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ABSTRACT

The Shadow Open Market Committee was formed in 1973 in response to rising inflation and the apparent unwillingness of U.S. policymakers to implement policies necessary to maintain price stability. This paper describes how the Committee's policy views differed from those of most Federal Reserve officials and many academic economists at the time. The Shadow argued that price stability should be the primary goal of monetary policy and favored gradual adjustment of monetary growth to a rate consistent with price stability. This paper evaluates the Shadow's policy rule in the context of the New Keynesian macroeconomic model of Clarida, Gali, and Gertler (1999). Simulations of the model suggest that the gradual stabilization of monetary growth favored by the Shadow would have lowered inflation with less impact on output growth and less variability in inflation or output than a one-time reduction in monetary growth. We conclude that the Shadow articulated a policy that would have outperformed the policies actually implemented by the Federal Reserve during the Great Inflation era.

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"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 U.S. 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 paper, 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.

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

[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.

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 one-time adjustment.

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 12 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

[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, p. 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, p. 1).

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 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 "Governmental 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, p. 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

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

[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, pp. 112-13).

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, p. 179).

Like Burns, some economists and policymakers claimed that government budget deficits contributed to rising inflation. Federal Reserve Governor Sherman Maisel (1973, p. 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 meetings throughout the Great Inflation period and for several years thereafter (provided in Appendix 1).

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

[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

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 "The 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

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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' 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, p. 177).

monetary growth we will not experience any persistent inflation. Moreover, any persistent acceleration of the money stock eventually unleashes a rising inflation. On 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, p. 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

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

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 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

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[13] "Conversation with a Monetarist." Quoted in Lys (1997, p. 6).
[14] "Has Monetarism Failed?" *Cato Journal* 3 (1), Spring 1983. Quoted in Lys (1997, p. 24).
[15] If anything, monetarists believed that inflation would depress economic growth (e.g., Friedman, 1977).
[16] Quoted by Karl Brunner in "Monetary Policy, Recovery, and Inflation" (SOMC position paper, September 12, 1975, p. 23).

predictable and stable monetary control path credibly understood by the mass of price and wage setters."[17]

4. *Adverse supply shocks reduce potential output*: 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 "The 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

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

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

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

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. 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]

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

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

[22] Orphanides (2003) and Romer and Romer (2004) conclude that reliance on an over estimate 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 1978-79 output was far below potential when in fact revised data suggest a much smaller gap in 1975-76 and little or no gap in 1977-79. 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, pp. 16-18).

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

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 "The 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 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]

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

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

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, p. 351). And Burns claimed that "The 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." 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

[26] "Key Issues of Monetary Policy" (statement before the House Banking Committee, July 30, 1974). Quoted in Burns (1978, p. 174).
[27] See Brunner and Meltzer (1968), Calomiris and Wheelock (1998), and Meltzer (2003).

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 "financial market behavior is too complex for simple monetary rules to work" (Gramley and Chase, 1965, pp. 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 "An 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

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

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

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

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 "From 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]

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]

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

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[31] "The Senate Concurrent Resolution on Monetary Policy" (testimony before the Senate Committee on Banking and Currency, February 25, 1975, p. 3).
[32] "Key Issues of Monetary Policy" (statement before the U.S. House Banking, Currency, and Housing Committee, July 30, 1974). Quoted in Burns (1978, p. 175).
[33] "Monetary Policy, Inflation and Economic Expansion" (SOMC position paper, September 13, 1976, p. 8).

Chase (1965) argued, for example, that "Traditional [i.e., monetarist] analysis … fails to recognize that substitution between time deposits and securities may be an important source of pro-cyclical 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

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[34] Quoted in Brunner (1968, p. 10).
[35] Quoted by Brunner in "Monetary Policy, Economic Expansion and Inflation" (SOMC position paper, March 8, 1976, p. 18).
[36] "Monetary Policy, Economic Expansion and Inflation" (SOMC position paper, March 8, 1976, pp. 18-19).

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]

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.

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[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, p. 14).

[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, Gali and Gertler (1999), Woodford (2003) and many others emphasize the importance of credibility and of transparent, rules-based policies.

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.

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 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 statement above makes clear, the SOMC rule implied that the adjustment of monetary base growth to the ultimate target should be gradual and publicly announced.

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

SOMC statements often called for transparent, consistent policies, and the SOMC was critical of the 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:

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

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:

(2) $$\ln(M_t) = \ln(M^{T}_{t-1,t}) + \varepsilon_t$$

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.

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

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]

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

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

.
.
.

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

(6) $\ln(M^{T}_{t,t+n+k}) - \ln(M^{T}_{t,t+n+k-1}) = \alpha$, k = 1, …

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]

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 below.

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

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[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.

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

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

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

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

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, 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 linear. The values for the years 2000-06 are also highlighted in Figure 1. These years are after the sample that Anderson and Rasche (2001) examined. Note that the data for 2000-06 fall on top of the scatter from the earlier sample. Table 1, reproduced from Anderson and Rasche (2001), shows the estimated values of the slope of the scatter in Figure 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

[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).

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 a nonlinear demand function for base money:

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

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 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:

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

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

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

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

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

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

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

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

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

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

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

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

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, Gali, and Gertler (CCG, 1999):

IS curve (CGG, equation 2.1):

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

Phillips Curve (CGG, equation 2.2):

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

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

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

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

Simulation of the SOMC Policy Rule for the Great Inflation

Linearized Model

The only nonlinearity in the above 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 below) 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 $detA(F)$ and the adjoint polynomial matrix of $A(F)$ as $adjA(F)$. Then $detA(F)Y_t = adjA(F)X_t$. The determinant of $A(F)$ is

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

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:

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

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.

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.[48] We set $\gamma = 0.94$ following Shiller (1979, Table 1, p. 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 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 expressed in polar coordinates, the polar angle of the complex roots (θ in Table 2) is always close to zero.[50]

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

14)) $$detA(F) = -\beta(\phi\gamma/(1-\lambda)+\zeta_3)r_2r_3F^{-1}(F-r_1)(1-r_2^{-1}F)(1-r_3^{-1}F \quad .$$

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

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

so

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

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

[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.

16)) $detA(F) = F^{-1}(F - r_1)R(F$.

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

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

The elements of the first column of $B(F)$ (coefficients of the current and expected future money stock) for the parameter values in Table 2 are shown in Figures 2 through 4. The low-order polynomial coefficients 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 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.

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 model specified above. The first experiment is the gradualist monetarist proposal of

[51] Expressions for $R(F)^{-1}$ are shown in Appendix 2.

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 one percentage point reduction in the money growth rate and announcing that money growth will be reduced by an additional one 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 one-time "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 one-time six 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 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

[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.

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 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, p. 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 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, p. 75) argue,

[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" (p. 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." (p.286)

"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 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, one-time reduction in money stock growth involves a larger decline in output growth, and more variability in inflation and output growth, than the implied by a gradual reduction in money stock

[54] Taylor (1993, p. 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."

growth. Although our model is highly stylized, our simulations favor the gradualist approach advocated by the SOMC over more abrupt changes in policy.[55]

Analysis of Sensitivity to Linearization

The above results were derived by linearization of the money demand function at a long-term nominal interest rate of 14 percent. It is clear from Figures 2a, 3a and 4a 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 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 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 Figures 2a, 3a, and 4a) and quantitatively the results 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.

[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.

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 i) is perfectly foreseen to return to the target path in future periods (the no-base-drift case) or ii) 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' desire for better control of the monetary aggregates.

The response to the no-base-drift rule is shown in Figure 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 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 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, 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.

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, Gali, 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 one-time 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 15 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 one-time 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.

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Appendix 1 is available online at:
http://www.nber.org/data-appendix/w16910/

Appendix 2

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

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

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

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

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

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

Figure 1

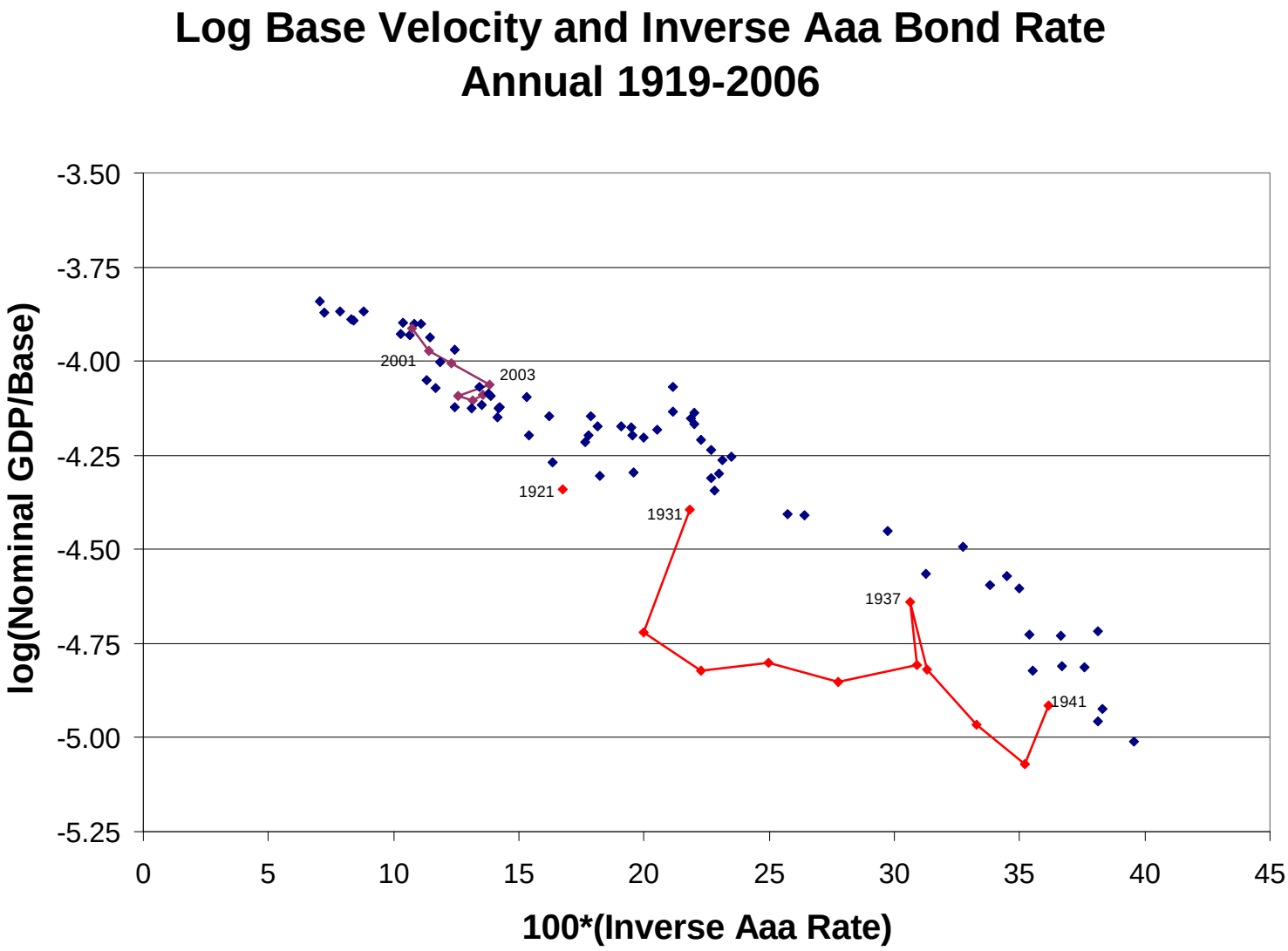

Log Base Velocity and Inverse Aaa Bond Rate
Annual 1919-2006
log(Nominal GDP/Base)
-3.50
-3.75
-4.00
-4.25
-4.50
-4.75
-5.00
-5.25
0
5
10
15
20
25
30
35
40
45
100*(Inverse Aaa Rate)
2001
2003
1921
1931
1937
1941

Figure 2: Moving Average Coefficients for the Response of Output in a Model that Includes the SOMC Policy Rule

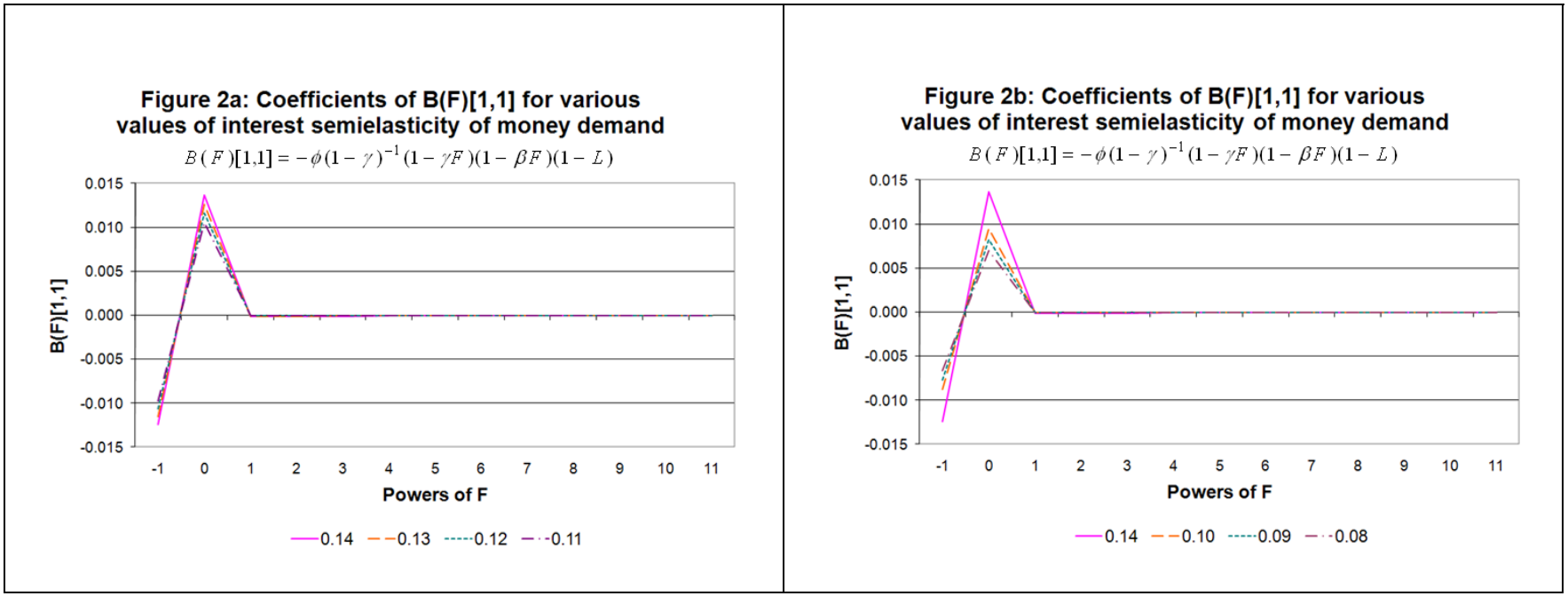
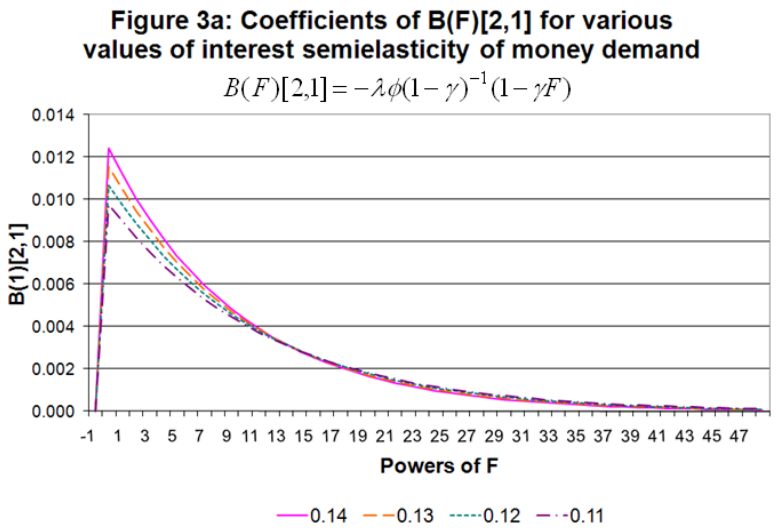


Figure 3: Moving Average Coefficients for the Response of the Price Level in a Model that Includes the SOMC Policy Rule



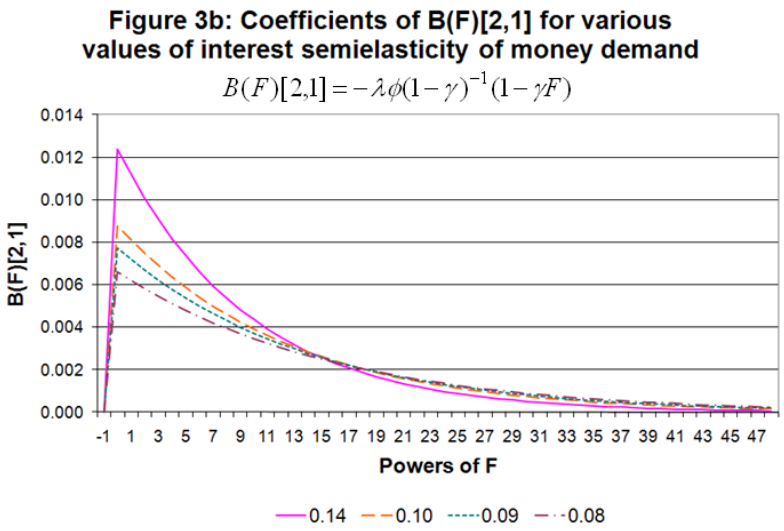
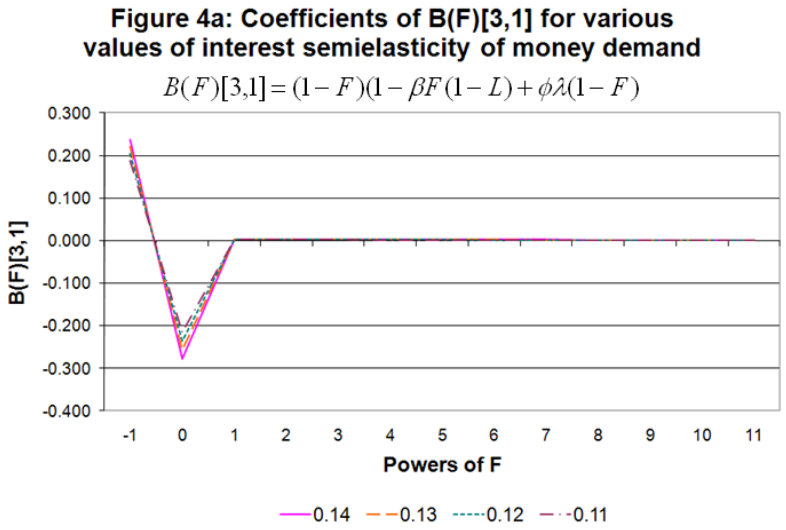


Figure 4: Moving Average Coefficients for the Response of the Long-Term Interest Rate in a Model that Includes the SOMC Policy Rule



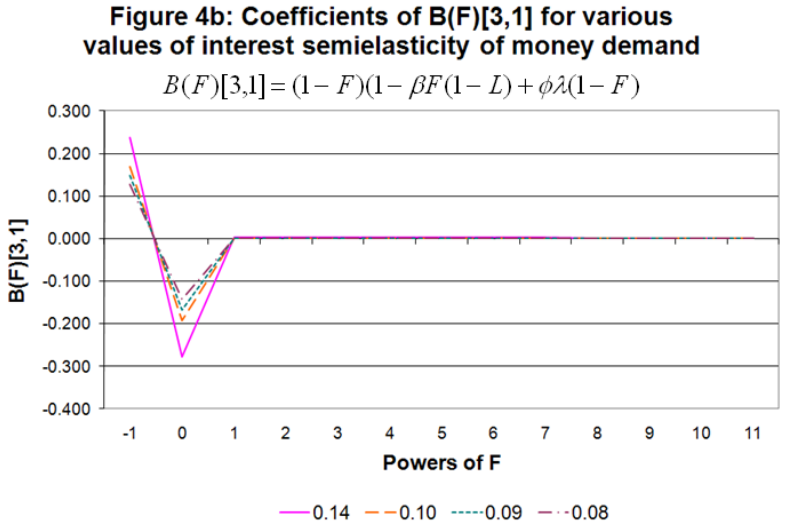


Figure 5
Gradualist (SOMC) Six Percent Reduction in Money Growth

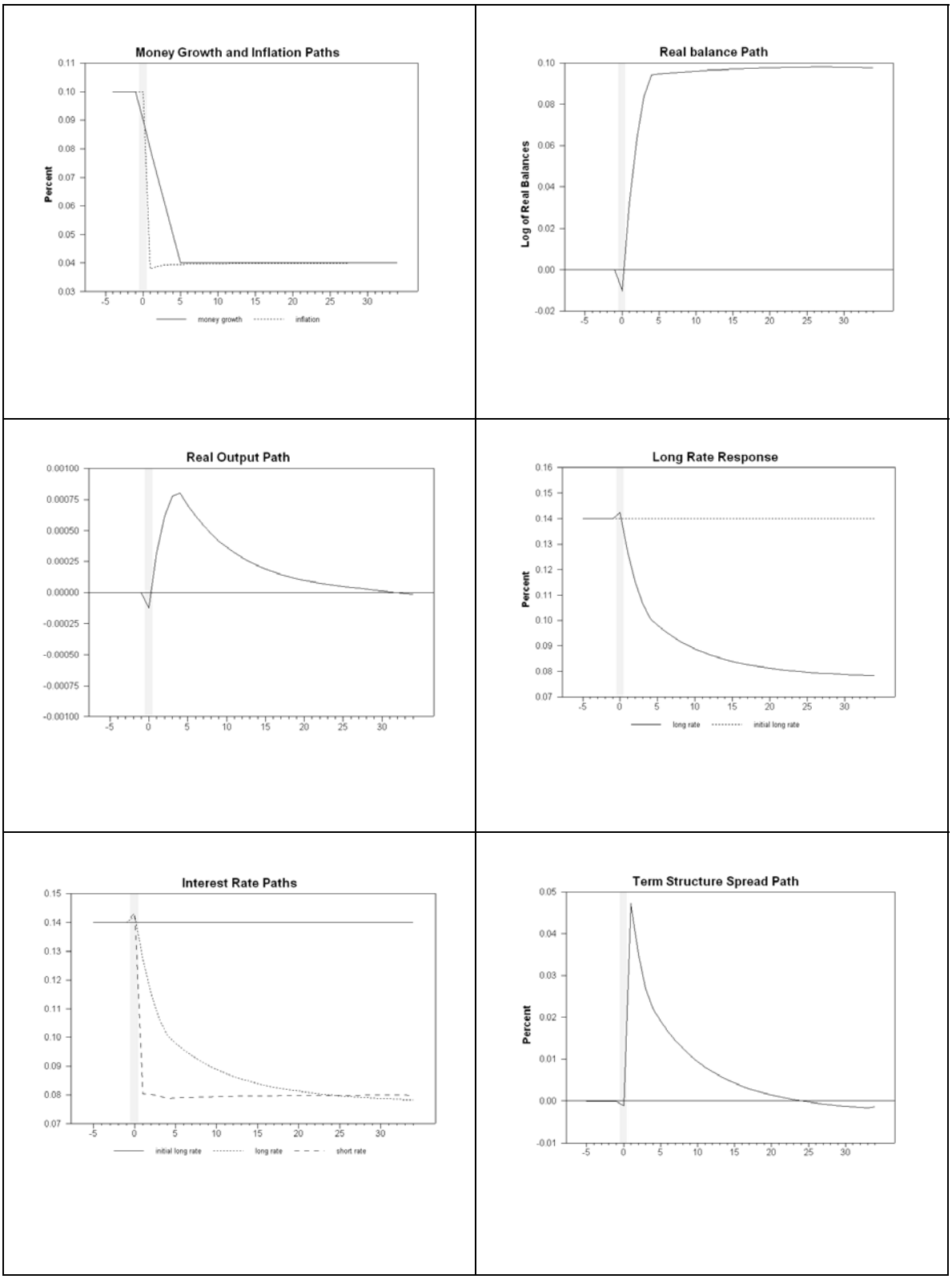


Figure 6
Six Percent "Cold Turkey" Reduction in Money Growth

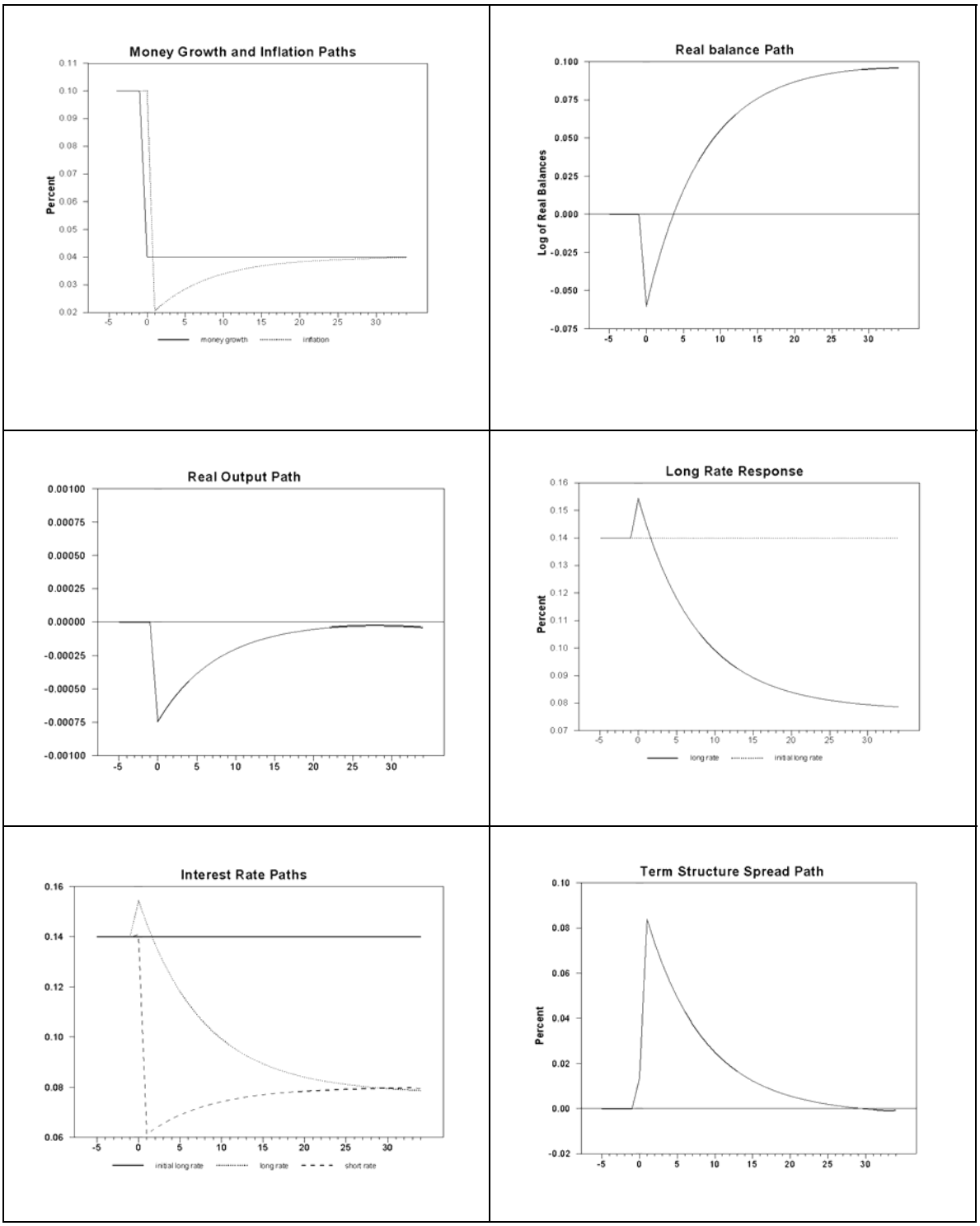


Figure 7
Sensitivity of Responses to Linearization of Model

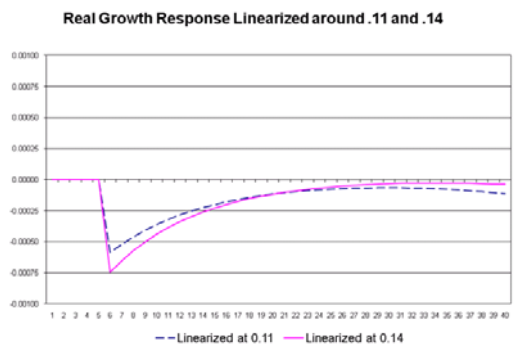
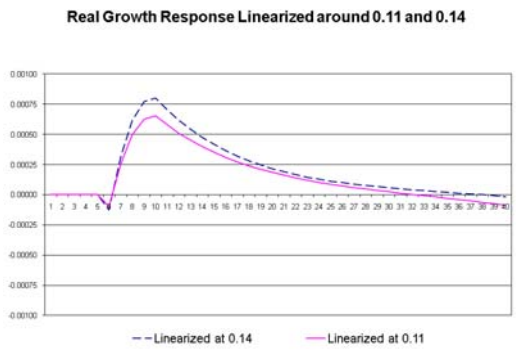
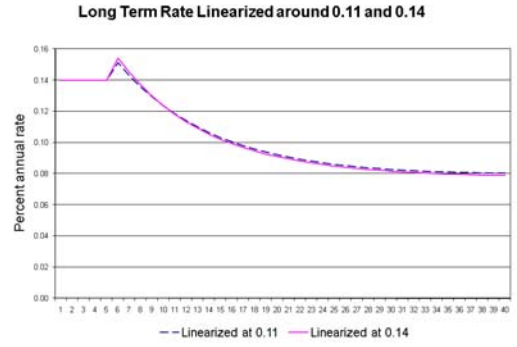
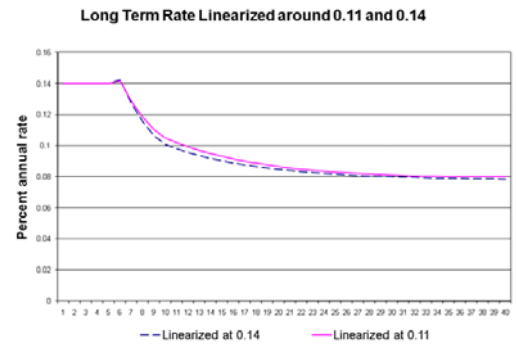
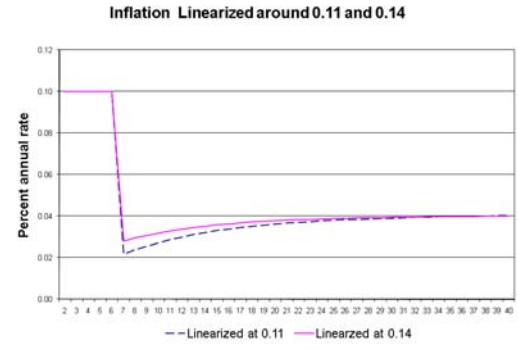
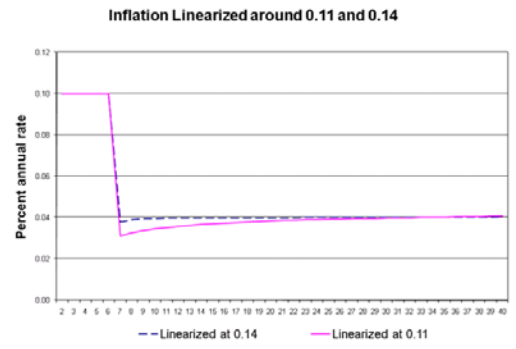
Six Percent "Cold Turkey" Reduction in Money Growth	Gradualist Six Percent Reduction in Money Growth
	
	
	

Figure 8
Response to a Transitory Deviation from Target Money Growth Path
(No Base Drift)

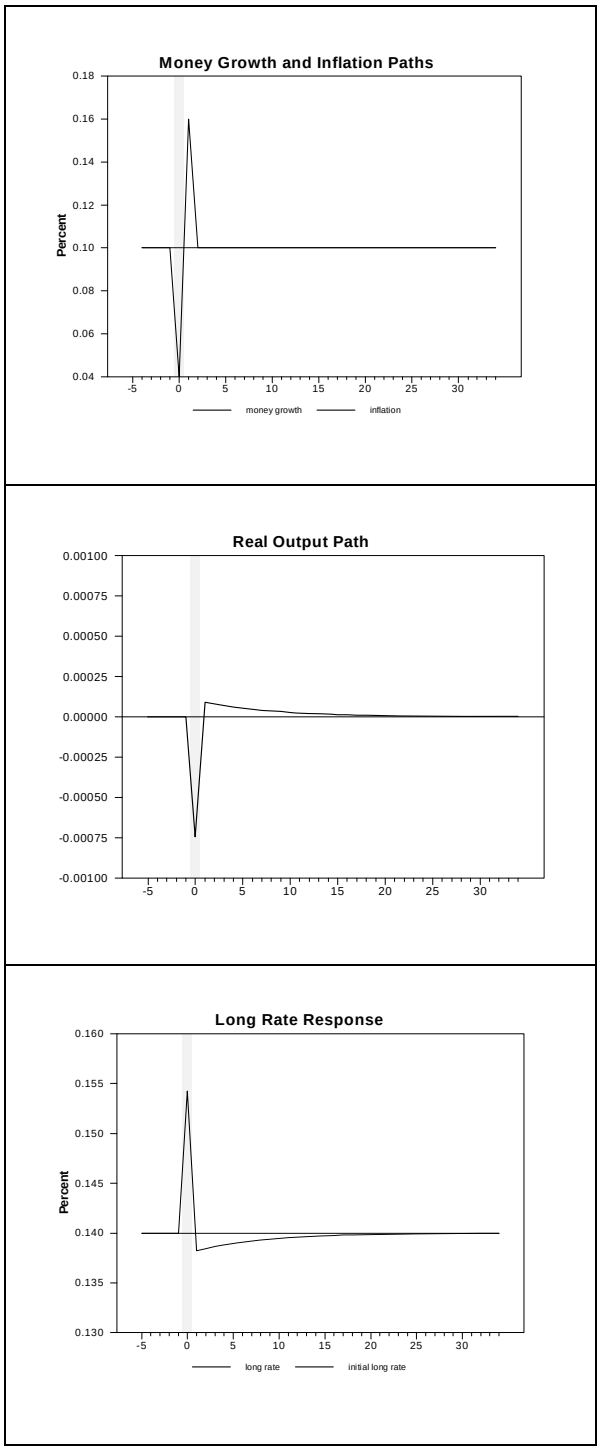


Figure 9
Response to a Permanent Change in the Level of the Money Stock
(Base Drift)

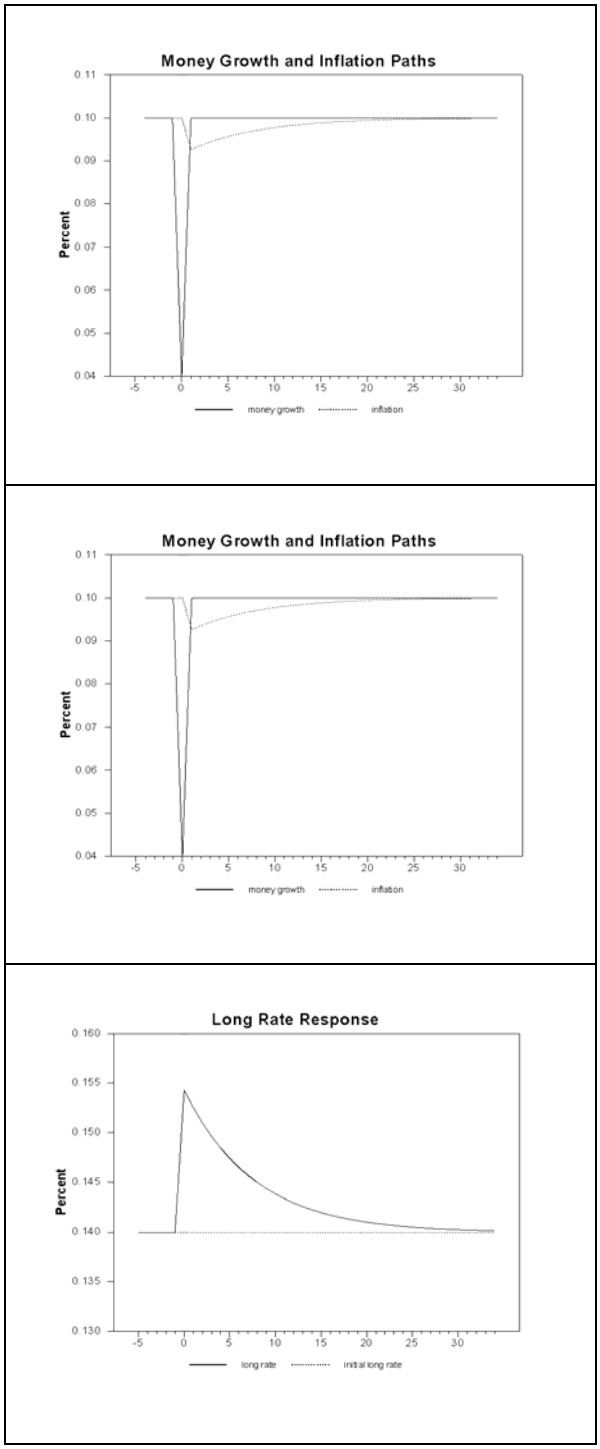


Figure 10
Response to a Persistent Change in the Level of the Money Stock
(Base Drift decays at 50% per period)

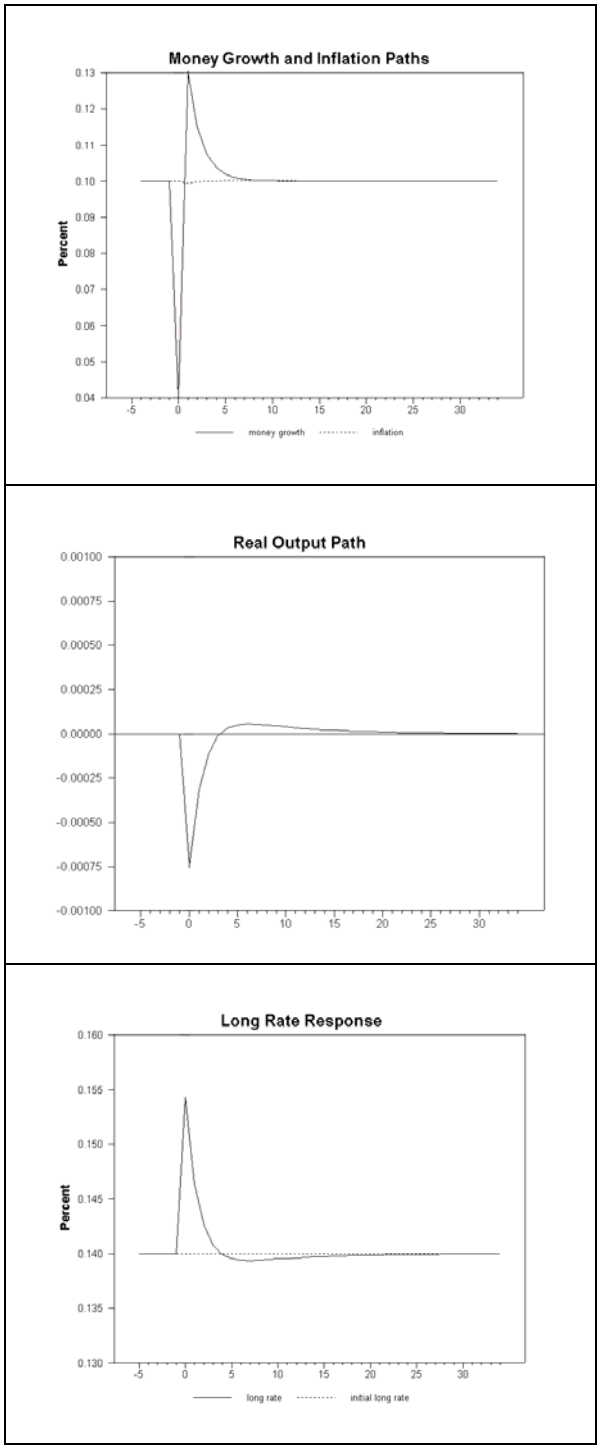


Table 1: Estimated Linear Regressions using the Adjusted Monetary Base and the Aaa bond rate (1919-1999)

Dependent variable: GDP velocity of the adjusted monetary base = log(GDP/adjusted monetary base)				
	Coefficient estimates			Standard error of estimate
estimation method ↓	constant	Inverse of Aaa bond rate, times 100	Rate of new bond defaults, percent of outstanding stock	
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[H]	

Dependent variable: Deflated adjusted monetary base = log(adjusted monetary base/GDP chain-type price index)					
	Coefficient estimates				Standard error of estimate
estimation method ↓	constant	Real GDP (chained 1996$)	Inverse of Aaa bond rate, times 100	Rate of new bond defaults, percent of outstanding stock	
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[H]	

[H] Coefficient estimates rounds to this value.

Table 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:

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

	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