monetarists consistently assumed that the long-run Phillips curve is vertical (see, e.g., Friedman 1968; Andersen and Carlson 1970; Poole 1978; Brunner and Meltzer 1976, 1993; and Mayer 1978), which, as noted previously, has become a standard feature of mainstream macroeconomic models. Hence we assume $\beta = 1.0$, with the result that the steady-state impact of money growth on real output is zero.

1.4.3 Dynamics

We need to calibrate the four remaining parameters to investigate the dynamics of the model. We chose a range of values for ζ_3 corresponding to a nominal interest rate from 14 percent to 8 percent and assume $\zeta_2 = -0.032$, consistent with the estimates reported in table 1.1.[48] We set $\gamma = 0.94$ following Shiller (1979, table 1, 1206), and we use estimates of $\phi = 0.125$ and $\lambda = 0.025$, consistent with typical values found in the literature adjusted to a model calibrated to annual data.[49] With these assumptions, we compute the roots of the determinantal polynomial of $A(F)$, which are the primary drivers of the dynamics of the model. These roots are shown in table 1.2.

For the parameter values that we have chosen, the polynomial always has one real root that lies within the unit circle and two roots that lie outside the unit circle. At high nominal interest rates (> 10 percent) the latter two roots are real. At lower nominal rates these roots are complex. However, when

48. The Aaa corporate rate in 1981 was 14.17 percent. By 1986 this rate had fallen to 7.78 percent.

49. We thank, without implicating, Ed Nelson for helpful suggestions on values for these parameters.

Table 1.2 Polynomial roots and parameter values for linearized model

Determinantal polynomial:

$$\det[A(F)] = \lambda\phi(1-\gamma)^{-1}(1-\gamma F) + \phi(1-\gamma)^{-1}(1-\gamma F)[(1-L)(1-\beta F)] - \zeta_3(1-F)[(1-L)(1-\beta F)] - \lambda\zeta_3\phi(1-F)$$

or:

$$\det[A(F)] = -\beta(\phi\gamma/(1-\lambda) + \zeta_3)r_2r_3F^{-1}[(F-r_1)(1-r_2^{-1}F)(1-r_3^{-1}F)]$$

	Polynomial roots			Parameter values				
Nominal rate	$r(1)$	$r(2)*r(3)$	Omega	Beta	Lambda	Phi	Gamma	Zeta
0.14	0.876688	1.180727	0.000000	1.00	0.025	0.125	0.94	1.60
0.13	0.879409	1.174064	0.000000	1.00	0.025	0.125	0.94	1.89
0.12	0.882195	1.167449	0.000000	1.00	0.025	0.125	0.94	2.22
0.11	0.885345	1.160207	0.000000	1.00	0.025	0.125	0.94	2.64
0.10	0.888993	1.152117	0.008305	1.00	0.025	0.125	0.94	3.20
0.09	0.893114	1.143369	0.011773	1.00	0.025	0.125	0.94	3.95
0.08	0.897810	1.133831	0.013491	1.00	0.025	0.125	0.94	5.00

expressed in polar coordinates, the polar angle of the complex roots (θ in table 1.2) is always close to zero.[50]

The determinantal polynomial can be written in terms of its roots as

$$\det A(F) = -\beta\left(\frac{\phi\gamma}{(1-\lambda)} + \zeta_3\right)r_2r_3F^{-1}(F-r_1)(1-r_2^{-1}F)(1-r_3^{-1}F). \tag{14}$$

Assume that r_2 and r_3 are outside the unit circle and define the invertible polynomial

$$R(F) = -\beta\left(\frac{\phi\gamma}{(1-\gamma)} + \zeta_3\right)r_2r_3(1-r_2^{-1}F)(1-r_3^{-1}F), \tag{15}$$

so

$$\det A(F) = F^{-1}(F-r_1)R(F). \tag{16}$$

Since $F^{-1}(F-r_1) = (1-r_1F^{-1}) = (1-r_1L)$, the model can be rewritten as

$$(1-r_1L)\,Y_t = R^{-1}(F) * \mathrm{Adj}[A(F)]X_t = B(F)X_t.^{51} \tag{17}$$

The elements of the first column of $B(F)$ (coefficients of the current and expected future money stock) for the parameter values in table 1.2 are shown in figures 1.2 through 1.4. The low-order polynomial coefficients

50. We computed the roots of this polynomial assuming values of β in the range of [0.96, 1.0], λ in the range of [0.005, 0.045], ϕ in the range of [0.075, 0.145], γ in the range of [0.92, 0.98], and ζ_3 corresponding to nominal interest rates in the range of [0.08, 0.14]. In all cases, we found one real root less than unity. The other two roots were sometimes complex, but in all cases were outside the unit circle.

51. Expressions for $R(F)^{-1}$ are shown in appendix B.

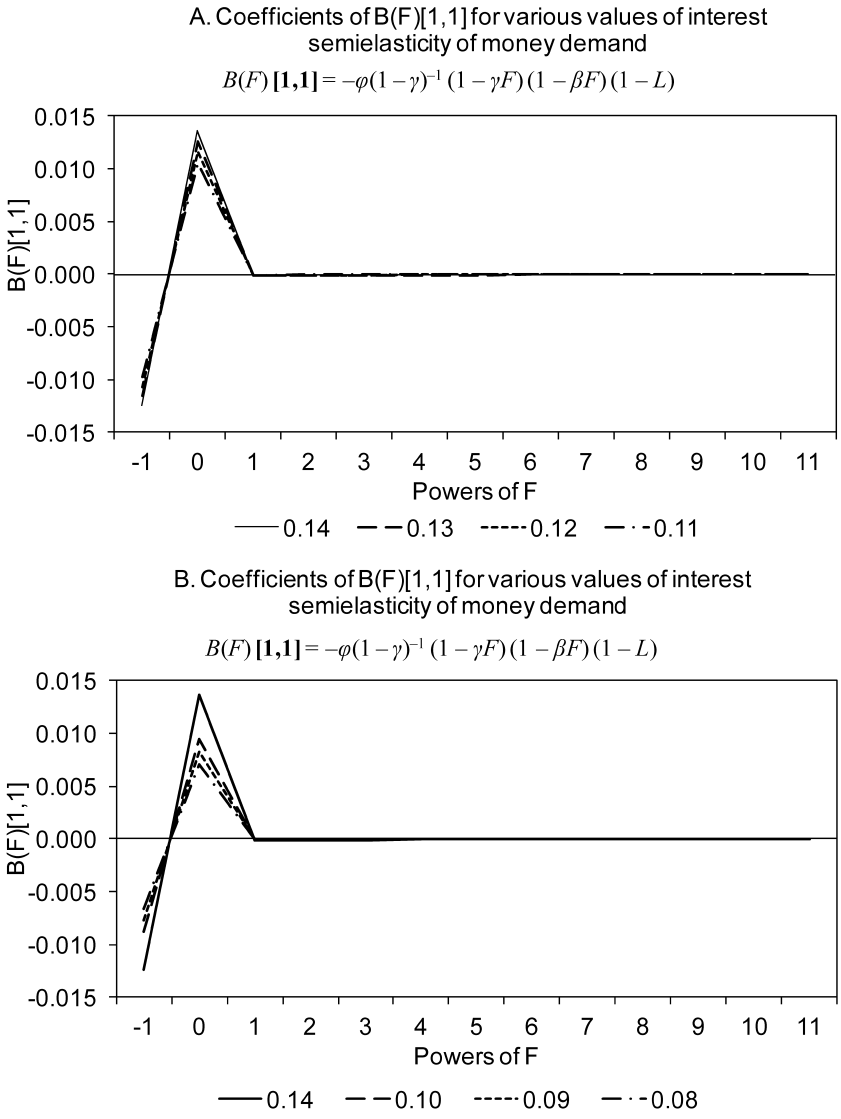

Fig. 1.2 Moving average coefficients for the response of output in a model that includes the SOMC policy rule

for the response of output and the long-term nominal interest rate are moderately sensitive to the level of the nominal interest rate around which the model is linearized, but the sensitivity of the higher-order coefficients in these polynomials disappears as the coefficients rapidly approach zero. The polynomial coefficients in the response of the price level die off much more slowly than those for output and the long-term nominal rate and

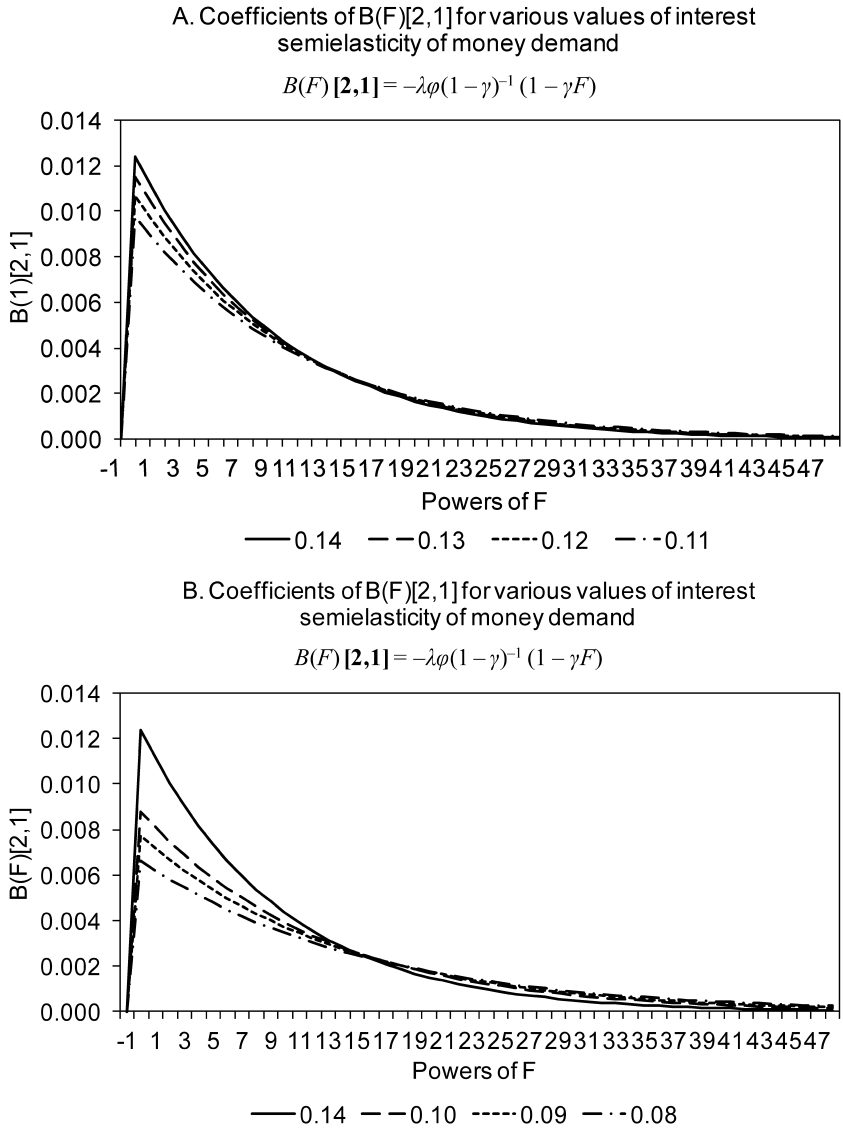

Fig. 1.3 Moving average coefficients for the response of the price level in a model that includes the SOMC policy rule

the low-order coefficients show considerable sensitivity to the level of the nominal interest rate around which the model is linearized. Consequently, we simulate the model with different assumptions about the value of ζ_3 corresponding to different assumed levels for the long-term nominal interest rate.

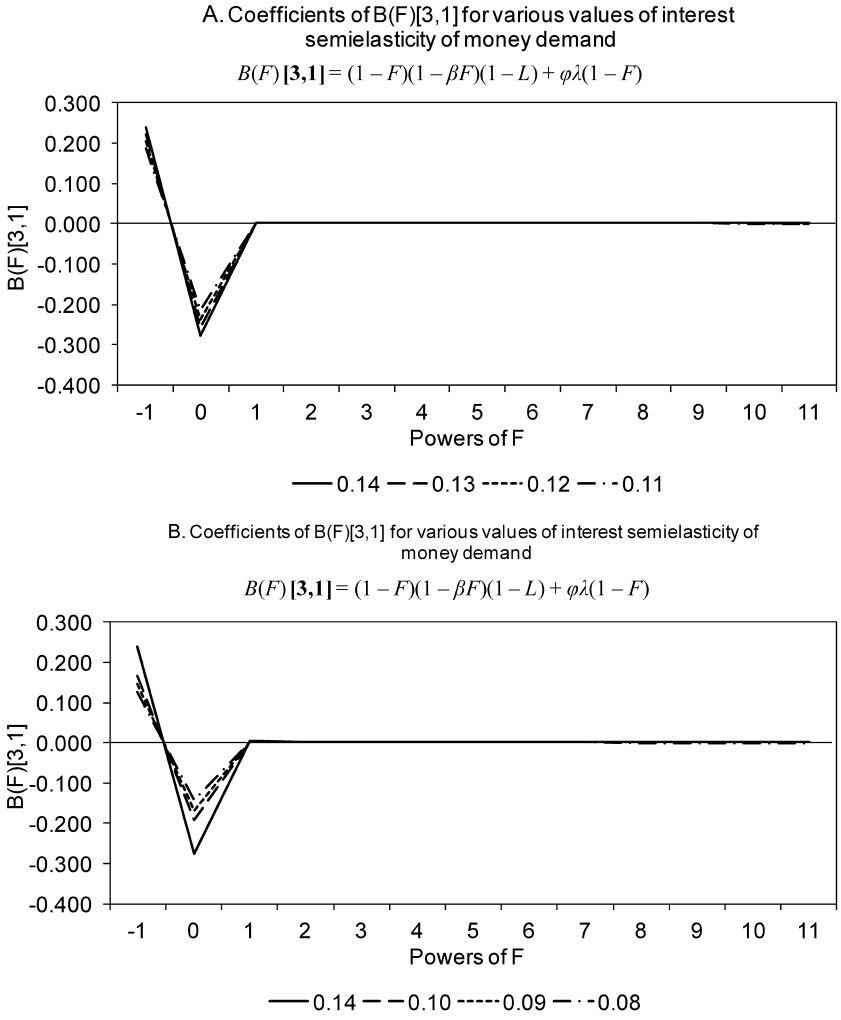

Fig. 1.4 Moving average coefficients for the response of the long-term interest rate in a model that includes the SOMC policy rule

1.4.4 Policy Experiments

Clearly, if money demand is stable, prices and wages are flexible, and supply shocks are limited, then a monetary growth rule like that advocated by the SOMC would yield superior inflation control with less output variability than the "stop-go" policies actually pursued by the Fed during the 1970s. Monetary policy can affect real output in the short-run in the modern New Keynesian model, such as CGG (1999) and some other models with nominal rigidities. We compare two policy rules for money stock growth in

the previously specified model. The first experiment is the gradualist monetarist proposal of the SOMC. We assume the economy is initially in a steady state with an expected constant nominal money growth rate of 10 percent. This translates into a nominal interest rate of 14 percent, since we assume a 4 percent equilibrium real interest rate. At some point in time after expectations of future money growth, output, and inflation have been set, the monetary authority surprises private agents by implementing an immediate 1 percentage point reduction in the money growth rate and announcing that money growth will be reduced by an additional 1 percentage point in each subsequent year until the growth rate reaches 4 percent. We assume that the policy announcement is fully credible so that agents adjust their expectations in future periods accordingly. The only policy shock occurs in the first period.[52]

The second policy experiment is a onetime "cold turkey" adjustment of money stock growth. We again assume that the economy is initially in a steady-state equilibrium with a constant nominal money growth rate of 10 percent. In this case, the monetary authority surprises agents by implementing a onetime 6 percentage point reduction in money growth and announcing that the money growth rate will be maintained at the new value. Again, the announcement is assumed to be fully credible so that agents adjust their expectations in future periods accordingly.

Figure 1.5 shows the response of the model economy to the gradualist experiment. With expectations set for future periods, the economy moves along a very flat short-run Phillips curve. The inflation rate is almost unchanged in the first period, while real output falls sharply. As a result, real money balances fall (inflation is higher than money growth) and the long- and short-term nominal rates increase slightly. In subsequent periods, the continued reduction in the growth rate of the nominal money stock is fully anticipated, so the inflation rate falls in advance of the decline in money growth, as does future expected inflation, and real balances rise. With the sharp decline in near-term expected inflation, the short-run Phillips curve shifts down and output rises above the steady-state level. The long-term and short-term nominal interest rates fall, but the short-term nominal rate falls more precipitously. Adjustment to full equilibrium takes time because of the autoregressive structure built into the model.

The assumed credibility of the monetary policymaker's commitment to the announced policy is obviously a key determinant of the adjustment paths traced by our simulations, as is our assumption of rational expectations. The time path of the economy after the initial policy surprise depends on the announcement being accepted at face value and expectations being

52. If the policy announcement occurred before agents set their expectations, there would not be any policy surprise, output would be unaffected, and inflation would fall in advance of the expected future reductions in money growth.

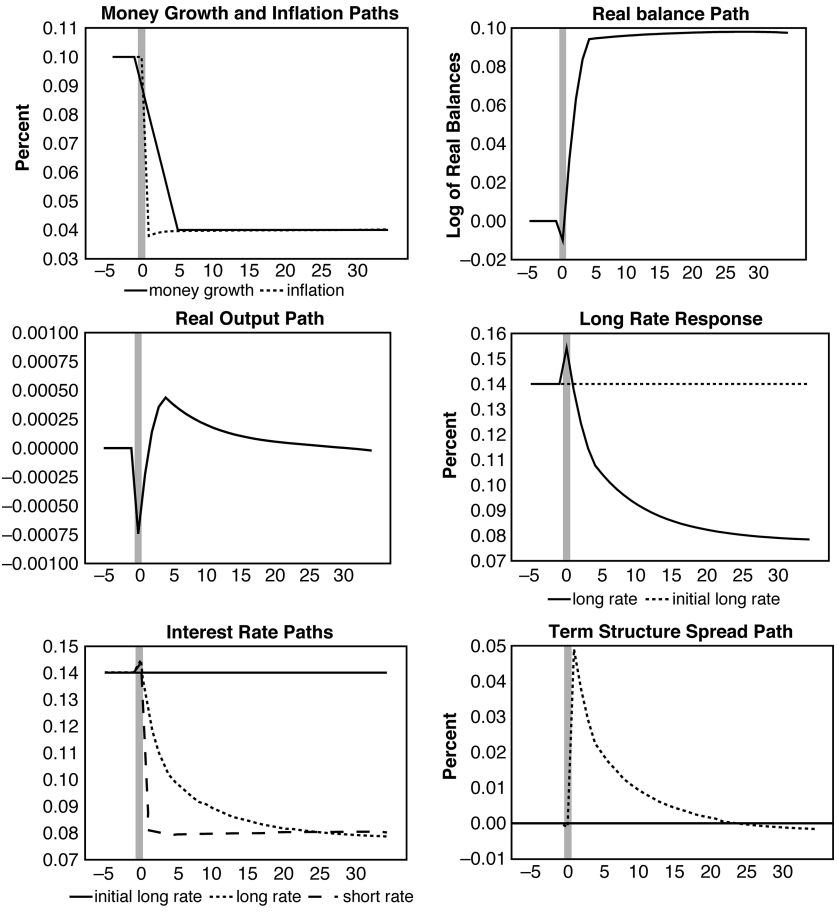

Fig. 1.5 Gradualist (SOMC) 6 percent reduction in money growth

adjusted accordingly.[53] The SOMC frequently stressed that the impact of a disinflationary policy depends crucially on the transparency and credibility of the change in policy. For example, Brunner and Meltzer (1993, 75) note

> In our analysis, if the policy of monetary control is credible, control errors are perceived as transitory deviations, so they are absorbed by changes in

53. Ball (1994) analyzes a model with staggered price setting and a credible disinflation. He finds that a gradual disinflation can produce a "boom," defined as "an output path that rises above the natural rate temporarily and never falls below the natural rate" (286). Ball's model differs from the one used here in that his demand for real balances is not interest sensitive (his equation [2]), and the path of the money stock is perfectly perceived at all points in time (he assumes that the announcement of the disinflation is made at $t = 0$), and that "the expectations operator can be dropped for all $t \geq 0$, because firms have perfect foresight after the Fed's announcement" (286).

> interest rates at the shortest end of the yield curve. . . . The consequences differ, of course, if monetary control policies lack sufficient credibility. Control errors, particularly those exhibiting serial correlation, are interpreted partly as permanent changes.

Clearly the Fed did not have much credibility when it announced a disinflationary policy in late 1979, and the trajectory of the economy in the early 1980s was significantly different from that simulated here. As Brunner and Meltzer (1993, 75) argue, "Experience in the United States from 1979 to 1982 is an example of the increase in uncertainty that can result from inappropriate control procedures and operations that lack credibility."[54]

Figure 1.6 shows the reaction of the model economy to the alternative policy of an immediate reduction in money growth from 10 percent to 4 percent with a credible announcement that it will be maintained at that rate henceforth. Again, inflation falls little at first in response to the surprise reduction in money growth as the economy moves along a flat short-run Phillips curve. The reduction in real balances is much larger, however, because the instantaneous reduction in nominal money growth is much larger than in the gradualist case (6 percent vs. 1 percent). The increase in the long-term nominal interest rate is also much larger. In the subsequent period, assuming that the pledge to maintain nominal money growth at the lower rate is fully credible, inflation adjusts and overshoots the new steady-state rate, real balances increase, long-term and short-term nominal interest rates fall, and output begins a gradual increase back to the new steady-state equilibrium. During this adjustment period the inflation rate approaches the steady-state rate from below, real balances continue to rise, and the long-term nominal interest rate gradually declines to the equilibrium level.

In sum, the transition to the steady state implied by a large, onetime reduction in money stock growth involves a larger decline in output growth, and more variability in inflation and output growth, than that implied by a gradual reduction in money stock growth. Although our model is highly stylized, our simulations favor the gradualist approach advocated by the SOMC over more abrupt changes in policy.[55]

1.4.5 Analysis of Sensitivity to Linearization

The abovementioned results were derived by linearization of the money demand function at a long-term nominal interest rate of 14 percent. It is

54. Taylor (1993, 207) argues similarly: "In the period after a new policy rule has been put in place, people are unlikely either to know about or understand the new policy or to believe that policymakers are serious about maintaining it. . . . Because expectations only gradually converge during this transition period, the impact of the policy rule on the economy may be quite different than projected by an analysis that assumes rational expectations."

55. Taylor (1993) notes that the presence of natural rigidities, such as long-term wage commitments, can prevent the public from changing behavior instantly in response to a change in monetary policy, which suggests further that transitions to a new policy rule should be gradual and announced publicly.

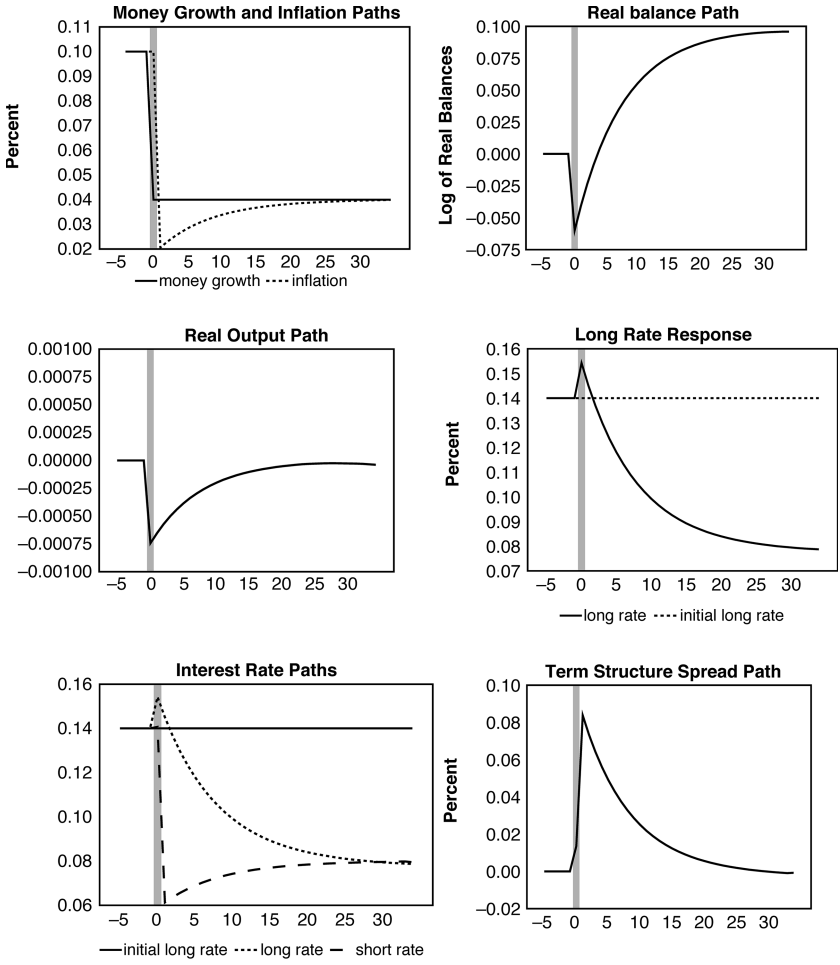

Fig. 1.6 6 percent "cold turkey" reduction in money growth

clear from figure 1.2, panel A, and figure 1.3 that the coefficients on future expected money growth vary somewhat with the assumed value of the interest rate (particularly the coefficients in the price equation). The values of the autoregression coefficient in table 1.2 ($r(1)$) also are somewhat larger, the lower the value of the nominal rate assumed for linearization. The responses of real output growth, the long-term nominal interest rate, and inflation are shown in figure 1.7 for two experiments: the "cold turkey" immediate reduction of money growth by 6 percent and the monetarist gradual reduction of 1 percent per year for linearization of the model at 14 and 11 percent nominal rates. Qualitatively the results are the same regardless which interest rate value we use (no surprise given the coefficient values in figure 1.2, panel A, and figure 1.3) and quantitatively the results

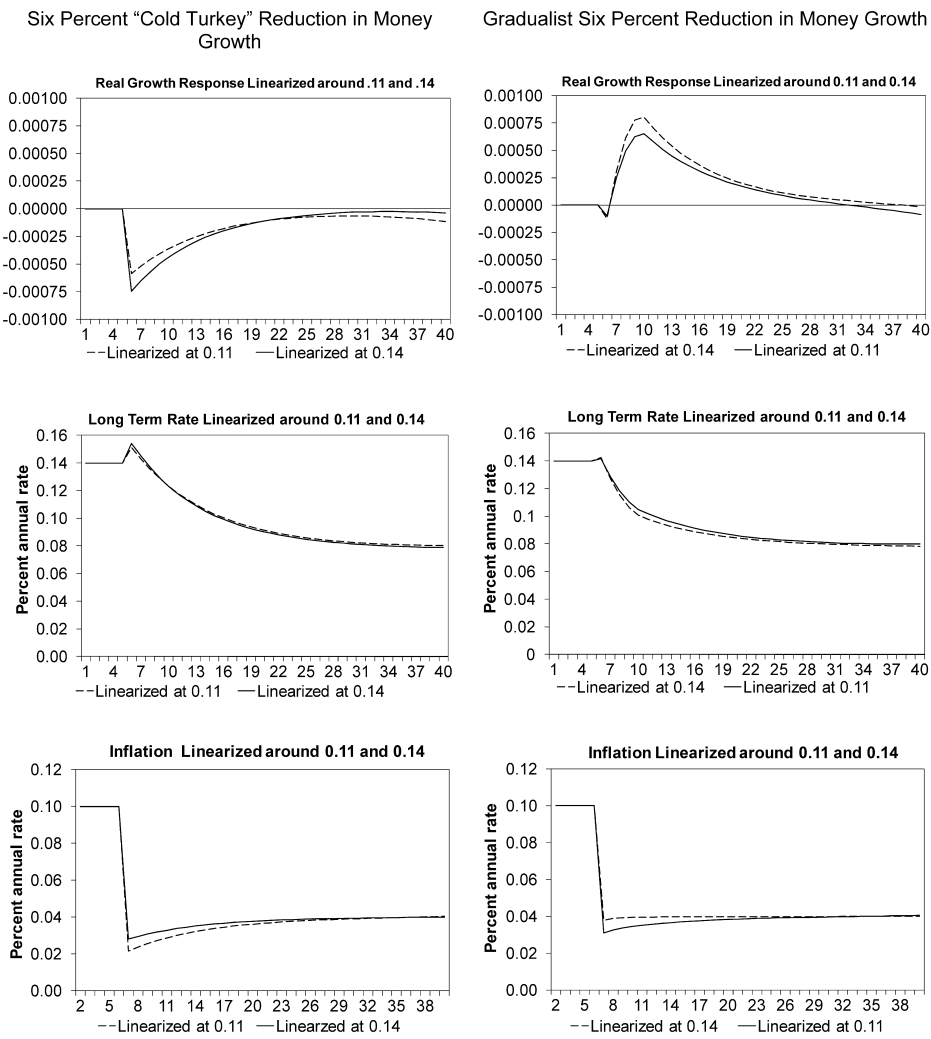

Fig. 1.7 Sensitivity of responses to linearization of model

in each experiment are quite robust to the change in the slope coefficient in the money demand function. With a lower assumed value of the nominal interest rate, the peak output response in each experiment is somewhat smaller in both experiments, but the timing of the peak and the speed of return to equilibrium are virtually the same. The price level responses are somewhat larger when the lower interest rate is used, but again the timing of the peak response is the same. The return to equilibrium is somewhat faster when we use the lower interest rate value for linearization, particularly in the gradualist experiment.

1.4.6 Shocks to a Money Growth Path: Base Drift or No Base Drift

Our final experiment considers the impact of an unexpected deviation from the target money growth path that (a) is perfectly foreseen to return to the target path in future periods (the no-base-drift case), or (b) is perfectly foreseen to remain for all future periods (the base-drift case). As noted previously, the SOMC criticized the Fed's practice of engaging in base drift, which it considered one tactic the Fed used to evade Congress's desire for better control of the monetary aggregates.

The response to the no-base-drift rule is shown in figure 1.8. The money growth rate decreases to 4 percent in the period of the unexpected shock and then jumps to 16 percent in the following period to return the money stock to the target path. Real output falls by a small amount in response to the unexpected shortfall from the target money path and quickly reverts to equilibrium with a small overshoot. That pattern is reflected in the deviation of the long-term rate from its equilibrium value. The inflation rate is virtually unaffected by this shock (again, the short-run Phillips curve in the model is flat), and so the transitory deviation of money from the target path is almost perfectly reflected in the deviation of real balances from an unchanged equilibrium value.

In the base-drift experiment (figure 1.9), money growth is reduced by 6 percent for one period but then returns to its assumed equilibrium value of 10 percent, although the money stock remains at 1 percent below the original target growth path. The initial response of inflation to the unexpected shortfall in money is very small, but once the future shortfall in money is foreseen, the inflation rate falls and only gradually returns to the equilibrium value of 10 percent. The persistence of inflation below the equilibrium value and below the maintained growth rate of the nominal money stock is required to restore the value of real balances to the unchanged equilibrium value. Again, the initial impact of the unexpected shortfall in the money stock is to reduce real output below its equilibrium value and increase the long-term nominal rate above its equilibrium value. Both of these variables return to their equilibrium values only gradually, given the slow autoregressive process inherent in the structure of the model.

A final experiment (figure 1.10), allows a persistent but not permanent deviation of the level of the money stock from the 10 percent growth path (the shock to the money stock is assumed to decay at a rate of 50 percent per period). The growth rate of the money stock decreases in the period of the shock, then increases to 13 percent in the following period (deviates from 10 percent by one-half of the deviation in the no-base-drift case), and then declines gradually to 10 percent. The deviations of real output and the long-term nominal interest rate from their equilibrium values are quite similar to the deviations in the no-base-drift case and do not show the persistence noted in the base-drift experiment. Initially inflation is barely affected,

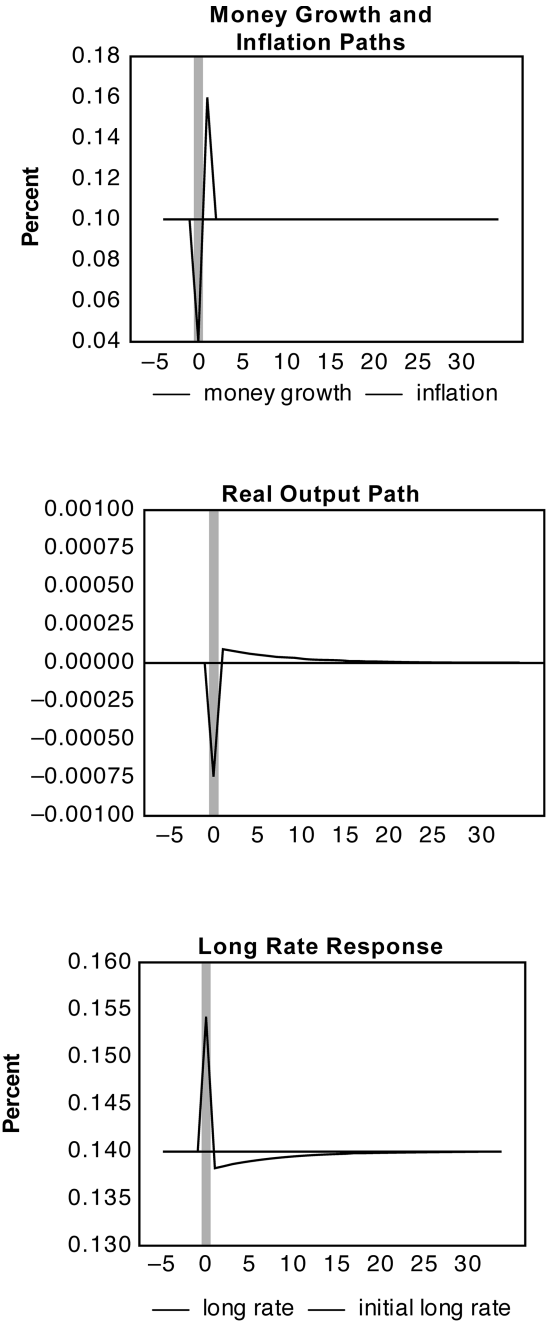

Fig. 1.8 Response to a transitory deviation from target money growth path (no base drift)

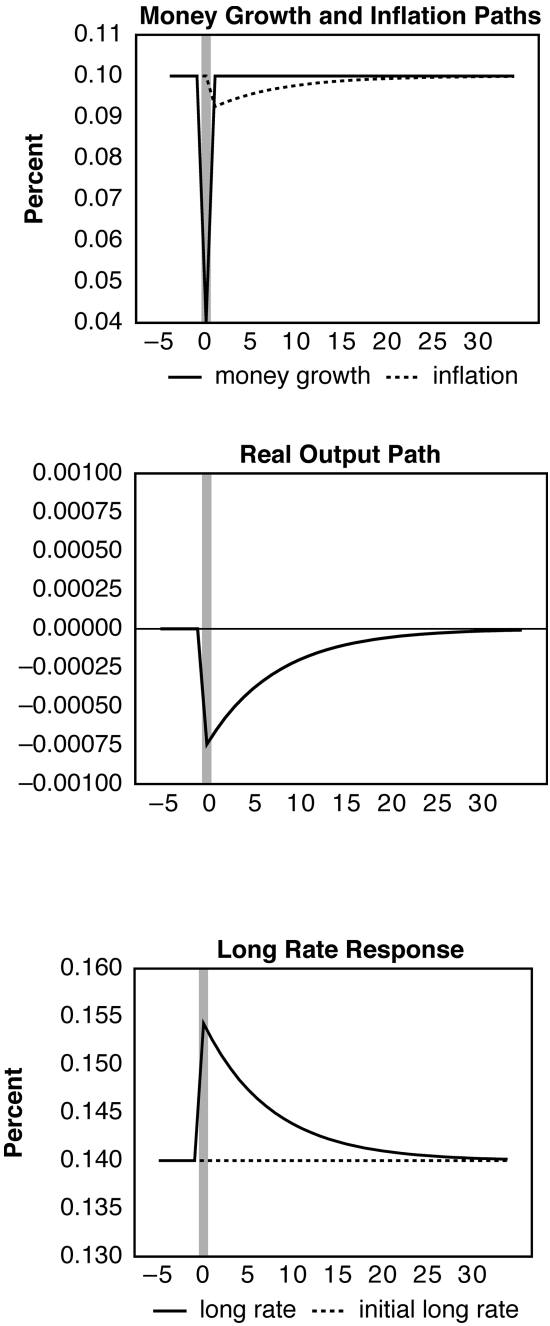

Fig. 1.9 Response to a permanent change in the level of the money stock (base drift)

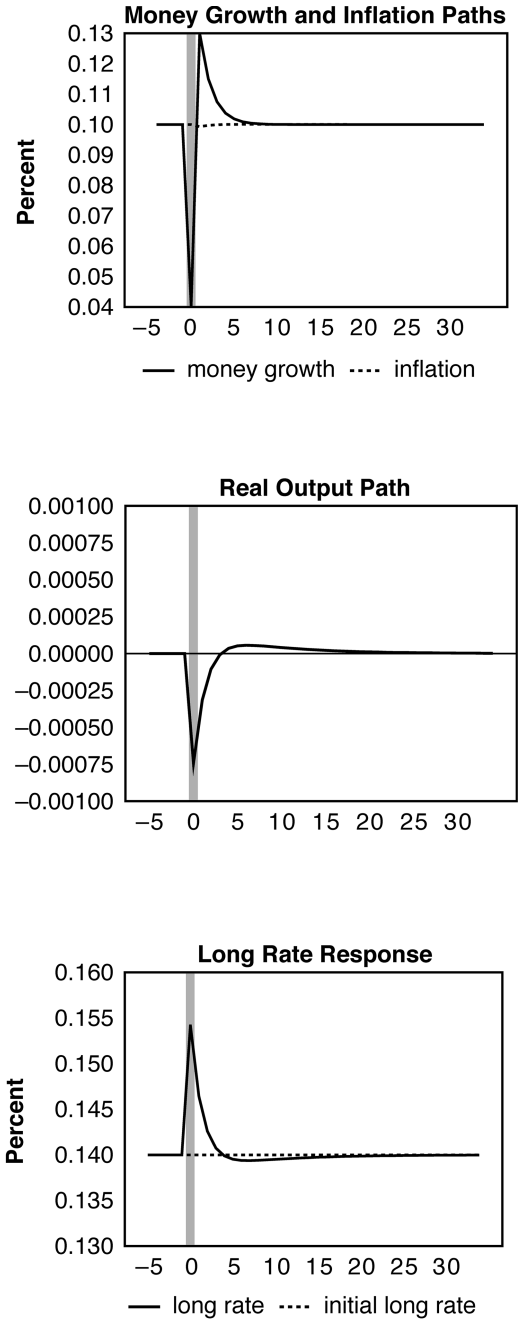

Fig. 1.10 Response to a persistent change in the level of the money stock (base drift decays at 50 percent per period)

although it falls below the equilibrium 10 percent rate once the persistence of the shortfall of the money stock is anticipated. Thus, our simulations indicate that base drift is relatively costly in terms of increased variability of output, at least in the context of the present model.

1.5 Conclusion

From its creation in 1973, the Shadow Open Market Committee was highly critical of Federal Reserve policy. Throughout the Great Inflation period, the SOMC consistently pushed for a gradual reduction in money stock growth to control inflation, and then a policy of fixing monetary growth at a level consistent with price stability. The views expressed by SOMC members reflected their acceptance of the natural rate hypothesis; the value of transparent, credible, rules-based policies; and the notion that, in the long run, inflation is determined solely by monetary policy. Such views were not widely held within the Federal Reserve System at the time and were just beginning to gain wide acceptance among academic economists.

Our evaluation of the SOMC policy rule in the context of the New Keynesian model of Clarida, Galí, and Gertler (1999) suggests that the gradual reduction in money growth advocated by the SOMC would have lowered inflation with less impact on output growth and less inflation and output variability than a large onetime reduction in money growth. However, our simulations are based on the extreme assumption that the adoption of a disinflation path for monetary growth is fully credible, as well as the assumption that expectations are forward-looking. As the SOMC stressed, the impact of a disinflationary monetary policy on the real economy depends crucially on the transparency and credibility of the change in policy. After some fifteen years of "stop-go" policy, the Fed had little credibility remaining. With that history, the public may have interpreted a large, one-shot cut in monetary growth (similar to what the Fed actually did in October 1979) as just another "stop" before the next "go." By contrast, the implementation of a gradual reduction in monetary growth (with no base drift) may have been perceived increasingly over time as reflecting a change to a stable price regime, and thus less costly in terms of foregone output than a "cold turkey" disinflation. Of course, without additional research, this is simply conjecture.

Regardless whether a gradual reduction in monetary growth would have resulted in a smaller reduction in output than a large onetime reduction, we are convinced that the policy rule advocated by the SOMC would have generated lower inflation, with less foregone output, than the policies actually implemented by the Federal Reserve during the Great Inflation. The SOMC articulated a policy based on a modern, well-thought-out economic model. We conclude that the Shadow did, in fact, know better than the Fed.

Appendix A
SOMC Policy Recommendations

September 14, 1973

"A policy of gradually reducing inflation can be initiated by lowering the average growth rate of money to 5 1/2% for the next six months. In March, a further reduction in the growth rate may be appropriate. The amount of additional reduction will depend on the economic conditions prevailing in March and expected to prevail thereafter."[56]

March 8, 1974

"During the first half of 1973, the rate of monetary growth was moderated somewhat to a 7.4% annual rate, and in the second half, the rate was reduced further to approximately 5%. We recommend that a growth rate of 5% to 5.5% be maintained for the coming six months."

September 6, 1974

"For the next six months the Committee recommends the objective of a 5 to 5 1/2% annual increase in money. It should be the goal of the Federal Reserve to attain that growth rate and reduce variability. This is the same short-term monetary policy that we recommended last March. A rate of growth of 5 to 5 1/2% would be appropriate as a step toward further reduction to an ultimate non-inflationary rate of about 4% a year."

March 7, 1975

"We renew the recommendation made at our September meeting that the growth rate of money be held at 5 1/2 percent. However growth should not start at that rate from the current low level. We recommend that the money stock be brought to a level it would have reached in March 1975, if our policy had been followed. A one-time increase in money—currency and demand deposits—to $290 billion should be announced and provided by April 15. This increase would put the money growth back on the path leading the economy toward full employment at lower rates of inflation than in recent years."

September 12, 1975

"Starting from the level of the money stock in August 1975, the Federal Reserve should maintain the growth rate of money at a steady 5.5 percent annual rate, so that the level in the first quarter of 1976 totals $304 billion. Such a growth rate will be adequate to support recovery but with a lower rate of inflation than more expansionary policy will produce."

56. All quotes in this appendix are from meetings of the SOMC.

March 8, 1976

"The Committee recommends that the Federal Reserve maintain a 4.5% growth rate from March 1976 onward. This growth rate should start from a base of $300 billion in March 1976 or a first-quarter average of 297.5 billion. Such a rate would mean that the money stock would rise to $304 billion by the third quarter of 1976 and $311 billion by the first quarter of 1977. A 4.5 percent rate is below the rate we recommended in March and September 1975 but above the recent rate of monetary expansion. It essentially extends the annual average rate the Federal Reserve produced for 1975. The rate of monetary expansion for the near future that we recommend is above the long-term rate consistent with zero inflation. Further reductions will be required as the economy recovers and uses resources more fully."

September 13, 1976

"The Committee concluded that the policy of gradually reducing the growth rate of the stock of money should be continued. A 4 percent annual rate of growth of money—currency and demand deposits—was recommended as appropriate policy for the next six months. A 4 percent rate of monetary growth would bring the stock of money to an average of $310 billion in the first quarter of 1977 and an average of $316 billion in the third quarter of 1977. Most importantly, 4 percent monetary growth would move the rate of monetary expansion closer to the range that permits sustained economic expansion without inflation."

March 7, 1977

"The Committee recommends that the growth rate of money—currency and demand deposits—be held in the range of 4 to 4 1/2% for the next year. A 4 to 4 1/2% rate of monetary growth would bring the stock of money to approximately $320 billion in the third quarter 1997 and to $326 billion in the first quarter 1978. These projections are made from the average $313 billion that would have prevailed in the first quarter 1977 if our previous recommendations had been followed. Currently, we anticipate an average money stock of $315 billion for the first quarter, so the policy requires the Federal Reserve to offset the recent surge in money and then maintain a less inflationary policy."

September 19, 1977

"[T]he Shadow Open Market Committee recommends that the summer bulge in money be removed by reducing the current level of the money stock by $4 billion, the reduction accompanied by an announcement that the step has been undertaken to return the money stock to the level it would have reached if the most recent error in monetary policy had not occurred.

Subsequent to the correction, money growth should resume at a constant annual rate of 4 1/2%."

March 13, 1978

"One, the rate of monetary expansion in the past year was between 7% and 7.5%. We urge that the rate be maintained at 6% in 1978.

Two, we recommend reductions of 1% a year in the average rate of monetary expansion until a noninflationary rate of monetary expansion is achieved."

September 11, 1978

"One, the rate of monetary expansion in the past year has been 7.75%. We urge that the rate be reduced to an annual rate of 6% over the next year. The stock of M-1—currency and demand deposits—will average $376 billion in the third quarter of 1979 if the 6% growth rate is attained.

Two, we recommend reduction in the average rate of monetary expansion by 1% a year until a noninflationary rate of monetary expansion is achieved."

March 12, 1979

"Two, the growth of the monetary base should be 8% for the year ending in August 1979. This is consistent with the recommendation of this Committee at our meeting in September 1978, when we selected the monetary base, as published by the Federal Reserve Bank of St. Louis, as the most reliable measure of monetary growth currently available in this period of uncertainty about the interpretation of growth rates of monetary aggregates. . . .

Three, we have urged repeatedly that the Federal Reserve adopt a five-year program to end inflation by reducing the growth rate of the monetary base by 1% a year for the next five years."

September 17, 1979

"To restore stability to the economy and permanently reduce inflation, the growth rate of the monetary base should now be reduced to an annual rate of 7% for the year ending August 1980."

February 4, 1980

"The SOMC favors an immediate return to the 6% growth rate for base money that was achieved in the first and second quarters of 1979. A 6% average rate of growth of the base in each quarter of 1980 will continue the policy we advocated at our September 1979 meeting. Base money by the end of the fourth quarter of 1980 will reach $162 billion if our recommendation is followed. The proposed policy is likely to be accompanied by a mild recession in 1980 and a slight reduction in the rate of inflation.

Large, permanent reductions in the rate of inflation can be achieved in

1981 and beyond only if there are further reductions in the growth rate of the base. We recommend reductions of one percentage point in 1981 and 1982, so the level of the base will reach $170 billion at the end of 1981 and $177 billion at the end of 1982."

September 22, 1980

"We favor an immediate end to the highly inflationary monetary policy of the past three to four months. We state our objectives in terms of the growth rate of the monetary base pending the prospective institutional change affecting the growth rates of other monetary aggregates. We urge the Federal Reserve to return the monetary base to the 6% growth rate reached in the second quarter of 1980 and to reduce the growth of the base to 5% in 1981 and to 4% in 1982."

March 16, 1981

"For 1981, we favor a 6% rate of increase in the monetary base, as computed by the Federal Reserve Bank of St. Louis. Current institutional changes have less effect on the growth of the base than on most other aggregates, so we continue to specify targets for the base. A 6% rate of growth of the base would bring the level of the monetary base to $172 billion in the fourth quarter of 1981."

September 14, 1981

"For 1982, we urge the Federal Reserve to increase the monetary base, as reported by the Federal Reserve Bank of St. Louis, by no more than 5%. Our targets being the level of the monetary base of $171 billion in the fourth quarter of 1981 and $180 billion in the fourth quarter of 1982."

March 15, 1982

"We repeat our recommendation for monetary policy in 1982. The Federal Reserve should control the monetary base, return to a sustained 5% growth path, and aim for a target of $180 billion in the fourth quarter 1982, as we urged six months ago."

September 13, 1982

"We recommend that the Federal Reserve manage the monetary base so as to increase the money supply (M1) by 4% to 4.5% from the average of the fourth quarter of 1982 to the fourth quarter of 1983. For the balance of 1982, the money supply should remain in a 5% to 5.5% growth path."

March 7, 1983

"The current inflationary policy should end. The growth of money should return to a disinflationary path. We recommend an annual growth rate of money (M1) not to exceed 5 1/2% in the year ending fourth quarter 1983."

"Again, we urge the Federal Reserve to improve control procedures and we challenge them to produce some evidence to support their statements about the effects of deregulation on the monetary aggregates. Proposals to set targets for interest rates—real or nominal—would be destabilizing."

September 19, 1983

"We urge the Federal Reserve to hold the growth rate of the monetary base to 6% from fourth quarter 1983 to fourth quarter 1984. This will be consistent with a growth rate of M1 of 6–7%, and if followed by further deceleration, would prevent a renewed burst of inflation and would help the economy to return to stable real growth with falling inflation in subsequent years."

March 11–12, 1984

"The alternative is to return monetary base growth to 6% this year. This is the path consistent with the Federal Reserve's target and our September recommendation. We urge but do not expect the Federal Reserve to implement this policy to avoid the resurgence of inflation and another prolonged recession."

October 1, 1984

"Money growth in 1985 should not exceed the mid-point of the Fed's 1984 target range (6%). Fears that further gradual reduction of money growth next year will lead to recession are unwarranted. The adjustment costs associated with sustaining a long-run disinflation would be minimized if the Fed announced and adhered to a multi-year policy of continually decreasing money growth."

March 25, 1985

"In order to eliminate 'base drift' and establish a coherent framework for steady progress towards lower money growth, the SOMC urges the federal Reserve to increase M1 in 1985 by 5% from the mid-point of the original target range for 1984. This policy would result in an increase for 1984 and 1985 taken together. In the event that money growth in 1985 exceeds this target, as we think highly likely, the target for 1986 would still be based on the target level for year-end 1985, rather than the actual level of fourth quarter 1985."

September 23, 1985

"We urge the Federal Reserve to achieve its targets, to stop rebasing and to return the money stock to a growth path of 5.5% from the second quarter of 1985 through the fourth quarter of 1986 as had been announced. The target for policy should be M1, and other monetary and credit aggregates should be discarded."

March 17, 1986

"We urge the Federal Reserve to announce—and achieve—a growth rate of the monetary base of 5% for the four quarters ending in the fourth quarter of 1986 and modest further reductions in subsequent years. This growth rate would be two and a half percentage points below the average rate of growth of the monetary base over the past five years."

September 21, 1986

"To avoid the coming inflation, the growth rate of the monetary base should be reduced to a rate consistent with price stability. Research prepared for this committee suggests that that rate is in the neighborhood of 3% to 4%. This goal should be achieved by the end of the decade."

March 9, 1987

"To avoid another costly inflation and disinflation, we again urge the Federal Reserve to abandon its inflationary policy and set the growth rate of the monetary base on the path toward sustained lower inflation. We recommend that the rate of growth of the monetary base be reduced to 7 percent for the four quarters ending in December 1987 and further reduced each year until non-inflationary growth is achieved."

September 14, 1987

"You have inherited an inflation rate that has been reduced substantially since 1981. However, inflation remains at rates that are high by past standards. We urge you to adopt a policy of reducing the strategy of consistently lowering the annual growth rate of the monetary base and maintaining the fluctuating exchange rate system."

"A 6% growth rate of the monetary base in the next 12 months is a step in a program to achieve price stability. Others urge you in different directions. They talk about testing your opposition to inflation or your commitment to current exchange rates. It is a mistake to be driven by the changing views of day traders and speculators in the markets. You cannot prevent changes in the value of the dollar, you can only delay them. It is a mistake to try."

March 14, 1988

"In 1988, monetary policy should initiate a policy of gradual disinflation. The policy should continue until price stability is achieved. At our September 1987 meeting, we praised the Federal Reserve for reducing the growth rate of the monetary base from the very high rates of 1986. We recommended a growth rate of 6 percent for 1988. This rate of money growth is consistent with administration and Federal Reserve forecasts of real growth and inflation. We repeat the recommendation today."

September 19, 1988

"We urge the Federal Reserve to resist political pressures to do the impossible—namely, to attempt to alter levels of interest rates from what freely competitive financial markets would produce. The Federal Reserve should declare its intent to focus exclusively on quantitative measure of reserves and monetary growth, and allow the price of credit to be determined by private competition."

March 20, 1989

"The present acceleration of inflation stems from overly expansive monetary policy in 1985 and 1986. The Federal Reserve has announced target ranges for monetary growth in 1989. We believe that the midpoints of the announced target ranges—if achieved as part of a continuing, long-run program to reduce money growth—would result in a gradual reduction in inflation. We urge the Federal Reserve (1) to reject fine tuning; (2) to publicly disavow the Phillips curve and concerns about policy mix; (3) to achieve its announced targets for money growth. Growth of the monetary base should be maintained in the range of 5% to 6% this year."

September 18, 1989

"Restrictive monetary policy remains in effect. During the past year, the Federal Reserve has held the growth rate of the monetary base—bank reserves and currency—at the lowest level since the early 1960s. Relatively slow growth of the base and other monetary aggregates is part of a pattern of slower money growth that is now entering its third year."

"Continuation of this pattern will bring more than 20 years of inflation to an end. We urge the Federal Reserve to continue on the path toward stable prices. To remain on this path, growth of the monetary base should remain in the neighborhood of 4 percent in the year ahead."

March 19, 1990

"The recent large increase in the base appears to be mainly a onetime increase in demand by foreigners for US currency. For 1990, we recommend that the Federal Reserve keep the growth rate of the monetary base close to an annual rate of 4 percent measure from first quarter 1990. Due regard should be taken to accommodate continued foreign demand for currency."

October 1, 1990

"We urge the Federal Reserve to maintain the long-run policy that it has emphasized in the past three years. Money growth should be brought to a level consistent with sustained long-term growth of real output and stable

prices. Currently, the Federal Reserve's announced target for growth of M2 has a midpoint of 5 percent for the four quarters ending fourth quarter 1990 and 4 1/2 percent for the four quarters of 1991. A 5 percent growth rate is consistent with the Federal Reserve's goal of reducing inflation. With the economy on the edge of recession, we urge that this target be maintained and achieved."

March 4, 1991

"We welcome the Federal Reserve's renewed attention to money growth. We urge officials to meet their announced targets for 1991. We caution however, that weekly or monthly rates of change in money supply are not reliable as weekly indicators of the thrust of monetary policy. What matters is whether moderate money growth is maintained for intervals of three to six months."

"Concern for recovery should not be allowed to cause a new round of rising inflation. A 4.5 percent rate would bring money growth back to the average rate since 1987. A 4.5 percent growth rate of M2 is consistent with recovery in the economy and a declining rate of inflation."

September 30, 1991

"To achieve sustained economic growth and stable prices, we urge the Federal Reserve to limit the growth rate of the monetary base to the range of 5 percent to 6 percent. The Federal Reserve should desist from making loans to failing banks. This practice only adds to the price that taxpayers must pay to protect depositors. The Treasury Department should overhaul bidding practices in the government securities market. However, an increase in regulation would be counterproductive. Proposals to bail out the Soviet economy would waste scarce resources. We reject them."

March 9, 1992

"The shift to slower money growth causes slower growth of output or a new recession. We urge the Federal Reserve now to slow the growth of the monetary base from the current 8 percent annual rate to a 5 to 6 percent range, even at the cost of a temporary rise in short-term interest rates."

"We believe that a 5 to 6 [percent] base growth rate will provide sufficient monetary stimulus for a durable expansion. Stable monetary growth can contribute to stable growth and stable prices. Money growth that is consistent with low inflation will increase economic efficiency."

September 14, 1992

"A reduced spread between long- and short-term rates can occur either because short-term rates rise or long-term rates fall. Since short-term rates, adjusted for inflation, are now zero, these rates are likely to rise. The Federal Reserve should lower long-term rates by reducing expec-

tations of future inflation. The policy we urge the Federal Reserve to adopt [is a] 5 to 6 percent growth in the monetary base [which] would accomplish that result. It is consistent with economic recovery and lower inflation."

March 8, 1993

"We believe growth of the domestic base should be reduced in 1993. To achieve this reduction, growth of the reported base (as published including foreign holdings of currency) should be reduced to about 8% annual rate. The Federal Reserve should measure the domestic monetary base and release this information to the public."

September 13, 1993

"A prudent monetary policy requires slower growth of the monetary base. We urge the Federal Reserve to slow the growth of the monetary base by 3 percentage points to an annual rate of no more than 8%. That is the maximum rate of base growth currently consistent with the Federal Reserve's repeated statements that it seeks to hold annual inflation to 2% or less."

March 7, 1994

"We believe that excessive money growth, not real growth, brings inflation. More decisive action is required to restrict the growth of spending by slowing money growth enough to prevent a rise in inflation. Based on recent growth of output and average cash balances, growth of the monetary base should be reduced immediately by two percentage points. The monetary base should grow at no more than an 8% annualized rate."

September 12, 1994

"Since March, year-to-year growth of the monetary base—bank reserves and currency—has fallen from above 10 1/2 percent to about 9 1/4 percent. For the past six months the base has increased at an 8 percent annual rate. This is the maximum rate we recommended at our meetings in September 1993 and March 1994. We are now on a path that, if sustained, is consistent with inflation of 2 to 3 percent. Modest further reductions are necessary if price stability is to be achieved. Therefore, the Federal Reserve should reduce base growth to 7 percent in 1995."

"We continue to urge the Federal Reserve to control growth of monetary aggregates and to use the information about future inflation provided by sustained growth of the monetary aggregates."

March 6, 1995

"At our September meeting, we recommended that Federal Reserve officials reduce growth of the monetary base to 7 percent. We now recommend that

they maintain a 7 percent growth rate of the base. The Federal funds rate should move up or down as needed to maintain this policy."

September 11, 1995

"The Federal Reserve should promptly reduce short-term interest rates until the monetary base grows at a 6 percent annual rate. A 6 percent growth of the base is the rate consistent with steady real growth without inflation. If the present growth of the base—4.5 percent for the past year—continues, the economy risks recession or deflation in 1996."

March 11, 1996

"Growth of the monetary base and money remain below the rate that our rule suggests is consistent with steady growth in output and price stability. We again urge the Federal Reserve to lower its interest rate target until the monetary base grows at an annual rate of 4 percent. The Federal Reserve can, at last, achieve price stability with sustained economic growth. Current Federal Reserve policy will not do that."

September 9, 1996

"For five years, Federal Reserve policy has sustained expansion without increasing inflation. This is an historical achievement. There are few comparable periods in the eighty-two years of the Fed's existence."

"Price stability has not been achieved, however. Inflation has remained in the 2 percent to 3 percent range, a range that once was, and we believe should again be, regarded as too high. We believe that current policy, if maintained, will not substantially reduce inflation below current levels. We recommend that the Federal Reserve reduce the growth rates of the monetary base and other monetary aggregates to achieve zero inflation. Monetary acceleration of the past year should not be permitted to continue."

March 3, 1997

"At our last meeting, we urged the Federal Reserve to reduce the growth rates of the monetary base and other monetary aggregates to achieve zero inflation. We repeat that recommendation and add another: Reduce money growth both to prevent inflation from rising and to end inflation. Growth of the monetary base should not exceed 2 percent this year. This policy will require a near-term increase in the Federal fund rate target."

September 1997—No SOMC meeting.

March 15, 1998

"We urge the Federal Reserve to reduce the growth rate of monetary aggregates by reducing the growth of the monetary base by two percentage points to an annual rate of 4 percent."

September 14, 1998

"We again urge the Federal Reserve to slow the growth of the monetary base to 4 percent per year, a rate consistent with steady long-term growth and a stable price level. We urge this policy though we are aware of the risks in the world economy. We believe that, in the event of a flight to liquidity, the Federal Reserve's overriding responsibility is to satisfy the demand for money by expanding the monetary base as much as required. At present, there is no evidence of a flight to money in the US. Stability of the US economy should continue to be the Federal Reserve's primary goal."

March 8, 1999

"The FOMC should act now to reduce growth of the monetary base. By the end of the year, base growth should be brought to 4 to 5 percent from the current 7 to 8 percent."

September 27, 1999

"To slow future inflation, the Federal Reserve should act promptly to bring the growth rate of the monetary base back to 4 percent. Base growth has fallen to 6 percent in the last few months, but we believe the decline is too small, and its duration is too short, to prevent the inflationary pressure of risking aggregate demand from increasing inflation."

Appendix B

Expressions for $R(F)^{-1}$

From Sargent (1979, 179) for real roots, $r_2 < r_3$, the inverse of $R(F)$ can be written as

$$R(F)^{-1} = \left[\frac{-1}{\beta\left(\frac{\phi\gamma}{(1-\gamma)} + \zeta_3\right) r_2 r_3}\right](1 - r_2^{-1}F)^{-1}(1 - r_3^{-1}F)^{-1}$$

$$= \left[\frac{-1}{\beta\left(\frac{\phi\gamma}{(1-\gamma)} + \zeta_3\right) r_2 r_3}\right]\left[\frac{1}{r_2^{-1} - r_3^{-1}}\right][r_2^{-1}(1 - r_2^{-1}F)^{-1} - r_3^{-1}(1 - r_3^{-1}F)^{-1}].$$

When the roots are complex, the inverse of $R(F)$ can be written as

$$R(F)^{-1} = \left[\frac{-1}{\beta\left(\frac{\phi\gamma}{(1-\gamma)} + \zeta_3\right) r_2 r_3}\right]\sum_{j=0}^{\infty} r^j \left[\frac{\sin\omega(j+1)}{\sin\omega}\right]F^j,$$

where $r = \sqrt{-[r_2 r_3]^{-1}}$ and $\omega = \cos^{-1}[(r_2 + r_3)/2r]$ (Sargent 1979, 181–82).

References

Anderson, L. C., and K. M. Carlson. 1970. "A Monetarist Model for Economic Stabilization." *Federal Reserve Bank of St. Louis Review* April:7–25.

Anderson, R. A., and R. H. Rasche. 2001. "The Remarkable Stability of Monetary Base Velocity in the United States: 1919–1999." Federal Reserve Bank of St. Louis Working Paper 2001-008A, August.

Ball, L. 1994. "Credible Disinflation with Staggered Price-Setting." *American Economic Review* March:282–89.

Brimmer, A. F. 1972. "The Political Economy of Money: Evolution and Impact of Monetarism in the Federal Reserve System." *American Economic Review* May:344–52.

Bronfenbrenner, M., and F. D. Holzman. 1963. "Survey of Inflation Theory." *American Economic Review* 52:593–661.

Brunner, K. 1983. "Has Monetarism Failed?" *Cato Journal* 3 (1): 23–62.

Brunner, K., and A. H. Meltzer. 1963. "Predicting Velocity: Implications for Theory and Policy." *Journal of Finance* 18 (2): 319–54.

———. 1964a. *The Federal Reserve's Attachment to the Free Reserves Concept.* Washington, DC: Committee on Banking and Currency, United States House of Representatives.

———. 1964b. "Some Further Investigations of Demand and Supply Functions for Money." *Journal of Finance* 19 (2): 240–83.

———. 1968. "What Did We Learn from the Monetary Experiences of the United States in the Great Depression?" *Canadian Journal of Economics* 2:334–48.

———. 1976. "An Aggregative Theory for a Closed Economy." In *Monetarism,* edited by J. Stein, 69–103. Amsterdam: North-Holland Publishing Company.

———. 1993. *Money and the Economy: Issues in Monetary Analysis,* Raffaele Mattiolli Lectures. Cambridge: Cambridge University Press.

Burns, A. F. 1978. "Reflections of an Economic Policy Maker." *Speeches and Congressional Statements: 1969–1978.* Washington, DC: American Enterprise Institute for Public Policy Research.

———. 1979. "The Anguish of Central Banking." *The Per Jacobsson Lecture.* Per Jacobsson Foundation, International Monetary Fund, Belgrade, September 30.

Calomiris, C. W., and D. C. Wheelock. 1998. "Was the Great Depression a Watershed for American Monetary Policy?" In *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century,* edited by M. D. Bordo, C. Goldin, and E. N. White, 23–66. Chicago: University of Chicago Press.

Clarida, R. H., J. Galí, and M. Gertler. 1999. "The Science of Monetary Policy—A New Keynesian Perspective." *Journal of Economic Literature* 37 (4): 1661–707.

Economic Report of the President. 1966. Lyndon B. Johnson, Council of Economic Advisers. Washington, DC: Government Printing Office.

Friedman, M. 1968. "The Role of Monetary Policy." *American Economic Review* March:1–17.

———. 1977. "Nobel Lecture: Inflation and Unemployment." *Journal of Political Economy* 85 (3): 451–72.

Goodfriend, M., and R. G. King. 1997. "The New Neoclassical Synthesis and the Role of Monetary Policy." In *NBER Macroeconomic Annual 1997,* edited by Ben S. Bernanke and Julio J. Rotemberg, 231–83. Cambridge, MA: MIT Press.

Gramley, L. E., and S. B. Chase Jr. 1965. "Time Deposits in Monetary Analysis." *Federal Reserve Bulletin* October:1380–404.

Hafer, R. W., and D. C. Wheelock. 2003. "Darryl Francis and the Making of Monetary Policy, 1966–1975." *Federal Reserve Bank of St. Louis Review* 85 (2): 1–12.

Hetzel, R. L. 1984. "Estimating Money Demand Functions." *Journal of Money, Credit, and Banking* 16 (2): 185–93.
Hoffman, D. L., and R. H. Rasche. 1991. "Long-Run Income and Interest Elasticities of Money Demand in the United States." *Review of Economics and Statistics:* 665–74.
Kimball, M. S. 1995. "The Quantitative Analytics of the Basic Neomonetarist Model." *Journal of Money, Credit and Banking* 27 (no. 4, pt. 2): 1241–77.
King, R. G., and A. L. Wolman. 1996. "Inflation Targeting in a St. Louis Model of the 21st Century." *Federal Reserve Bank of St. Louis Review* May/June:83–107.
Laidler, D. 1981. "Monetarism: An Interpretation and an Assessment." *Economic Journal* 91 (361): 1–28.
Lucas, R. 1976. "Econometric Policy Evaluation: A Critique." *Carnegie-Rochester Conference Series on Public Policy* 1:19–46.
Lys, T. 1997. *Monetary Theory and Policy: Selected Essays of Karl Brunner,* vol. 2. Cheltenham: Edward Elgar Publishing, Inc.
Maisel, S. J. 1973. *Managing the Dollar.* New York: W. W. Norton & Company.
Mayer, T. 1978. *The Structure of Monetarism.* New York: W. W. Norton & Company.
McCallum, B. T. 1988. "Robustness Properties of a Rule for Monetary Policy." *Carnegie-Rochester Conference Series on Public Policy* 29:173–203.
———. 1999. "Issues in the Design of Monetary Policy Rules." In *Handbook of Macroeconomics,* edited by J. B. Taylor and M. Woodford. Amsterdam: North-Holland Publishing Co.
McCallum, B. T., and E. Nelson. 1999. "An Optimizing IS-LM Specification for Monetary Policy and Business Cycle Analysis." *Journal of Money, Credit, and Banking* 31 (no. 3, pt. 1): 296–16.
Meltzer, A. H. 1963. "The Demand for Money: Evidence from the Time Series." *Journal of Political Economy* 71 (3): 219–46.
———. 2000. "The Shadow Open Market Committee: Origins and Operations." *Journal of Financial Services Research* 18 (2-3): 119–28.
———. 2003. *A History of the Federal Reserve. Volume 1:1913–1951.* Chicago: University of Chicago Press.
Nelson, E., and A. J. Schwartz. "The Impact of Milton Friedman on Modern Monetary Economics: Setting the Record Straight on Paul Krugman's 'Who Was Milton Friedman?'" Federal Reserve Bank of St. Louis Working Paper 2007-048A.
Orphanides, A. 2003. "Historical Monetary Policy Analysis and the Taylor Rule." *Journal of Monetary Economics* 50:983–1022.
Phelps, E. S. 1967. "Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time." *Economica* August:254–81.
———. 1978. "Commodity-Supply Shock and Full-Employment Monetary Policy." *Journal of Money, Credit, and Banking* 10 (2): 206–21.
Poole, W. 1975. "Monetary Policy during the Recession." *Brookings Papers on Economic Activity* 1975 (1): 123–39.
———. 1978. *Money and the Economy: A Monetarist View.* Reading, MA: Addison-Wesley Publishing Company.
Prescott, E. C. 1986. "Theory Ahead of Business Cycle Measurement." *Federal Reserve Bank of Minneapolis Quarterly Review* 10 (4): 9–22.
Rasche, R. H. 1987. "M1-Velocity and Money-Demand Functions: Do Stable Relationships Exist?" *Carnegie-Rochester Conference Series on Public Policy* 27:9–88.
Romer, C. D., and D. H. Romer. 2002. "A Rehabilitation of Monetary Policy in the 1950s." *American Economic Review* 92 (2): 121–27.
———. 2004. "Choosing the Federal Reserve Chair: Lessons from History." *Journal of Economic Perspectives* 18 (1): 129–62.

Samuelson, P. A. 1960. "Reflections on Monetary Policy." *Review of Economics and Statistics* August:263–69.
Samuelson, P. A., and R. M. Solow. 1960. "Problem of Achieving and Maintaining a Stable Price Level: Analytical Aspects of Anti-Inflation Policy." *American Economic Review, Papers and Proceedings* May:177–94.
Sargent, T. J. 1979. *Macroeconomic Theory.* New York: Academic Press.
Shiller, R. J. 1979. "The Volatility of Long-Term Interest Rates and Expectations Models of the Term Structure." *Journal of Political Economy* 87 (6): 1190–219.
Taylor, J. B. 1993. "Discretion versus Policy Rules in Practice." *Carnegie-Rochester Conference Series on Public Policy* 39:195–214.
Woodford, M. 2003. *Interest and Prices: Foundations of a Theory of Monetary Policy.* Princeton, NJ: Princeton University Press.

Comment Christina D. Romer

The premise of this chapter by Poole, Rasche, and Wheelock is brilliant. The Shadow Open Market Committee started business in 1973 as a self-appointed alternative to the official monetary policymaking committee in the United States. As such, their recommendations constitute a wonderful counterfactual to the policies that were actually followed. Like looking at the experiences of other countries in the 1970s (another great topic included in the conference), this counterfactual helps us to understand whether avoiding the Great Inflation was something that required knowledge not available at the time, or simply knowledge available but not used by American policymakers in the 1970s.

The SOMC's Economic Ideas

Poole, Rasche, and Wheelock begin their study with an extensive discussion of what members of the Shadow Open Market Committee (SOMC) believed about key economic relationships. This is, to my mind, the right place to start. I am a contributor to what Sargent (2002) has called the "Berkeley story" about the causes of the Great Inflation. This story emphasizes the crucial role of mistaken beliefs about how the economy operated in causing policymakers to take unfortunate policy actions. DeLong (1997) stressed the role of the Samuelson-Solow belief in an exploitable Phillips curve, along with a deep-seated fear of unemployment resulting from the trauma of the Great Depression, in leading both monetary and fiscal policy-

Christina D. Romer is the Class of 1957-Garff B. Wilson Professor of Economics at the University of California, Berkeley, former chair of the President's Council of Economic Advisers, and a research associate and codirector of the Monetary Economics Program at the National Bureau of Economic Research.

For acknowledgments, sources of research support, and disclosure of the author's material financial relationships, if any, please see http://www.nber.org/chapters/c9157.ack.