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Falling Behind the Curve
A Positive Analysis of Stop-Start Monetary Policies and the Great Inflation

Andrew Levin and John B. Taylor

4.1 Introduction

US consumer price inflation, which had been stable at around 1 percent in the late 1950s and early 1960s, reached double-digit levels by the late 1970s. This bout of inflation is commonly referred to as the Great Inflation and has been viewed as one of the most dramatic failures of US monetary policy since the founding of the Federal Reserve. Many analysts and commentators have sought to identify the primary causes of the Great Inflation; indeed, understanding its sources might help minimize the likelihood of a recurrence.

Of course, the US economy was buffeted by a wide range of shocks over this period, including changes in fiscal policy during the late 1960s, a downward shift in structural productivity growth around 1970, wage and price controls in the early 1970s, and the Organization of the Petroleum Exporting Countries (OPEC) oil price hikes in 1973 and 1979. Moreover, some

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of those shocks had substantial short-term effects on inflation outcomes and contributed to an elevated level of uncertainty about the near-term inflation outlook. Nonetheless, as Meltzer (2010b) emphasizes, a coherent explanation of the Great Inflation must account for the sources of the *persistent upward drift in inflation* over an extended period of about a decade and a half.

In this chapter, we document the evolution of long-run inflation expectations and we model the stance of US monetary policy over the period from 1960 to 1980. We use this evidence to distinguish among various explanations of the Great Inflation and draw lessons for the future. Despite the remarkable breadth of the existing literature, relatively scant attention has been paid to the behavior of long-run inflation expectations over this period. Furthermore, most of the empirical studies have represented the conduct of monetary policy over the entire Great Inflation period using a linear reaction function with a fixed intercept, thereby assuming time-invariant values for the implicit inflation objective as well as for the equilibrium short-term real interest rate.

We begin by considering several distinct measures of long-run inflation expectations, which indicate that such expectations rose markedly during the late 1960s, remained elevated at that plateau through the mid-1970s, and then rose at an alarming pace from 1977 until mid-1980. Next, we gauge the stance of monetary policy in terms of the ex ante short-term real interest rate; that is, the federal funds rate less the Livingston Survey of one-year-ahead expected inflation. We then proceed to analyze the behavior of real interest rates and show that the course of monetary policy during the Great Inflation period can be represented as a series of stop-start episodes that occurred in 1968 to 1970, 1974 to 1976, and 1979 to 1980. In each case, policy tightening induced a contraction in economic activity, but that stance of policy was not maintained long enough to induce a sustained decline in the inflation rate.

The remainder of the chapter is organized as follows. Section 4.2 documents the evolution of long-run inflation expectations. Section 4.3 models the stance of monetary policy. Section 4.4 draws implications and section 4.5 concludes.

4.2 The Evolution of Inflation Expectations

In this section, we characterize three stylized facts regarding the evolution of long-run inflation expectations over the Great Inflation period.

Stylized Fact 1: The Great Inflation started in the mid-1960s. The classic measure of short-run inflation expectations is the Livingston Survey of one-year-ahead projections of consumer price inflation. As recounted by Croushore (1997), this survey of business economists was initiated by Joseph Livingston in 1946 and is now conducted by the Federal Reserve

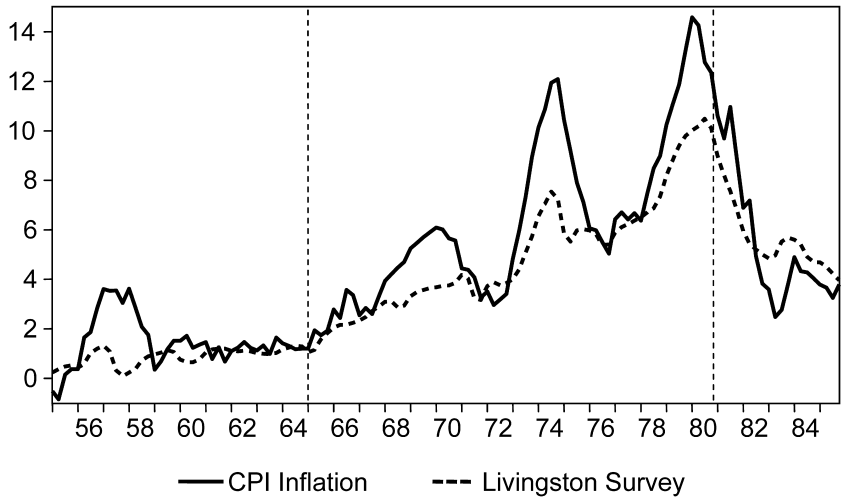


Fig. 4.1 Actual inflation and short-run inflation expectations, 1955–1985
Note: The solid line depicts the realized four-quarter-average CPI inflation rate, and the dashed line depicts the median response to the Livingston Survey regarding expected inflation over the year ahead.

Bank of Philadelphia, which began providing support for the survey in the late 1970s and assumed full responsibility in 1989. Since its inception, the survey has been conducted in May and December of each year, shortly after the release of the preceding month's Consumer Price Index (CPI).[1] There have generally been about fifty respondents to each survey, including professional forecasters, chief economists of financial institutions and nonfinancial corporations, and a few academic and government economists.[2] Over the years, the Livingston Survey has received widespread attention in the business press and has been analyzed in numerous research papers.[3]

As shown in figure 4.1, the Livingston Survey indicates that short-run inflation expectations were stable at about 1 percent from 1956 until 1964, even though actual CPI inflation exhibited substantial variation over this period. An inflation rate of around 1 percent was viewed as broadly consistent with the Federal Reserve's mandate under the Employment Act of 1946,

1. Given this timing of the survey, the horizon of the inflation projections is not exactly one year but alternates between ten and fourteen months—this modest degree of variation in the forecast horizon can be relevant for certain types of statistical tests but is not crucial for any of the analysis presented in this chapter.

2. In the mid-1990s, the sample of respondents included economists from nonfinancial businesses (30 percent), financial institutions (50 percent), academic institutions (13 percent), and other organizations including government agencies, labor unions, and insurance companies (8 percent). For further discussion, see Croushore (1997).

3. A comprehensive bibliography is available online at http://www.philadelphiafed.org.

which established the objectives of "maximum employment, production, and purchasing power" for all federal agencies.[4]

In 1956 to 1957, for example, realized CPI inflation reached a peak of nearly 4 percent, but one-year-ahead inflation expectations remained well-anchored, reflecting the private sector's confidence that the stance of monetary policy was consistent with inflation returning to around 1 percent within a year. In effect, business economists and professional forecasters did not expect these inflation fluctuations to be very persistent, but instead anticipated that inflation would subside quite quickly. Indeed, the firm anchoring of inflation expectations during the late 1950s and early 1960s may have contributed to the relatively low persistence of actual inflation over this period.[5]

Starting in 1965, however, a sharply different pattern of expectations formation becomes evident in the Livingston Survey: short-run inflation expectations began rising in parallel with actual inflation and reached about 4 percent by 1970, indicating that forecasters anticipated that the upswing in actual inflation would *not* be purely transitory. Moreover, by 1971 and 1972, short-run inflation expectations were virtually identical to actual CPI inflation, consistent with the view that policymakers would allow inflation to stay at around 4 percent rather than taking any decisive action to return to an environment of price stability.

A large empirical literature has made note of the persistent negative forecast errors that were associated with survey measures of inflation expectations from the mid-1960s through the late 1970s. For an environment with stable linear inflation dynamics, such results might be interpreted as pointing to the "irrationality" of survey respondents. In contrast, persistent forecast errors are associated with the *optimal* forecast in a Markov regime-switching environment where the current state is not directly observed by private agents (cf. Evans and Wachtel 1993).[6]

Yields on Treasury securities provide additional confirmation that inflation expectations began to shift markedly around 1965. In particular, Gürkaynak, Sack, and Wright (2007) employed the methodology of Nelson and Siegel (1987) and Svensson (1994) to fit daily data on the entire term structure of bond yields since 1961, thereby obtaining a smoothed yield curve that can be used to compute forward interest rates at each date. During the 1960s and early 1970s, the seven-year bond was the longest matu-

4. The Employment Act of 1946 also established the Joint Economic Committee (JEC), which subsequently stated that the act "provides a tried and successful institutional framework for the coordination of economic policies to the end of maximizing employment and production within a framework of price stability and growth" (*JEC Report,* March 1966, 2) A year later, the JEC indicated that "[p]rices rose too rapidly in 1966 and are in danger of doing so again in 1967" (*JEC Report,* March 1967, 18)

5. For further discussion, see Bordo and Schwartz (1999), Sargent (1999), Levin and Piger (2004), and Benati (2008).

6. Ang, Bekaert, and Wei (2007) provide further evidence on the efficiency of survey-based inflation forecasts.

rity issue that was auctioned regularly by the US Treasury, and hence for this period Gürkaynak, Sack, and Wright (2007) constructed daily series of one-year forward nominal interest rates for horizons up to six years ahead. Henceforth, we refer to the six-year-ahead forward interest rate as the "far-ahead forward rate"; it should be noted, however, that we have conducted sensitivity analysis that confirms that all of our conclusions are robust to the use of forward rates at even longer horizons (which are available starting in the early 1970s).

To make inferences from far-forward nominal interest rates regarding the evolution of long-run inflation expectations, we assume that the far-forward real short-term interest rate has a constant value of 2 percent and that the term premium has a constant value of 1 percent. The constancy of the far-forward real interest rate is consistent with the view that the real economy would be expected to converge to its balanced growth path over a seven-year horizon, and the value of 2 percent for the equilibrium short-term real interest rate is the same as embedded in the Taylor (1993) rule. Of course, investors might well perceive the equilibrium real interest rate as time-varying, especially in response to a persistent shift in productivity growth like the one that occurred during the 1970s. Indeed, a long literature has documented the extent to which term premiums vary over time, reflecting movements in the perceived distribution of returns as well as in the market price of risk. Nonetheless, as discussed further later, the variations in the far-forward real interest rate and in the term premium appear to be fairly small compared with the marked shifts in expected inflation that occurred during the Great Inflation, so that this measure of long-run inflation expectations can be very useful, at least as a rough gauge.

As depicted by the solid line in figure 4.2, this measure indicates that long-run inflation expectations were quite stable from 1961 until early 1965 at a rate just above 1 percent, consistent with the implications from the Livingston Survey. In effect, this evidence confirms that during the early 1960s inflation expectations were firmly anchored at a level broadly consistent with the Federal Reserve's mandate of price stability.

In 1965, however, this measure exhibits a fairly dramatic kink: far-forward inflation expectations began to drift upward steadily, reaching a peak of about 4.5 percent in 1970, and then remained in the range of 3.5 to 4.5 percent over the next several years. Again, this pattern is consistent with the implications of the Livingston Survey—not only that inflation expectations drifted upward during 1965 to 1970, but that these expectations remained at an elevated plateau during the early 1970s.

Importantly, these findings regarding the early stages of the Great Inflation are not sensitive to alternative assumptions about the determination of real interest rates or term premium. For example, a recent study by Ang, Bekaert, and Wei (2008) also provides a measure of long-run expected inflation implied by a no-arbitrage factor model of the term structure. Their

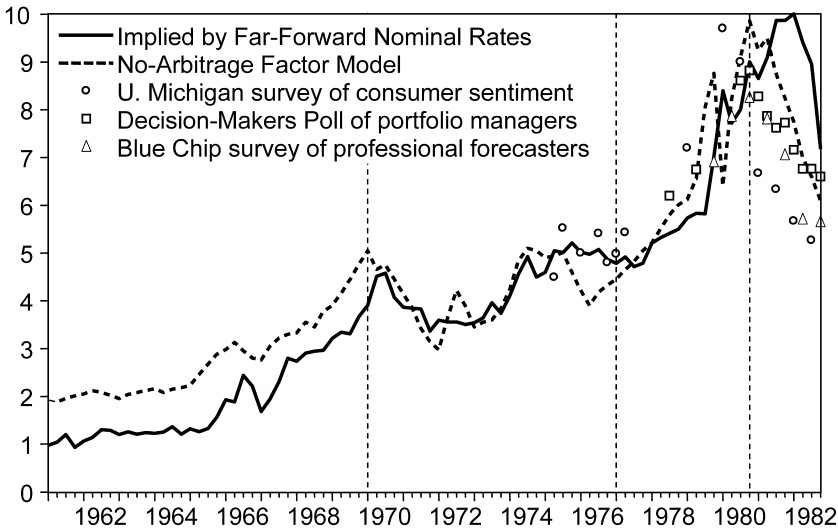


Fig. 4.2 The evolution of long-run inflation expectations, 1961–1982

Notes: The solid line depicts the forward rate of expected inflation six years ahead, using nominal forward rates computed by Gürkaynak, Sack, and Wright (2007) and subtracting a constant far-forward real rate of 2 percent and a constant term premium of 1 percent. The dashed line depicts the five-year expected inflation rate from the no-arbitrage factor model of Ang, Bekaert, and Wei (2008). The three survey measures of long-run inflation expectations are defined in the notes to table 4.1.

analytical framework utilizes latent factors and allows for Markov switching among four different regimes, and was estimated using data over the period 1952:2 to 2004:4 for CPI inflation and zero-coupon Treasury yields at four maturities (1, 4, 12, and 20 quarters).

As shown by the dashed line in figure 4.2, the five-year average expected inflation rate produced by the no-arbitrage factor model of Ang, Bekaert, and Wei (2008) moves largely in parallel with the measure implied by far-forward nominal interest rates. During the early 1960s, the no-arbitrage measure is nearly a percentage point higher than the measure based on far-forward rates, because the factor model implies that the real interest rate and the inflation risk premium were a bit below their historical averages during this period. (Of course, that implication might change if the Livingston Survey were incorporated into the estimation procedure.) More broadly, however, the factor model underscores the findings noted earlier: inflation expectations were relatively low and stable during the early 1960s, began rising steadily in 1965, and reached a peak of about 5 percent by 1970.

Moreover, while no direct surveys of long-run inflation expectations were conducted during this period, the view that the Great Inflation started around 1965 is certainly corroborated by the general tenor of media reports,

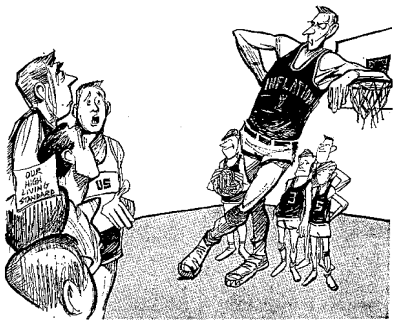
November 1965

"Latest paddle at the Washington woodshed"

November 1966

"Could stand some escalation."

February 1969



"He keeps getting bigger and bigger all the time."

December 1969

"Signals—hut... hut?"

Fig. 4.3 Perspectives on the early years

Sources: Upper left, Edward Kuekes, *Cleveland Plain Dealer,* reprinted in *New York Times* (*NYT*) on November 28, 1965; *upper-right,* Don Hesse, *St. Louis Globe-Democrat,* reprinted in *NYT* on November 27, 1966; *lower-left,* Bil Canfield, *Newark Evening News,* reprinted in *NYT* on February 2, 1969; lower-right, Bil Canfield, *Newark Evening News,* reprinted in *NYT* on December 7, 1969.

congressional hearings, and academic conferences through the remainder of the decade. Indeed, as shown in figure 4.3, editorial cartoons provide contemporary evidence of widespread public concerns about the upward drift in inflation from 1965 to 1969.

In summary, the evidence from the Livingston Survey and from bond yield data demonstrates conclusively that the roots of the Great Inflation can be traced back to around 1965. This conclusion is consistent with the broad assessment of DeLong (1997), who argued that the Great Inflation began well before 1970.

Stylized Fact 2: Long-run inflation expectations remained at a plateau of about 4 to 5 percent during the first half of the 1970s and shifted upward rapidly over the remainder of the decade. In the mid- to late 1970s, several surveys of inflation expectations began to include questions regarding respondents' expectations at longer horizons. In spring 1975, for example, the University of Michigan's survey of consumer sentiment started asking occasionally about the expected average CPI inflation rate over the next five to ten years. In mid-1978, Richard Hoey's "Decision-Makers Poll" of institutional portfolio managers started including an occasional question about the expected average CPI inflation rate over the coming decade.[7] And in fall 1979, Blue Chip Economic Indicators began asking about the longer-run outlook in its survey of professional forecasters, including a question about the expected ten-year average inflation rate for the gross national product (GNP) deflator.[8]

Table 4.1 reports the median value of the long-run inflation projections from each of these three surveys over the period from 1975 through the end of 1980; these survey results are also plotted in figure 4.2. Although the timing of the surveys is quite uneven over this period, the results can be directly compared in 1979 and 1980, and the degree of consistency in long-run inflation expectations across the three groups of respondents—households, institutional portfolio managers, and professional forecasters—seems particularly remarkable in light of the volatility of actual inflation over this period.

Moreover, as shown in figure 4.2, these survey-based measures of long-run inflation expectations line up quite closely with the two indicators derived from the term structure of nominal interest rates, further bolstering our confidence that these measures serve as useful gauges of the evolution of long-run inflation expectations.

The Michigan survey indicates that household expectations regarding the longer-run inflation outlook stayed in the range of 4.5 to 5.5 percent from mid-1975 until early 1977, a range that is very similar to that of the two expectations measures derived from bond yield data and to the levels of these two measures at the beginning of the decade. Evidently, long-run inflation expectations had remained around this plateau since about 1970; that is, policymakers were not successful in bringing down long-run inflation

7. The Decision-Makers Poll was initiated when Richard B. Hoey was employed at Bache, Halsey, Stuart, & Shields, and he continued to conduct the survey when he moved to Warburg, Paribus, & Becker, then to Drexel, Burnham, Lambert, and finally to Barclays de Zoete Wedd Research. The number of respondents varied between 175 and 500 and included chief investment officers, corporate financial officers, bond and stock portfolio managers, industry analysts, and economists. Although the survey was originally disseminated via proprietary newsletters, Holland (1984) received permission to publish the median survey responses for long-run inflation expectations; see also *Economic Report of the President* (1985, chapter 1), Havrilesky (1988), and Darin and Hetzel (1995).

8. Although Blue Chip Economic Indicators is a proprietary survey, the median responses for long-run inflation expectations are publicly available for 1979 to 1991 and can be downloaded from http://www.philadelphiafed.org.

Table 4.1 Surveys of long-run inflation expectations, 1975–1980

	Michigan survey (households)	Decision-Makers Poll (portfolio managers)	Blue Chip survey (professional forecasters)
1975			
Q2	4.5	—	—
Q3	5.5	—	—
1976			
Q1	5.0	—	—
Q3	5.4	—	—
Q4	4.8	—	—
1977			
Q1	5.0	—	—
Q2	5.4	—	—
1978			
Q3	—	6.2	—
1979			
Q1	7.2	—	—
Q2	—	6.8	—
Q4	—	—	6.9
1980			
Q1	9.7	—	—
Q2	—	—	7.9
Q3	9.0	8.6	—
Q4	—	8.8	8.3

Notes: This table reports the median of respondents' projections for three surveys: the University of Michigan survey of consumer sentiment asked about average CPI inflation over the next five to ten years; the Decision-Makers Poll survey of institutional portfolio managers asked about average CPI inflation over the next ten years; and the Blue Chip Economic Indicators survey of professional forecasters asked about the average GNP price inflation rate over the next ten years.

expectations but did at least manage to avoid any marked upward shift over the period through early 1977.

Starting in mid-1977, however, long-run inflation expectations began rising at an alarming pace. The Michigan survey indicates that these expectations rose sharply from 5 percent in early 1977 to around 7 percent by early 1979 and to more than 9 percent by early 1980. The results of the Decision-Makers Poll are very similar, with long-run inflation expectations rising from about 6 percent in mid-1978 to about 7 percent in mid-1979 and to nearly 9 percent by 1980. Again, these trajectories are very close to those of the two indicators derived from term structure data, which rose from 5 percent in early 1977 to about 8.5 percent by early 1980.

Stylized Fact 3: Long-run inflation expectations did not begin to ebb until late 1980. Long-run inflation expectations did not start shifting downward until late 1980. This characteristic is apparent from the two indicators derived from term structure data as well as from the survey-based measures. In the Decision-Makers survey, for example, long-run inflation expectations

rose from 6 3/4 percent in mid-1979 to about 8 1/2 percent in mid-1980, and then peaked at about 8 3/4 percent that October; indeed, this measure did not return to around 6 3/4 percent until spring 1982. Similarly, the Blue Chip survey measure of long-run inflation expectations was around 7 percent in fall 1979—the first time that this question was included in the survey—but rose to about 8 percent in spring 1980 and peaked at 8 1/4 percent in fall 1980.

The absence of any noticeable decline—and indeed, perhaps even a further pickup—of long-run inflation expectations in 1980 appears to have reflected continuing skepticism about the prospects for making lasting progress on the inflation front. Editorial cartoons, such as those shown in figure 4.4, can provide a distinct perspective regarding that skepticism. In particular, the broad tenor of editorial cartoons in early 1980 was essentially unchanged from a year earlier, exhibiting only limited confidence that policymakers would take decisive steps to reverse the upward drift in inflation.

In October 1979, about two months after Paul Volcker was appointed chairman of the Board of Governors, the Federal Reserve switched operating procedures, resulting in an unprecedented jump in the federal funds rate and other short-term interest rates. At least initially, the switch in operating procedures may have appeared to be aimed primarily at stemming the upward spiral of actual and expected inflation rather than at bringing the inflation rate down. For example, Volcker told the Joint Economic Committee in February 1980 that those policy measures signaled "unwillingness to finance an accelerating rate of inflation" (Volcker 1980, 77)

Given that a shift in monetary policy tends to affect aggregate demand and inflation with "long and variable lags" (Friedman 1961, 464), it would have been reasonable to anticipate that several quarters might pass before seeing clear evidence of the impact of the October 1979 policy measures. Nevertheless, the Carter administration was apparently reluctant to wait that long, perhaps in part because of the approaching presidential primaries and a general election later in the year.[9] As the administration later explained, "Early in 1980, there were few signs of recession. If anything, activity seemed to be picking up. . . . By early March, there was fear that inflationary pressures . . . were mounting . . . and that without some additional action, these would . . . lead to an explosion of prices" (*Economic Report of the President,* January 1981, 160–61).

In mid-March 1980, President Carter issued an executive order authorizing the Federal Reserve to impose controls on the growth of credit. President Carter explained the rationale as follows: "The traditional tools used by the

9. As noted by Schreft (1990), Senator Edward Kennedy—Carter's major opponent for the Democratic Party nomination—gave a campaign speech in January 1980 describing inflation as "out of control." Moreover, contemporary newspaper accounts indicated that Carter's advisers "hoped that the anti-inflation program [announced in March] would be accepted by the public, thus giving the President an advantage over the other contenders for the Democratic nomination." (Schreft 1990, 35)

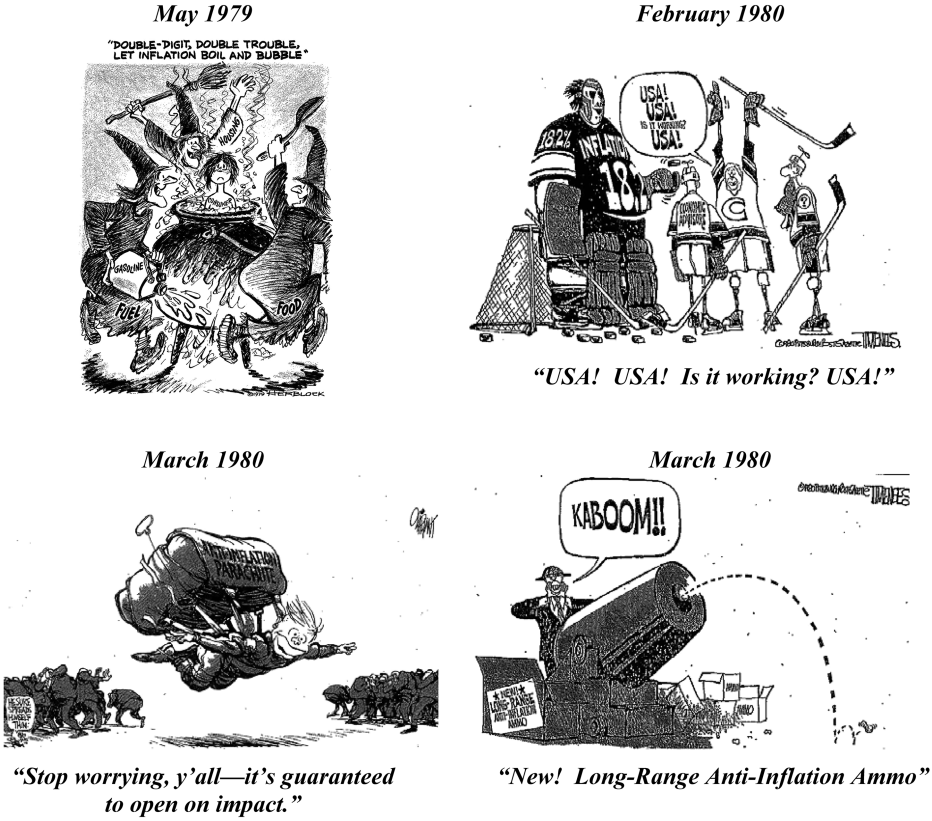


Fig. 4.4 Perspectives on the final years of the Great Inflation (1979–1980)

Sources: upper-left, A 1979 Herblock Cartoon, copyright by The Herb Block Foundation; *upper-right and lower-right,* Tim Menees, copyright (c), *Pittsburgh Post-Gazette,* 2012; *lower-left,* Pat Oliphant, (c) 1980 Universal Uclick, reprinted with permission, all rights reserved.

Federal Reserve to control money and credit expansion are a basic part of the fight on inflation. But in present circumstances, those tools need to be reinforced so that effective restraint can be achieved in ways that spread the burden reasonably and fairly" (Carter 1980, 7–8). Using that authority, the Federal Reserve initiated the Credit Restraint Program (CRP), a set of measures that included voluntary restraints for a wide range of financial institutions as well as the imposition of reserve requirements for all lenders (not just commercial banks) on increases in certain types of consumer credit.[10]

10. Schreft (1990, 35–38) provides a detailed description of the CRP, which also included four other measures: an increase in the marginal reserve requirement on managed liabilities of large banks; a special deposit requirement on additions to the managed liabilities held by nonmember banks; a special deposit requirement on any additional assets held by money market mutual funds; and a surcharge on the discount window borrowings of large banks.

Although the CRP was not expected to have a major impact on consumer behavior, incoming data during spring 1980 revealed sharp declines in credit aggregates, retail sales, and business spending. Even though the credit controls were eased substantially during May, "the economy was so weak by late June that the controls were nonbinding" (Schreft 1990, 43). The Federal Reserve announced the phaseout of the CRP in early July, less than four months after the credit controls were imposed.

After the sharp drop in economic activity during the second quarter of 1980, economists generally anticipated that the contraction would continue through the end of the year and would be nearly as severe as the 1974 to 1975 recession. Under the Federal Reserve's operating procedures, however, broad monetary aggregates recovered quickly during late spring and summer, and relatively accommodative monetary conditions apparently contributed to an unexpectedly brisk pace of economic recovery. For example, M1 (which had grown at an annual rate of about 7.5 percent from October 1979 through February 1980 and then dropped sharply during March and April) exhibited a robust growth rate of about 15 percent from June through September 1980. Meanwhile, the federal funds rate (which was around 13 percent during fall 1979 and winter 1980) dropped to around 9 percent in spring 1980 and remained at that level through September. Over the same period, core CPI inflation was also running at an annual rate of about 9 percent, and the short-term inflation expectations in the Livingston Survey remained close to 10 percent—about the same level as in late 1979.

Thus, looking at the entire period from October 1979 through September 1980, the evolution of monetary and credit conditions likely contributed to the variability of real economic activity but did not succeed in bringing down actual or expected inflation. In contrast, long-term inflation expectations finally began to recede after the Volcker Fed maintained its disinflationary policy during 1981 and 1982 despite the sharp contraction in economic activity.

4.3 An Empirical Model of Monetary Policy during the Great Inflation

In this section, we gauge the stance of monetary policy in terms of the ex ante short-term real interest rate—that is, the federal funds rate less the Livingston Survey of one-year-ahead expected inflation—and we formulate an empirical model of the evolution of monetary policy during the Great Inflation period. A number of previous studies (including Clarida, Galí, and Gertler 1998 and Taylor 1999) have focused on interest rate rules with fixed coefficients and have shown that monetary policy did not satisfy the Taylor principle over this period; that is, the federal funds rate was not raised by more than one-for-one in response to movements in actual inflation as would be implied by the Taylor (1993) rule. Here we extend that earlier analysis by allowing for discrete shifts in the intercept of the policy rule. This approach is useful in accounting for the possibility of occasional upward shifts in the

Federal Reserve's implicit inflation objective—as suggested by the evidence on long-run inflation expectations—and provides a representation for the stop-start pattern of policy tightening and easing that we discussed in the previous section.

To see this, let

$$r_t = \bar{r} + \gamma_\pi (\pi_t - \pi^*) + \gamma_y (y_t - y_t^*), \tag{1}$$

where r_t is the short-term real interest rate, π_t is the actual inflation rate, π^* is the central bank's objective for the inflation rate, and $y_t - y_t^*$ is the output gap. If the slope coefficients $\gamma_\pi = \gamma_y = 0.5$, then the real interest rate should be raised by 50 basis points in response to a 1 percentage point increase in the inflation rate relative to target or the output gap. We assume that $\bar{r} = 2$ is the steady-state value of the real interest rate. We now proceed to show that by permitting simple shifts in the implicit inflation objective π^*, equation (1) provides a good fit of the real interest rate during the Great Inflation. We first must describe how we measure the other variables in the equation.

4.3.1 Measuring the Real Interest Rate

When inflation is fairly inertial, the current inflation rate may provide a reasonable estimate for expected inflation going forward. In such a situation the real interest rate can be computed by subtracting the current inflation rate from the nominal rate. In that case, equation (1) can be written with the nominal rate on the left-hand side and the inflation rate added to the right-hand side, yielding the Taylor rule. But if inflation is more variable—as in the Great Inflation period—it is necessary to get a better measure of inflation expectations. For this purpose, we use the Livingston Survey of one-year-ahead CPI inflation projections. An advantage of this measure is that it was available nearly two decades prior to the onset of the Great Inflation. Accordingly, our analysis focuses on the real federal funds rate at a quarterly frequency, computed by subtracting the Livingston Survey measure from the quarterly average of the nominal federal funds rate.[11]

4.3.2 Measuring the Output Gap and the Inflation Rate

As emphasized by Orphanides (2002, 2003), the use of real-time estimates of the output gap—as opposed to retrospective estimates constructed at a much later date—can have crucial implications in making assessments of the stance of monetary policy, especially because the difference between real-time versus retrospective estimates of the output gap may be quite large during periods in which there are substantial shifts in trend productivity growth or the natural unemployment rate.

There are no extant records from the 1960s or 1970s regarding real-time

11. The Livingston Survey is conducted semiannually, in May and November; thus, we use linear interpolation to obtain a quarterly time series of one-year-ahead inflation expectations.

Federal Reserve staff estimates of potential output or the output gap. Thus, following Orphanides (2002, 2003), one approach is to utilize the real-time assessments of potential output and the output gap that were constructed by the Council of Economic Advisors (CEA) and published annually in the *Economic Report of the President (ERP)*. And during the late 1960s, those estimates may well serve as a useful real-time proxy for the assessments that would have been relevant for policymakers at that time. Unfortunately, however, as the CEA estimates became increasingly politicized during the 1970s, neither economic analysts nor policymakers continued paying serious attention to these estimates.

Therefore, following the approach of Cecchetti et al. (2007), we construct another proxy for the real-time output gap by applying a one-sided Hodrick-Prescott (HP) filter to each vintage of real GNP drawn from the Philadelphia Fed's real-time data set, using a smoothing parameter of 1,600.[12] While the Hodrick-Prescott method was not available in the 1970s, it corresponds well with less formal procedures economic analysts use to assess trends.[13]

As shown in figure 4.5, the HP filtered series for the real-time output gap is very similar to the CEA series during the late 1960s, but the two measures diverge quite dramatically starting in 1970. In particular, from 1966 to 1969, both series imply that the output gap was fairly close to zero—roughly 5 percentage points below the Congressional Budget Office's (CBO's) most recent retrospective estimate, which we henceforth refer to as the "true" output gap. In contrast, the CEA estimates indicate a dramatic widening of the output gap through the mid-1970s; indeed, the trough of about –15 percent during 1975 suggests that the magnitude of slack in the economy was approaching that of the Great Depression—an implication that underscores the pitfalls of using the CEA series as a real-time measure of the output gap. In contrast, the HP filtered measure remains only a few percentage points below the "true" output gap through the early 1970s, reaching a trough of about –6 percent in early 1975 before recovering sharply and then remaining positive from 1976 through 1979.

We measure actual inflation using the realized four-quarter average CPI inflation rate at each date; that is, the same definition of inflation as in the Livingston Survey projections. For this measure of inflation, there is no distinction between real-time versus revised vintages of data, because the CPI is not subject to revision.

4.3.3 Discrete Shifts in the Implicit Inflation Objective

Now consider the inflation objective, π^*. Of course, policymakers did not have an explicit inflation goal during the 1960s and 1970s. As an empiri-

12. We have confirmed that the results are virtually identical for alternative values of the smoothing parameter.

13. Nikolsko-Rzhevskyy and Papell (2009) analyze the implications of alternative proxies for the real-time output gap based on linear and quadratic detrending procedures.

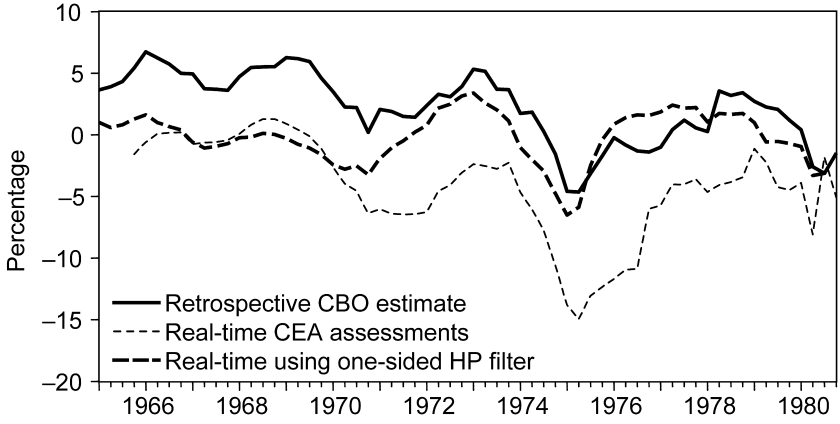


Fig. 4.5 Real-time versus final assessments of the output gap

Notes: This figure depicts three estimates of the output gap over the period 1965:1 through 1980:4. The solid line depicts the retrospective estimates of the CBO, using all data available through 2007. The short-dashed line depicts the contemporaneous estimates of the CEA, published annually in the *Economic Report of the President.* The long-dashed line depicts the estimate obtained by applying a one-sided Hodrick-Prescott filter to each vintage of real GNP taken from the Federal Reserve Bank of Philadelphia's real-time data set.

cal matter, however, discrete shifts in the implicit inflation objective can be detected by testing for structural breaks in the regression intercept for equation (1).

Figure 4.6 provides a graphical depiction of these structural breaks by comparing the evolution of the short-term real interest rate with prescriptions of the Taylor (1993) rule, using three alternative values of the implicit inflation goal: 1 percent, 5 percent, and 8 percent. This figure highlights a sequence of three stop-start episodes that appear to have occurred in 1968 to 1970, 1974 to 1976, and 1979 to 1980.

In each of those episodes, the stance of monetary policy evolved in three distinct stages: (1) policy remained passive while inflation begins to pick up; (2) policy shifted to a contractionary stance once the inflation rate exceeded a particular threshold, where the value of the threshold depended on the previous inflation peak; and (3) contracting economic activity caused the policy tightening to stop before inflation converged back to its initial rate. While the stance of monetary policy followed a roughly similar stop-start pattern in each case, it should be noted that the underlying reasons for that pattern differ across the three episodes: in 1970 and in 1976, policymakers intentionally shifted to a more accommodative stance, whereas the 1979 to 1980 episode occurred during a period in which the Federal Reserve employed a reserves-oriented operating procedure to control money supply growth while the federal funds rate evolved endogenously.

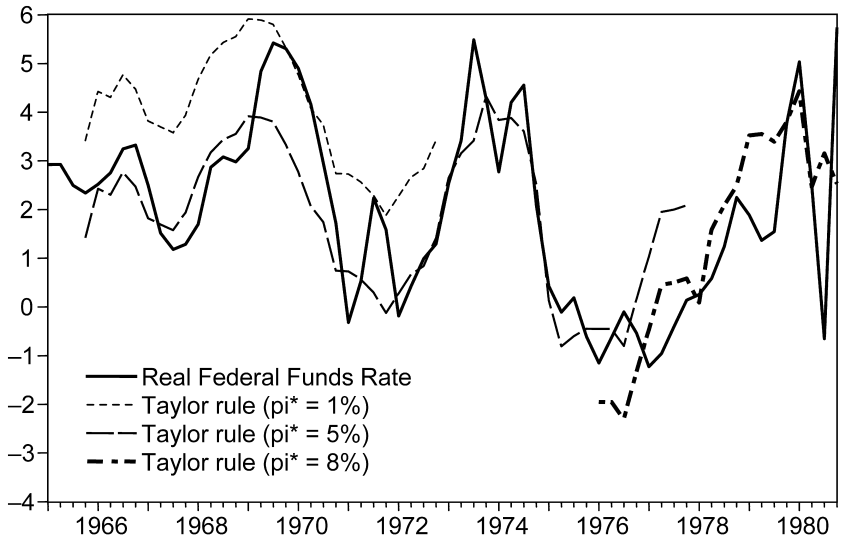


Fig. 4.6 Three episodes of start-stop monetary policy, 1965–1980

Notes: The solid line depicts the ex ante real federal funds rate, using the Livingston Survey as the measure of expected inflation. The other lines depict prescriptions of the Taylor (1993) rule for three specifications of the inflation objective: 1 percent (short-dashed), 5 percent (long-dashed), and 8 percent (dash-dotted).

4.3.4 Regression Analysis

The graphical implications of figure 4.6 are confirmed by regression analysis of a policy rule that incorporates interest-rate smoothing and that allows for discrete shifts in the regression intercept, using quarterly data for the period 1965q4 to 1980q3. The regression equation has the following form:

$$(2) \qquad FFR_t = c_0 + \rho FFR_{t-1} + (1-\rho) \\ [\alpha(PI4CPI_t - \delta_1 DUM70_t - \delta_2 DUM76_t) + \beta YGAP_t],$$

where FFR is the federal funds rate, PI4CPI is the four-quarter-average CPI inflation rate, YGAP is the one-sided HP-filter estimate of output gap, DUM70 equals 1 for $t \geq$ 1970q2 and 0 otherwise, and DUM76 equals 1 for $t \geq$ 1976q1 and 0 otherwise.[14] It should be noted that the first dummy variable allows for the possibility of a shift in the implicit inflation objec-

14. This reaction function is specified in terms of the contemporaneous values for the CPI inflation rate and the one-sided HP-filtered output gap, consistent with policymakers' careful monitoring of the latest data releases and other economic news. An alternative approach would be to specify the reaction function solely in terms of lagged values of the output gap, thereby implying that policymakers had no current-quarter information about real economic activity. Both hypotheses can be nested in a single policy reaction function; the regression results for that nested specification (not shown here) confirm that the contemporaneous output gap is statistically significant while the coefficient on the lagged output gap is close to zero.

Table 4.2 **Regression evidence on start-stop monetary policies during the Great Inflation**

Variable	Coefficient	Std. error	*t*-statistic
OLS estimation without shifts in intercept			
c_0	0.15	0.39	0.37
ρ	0.83	0.11	7.54
α	1.07	0.34	3.08
β	1.82	1.33	1.36
OLS estimation allowing for intercept shifts			
c_0	0.40	0.36	1.11
ρ	0.61	0.10	5.89
α	1.41	0.20	7.08
β	1.24	0.38	3.30
δ_1	1.94	0.49	3.97
δ_2	2.10	0.53	3.93
IV estimation allowing for intercept shifts			
c_0	0.31	0.37	0.84
ρ	0.70	0.12	5.81
α	1.48	0.28	5.21
β	1.53	0.62	2.44
δ_1	2.05	0.62	3.30
δ_2	2.21	0.68	3.26

Notes: The upper and middle panels report the results of ordinary-least squares (OLS) estimation of equation (2), and the lower panel indicates the results of instrumental variable (IV) estimation, where the instruments include a constant, DUM70, DUM76, the lagged values of PI4CPI and YGAP, and two lagged values of RFFE.

tive when Arthur Burns became Federal Reserve chairman, and the second dummy variable allows for another shift that occurred at the onset of the election year of 1976.

As shown in the top panel of table 4.2, the regression results in the absence of intercept shifts (that is, imposing the restriction $\delta_1 = \delta_2 = 0$) are very similar to those reported in earlier studies. In particular, the estimated policy rule exhibits a very high degree of interest-rate smoothing ($\rho = 0.83$) and a fairly aggressive response to the output gap ($\beta = 1.85$). Moreover, the coefficient on inflation is very close to unity, confirming that policy did not satisfy the Taylor principle during this period; that is, the stance of policy was not tightened sufficiently to stabilize inflation around a constant objective.

Now consider allowing for shifts in the regression intercept in 1970q2 and 1976q1. From the middle panel of table 4.2, it is evident that these dummy variables are highly significant, with *t*-statistics exceeding 4, and the estimated coefficients δ_1 and δ_2 indicate that the Fed's implicit inflation objective rose by about 2 percentage points at each of these dates. Indeed, while these two breakdates have been treated as known a priori (based on the key points in Burns' tenure as Federal Reserve chairman), the significance levels

are so high that breaks close to these two dates would be confirmed even by procedures that test for the presence of structural breaks at an unknown set of dates and that tend to exhibit substantially lower empirical power. Moreover, once we account for these two shifts in the implicit inflation objective, the coefficient on inflation in the policy rule is significantly greater than unity. The statistical significance of this coefficient mainly reflects the relatively tight stance of monetary policy in 1974 and 1975 that was aimed at preventing the deterioration in the near-term inflation outlook from becoming embedded in longer-run inflation expectations.

Of course, given that the output gap and inflation rate are endogenously determined, ordinary least squares (OLS) regression only yields consistent estimates of the policy rule coefficients under a specific set of identifying assumptions, namely, that these two explanatory variables do not respond contemporaneously to adjustments in the federal funds rate.[15] Thus, it is helpful to perform sensitivity analysis via instrumental variables (IV) estimation, which does not require those identifying assumptions. As shown in the bottom panel of table 4.2, the IV estimates are essentially the same as the OLS estimates, but the standard errors are somewhat higher and hence the confidence intervals are correspondingly somewhat wider.

4.4 Assessing Some Prominent Explanations for the Great Inflation

What are the implications of these stylized facts about inflation expectations and the evolving stance of monetary policy? In our view, these facts raise serious doubts about most of the prominent explanations of the Great Inflation, point to an alternative explanation, and suggest a way to prevent reoccurrences in the future.

4.4.1 Faulty Economic Theories

The evidence in sections 4.2 and 4.3 is not consistent with the view that changes in economic theory were the primary source of swings in trend inflation—an interpretation that has previously been emphasized by one of us (Taylor 1997).[16] While the rise in actual and expected inflation during the second half of the 1960s—the height of the period when many economists supported the notion of a stable long-run Phillips curve—may suggest that economic theory had a significant impact on actual policy over that period, the rapid surge in inflation during the second half of the 1970s (by which point most economists had concluded that there was no long-run Phillips curve trade-off) raises strong doubts about such an explanation for the Great Inflation.

15. These identifying assumptions are frequently employed in structural vector autoregression (VAR) analysis of monetary policy shocks; cf. Christiano, Eichenbaum, and Evans (1999) and Hetzel (2008, 276) for further discussion.

16. See also Romer and Romer (2002a, 2002b, 2004).

Our assessment of the limited role of faulty economic theories in the Great Inflation is consistent with the narrative analysis of Meltzer (2005, 2010a, 2010b). In particular, Federal Reserve Chairman William McChesney Martin Jr. was a pragmatist who "did not find economic models useful and . . . gave most attention to market data and market participants, not economists," while Burns was "an empirical economist who disdained deductive models," and most other Federal Open Market Committee (FOMC) members "were not ideologues or slavish adherents to a particular theory."[17] Meltzer also notes that the problem of inflation "was not new in 1965, and it was not new to Martin."[18] Indeed, Martin had been successful in ending two previous surges of inflation during the 1950s, and as discussed further later, the policy tightening that Martin initiated in 1969 presumably would have resulted in substantial disinflation if it had been maintained beyond the end of his term in January 1970.

4.4.2 Aggregate Supply Shocks

Over the past several decades, a number of studies have attributed the Great Inflation to the influence of adverse aggregate supply shocks (cf. Blinder 1982; Hetzel 1998; Mayer 1998; and Ireland 2007). According to this hypothesis, Federal Reserve policies systematically translated transitory shocks to the *price level* into persistent upward shifts in the *inflation rate*. Nonetheless, the evidence in section 4.2 on the evolution of inflation expectations is not consistent with the view that aggregate supply shocks were at the roots of the Great Inflation. First, the Livingston Survey and bond yield data indicate that inflation expectations started rising during the late 1960s, well before the onset of sharp increases in the prices of oil and other commodities.[19] Second, longer-run inflation expectations remained at around 4 to 5 percent from 1970 through 1975, despite the oil price shock triggered by the OPEC embargo in mid-1973. Third, longer-run inflation expectations spiraled upward from 1976 through mid-1979, a period when energy and commodity prices were relatively stable.

Moreover, the evidence in section 4.3 indicates that the Federal Reserve's response to the first OPEC oil shock was broadly in line with the prescriptions of the Taylor rule with an inflation goal of 5 percent. Actual consumer inflation jumped up nearly 9 percentage points from 1972Q4 through 1974Q4, reflecting the winding down of wage and price controls as well as the transitory effects of the OPEC oil price shock. The FOMC responded by tightening the stance of policy, and the federal funds rate rose from about 6 percent in January 1973 to 10 percent by autumn and to 12 percent in

17. Meltzer (2010b, chapter 7, 11).

18. Meltzer (2010a, chapter 3, 149).

19. Indeed, the analysis of Barsky and Kilian (2001) indicates that the OPEC oil price hike of 1973 was not an exogenous shock but instead was induced by the accommodative stance of monetary policy over preceding years.

mid-1974. Indeed, this policy tightening (which was criticized by numerous observers at the time) may have damped the response of inflation expectations to the oil price shock. In particular, one-year-ahead projections in the Livingston Survey rose about 3 percentage points, and the longer-run inflation expectations of bond investors appear to have moved up by around a percentage point or so.

4.4.3 Natural Rate Misperceptions

Some analysts have argued that policymakers' misperceptions of potential output growth and the natural unemployment rate were the primary reason that the stance of monetary policy was excessively accommodative in the late 1960s and the 1970s.[20] Our analysis indicates that such misperceptions may well have contributed to short-term inflation pressures over this period but cannot explain the evolution of longer-run inflation expectations and hence do not provide a complete account of the causes of the Great Inflation.

From an analytical perspective, policymakers' misperceptions of natural rates tend to induce persistent errors in the setting of the policy instrument, which in turn causes inflation to deviate from the longer-run goal. Nevertheless, such policy mistakes and the associated inflation outcomes should be *transitory,* as long as the inflation goal itself remains fixed and credible. In particular, the private sector should anticipate that policymakers will gradually revise their natural rate estimates in response to incoming information—including inflation outcomes that are persistently higher than expected—and hence that the stance of monetary policy will subsequently be adjusted to bring the inflation rate back to the specified goal. Thus, in the absence of any other considerations, this hypothesis implies that the private sector's longer-run inflation expectations should remain stable even if actual inflation is elevated due to policymakers' natural rate misperceptions.

In contrast, as we have seen in section 4.2, longer-run inflation expectations did indeed shift up markedly during the Great Inflation. In effect, by 1970, investors appear to have lost confidence that policymakers would take sufficient actions—even over a horizon of five or ten years—to bring inflation back to the level of about 1 to 2 percent that had prevailed during the mid-1950s and early 1960s. As for the late 1970s, surveys of consumers and professional forecasters as well as Treasury bond data indicate that inflation expectations became completely unhinged. In contrast, longer-run inflation expectations remained fairly stable at around 4 to 5 percent during the first half of the 1970s—precisely the period over which Orphanides (2002) concluded that policymakers' natural rate misperceptions were particularly large.

Although narrative evidence is inherently subject to alternative interpretations, our reading of that evidence appears to be consistent with Meltzer

20. See Orphanides (2002, 2003).

(2005, 2010a, 2010b) in casting doubt on the degree to which natural rate misperceptions played a fundamental role in explaining the Great Inflation. The following points are noteworthy.

Martin served as Federal Reserve chairman from April 1951 through January 1970. When inflation began rising in 1965 to 1968, Martin delayed tightening mainly due to concerns about coordination with anticipated adjustments in fiscal policy, particularly the expectation—supported by the analysis of Federal Reserve staff and of the Council of Economic Advisors—that the tax surcharge that was finally enacted in May 1968 would curtail aggregate demand and induce a significant decline in inflation.[21] Nonetheless, Martin recognized the pitfalls of having kept monetary policy on hold, noting in December 1967: "The horse of inflation is out of the barn and already well down the road. We cannot return the horse to the barn . . . but we can prevent it from trotting too fast."[22] In 1969, after it became clear that the tax surcharge had not restrained aggregate demand or inflation, the Federal Reserve moved decisively to tighten the stance of policy. In a front-page interview with *The New York Times,* Martin stated:

> It appears that the Federal Reserve was overly optimistic in anticipating immediate benefits from fiscal constraint . . . but now we mean business in stopping inflation. . . . A credibility gap exists in the business and financial community as to whether the Federal Reserve will push restraint hard enough to check inflation. The Board means to do so and is unanimous on that point. (*New York Times,* February 27, 1969, 1)

The funds rate rose from 6 percent in early January to around 9 percent by June—that is, the ex ante real funds rate increased from a roughly neutral value of about 2 percent to a very tight level of around 5 percent—and the Federal Reserve maintained that stance of policy through the end of Martin's term in January 1970.[23] Following the appointment of Arthur Burns to succeed Martin in February 1970, however, the Federal Reserve reversed course.[24] As a consequence, the funds rate declined about 4 percentage points over the course of the year, even though trend inflation and inflation expectations had not turned downward.

By the mid-1970s, policymakers were well aware of the difficulties in estimating potential output and the natural unemployment rate. For ex-

21. See the discussion in Bremner (2004, 251–56). Meltzer (2010a) notes that as of late spring 1968, the Federal Reserve and the Administration had similar macroeconomic forecasts in which "inflation would fall gradually to about 2.5 percent by mid-1969" (chapter 4, 49).

22. FOMC Minutes, December 12, 1967, 98.

23. Martin filled the remainder of his predecessor's term as Federal Reserve governor from 1950 to 1956 and was then appointed to a full fourteen-year term on February 1, 1956. Because no Federal Reserve governor may serve more than one full term, January 31, 1970 also marked the conclusion of Martin's final four-year term as Federal Reserve chairman.

24. Maisel (1973) described the discussion at Burn's first FOMC meeting on February 10, 1970 as "the most bitter debate I experienced in my entire service on the FOMC" (250). See also Meltzer (2010b, chapter 6).

ample, in testimony to the Joint Economic Committee in February 1976, Burns "firmly rejected the idea that anyone could give an accurate numerical value for full employment. Any number was both unreliable and subject to change."[25] Similarly, at the May 1978 FOMC meeting, Federal Reserve staff indicated that estimating the natural rate of unemployment was "a very difficult problem," and committee members referred to a wide range of estimates.[26]

In summary, the narrative evidence confirms that natural rate misperceptions did not play a significant role during the onset of the Great Inflation (1965–1970) and were not the key factor driving the surge in actual and expected inflation during the late 1970s.

4.4.4 Misperceptions of the Sacrifice Ratio

A number of studies have emphasized the extent to which policymakers' misperceptions of the sacrifice ratio may have played a key role in the Great Inflation.[27] Indeed, the narrative evidence suggests that concerns about the prohibitive cost of disinflation may well have contributed to the marked shift in the stance of monetary policy during 1970. According to the minutes of a Federal Reserve Board meeting in November 1970, Chairman Burns stated that "the Federal Reserve could not do anything about [union wage pressures] except to impose monetary restraint, and he did not believe the country was willing to accept for any long period an unemployment rate in the area of 6 percent. Therefore, he believed that the Federal Reserve should not take on the responsibility for attempting to accomplish by itself, under its existing powers, a reduction in the rate of inflation to, say, 2 percent."[28]

Nevertheless, our evidence does *not* support the view that the ultimate magnitude of the Great Inflation can be attributed to misperceptions of the sacrifice ratio. In particular, a monetary policymaker with strong concerns about the sacrifice ratio would perceive the cost of reversing an upward shift in inflation expectations as prohibitively high and hence would rationally decide to keep inflation expectations anchored as firmly as possible. In contrast, as we have seen, the actual stance of monetary policy was highly accommodative during the final two years of Burns' chairmanship—with the ex ante real federal funds rate remaining at or below zero—even though consumer inflation was rising rapidly toward double-digit levels. Under Chairman Miller, the Federal Reserve shifted to a roughly neutral stance of policy but did not place any substantial downward pressure on inflation. As a result, longer-run inflation expectations (which had remained reasonably stable until 1977) picked up markedly by mid-1979.

25. Meltzer (2010b, chapter 7, 120).

26. Meeting Transcript, FOMC, May 16, 1978, 6. For further details of this discussion, see Meltzer (2010b, chapter 7, 71).

27. See Sargent (1999); Primiceri (2006); Sargent, Williams, and Zha (2006); among others.

28. Hetzel (1998) gives this excerpt from the minutes of the Federal Reserve Board meeting on November 16, 1970.

4.4.5 Time Inconsistency Problems

Some analysts have argued that the Great Inflation resulted from time inconsistency problems in the conduct of monetary policy.[29] In particular, under the assumption that the central bank cannot make credible commitments regarding the path of policy, the policymaker's incentive to produce inflationary outcomes is an increasing function of the natural rate of unemployment. Thus, at least in principle, an upward trend in the natural rate of unemployment during the 1960s and 1970s could have induced the coincident upward trend in inflation.

The evidence in sections 4.2 and 4.3 contradicts this hypothesis. First, actual and expected inflation moved up during the late 1960s, that is, *before* policymakers were even aware that the natural unemployment rate had shifted upwards. Second, longer-run inflation expectations remained at a plateau of about 4 to 5 percent from 1970 to 1975, whereas econometric analysis indicates that the natural unemployment rate continued rising steadily throughout the 1970s as a consequence of demographic shifts and technological factors. Finally, this hypothesis does not provide any motivation for the sequence of stop-start episodes that occurred over the course of the Great Inflation.

4.4.6 Political Factors

If all these explanations seem inconsistent with our data, then what factors generated the recurring sequence of stop-start policies and the corresponding upward drift of longer-run inflation expectations? We think the most plausible explanation is a combination of periodic political pressures on the Federal Reserve and a lack of clear guidelines that would have helped policymakers to resist those pressures.

One well-known example of such political pressure is the instance when President Johnson took Federal Reserve Chairman Martin "out to the woodshed" in December 1965, shortly after the Federal Reserve Board approved an increase in the discount rate.[30] Transcripts of President Nixon's office recordings have revealed the pressures faced by Chairman Burns in the early 1970s.[31] A variety of documents have underscored the political pressures on the Federal Reserve during the early years of the Carter Administration.[32]

29. See Kydland and Prescott (1977), Barro and Gordon (1983), and Ireland (1999), among others. For a contrary view, see Beyer and Farmer (2007).

30. A first-hand account of this episode is given in Califano (1991, 108–10). Further background is provided by Bremner (2004, 209–11).

31. See Abrams (2006). For example, shortly after announcing Burns' nomination as Federal Reserve chairman, Nixon had a private conversation with Burns and told him, "I know there's the myth of the autonomous Fed." Burns (1979) also highlighted these pressures: "My conclusion that it is illusory to expect central banks to put an end to the inflation that now afflicts the industrial economies does not mean that central banks are incapable of stabilizing actions; it simply means that their practical capacity for curbing an inflation that is driven by political forces is very limited" (29).

32. See Kettl (1986), Biven (2002), Weise (2008), and Meltzer (2010b).

In contrast, the conduct of monetary policy became relatively well-insulated from political pressures after the Great Inflation.[33] The clarification of Federal Reserve accountability that came with the introduction of regular monetary policy reports and testimony under the Full Employment and Balanced Growth Act (1978) likely helped defuse some of the political pressures on the Federal Reserve. And in the early 1980s, President Reagan voiced consistent strong support for Chairman Volcker's policies, thereby initiating a pattern of acknowledging the Federal Reserve's operational independence that was generally followed by subsequent administrations. Perhaps most importantly, by the late 1970s the general public became acutely familiar with the high costs of inflation, and that awareness has provided the ongoing foundation for monetary policies aimed at fostering price stability along with maximum sustainable employment.[34]

4.4.7 Lessons for the Future

If political factors are the primary explanation for the Great Inflation, then what actions might be taken to reduce the likelihood of a recurrence? Our analysis suggests that simple rules can be valuable in providing transparent benchmarks for the conduct of monetary policy. For example, the Taylor (1993) rule specifies a quantitative inflation objective of 2 percent and prescribes adjustments to the stance of policy that would be expected to foster the achievement of that objective over time. Moreover, this rule is specified in terms of the current inflation rate and output gap, thereby avoiding the pitfalls of relying on any given model for generating macroeconomic forecasts.

On occasion, of course, policymakers might find compelling reasons to modify, adjust, or depart from the prescriptions of any simple rule, but in those circumstances, transparency and credibility might well call for clear communication about the rationale for that policy strategy. For example, while the Taylor rule embeds a constant value of the equilibrium short-term real funds rate, denoted as r^*, economic theories and empirical evidence suggest that r^* may move gradually and persistently in response to a shift in the trend rate of total factor productivity growth. Thus, under circumstances of elevated uncertainty about trend productivity growth, there could be significant benefits from monitoring statistical and model-based indicators of r^*.

33. Some legislative measures in the mid-to-late 1970s gave an early sign of this trend. The Federal Reserve's monetary policy deliberations were specifically exempted from the requirements of the Government in the Sunshine Act (1975), and these deliberations were also exempted from the General Accounting Office (GAO) audits that were instituted under the Federal Banking Agency Audit Act (1978).

34. Meltzer (2010a) notes that in Gallup polls from 1978 to 1982, more than 50 percent of respondents listed inflation and the high cost of living as the *most important problem* facing the country.

4.5 Conclusion

In this chapter, we have characterized the evolution of long-run inflation expectations and the stance of monetary policy over the period from 1965 to 1980, and we have employed this evidence to distinguish among various competing explanations regarding the causes of the Great Inflation.

Using survey-based measures and financial market data, we have shown that long-run inflation expectations rose markedly from 1965 to 1969, remained elevated but stable through the mid-1970s, and then deteriorated at an alarming pace from 1977 to 1980. We have also shown that the course of monetary policy over this period is well represented by a sequence of stop-start episodes that occurred in 1968 to 1970, 1974 to 1976, and 1979 to 1980. In each case, belated policy tightening induced a contraction in economic activity, but that stance of policy was not sustained long enough to bring inflation back to previous levels.

Finally, we have shown that several prominent explanations of the Great Inflation do not stand up to the evidence and that the most plausible explanation is a combination of periodic political pressures on the Federal Reserve and a lack of clear guidelines that would have helped policymakers to resist those pressures. This analysis suggests that the risk of a recurrence of the Great Inflation—as well as other costly policy choices—could be addressed through the use of simple rules as benchmarks for the conduct of monetary policy.

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Comment Bennett T. McCallum

I enjoyed this chapter by Andrew Levin and John Taylor very much. I started studying economics in the early to mid-1960s, about the time that Levin and Taylor date the beginning of the Great Inflation, and moved into monetary economics as the inflation progressed. I recall discussing Volcker's announcement of October 6, 1979 with Allan Meltzer during a visit to Carnegie-Mellon just a week or so later. And I recall a telephone conversation with Marvin Goodfriend (at the Richmond Fed) during the summer of 1981 at a time at which the Federal Reserve was trying to decide whether to let the M1 growth rate climb back into its official target range, after finally getting it down to about 2 percent per annum.

Anyhow, the account given by Levin and Taylor rings true. More specifically, I think they are correct to redate the Great Inflation (GI) away from the "1970s" label, although I believe most of us have understood that to be the case, with the label used just as a shorthand. They date the episode as 1965 to 1980. A look at the data (see table 4C.1) shows that M1 growth rates were significantly higher after 1964 than before, so their start date seems about right.[1] Stating that the GI "ended in late 1980" seems a bit inadequate, however. The interest easing in spring 1980 came about after the imposition of credit controls, against the Fed's wishes, which precipitated a truly sharp fall in output. To me it was the tight money over the first two-thirds of 1981 that was crucial—the tightness shows up, by the way, in M1 growth figures when "adjusted" values used by the Fed at the time are taken into account. (Mine come from Broaddus and Goodfriend 1984.)

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1. It is also the case, though not documented here, that monetary base growth rates show a distinct increase around 1964.