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**SOME LIKE THE ECONOMY
HOT: OR, REVIVING THE
MONETARIST/KEYNESIAN
DEBATE**

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Global Health, and the Study of Business
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Some Like the Economy Hot: Or, Reviving the Monetarist/Keynesian Debate

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About the Series

The Studies in Applied Economics series is under the general direction of Professor Steve H. Hanke, co-director of the Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise (hanke@jhu.edu).

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Abstract

In 2017 and early 2018, inflation regularly fell below the FOMC's two-percent inflation target. To raise inflation, the FOMC pursued a policy of allowing growth to run above potential to create a positive output gap. A positive output gap would, it was assumed, create wage inflation, which would pass through to price inflation. This policy possessed the hallmarks of the activist policy of the 1970s. The question then arises of whether it will produce the same destabilizing go-stop cycle.

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**Some Like the Economy Hot:
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By Robert L. Hetzel

From mid-2012 and into 2018, inflation (12-month percentage changes in the core PCE deflator) mostly ran below the FOMC's two-percent inflation target. In 2017 and 2018, policymakers attempted to raise inflation by allowing the economy to run "hot," that is, by allowing real GDP to run above potential to create a positive output gap (negative unemployment gap). The strategy was "activist" in that policymakers attempted to manage a Phillips curve trade-off between changes in inflation and an output (unemployment) gap. It revived the activist character of policy in the 1970s. The issue then arises of whether a policy based on manipulation of a Phillips curve relationship can succeed. Does the monetarist critique of activist policy retain relevance for the FOMC's strategy for raising inflation?

Friedman (1960) proposed a rule for steady growth in money based on a "long-and-variable lags" critique of activist policy. Although instability in money demand has rendered his rule infeasible, its underlying prerequisites for an optimal rule remain. Namely, the FOMC should follow a rule that provides for a stable nominal anchor (price stability) and then allows markets to determine real variables. The assumption here is that these prerequisites for an optimal rule are the same as those implied by the of the New Keynesian (NK) model expounded by Goodfriend and King (1997). The issue then becomes whether this version of the NK model the relevant one for evaluating policy.

Section 1 points out the common activist character of the 2017-2018 policy and the earlier 1970s policy. Section 2 documents the activist character of the 2017-2018 FOMC strategy for raising inflation. A common reason advanced for the failure of monetary policy to maintain price stability in the 1970s avoids placing blame on activist policy by stressing the failure to adhere to the Taylor principle. According to this principle, the central bank should raise the real interest rate more than one-for-one with inflation. Section 3 questions whether violation of this principle accounted for the 1970s inflation. It also raises questions about treatment of empirically-estimated Taylor rules as structural as opposed reduced-form relationships. The contention here is that the identification of monetary policy is better handled through choice of different versions of the NK model.

Section 4 reviews monetary policy in the 1970s with an emphasis on the relevant characteristic for recent policy, namely, providing monetary stimulus until the actual appearance of inflation. Section 5 reviews the experience of the Great Recession not from the perspective of disruption to financial intermediation but rather from the perspective of the FOMC's attempt to lower inflation by allowing slack in the economy to develop. To provide insight into how the FOMC controls inflation, section 6 provides background on the longer-run behavior of inflation. Section 7 outlines the basic choices for the FOMC between activist and nonactivist policies.

1. The rebirth of activist monetary policy

In the 1970s, monetary policy was activist. Policymakers classified inflation under two broad headings: aggregate-demand and cost-push. With inflation on the y-axis and unemployment on the x-axis, a downward sloping Phillips curve provided a menu relating inflation to aggregate demand measured relative to the benchmark of full employment. The acceptance of 4 percent as full employment implied that the benchmark aggregate-demand-only Phillips curve would intersect the

horizontal axis at a 4-percent unemployment rate. The combination of positive inflation and unemployment rates above 4 percent implied that cost-push pressures had raised the Phillips curve from this benchmark. Policy then entailed trading off between a positive unemployment gap (unemployment above its NAIRU value) and price stability.¹ That is, the policymaker faced the cruel dilemma of mitigating the departure from price stability (allowing inflation) through creating a positive unemployment gap (unemployment above 4 percent). The appeal of incomes policies testified to the prevalence of this view.

In 2017-2018, monetary policy once again became activist. In the latter period, rather than using the Samuelson-Solow (1960 [1966]) Phillips curve described above, policymakers used the Modigliani and Papademos (1976) version relating changes in inflation to the difference between actual unemployment and the NAIRU. Aggregate-demand inflation would emerge with a sufficiently negative unemployment gap. Maintenance of inflation somewhat above the two percent target for an extended period would then raise expected inflation to make it compatible with the long-run two-percent inflation target.

2. The 2017-2018 FOMC strategy for raising inflation

In 2017 and the first half of 2018, the FOMC concentrated on raising inflation through a strategy of sufficiently limiting increases in the funds rate so that the economy would continue to grow moderately above potential and, through the concomitant declines in the unemployment rate, put pressure on wage inflation and thus on price inflation. The regular summary of commentary by FOMC participants in former Fed governor Larry Meyer's newsletter captured the views of monetary policymakers. For example, *Monetary Policy Analytics* (LHM 7/25/2017) summarized:

Chair Yellen continued to show faith that the Phillips curve relationship between the labor market and inflation would eventually assert itself: "We have seen increasing strength in the labor market that continues, and although there are lags in this process, I believe that that's something that, over time, will put upward pressure on both wages and prices." (7/13).... Many of her colleagues made similar remarks about the Phillips curve. President Dudley said: "We think if the labor market continues to tighten, wages will gradually pick up, and with that, we'll see inflation get back to 2 percent" (6/19).... President Kaplan said: "As we remove slack from the labor market, you're going to see ... with a time lag ... more wage pressure, and some of that will likely translate into greater inflation pressure" (7/13).²

¹ James Tobin (1980) coined the term "NAIRU" or the "non-accelerating inflation rate of unemployment." When Friedman (1968 [1969]) revived the Wicksellian term "natural," Keynesians assumed that price rigidities riddled the economy and prevented markets from clearing. Fluctuations in aggregate demand impacted prices and output. There were then only pairs of prices and output. In contrast, Friedman argued that the price system worked to determine well-defined market-clearing values of real variables, in particular, a "natural" rate of unemployment. Only accelerating inflation could allow the central bank to maintain that rate. In contrast, Keynesians believed that the central bank could predictably manage changes in inflation through manipulating the difference between the unemployment rate and a NAIRU. The "sacrifice ratio," the man-years of excess unemployment required to change the inflation rate one percentage point, captured the relationship.

² Yellen's comments came from the Semiannual Monetary Report to Congress delivered to the Senate. Dudley's comments came from a Business Roundtable Breakfast Meeting in Plattsburgh, NY. Kaplan's comments accompanied delivery of an essay, "Assessment of Current Economic

William Dudley (4/18/18), president of the New York Fed, detailed the FOMC's strategy for raising inflation to the two-percent target. He first posed the question "How quickly to remove monetary policy accommodation...." Continued expansionary monetary policy ("accommodation") was desirable until above-potential growth in output and the concomitant decline in the unemployment rate pushed inflation above its two-percent target. Lack of knowledge of the unemployment rate serving as the dividing line between wage inflation and wage disinflation required its discovery through the actual appearance of inflation as unemployment declined. Dudley explained, "We do not directly observe the ... NAIRU. Rather, we only infer it from the response of wage compensation and price inflation as the labor market tightens."

Empirical estimates of the Phillips curve available as of 2018 revealed a flat line. That is, the unemployment rate varied with little movement in inflation. Without empirical guidance, policymakers were willing for the economy to grow above potential with a concomitant decline in the unemployment rate until visible signs of inflation (wage or price) appeared. Moreover, to be certain that inflation would rise, as well as to demonstrate the "symmetric" character of the inflation target, the FOMC intended to err on the side of allowing inflation to overshoot. Dudley explained, "[L]ast month's Summary of Economic Projections, or SEP, is instructive. Most FOMC participants—including me—have the unemployment rate moving considerably below their estimate of NAIRU by 2020, with inflation climbing slightly above 2 percent.... At the same time, the overshoot will require that monetary policy become contractionary at some time in the future." Dudley added, "Thus, the March SEP implies that most FOMC participants expect that monetary policy will need to become slightly restrictive in the years ahead."

Specifically, the SEP for the March 2018 FOMC meeting had participants' median estimate for potential ("longer-run") real GDP growth at 1.8 percent but with the median forecasts for growth in 2018 and 2019, respectively, at 2.7 and 2.4 percent. This above-trend growth implied a decline in the median projected unemployment rate to 3.8 percent and 3.6 percent, respectively, in 2018 and 2019 from 4.1 percent at the March meeting. Those projected unemployment rates were well below the FOMC's median estimate of the NAIRU (the "longer run" unemployment rate) of 4.5 percent. That is, the unemployment gap was negative and growing in magnitude. This exploitation of Phillips curve relationships would produce a measured increase in inflation to 2 percent in 2019 and 2.1 percent in 2021. The eventual restoration of the unemployment gap to zero would, however, require a period of below-trend output growth as implied by Dudley's statement that future policy would need to become "restrictive." Although the SEP is uninformative about the transition, the median projected unemployment rate rose from 3.6 percent in 2020 to 4.5 percent in the "longer run."

A strategy based on the ability to move the unemployment rate relative to its NAIRU value to effect changes in inflation has a counterpart in an ability to move predictably the real rate of interest relative to its "natural" value. Dudley expressed the stance of monetary policy in terms of the relationship between the short-term real rate of interest and "the neutral real ... short-term interest rate, or r^* ." By moving from a policy of "accommodation" to a "restrictive" policy, he meant that the short-term real rate would have to rise above r^* , but only after an extended period of expansionary monetary policy. That is, using as r^* the "longer run" median projected funds rate of 2.9 percent in the March 2018 SEP, the SEP had the median projected funds rate rising only gradually from 2.1 percent in 2018, to 2.9 percent in 2019, and to 3.4 percent in 2020. As stated in the language of the directive released after the May 2, 2018, meeting, "The stance of monetary policy remains accommodative.... The Committee expects that economic conditions will evolve in a

Conditions and Implications for Monetary Policy."

manner that will warrant further gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run.”

To be sure, financial markets would have to “cooperate.” That is, they could not turn an expansionary monetary policy into a restrictive one by pushing up bond rates significantly as happened with the May 2013 “taper tantrum.”³ The word “gradual” in the Directive reassured the bond market that long-term rates need not rise significantly. Market players, who envisaged historically low growth in real output and found credible the FOMC’s objective of inflation limited to a moderate overshoot of target, continued to keep bond rates at cyclically-low levels. Concerned about recession, as the FOMC raised short-term rates, markets focused on an inversion of the yield curve. They minimized the danger that the FOMC was “behind the curve” requiring a significant upward shift in the entire yield curve produced by an increase in inflationary expectations.⁴

Routine communication with the public by FOMC participants takes the form of a review of the economy and individual forecasts of the funds rate path. For example, the comments by President Harker of the Philadelphia Fed reported in LHM (5/25/18) were typical. “Harker thought the funds rate was ‘getting close’ to neutral, which he saw as 2.75% to 3% (May 24). In his view, ‘Let’s get to neutral and see how things play out, I would prefer to not be contracting the economy’ (May 21). Harker’s base case was three hikes in total this year.” (After the March FOMC meeting, the funds rate target range was 1.5 to 1.75 percent.)

Such comments are forecasts based on the underlying strategy not forward guidance representing commitment to a future funds rate path. What is relevant to policy is how the market translates this communication into its own funds rate forecasts and the resulting behavior of the entire yield curve. As of June 2018, markets were decidedly more dovish than the FOMC even though the market consensus had growth continuing well above trend. For example, Stanley (6/1/18) wrote:

Coming into today (June 1, 2018), fed funds futures showed that the market expects the Fed to move to around 2 ½% by the end of next year and to more or less peak out in that vicinity.... [B]ut economic momentum appears to be building, due in part to the tax cuts passed late last year, and I do not believe growth will be easily derailed.

Torsten Slok (6/3/18) wrote on the strength in the economy:

The top line in the chart below [Bloomberg Consensus Economic Forecasts] shows that the consensus expects 2.8% growth for every quarter until mid-2019. With CBO estimating potential GDP growth at 1.8% we are almost one percentage point above potential, which means that we will continue to see significant downward pressure on the unemployment rate....

In the past, when the FOMC wanted to communicate the need for a more aggressive tightening of policy, it raised the funds rate by ½ instead of ¼ percentage point, raised the funds rate between

³ Bond yields rose sharply in May 2013 when the FOMC announced that it would begin reducing (tapering) its purchases of bonds and mortgage-backed securities from the \$70 billion a month pace.

⁴ With the midpoint of the funds rate at 1.625 percent after the March 2018 meeting and a median projected value in the SEP of 3.4 percent for 2020, the median SEP forecast was for a 1 ¾ percentage point rise. At the same time, based on Fed funds futures, markets expected only about a one percentage point rise. See, for example, the commentary in Stanley (4/30/18.)

FOMC meetings, or under former discount rate procedures accompanied an increase with an increase in the discount rate (the gong effect). At present, a counterpart would be to raise the funds rate at an FOMC meeting that is not accompanied by a press conference. The fact that the FOMC has ignored the dovish market forecasts and the resulting fairly flat yield curve is a reflection of its strategy of allowing the economy to run above potential and the unemployment rate to continue to decline until inflation rises to two percent or somewhat higher.

Although in abeyance in the Volcker-Greenspan era, activist policy has always had adherents. For example, Joseph Stiglitz, member of the Council of Economic Advisors from July 1994 through February 1997 and chairman beginning June 1995, advanced the Clinton administration's position on monetary policy. By maintaining tight labor markets, monetary policy would be one of the instruments for assuring the success of welfare reform. According to Stiglitz, the FOMC should set successively lower targets for the unemployment rate until it saw inflation rising. The FOMC could then bring inflation back down at little cost. Furthermore, the FOMC might lower the equilibrium unemployment rate through hysteresis. Stiglitz (1997, pp. 9-10) wrote:

[I]f you hold the unemployment rate below the NAIRU for a year, the inflation rate rises by about .3 to .6 of a percentage point per year.... [I]f the Phillips curve is linear, then experimentation has zero expected cost—the cost of a deflation in terms of temporarily increased unemployment is exactly equal to the benefit of the lower unemployment that caused the inflation in the first place.... If the hysteresis effect proves important, then these conclusions are reinforced.

The current period is unheralded in that FOMC participants have openly communicated a strategy. In the past, the FOMC never communicated its monetary policy to the public in terms of a policy (a consistent strategy), much less a policy involving trade-offs. It communicated within a framework of forecasts of the economy in which in the long run it achieved its goals of price stability and full (“maximum”) employment. The forecasts were judgmental rather than model-based. If, period by period, the FOMC always chooses its settings for the funds rate optimally, then adverse outcomes necessarily come from outside shocks.⁵

3. Comparing policies requires identification of those policies

In the past, one has had to be a detective to discover the systematic character of monetary policy. That is, one has had to solve the issue of identification. Comparison of current policy with that of the 1970's requires confronting the issue of identification. At the same time, economists require a reaction function to estimate and simulate macro models. The empirical Taylor-rules literature has filled the void in FOMC communication. As argued below, however, this literature deals unsatisfactorily with the issue of identification. This section reviews the use of Taylor rules as reaction functions and then argues for identification in terms of choice of versions of the NK model.

⁵ At times, FOMC participants have noted that they look at a variety of model simulations as preparation for FOMC meetings. Such statements have the flavor of “trust me” because “I look at everything.” FOMC decision making is not disciplined by models in the sense of using models to understand the past evolution of the economy. As a result, there is no systematic procedure for learning from the past—what FOMC behavior (reaction function) has stabilized the economy and what behavior has destabilized it. Learning requires the admission of mistakes—a task not undertaken when communication entails exclusively judgmental forecasts with desirable outcomes.

The hypothesis advanced here is that in the stop-go era of the 1970s Taylor rules, properly estimated with real time data as in Orphanides (2002, 2004), are structural. In contrast, in the subsequent Volcker-Greenspan era, they are reduced forms. As a result, the empirical Taylor-rule literature fails to convey how policy moved from being destabilizing to being stabilizing in going from the stop-go era to the Volcker-Greenspan era known as the Great Moderation.

Formula (1) displays the Taylor (1999) rule. FFR is the funds rate. The constant term “2” is the benchmark interest rate around which the FOMC moves the real rate of interest in a way that trades off between misses in its inflation and output objectives. Inflation is π . The coefficients “.5” and “-2,” respectively, measure the strength of the response to misses of inflation from its two-percent target ($\pi - 2$) and unemployment from its NAIRU value ($u - u^*$) and are the ones reported in Yellen (4/11/12).

$$(1) \quad FFR = 2 + \pi + .5(\pi - 2) - 2(u - u^*)$$

Taylor rules fit the data in that they capture the relationship between short-term interest rates on the one hand and inflation and cyclical movements in the economy on the other. Of course, that fit does not distinguish between a reduced-form and a structural relationship. Proponents of using Taylor rules as structural relationships point not only to their ability to fit the data but also to their stabilizing properties in models with “exploitable” inflation-unemployment trade-offs (see for example Taylor 1999). However, that sort of evidence begs the question of whether such models are useful or misleading guides to policy. As Orphanides (2006, 5) wrote:

Typical optimal control exercises based on simple models, for instance, may suggest that policy decisions should be guided by balancing output and inflation gaps over some forecast horizon, or, alternatively, by Taylor rules responding to such gaps. Such strategies, however are antithetical to a framework that properly acknowledges the limitations of policymakers’ knowledge....

The era of “balancing output and inflation gaps” was the 1970s. In the 1970s, the belief that 4 percent unemployment represented full employment, when combined with an unemployment rate averaging 6 percent, created the impression that inflation had to be of the cost-push variety rather than of the aggregate-demand variety. The inference that powerful monopolies (corporations and labor unions) drove inflation meant that a “high” rate of unemployment would be required to restrain it. Although the FOMC never communicated in terms of trade-offs, Phillips curve trade-offs between inflation and unemployment and the presumption that lowering inflation required large increases in unemployment (a high sacrifice ratio) were at the center of monetary policy. As Burns (1979) argued in his monograph, *The Anguish of Central Banking*, on an ongoing basis, the Fed had to determine the extent to which to restrain inflation based on a judgment about how much unemployment was politically acceptable. This view led to the period-by-period discretionary policy intended to balance off restraining inflation with creating negative output gaps (Hetzel 1998).

The functional form of the Taylor rule then captures the FOMC reaction function in the 1970s. In the 1970s, policymakers benchmarked the output gap to an unemployment gap with full employment assumed consistent with a 4 percent rate of unemployment. When estimating a reaction function like the Taylor rule, it is essential to use a measure of the output gap as understood by policymakers contemporaneously not with hindsight. In a series of papers, Athanasios Orphanides (2004) estimated Taylor rules subject to this discipline. For inflation, he used inflation forecasts by the staff of the Board of Governors contained in the document known as the Greenbook.

Orphanides work raises the question of what misled the FOMC into allowing inflation to drift upward—something the FOMC never intended. His work shows that policy in the 1970s adhered to the Taylor principle. That is, the FOMC responded aggressively to inflation by raising the funds rate more than one for one with inflation. The Taylor rules estimated in Orphanides (2002, Table 1; 2004, Table 1) possess coefficients on inflation greater than one. That the FOMC responded strongly to observed inflation is evident in Figure 1 (see also Orphanides 2004, Fig. 1). The fundamental problem was not an insufficiently large coefficient on the inflation term in the FOMC’s reaction function. The problem was an activist monetary policy motivated by the belief that there was an exploitable trade-off between unemployment and inflation.

Orphanides (2004, 172) wrote:

In theory, the activist approach to monetary policy that was followed during the Great Inflation would be workable, if only policymakers could have a solid understanding of the structure of the economy and reliable readings of the state of the economy upon which to base their actions. But what works in theory, often only works in theory only. In reality, policymakers did not possess the knowledge necessary for an activist approach....

In contrast, in the Volcker-Greenspan era, policy became nonactivist. The character of monetary policy in that era derived from the combination of the FOMC’s desire to reestablish the nominal expectational stability lost in the prior stop-go era of activist monetary policy and the incessant concern of the bond-market vigilantes that inflation would revive (Goodfriend 1993; Hetzel 2008, Chs. 15 and 21). That combination rendered infeasible any attempt to resurrect an activist policy based on exploiting Phillips curve trade-offs.

Interpreted as structural, estimated Taylor rules are misleading for this latter period. The focus on financial markets’ sensitivity to any evidence of a revival of inflation made monetary policy preemptive with respect to inflation rather than reactive to observed inflation. For the period 1987 through 2008, Hetzel (2017) estimated the Taylor (1999) version of the Taylor rule using a level-form regression. The estimated values on the inflation-miss and unemployment-gap terms were close to the coefficients shown in formula (1). However, when the regression was estimated in first differences, the estimated value on the inflation-miss term became negative and statistically significant. The lack of robustness of this coefficient illustrates the phenomenon highlighted by Granger and Newbold (1987). In level-form regressions, the coefficient captures only the common trends in inflation and the funds rate, not the behavior of the FOMC and not an FOMC balancing off inflation and unemployment goals.

Identification requires a choice of model. One can illustrate the alternatives with two versions of the NK model. The first is the one expounded by Goodfriend and King (1997). It displays a “classical dichotomy,” which Blanchard and Gali (2007) termed “divine coincidence.” When the central bank provides for price stability, it also maintains the output gap at zero. That is, it separates the behavior of inflation from the behavior of real variables. More generally, the central bank should adopt a rule that provides for a stable nominal anchor in the form of the expectation of price stability not literal price stability. With such a rule, it can allow the price system to determine real variables.

The expectation that in the future the price system will keep the real rate of interest equal to the natural rate of interest will maintain the output gap equal to zero. Intuitively, by allowing the price system to stabilize fluctuations in output around a growing level of potential output, households will

remain optimistic about the future. That optimism will work to maintain stability in consumption in a way expressed in the permanent-income hypothesis of Friedman (1957). Note also that the central bank maintains nominal expectational stability through credibility for a rule that conditions the price setting of firms in the “sticky-price” sector, that is, firms that set prices for multiple periods (Aoki 2001). It does not respond directly to inflation misses through manipulating an output gap. Optimal policy is nonactivist. Policymakers should give the price system full rein to work and let the real business cycle core of the economy determine real variables.

In contrast, consider the Blanchard and Gali (2007) version of the NK model. In this “ongoing-dilemma” version, markup shocks force a divergence between the prices firms charge for their products and the marginal cost of producing them. Optimal policy must engage in a trade-off between the competing objectives of price stability and a zero output gap. In this “cruel-dilemma” version, the economy is beset by the exercise of market power by labor unions and corporations. Price stability forces recurrent episodes of “high unemployment.”

Paul Samuelson expressed this view of the world when he opposed lowering inflation through restrictive monetary policy. Samuelson (1979 [1986], 972) argued:

Today’s inflation is chronic. Its roots are deep in the very nature of the welfare state. [Establishment of price stability through monetary policy would require] abolishing the humane society [and would] reimpose inequality and suffering not tolerated under democracy. A fascist political state would be required to impose such a regime and preserve it. Short of a military junta that imprisons trade union activists and terrorizes intellectuals, this solution to inflation is unrealistic—and, to most of us, undesirable.

Movement away from this “cruel dilemma” understanding of the world to the “classical dichotomy” understanding captures the change in the intellectual and policymaking environment that characterized the passage from the Burns/Miller FOMC to the Volcker/Greenspan FOMC. That change occurred after the Volcker disinflation and the subsequent demonstration that maintenance of stable, low inflation did not require recurrent recourse to episodes of “high” unemployment. (See Goodfriend [2004, 2005], Goodfriend and King 2005, and Hetzel 2008, Ch. 13.)

Identification of the appropriate model for evaluating monetary policy has turned on these grand experiments that allow the economist to bring in information about policy from the intellectual and political environment of the time.⁶ The policy of the 1970s entailed aggregate-demand management aimed at achieving “low” unemployment at a socially acceptable cost in terms of inflation. The subsequent Volcker-Greenspan policy concentrated on establishing a stable nominal anchor (low, moderate inflation as a way station to price stability) undergirded by giving the price system free rein to determine unemployment and output. The association of the first policy with high and rising inflation and recurrent recessions and of the second policy with the Great Moderation provided

⁶ The character of these experiments is not self-evident. The appeal of Keynesianism with its emphasis on aggregate-demand management through deficit spending resulted from the juxtaposition of two events. The first was the prolonged high unemployment in the Great Depression and the apparently self-evident failure of the price system to maintain full employment. The second was the low unemployment in World War II combined with the fiscal stimulus of military expenditures. Friedman and Schwartz (1963a) in *A Monetary History* challenged the Keynesian consensus by focusing on the disruptive interference of the Fed with the operation of the price system. In this regard, see section 5 on the Great Recession.

support for the classical-dichotomy version of the NK model. The following interprets the monetarist critique of activist monetary policy in this spirit.

4. A critique of activist policy: lessons from the seventies

As stated in the Orphanides (2004) quotation above, to implement an activist policy, policymakers need to know the magnitude of the output gap (have “reliable readings of the state of the economy”) and need to understand how to manipulate the funds rate to manage that gap (know “the structure of the economy”). In the absence of such knowledge, attempts to implement an activist policy must rely on observation of and a direct response to the contemporaneous state of the economy. Presciently, in a critique that came to be known under the moniker “long and variable lags,” Friedman (1960, 88-89) used these facts to attack activist policy. The unforecastable delays in the impact of changes in the stance of an activist policy would destabilize the economy. Throughout the sixties and seventies, Friedman gave his critique content by arguing that an activist policy would entail a pattern of excessive stimulus followed by excessive restraint—a policy of go-stop.

Economists lack a model of the short-run dynamics of how monetary stimulus or contraction impacts nominal output and how nominal output breaks down between real output and inflation. Monetarists talked about “the missing equation.” Economists in the Keynesian camp filled in the gap with the empirical Phillips curve literature. Policymakers could reliably manipulate the difference between the unemployment rate and the NAIRU guided by empirical estimates of the sacrifice ratio. Friedman provided a different empirical alternative based on the difference in timing of the impact of money growth on output and inflation. He summarized empirical evidence that money impacted real output with a lag of 2 to 3 quarters and inflation with a lag approximating two years.⁷

As background, it is important to note the remarkable laboratory for monetary policy in the pre-1981 period. Because of the interest insensitivity and stability of real money (M1) demand, money served as an indicator of the stance of monetary policy—expansionary, neutral, or contractionary. Moreover, the way in which its accelerations and decelerations predicted subsequent changes in nominal income and inflation implied that its movements flagged corresponding discrepancies between the natural and real interest rates. That fact provided indirect evidence that the price system worked well to determine well-defined values of real variables. Figures 2 and 3 show the relationship between lagged M1 and, respectively, real income and inflation flagged by Friedman and Schwartz.⁸

Activist policy entailed the manipulation of aggregate demand to attenuate fluctuations in output by trading off against fluctuations in inflation and vice versa. The absence of a structural model in combination with the lags in the impact of monetary policy shown in Figures 2 and 3 rendered activist policy destabilizing. As the alternative to activist policy, Friedman (1960) advocated a “k-percent” rule of steady money growth. Given the interest insensitivity and stability of money demand at the time, Friedman’s rule for steady money growth would have supplied a stable nominal anchor in terms of domestic prices while turning over to the price system the determination of real variables, such as the real interest rate and the unemployment rate.

⁷ For example, see Friedman and Schwartz (1963b). For a summary, see Friedman (1989).

⁸ The lagged money series begins in 1956. Although the Treasury-Fed Accord, which gave the Fed its independence, occurred in 1951, the lean-against-the-wind policy that became the hallmark of the Martin era did not begin immediately but evolved slowly. The lags reflect the way in which this policy responded to observed inflation.

When money demand became highly interest sensitive with the deregulation of interest rates in the early 1980s, Friedman's money rule became infeasible. The reason is that, when the economy weakens and interest rates need to decline, money demand increases. The resulting increased money growth, however, sends an inappropriate signal that interest rates should rise. During periods of financial distress, the flight to quality and to liquid assets also increases the demand for demand deposits. Again, rapid money growth is a misleading guide to monetary policy. Although Friedman's k-percent money growth rule has been displaced, the reasons for abandoning it do not bear on his supposition about what a central bank can and cannot control.

Figure 4 shows M1 growth with recession shading. M1 growth increased across recovery periods but then dropped prior to cyclical peaks. The rising pattern reflects the activist character of policy in which the FOMC pursued a stimulative monetary policy to push down the unemployment rate. At the time, policymakers understood that relatively high rates of money growth indicated expansionary policy but were unwilling to raise interest rates sufficiently to provide for low, steady money growth. In the activist spirit of the time, they were unwilling to relinquish their presumed control of the real economy to the unfettered operation of the price system. Although willing to raise the funds rate as the economy strengthened, the FOMC was unwilling to abandon monetary stimulus until inflation emerged (Hetzel 2012, Chs. 7 and 8). In the 1970s, the monetarist Jerry Jordan termed such a practice "as firing only when you see the whites of their eyes."

As noted with reference to Figure 1 and discussion of the Taylor principle, when inflation emerged, the FOMC did respond strongly. Figure 5 displays measures of the real funds rate and real commercial paper rate. As shown, real rates of interest remained at cyclically-high values past cyclical peaks. That pattern of monetary policy, namely, the maintenance of cyclically-high short-term interest rates as the economy weakened prior to cyclical peaks, generated commonly-used leading indicators of recession. For example, peaks in single-family housing starts have preceded peaks in the business cycle. In 2018, as a precursor of recession, market commentators pointed to a flattening of the yield curve with a possible inversion as the FOMC raised the funds rate (Figure 6). However, that pattern derived from the contractionary policy prior to cyclical peaks.

The inversions in the yield curve that preceded cycle peaks indicated that the FOMC had raised short-term rates to a level such that the real yield curve (the yield curve adjusted for expectations of inflation) lay above its natural counterpart (the real yield curve in the absence of monetary nonneutrality). The FOMC felt constrained to maintain cyclically-high short-term rates to counter the increase in inflationary expectations set off by the prior expansionary policy. Several points are relevant. First, the stance of monetary policy depends not upon a comparison of a single short-term real rate of interest relative to its natural counterpart (r^*), but rather on the entire real and natural yield curves. A monetary policy that strives to allow the real yield curve to track the natural yield curve is very different than a policy that strives to manipulate the former relative to the latter. Second, an inversion of the yield curve could reflect an optimal FOMC response to cyclical strength in the economy. Third, activist monetary policy can set in motion forces that push the FOMC into a destabilizing alternation between expansionary and contractionary policy.

The FOMC never set out to create recessions to lower inflation. The intent was always to create a moderate amount of slack over an extended period, that is, to spread it out over time and thus lessen the excess of unemployment over NAIRU required to effect a given reduction in inflation. At the time of the attempt in 1970, commentators used the term "soft landing" referring to the recent moon landing. As Dudley remarked in the quotation cited in section 2, "[M]onetary policy will need to

become slightly restrictive in the years ahead.” Despite the confidence of the FOMC in its ability to raise the unemployment rate only gradually back to and then somewhat above its NAIRU value to guide inflation initially somewhat above and then back to its two-percent target, such ambitious efforts at soft landings have failed in the past. As shown in Figure 7, the historical record contains very few even moderate increases in the unemployment rate not associated with recession.

In Figure 7, increases in the unemployment rate of more than 40 basis points not associated with recession are shown as squares. Those instances appear to indicate incipient recessions obviated by fortuitous external events. The square marking November 1951 coincides with the crossing by the Chinese of the Yalu River and the intensification of the Korean War. The increase in August 1952 also happened during the Korean War. The increase in February 1963 convinced President Kennedy to ask for a tax cut (Hetzl 2008, Ch. 7). Although not rising to the threshold of 40 basis points, the decline in the unemployment rate ceased temporarily in early 1967. The FOMC had been tightening policy but reversed course when President Johnson agreed to a tax increase. The increase in summer 1976 remains unexplained.

Orphanides (2002, 115) quoted Herbert Stein (1984, 171) to capture the confidence imparted by the Keynesian revolution regarding the ability to manage aggregate demand in a way that allowed Phillips curve trade-offs between unemployment and inflation.

[T]his was meant to be the “Age of the Economist” (Walter Heller, 1966 p. 2); when the latest scientific advances in macroeconomic theory, model building, and forecasting were brought to bear on policy decisions; when, having mastered optimization techniques, economic advisers could rely on the tools of activist stabilization policy to guide the economy to its “optimum feasible path.”

In its efforts to create a measured amount of slack to reduce inflation, the FOMC has tripped over the “long and variable” lag phenomenon highlighted by Friedman (1968 [1969], 109):

The reason for the propensity to overreact seems clear: the failure of monetary authorities to allow for the delay between their actions and the subsequent effects on the economy. They tend to determine their actions by today’s conditions—but their actions will affect the economy only six or nine months later. Hence they feel impelled to step on the brake, or the accelerator, as the case may be, too hard.

An activist policy also raises the issues highlighted by Friedman (1968 [1969]) with respect to treating as structural correlations between real and nominal variables. Figure 8 shows a relationship between the unemployment rate and growth in real wages calculated as four-quarter percentage changes in wages minus four-quarter percentage changes in prices lagged six quarters. The fact that the fit is closest with wages deflated by prices with a six-quarter lag does not accord with the assumption of a temporal relationship running from labor market tightness, to an increase in real wages, to an increase in inflation. More fundamentally, as stressed by Friedman, there is no theory to explain a predictable relationship between unemployment and real wages (real variables) on the one hand and inflation (a nominal variable) on the other. As discussed in section 5, the Great Recession offers a lesson in the difficulty of purposeful attempts to manipulate an output gap to control inflation.

5. What the Great Recession teaches about an activist monetary policy

The FOMC worked inflation down over the 1980s and 1990s (Figure 9). Inflation (four-quarter percentage changes in the personal consumption expenditures, PCE, deflator) peaked at 11 percent in

1980Q1 and averaged .8 over the four quarters of 1998.⁹ Because real factors ultimately determine real GDP growth, monetary policy controls inflation through control over the difference between nominal and real GDP growth. Figure 10 plots nominal and real GDP growth. As shown in Figure 11, which plots the difference, the FOMC abandoned its price-stability goal after 1999 (Hetzel 2008, Chs. 17-18).

The difference between growth in nominal and real GDP increased after 1999 with only a short-lived reversal following the 2001 recession. Especially after 2003, the common perception in markets was that the FOMC, concerned about deflation, wanted two-percent plus inflation (Hetzel 2008, Ch. 20). Only in January 2012, did the FOMC make explicit its desire for two-percent inflation. The FOMC, however, ended up concerned about inflation not deflation. Core PCE inflation increased irregularly from 1999 until mid-2018 (Figure 9). It averaged 2.2 percent from 2004Q2 through 2008Q3.

The corresponding headline number reached a trough of .8 percent in 2002Q1 and peaked at 4 percent in 2008Q3. The reason for the excess of headline over core inflation was the worldwide boom in commodity prices set off by the entry of the BRICs (Brazil, Russia, India and China) into the world economy. Figure 12, which displays goods and services PCE inflation, shows that normally goods inflation lies well below services inflation. The terms of trade favor services. The exceptions occur during booms in the world economy that raise commodity prices such as occurred starting in 2004Q2. By spring 2008, the FOMC became concerned that the persistent overshoot in headline inflation would pass into core inflation and would damage the credibility of its two-percent inflation target.

Monetary policy in the Great Recession followed a variant of past recessions. The typical pattern was for the FOMC to start raising the funds rate after a cyclical trough when it believed that the momentum of the economy was self-sustaining. It continued the process of ratcheting up the funds rate until the economy weakened. At that point, its priorities shifted away from sustaining recovery to a concern for inflation. As shown in Figure 5, it then imparted inertia to reductions in the funds rate with the result that short-term real interest rates remained at cyclical highs past the cyclical peak. (See Hetzel 2008, Chs. 23, 24; Hetzel 2012, Chs. 7, 8; Hetzel 2015 and 2016).

The funds rate reached its cyclical high of 5.25 percent at the June 2006 FOMC meeting. As the economy weakened prior to the cyclical peak in December 2007, at its September 2007 meeting, the FOMC began the process of lowering the funds rate. By the April 2008 meeting, it had lowered the funds rate to 2 percent. Crucially, at that meeting, the priority of the FOMC changed from reviving a weak economy to limiting inflation and to defending the external value of the dollar. The FOMC signaled to markets an end to the easing cycle (Hetzel 2012, 2017, and forthcoming a; Hetzel and Richardson 2018).¹⁰ That signal appeared in the difference between the six-month Treasury bill yield

⁹ The temporary reversal after 1987 occurred because the jockeying among central banks associated with the Louvre Accord prompted expansionary monetary policies (Hetzel 2008, Ch. 14).

¹⁰ The Minutes (Board 4/29-30/2008, 9) for the April 29-30, 2008, FOMC meeting sent the message that the easing cycle had likely ended:

[A]lthough downside risks to growth remained, members were also concerned about the upside risks to the inflation outlook, given the continued increases in oil and commodity prices and the fact that some indicators suggested that inflation expectations had risen in recent months.... [R]isks to growth were now thought to be more closely balanced by the risks to inflation. Accordingly, the Committee felt that it was no longer appropriate for the

and the funds rate target measured on the day after the FOMC meetings. The difference remained close to -1 percent after the December 2007, January 2008, and March 2008 FOMC meetings. That is, markets expected the FOMC to continue lowering the funds rate. However, after the April, June, and August meetings, it was close to zero.

For a while, it appeared that the decline in economic activity might be abating. A fall in the magnitude of net exports boosted GDP in 2008Q2. More important, the Bush tax cut temporarily boosted real disposable personal income (DPI) and provided a fillip to consumption (Figure 13).¹¹ However, concern for the credibility of its inflation target and for a depreciation of the dollar were the determining factors. On June 3, 2008, Chairman Bernanke (2008) stated in a speech:

Another significant upside risk to inflation is that high headline inflation, if sustained, might lead the public to expect higher long-term inflation rates, an expectation that could ultimately become self-confirming.... We are attentive to the implications of changes in the value of the dollar for inflation and inflation expectations and will continue to formulate policy to guard against risks to both parts of our dual mandate, including the risk of an erosion in longer-term inflation expectations.

In summer 2008, even when it became evident that the decline in economic activity was continuing, the FOMC's concern for inflation prevented it from lowering the funds rate. A near zero or slightly negative funds rate appeared appropriate to the doves while the hawks wanted to raise rates. At the time of the April 2008 meeting, the real funds rate was about -.4 percent as measured in Figure 5. Only after the fact did it become evident that a conjunction of shocks required a significantly negative funds rate. In particular, the real funds rate averaged -1.4 percent over the years 2011 to 2012. Growth in the economy also required measures to bend down the yield curve in the form of forward guidance and quantitative easing (LSAPs or large-scale asset purchases).

Transitory shocks (an inflation shock and a wealth shock to housing) interacted with longer-run

statement to emphasize the downside risks to growth.... In that regard, several members noted that it was unlikely to be appropriate to ease policy in response to information suggesting that the economy was slowing further or even contracting slightly in the near term, unless economic and financial developments indicated a significant weakening of the economic outlook.

¹¹ Annualized growth rates of monthly real PCE were as follows:

12/2007 – 2/2008: -1.9%
 3/2008 – 5/2008: 1.7%
 6/2008 – 9/2008: -3.8%
 10/2008 – 12/2008: -4.5%

On February 12, 2008, President Bush signed into law a tax cut in the form of rebates. Real DPI increased at an average monthly rate of \$12.1 billion from January 2007 through September 2007; at the average rate of \$6.6 billion from October 2007 through April 2008; and soared to \$562.1 billion in May 2008. Although the rebates arrived in May, households increased their consumption in anticipation. That increase temporarily halted the decline in consumption in March, April, and May. An unfortunate side effect of temporary tax cuts is the way they obscure the underlying state of the economy.

factors (declining productivity growth and an aging population) to lower the natural rate of interest. As shown in Figure 13, the inflation shock lowered growth in real DPI. After averaging 3 percent in 2006, growth in real personal consumption began to decline in 2007 with the decline quickening after August 2007.¹² Mian and Sufi (2011) showed how the decline in house prices caused credit-constrained households to reduce their expenditures. From 1997Q1 to 2007Q1, house prices rose 92 percent.¹³ Although from the 2007Q1 peak in house prices until the business cycle peak of 2007Q4, nominal house prices fell only 1.4 percent, high inflation produced a larger decline in real terms. On the impact of longer-run factors on the natural rate of interest, see Williams (2018).

In the past, strong economic recoveries had always followed sharp contractions. At first, the presumption prevailed that the Great Recession with its sharp contraction would also display such a V shape. Bond rates reflected that presumption. However, recovery from the Great Recession was prolonged and moderate. The level of bond rates during the Great Recession and initially during the recovery then made monetary policy restrictive. That is, with the near-zero funds rate target as of the December FOMC meetings, the upward slope of the yield curve was too steep. Only gradually, aided by forward guidance and quantitative easing, did bond rates decline and the yield curve flatten (Figure 6). The ten-year constant-maturity Treasury yield was 5 percent on July 2, 2007, 4 percent on July 1, 2008 and July 1, 2009, 3 percent on July 1, 2010, and 1.6 percent on July 2, 2012.

In the mind of the public, the defining event of the Great Recession was the disruption to financial intermediation that occurred in fall 2008 with the bankruptcy of Lehman Brothers on September 15, 2008. Starting most spectacularly in summer 1974 with the bailout of Franklin National Bank, regulators (the Fed, the Comptroller of the Currency, and the FDIC) had not allowed any significant financial intermediary to fail with losses to uninsured creditors. Cash investors financed the shadow banking system based on the presumed policy of “too leveraged to fail.” Overnight, the failure of Lehman destroyed that foundation of the shadow banking system. The retraction of the financial safety net to a more limited but ambiguous boundary caused cash investors to withdraw their funds not only from investment banks but also from any financial institution with an asset portfolio of opaque, illiquid, and long-term assets. They sought refuge for their funds in Treasuries and conservatively-managed, too-big-to-fail banks (Hetzel 2012, Ch. 9).

FOMC chairman Ben Bernanke and Treasury Secretary Henry Paulson acted to preempt what Bernanke saw as a reason for the severity of the Great Depression—disruption of the credit channel routing funds from banks to business. Through a multiplicity of programs in which the Fed assumed the role of financial intermediary, through the bailout of AIG and Citibank, and through the extension of FDIC insurance, they worked to undo the disintermediation caused by the flight of the cash investors. It is difficult to assess the efficacy of the post-Lehman credit interventions relative to the response of the Fed during the Penn Central bankruptcy in June 1970 in which it opened wide the discount window to banks. It is also hard to assess whether the disruption of financial intermediation that remained after the official credit interventions increased the severity of the recession. In early October 2008, incoming data on the advanced economies of the world produced the realization that they had entered a severe recession in the preceding summer. In the public mind, however, the

¹² In August 2007, cash investors withdrew from funding the structured investment vehicles (SIVs) that banks had set up to hold mortgage backed securities (MBS) off their balance sheets. Banks then put the mortgages on their own balance sheets. Liberal lending by the Federal Home Loans Banks prevented any issues with bank liquidity (Hetzel 2012, Ch. 10).

¹³ The price measure used is the Federal Finance Housing Agency (FHFA) index. It excludes wealthy households, which are not credit constrained.

association was between recession and disruption to credit markets in the fall.

Separating monetary policy and credit policy is difficult. On October 8, 2008, the FOMC lowered the funds rate from 2 percent to 1.5 percent. However, still concerned about inflation, it introduced the payment of interest on reserves (IOR) so that the reserves creation associated with the credit programs would not depress the funds rate and mislead markets into thinking that the FOMC was lowering it below the targeted 1.5 percent. At the same time, it seems highly likely that the natural rate of interest was falling sharply—a fall in part produced by policymakers themselves. Motivated by a desire to “unclog” a credit channel by removing troubled assets from bank balance sheets and somewhat later by a desire to increase bank equity, Bernanke and Paulson lobbied Congress for funding. However, to persuade a reluctant Congress to grant the funds, they preached that a failure to fund their Troubled Asset Relief Program (TARP) could lead to a collapse of the financial system and another Great Depression. The resulting fear had to lower the natural rate of interest through a risk premium for liquidity.¹⁴

Regardless of a final verdict on the role played by disruptions to financial intermediation, there remains no way to explain the Great Recession without recourse to contractionary monetary policy. The combination of disinflation (Figure 9) and recession as well as the subsequent persistent decline in inflation required contractionary monetary policy. The contention that the Fed should include financial stability as well as inflation and an output gap in its reaction function also raises difficult issues for the FOMC (Curdia and Woodford 2009). The implication is that optimal policy in a financial crisis would require missing the inflation and output objectives on the upside not on the downside as occurred in the Great Recession. The Great Recession should give pause to policymakers who believe that the FOMC can engineer moderate, controlled reductions in inflation through a controlled slowing in output growth below potential.

6. Explaining the behavior of inflation

In January 2012, the FOMC articulated an explicit inflation target. It did not, however, accompany that target with a strategy for controlling inflation. Perhaps that omission derived from the practice of using models to forecast the economy but not to learn from experience or to discipline the formulation of policy. Regardless of the explanation, following 2012Q1, four-quarter core PCE inflation persistently fell short of the two-percent target. Only in 2017Q1, did four-quarter headline PCE inflation reach two percent.

To understand the behavior of inflation, it is useful to draw on the insights of the NK model. As explained in Aoki (2001), the NK model places price setters into one of two sectors—the sticky price and the flexible-price sectors. Firms in the sticky-price sector change prices only infrequently and thus must forecast inflation while firms in the flexible-price sector set prices continuously. To allow the price system to determine relative prices, the central bank should target inflation in the sticky-price sector and allow inflation originating in the flexible-price sector to pass through to headline inflation (Aoki 2001).¹⁵ That implication was especially relevant for monetary policy in the Great

¹⁴ For additional detail and references, see Hetzel (2012, Chs. 12 to 16.)

¹⁵ The Goodfriend-King (1997) classical-dichotomy (divine-coincidence) version of the NK model translates naturally into the Aoki (2001) exposition of the NK model. The nominal anchor of price stability is the common expectation of price stability by firms in the sticky-price sector. With that expectation, the Fed allows the price system to set relative prices and real quantities by following a rule that causes the real interest rate (yield curve) to track the natural interest rate (yield curve). The

Recession when central banks focused on the significant overshoot in headline inflation rather than on the slight overshoot in core inflation (see above and Hetzel forthcoming a).

In this regard, the comments in Aoki (2001, 57 and 75) appear prescient:

[T]here is a trade-off between stabilizing the aggregate output gap and aggregate inflation, but ... there is no trade-off between stabilizing [the] aggregate output gap and stabilizing core inflation.... [S]uppose there is an increase in the price of food and energy ... putting an upward pressure on aggregate inflation.... The central bank could respond with a sharp contractionary policy and reduce aggregate demand by a large amount so as to decrease prices in the sticky-price sector.... However, our model shows that such a policy is not optimal. The optimal policy is to stabilize core inflation.

Figure 14 shows measures of sticky-price and flexible-price inflation constructed by the Atlanta Fed. As shown, recessions lower sticky-price inflation. Between the immediate pre-Great Recession period and the subsequent period, sticky-price inflation declined about a percentage point. Cecchetti et al (2017), using the procedures of Stock and Watson (2007), determined that after the Great Recession core PCE trend inflation declined to about 1 ½ percent. This correlation in itself does not, however, demonstrate a capacity to manipulate an output gap in a way that produces a controlled change in inflation.

Since 2012, weakness in the world economy has restrained flexible-price inflation by moderating commodity-price inflation, especially in oil prices. This combination of moderate inflation in the sticky-price sector with low inflation in the flexible-price sector worked to keep headline inflation below 2 percent. Figure 12, which displays goods and services PCE inflation, tells the same story. After mid-2008, services inflation declined relative to the prior period. Since 2012, goods inflation has stayed significantly below services inflation.

The NK model offers insights into the challenge facing the FOMC in moving away from a world in which firms set prices based on price stability to a world in which they set prices based positive inflation. Firms in the sticky-price sector have an incentive to coordinate their inflation forecasts on a common number. In extreme cases of a change in the monetary regime, there is a mechanism to coordinate such a change (Sargent 1983). However, when the FOMC runs a monetary policy inconsistent with the common expectation of inflation, there is little empirical evidence concerning how firms realign their expectations in a way consistent with FOMC policy. The difficulty in coordinating a change in the common expectation of inflation must partly explain the long lags between changes in the stance of monetary policy and inflation shown in Figure 3.

7. The monetary regime: activist or nonactivist?

The foundation of all post-Accord monetary policy is the procedure termed “lean-against-the-wind” (LAW) by William McChesney Martin (Hetzel 2008 and 2012). LAW implies moving the funds rate in a way that counters persistent changes in rates of resource utilization. The basic version, LAW with credibility, does not attempt to trade off between inflation and output gaps. The behavior of the funds rate is procyclical without cyclical inertia intended to exploit a Phillips curve trade-off. In

FOMC does not attempt to manipulate Phillips curve trade-offs between inflation and output.

contrast, LAW with PC (Phillips curve) trade-offs attempts such trade-offs by imparting cyclical inertia to funds rate changes (Hetzel 2012, Ch. 8).

For LAW with credibility, the ideal is for the economy to grow consistently along the path of potential output. Policymakers make an initial estimate of the growth of potential output based on estimates of labor force growth and productivity growth. They also make estimates of the contemporaneous growth of output. They check their estimates of the difference between potential and actual growth by observing changes in the rate of resource utilization, especially, the change in the unemployment rate. Sustained growth of output with no change in the rate of resource utilization (no change in the unemployment rate) indicates growth at potential.

The variations in LAW appear during economic recoveries. Coming out of the trough, it is evident that the output gap is negative (the unemployment gap positive). Output must grow above potential for some time. Growth above potential implies that the funds rate must rise (the yield curve slope upward) but not so much as to stifle the recovery. There is no formula that informs the FOMC how to choose a yield curve that causes the magnitude of the output gap to decline in a way that puts output on a glide path leading to and then along the path for potential output. Moreover, as the recovery proceeds, estimates of the output gaps become problematic.

LAW with credibility entails acting to preempt inflation. The recovery should proceed with no change in inflation, actual or expected. Given the implementation of policy in the fog of a world in which policymakers do not know the natural values of real variables, policy has the spirit of guess, observe, and correct. If the recovery appears to stall, the FOMC backs off on communicating a path for the funds rate that causes the yield curve to slope upward.

LAW with credibility requires sensitivity to signs that increased rates of resource utilization are placing stress on resources. Evidence of stress requires judgment, but the spirit of that judgment is that there is no bias in favor of “low” unemployment. The times for which the FOMC sets the funds rate “too high,” that is above the natural rate, balance off against the times for which it sets the funds rate “too low,” so that monetary policy exercises at most a transitory influence on the unemployment rate. Maintenance of price stability does not require a higher average rate of unemployment as would exist in a world of presumed cost-push pressures. Greenspan (in U.S. Cong. 7/28/99, 16, cited in Hetzel 2008, 257) testified:

Focusing on a specific unemployment rate as an economic goal ... is very shortsighted. I think what you try to do is to get maximum sustainable growth.... What unemployment rate falls out as a consequence of that policy ... would be the appropriate unemployment rate.¹⁶

In contrast, for LAW with PC trade-offs, the emphasis is on not aborting the recovery rather than on preempting inflation. The FOMC waits until it observes inflation before aggressively raising the funds rate. The most striking episode of the move away from LAW with PC trade-offs to the preemptive policy of LAW with credibility occurred when the FOMC raised the funds rate from 3 percent going into its February 1994 meeting to 6 percent a year later (Goodfriend 2015; Hetzel 2008, Ch. 15). Over this period, headline PCE inflation was steady while core PCE inflation continued its moderate decline (Figure 9). Greenspan (in U.S. Cong. 2/20/96, 8) testified:

¹⁶ In going from the Burns/Miller era to the Volcker/Greenspan era, the unemployment rate became an indicator rather than a target.

[P]ersistent deviations of actual growth from that of capacity potential will soon send signals that a policy adjustment is needed.... Through the four quarters of 1994, for example, real GDP ... rose 3 ½ percent. If that were the true rate of increase in the economy's long-run potential, then we would have expected no change in rates of resource utilization. Instead, industrial capacity utilization rose nearly 3 percentage points, and the unemployment rate dropped 1 percentage point. Moreover, we began to see signs of strain on facilities: deliveries of materials slowed appreciably, and factory overtime rose sharply.

The “Appendix: Leaning against the Wind” provides quotes from Greenspan detailing measures he used to look for stress on resources (cited in Hetzel 2008, Ch. 21). It also contains an excerpt from a market analyst summarizing the elevated stress placed on resources as of early June 2018 associated with the policy of raising inflation.

The motivation for the 2017-2018 activist policy of creating a positive output gap was to replace the existence of near price stability with positive inflation. The idea was that positive inflation raises the level of nominal interest rates and gives the FOMC more leeway to enact a stimulative monetary policy unhindered by the zero lower bound on interest rates (Summers 1991). There is no evidence that the FOMC discussed the alternative of price stability combined with recourse to forward guidance in the event of reaching the zero lower bound (Eggertsson and Woodford 2003). Price stability may, however, be special for creating a stable nominal anchor. It seems natural for price setters to set prices in a way that assumes the absence of inflation. It seems less obvious that a central bank can convince the vast multitude of price setters all to make price setting contingent on the same positive number for inflation.

Paul Volcker and at least the early Alan Greenspan considered price stability as the natural nominal anchor. Volcker (1983, cited in Orphanides 2006) commented:

A workable definition of reasonable “price stability” would seem to me a situation in which expectations of generally rising (or falling) prices over a considerable period are not a pervasive influence on economic and financial behavior. Stated more positively, “stability” would imply that decision-making should be able to proceed on the basis that “real” and “nominal” values are substantially the same over the planning horizon.... I realize sophisticated arguments are made that a steady, relatively low rate of inflation can be tolerated as a kind of background noise that, because it is generally anticipated, will cause few distortions. I don't know of any precedent in this country for that kind of “steady state” inflation — indeed, psychologically, I suspect it is a contradiction in terms.

In 1992, Greenspan (in Board 1992, 45) could tell the FOMC, “[T]here is no debate within the Committee ... that a non-inflationary environment is best....” When asked during an FOMC meeting by then Gov. Yellen to define price stability, FOMC chairman Greenspan (in Board 1996, 50) replied that it “is that state in which expected changes in the general price level do not effectively alter ... decisions.” In 1989, Rep. Neal (D. NC) introduced legislation mandating price stability. As documented in Hetzel (2008, 197), Greenspan supported the resolution conditional on the language that “inflation be deemed to be eliminated when the expected rate of change of prices ceases to be a factor in individual and business decision making.”

8. Concluding comment

Friedman (1960), in his “long-and-variable lags” critique, set the benchmark for a nonactivist rule. When Friedman wrote, given the stability and interest insensitivity of real M1 demand plus steady

potential GDP growth, his proposed k-percent rule for money growth would have provided for a stable nominal anchor (approximate price stability). It would also have turned over to the unfettered operation of the price system the determination of real variables. Friedman's critique was the godfather of the price-stability rule in the classical-dichotomy (divine-coincidence) version of the NK model. Monetary policy in the Volcker-Greenspan era approximated such a rule.

The situation in 2017-2018 resembled that of the early 1960s in which markets took price stability for granted. Expansionary monetary policy in this environment can impact positively output and employment. The current ingrained expectation of price stability has allowed the revival of an activist monetary policy in the form of an attempt to raise inflation through the creation of a positive output (negative unemployment) gap. The 2017-2018 FOMC strategy of running the economy "hot" to raise inflation will take its place as one of the great experiments of monetary policy. Its outcome will influence significantly the perennial debate over activist versus nonactivist monetary policy.

Appendix: Leaning against the Wind

Alan Greenspan (in U.S. Cong. 7/20/94, 54-5) summarized the variety of indirect evidence the FOMC examined in evaluating the existence of a positive growth gap:

[P]olicymakers need to look ... for evidence of tightness that might indicate whether inflationary pressures are indeed building.... Reports of shortages of skilled labor, strikes, and instances of difficulties in finding workers in specific regions all would be more likely. To attract additional workers, employers would presumably step up their use of want-adds.... Firms might choose to bring on less skilled workers and train them on the job.... As firms experienced difficulty in expanding production to meet rising demand, we would also expect to see increasing signs of shortages of goods as well as labor. Businesses might have difficulty in obtaining certain materials. Vendor performance would deteriorate, and lead times on deliveries of new orders would increase. Pressures on supplies of materials and commodities would be reflected in rising prices of these items.

Stephen Stanley (6/5/18) commented on the May 2018 Non-manufacturing Survey:

As with the manufacturing survey, the standouts were the measures directly related to developing strains in the system. The supplier deliveries index jumped to 58.5, matching the March reading as the highest since 2005 and third-highest in the history of the series going back to 1997 (exceeded only in 2005, just after Hurricane Katrina, and in 1997, when there was a UPS strike.... Meanwhile, the order backlogs measure surged by 8½ points to 60.5, establishing a new all-time high in the series – by a whopping 3½ points. Finally, input costs continued to rise, as the prices index rose by 2½ points to 64.3, the highest reading since 2012. There were 15 commodities reported up in price vs. 1 reported down in price, and construction workers were said to be in short supply. Presumably, when firms are having trouble getting supplies on a timely basis and paying more for their inputs, the leverage to raise their own prices may be building. This should be especially true when order backlogs are exploding, suggesting that firms need not be particularly worried about losing a customer or two.

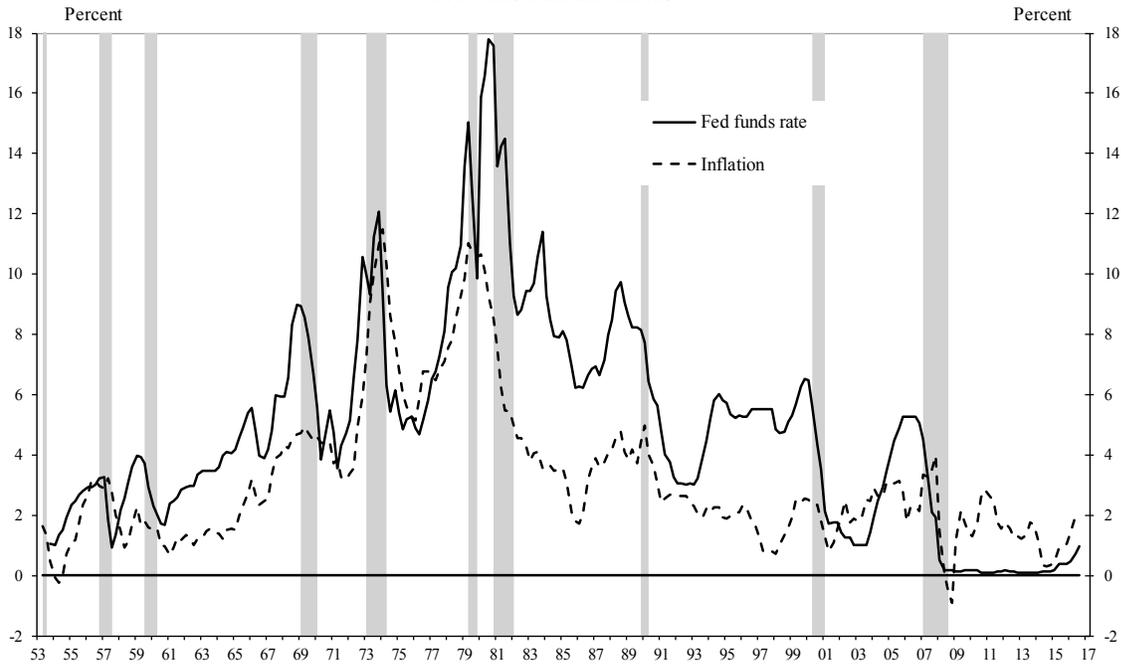
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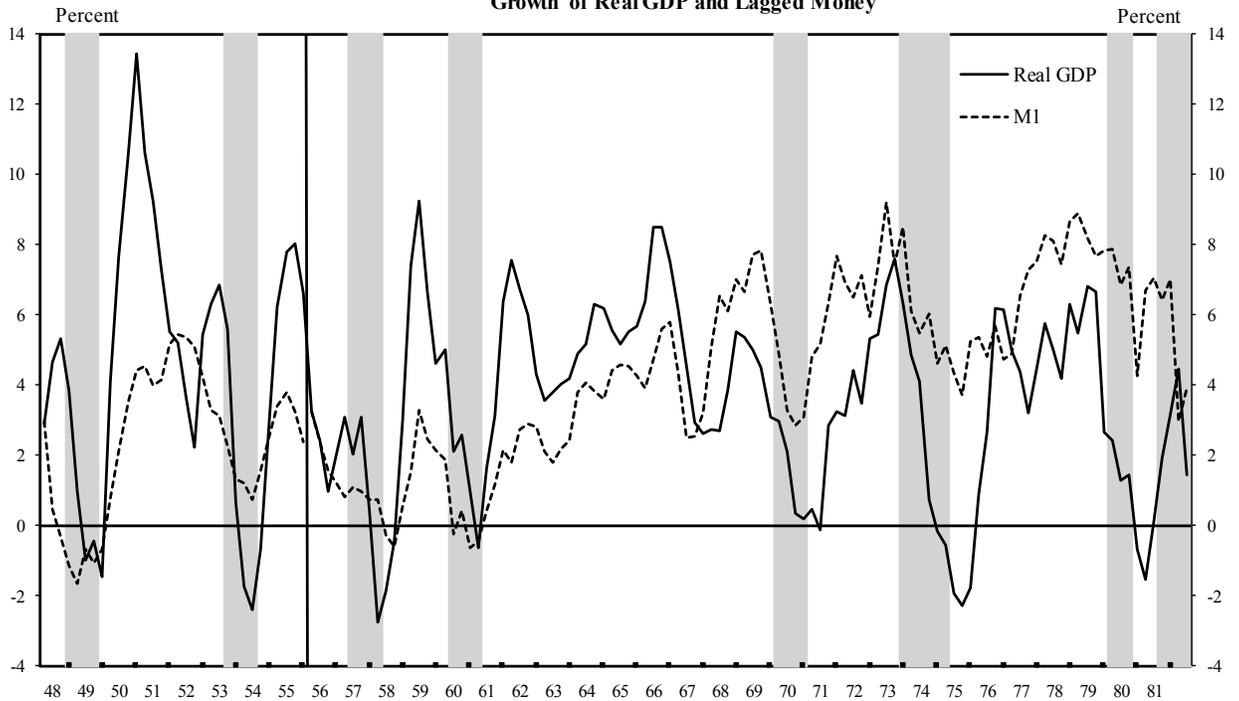
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Figure 1
Fed Funds Rate and Inflation



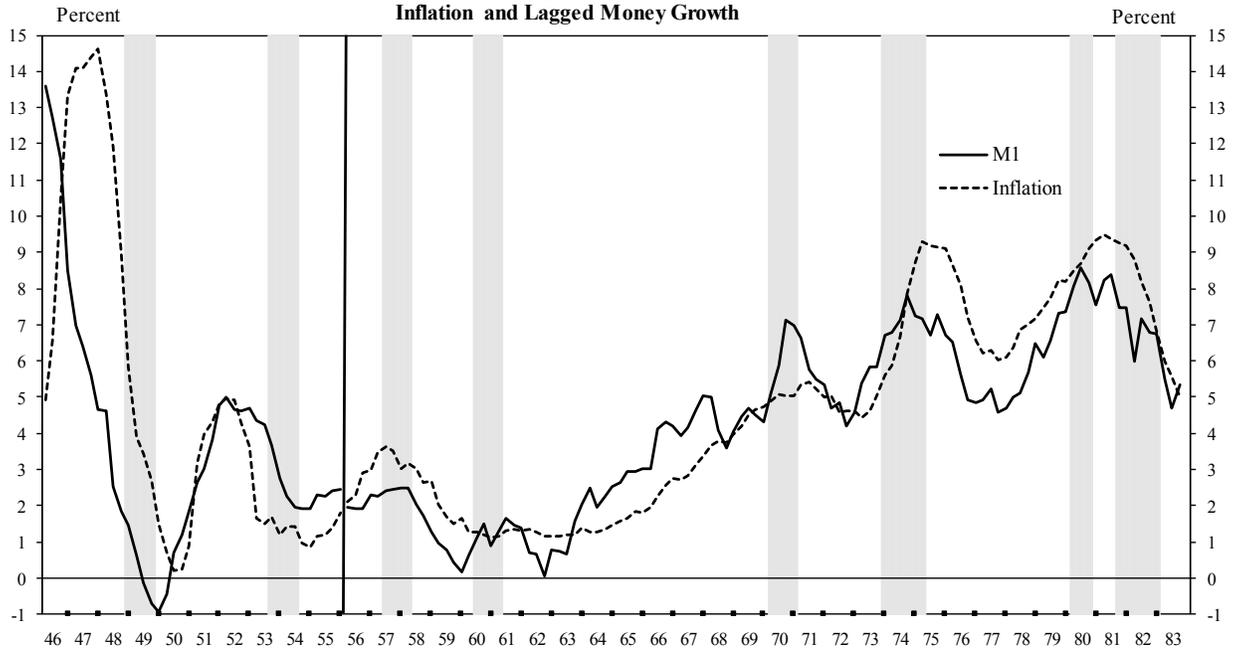
Notes: Quarterly observations of the effective federal funds rate. Inflation is four-quarter percentage changes in the personal consumption expenditures (PCE) deflator. Shaded areas indicate NBER recessions. Data from St. Louis FRED data base.

Figure 2
Growth of Real GDP and Lagged Money



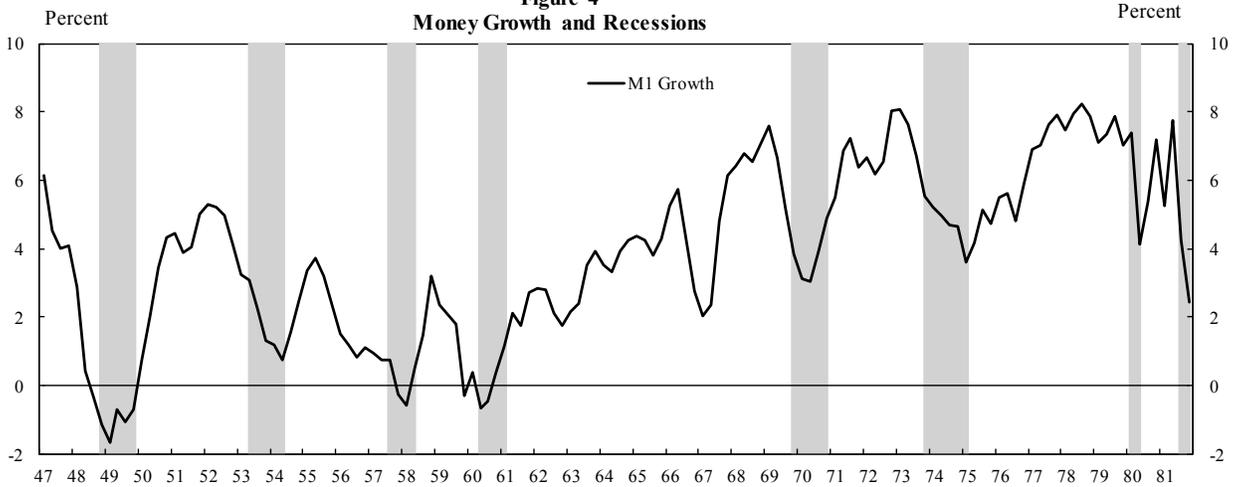
Notes: Quarterly observations of 4-quarter moving averages of real GDP (chain-weighted) and M1. Beginning in 1956, M1 is lagged 2 quarters. The vertical line separates lagged and unlagged M1 growth. In 1981, M1 is shift-adjusted M1 (Bennett 1982). Shaded areas indicate recession. Heavy tick marks indicate fourth quarter of year. Source: St. Louis FRED.

Figure 3
Inflation and Lagged Money Growth

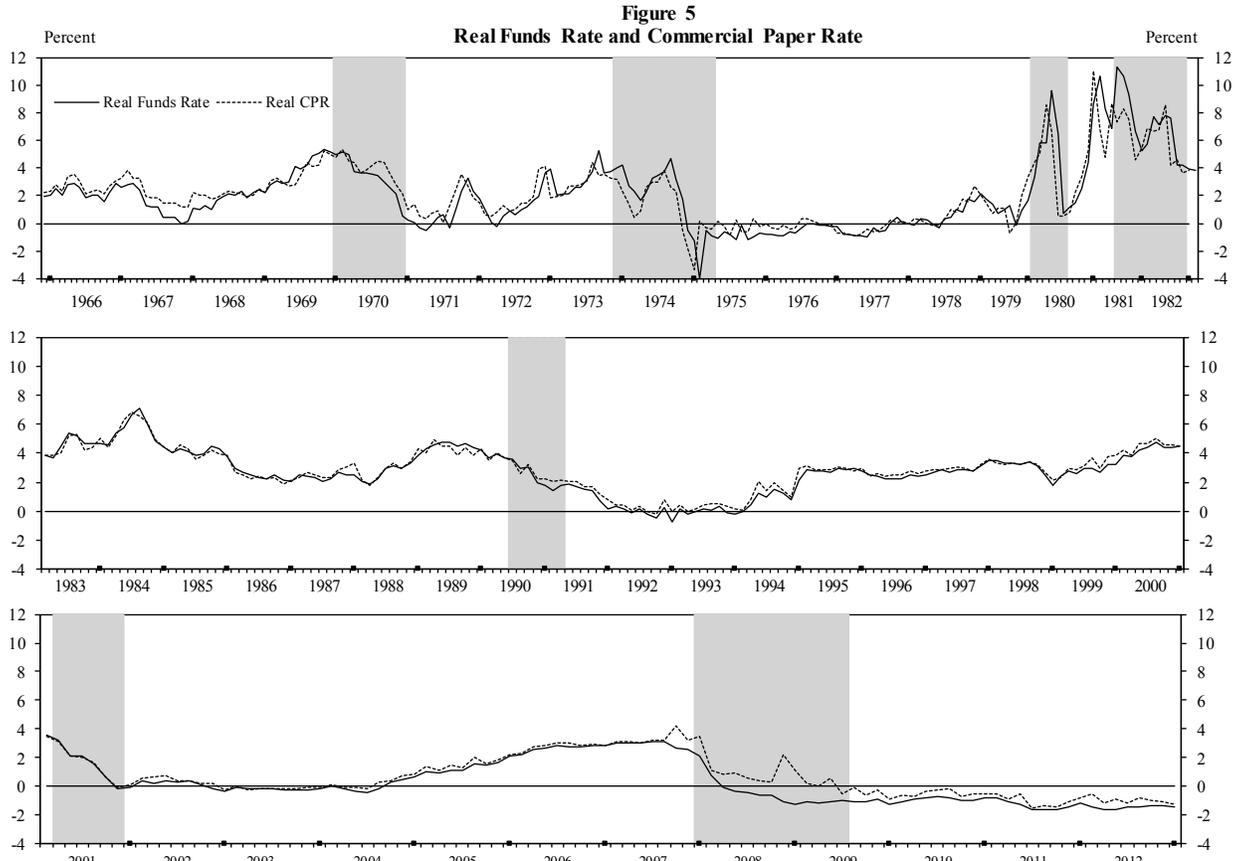


Notes: Inflation is the annualized percentage change in the fixed-weight GDP deflator over an 8-quarter period. The GNP deflator from Balke and Gordon (1986) is used before 1947. Money growth is the annualized percentage change in M1 over an 8-quarter period. Beginning in 1956 M1 is lagged 7 quarters. The vertical line separates lagged and unlagged M1 growth. In 1981, M1 is "shift-adjusted" (Bennett 1982). Heavy tick marks indicate fourth quarter of the year. Source: Haver Analytics, Board of Governors, and Friedman and Schwartz (1970).

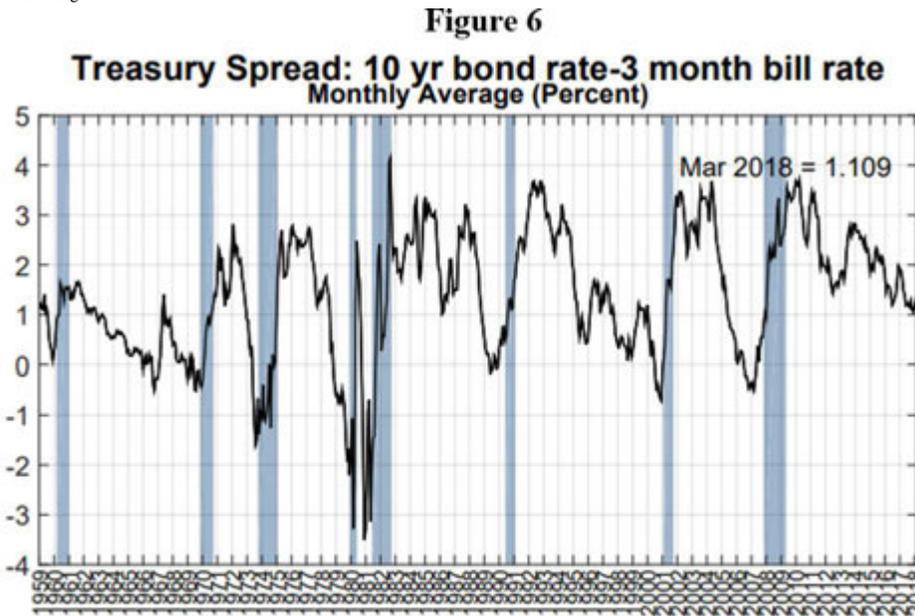
Figure 4
Money Growth and Recessions



Notes: The money series is quarterly observations of four-quarter percentage changes in M1. M1 series is "shift-adjusted" M1 for 1981 (Bennett 1982). Shaded areas indicate NBER recessions. Source: Board of Governors and Friedman and Schwartz (1970).

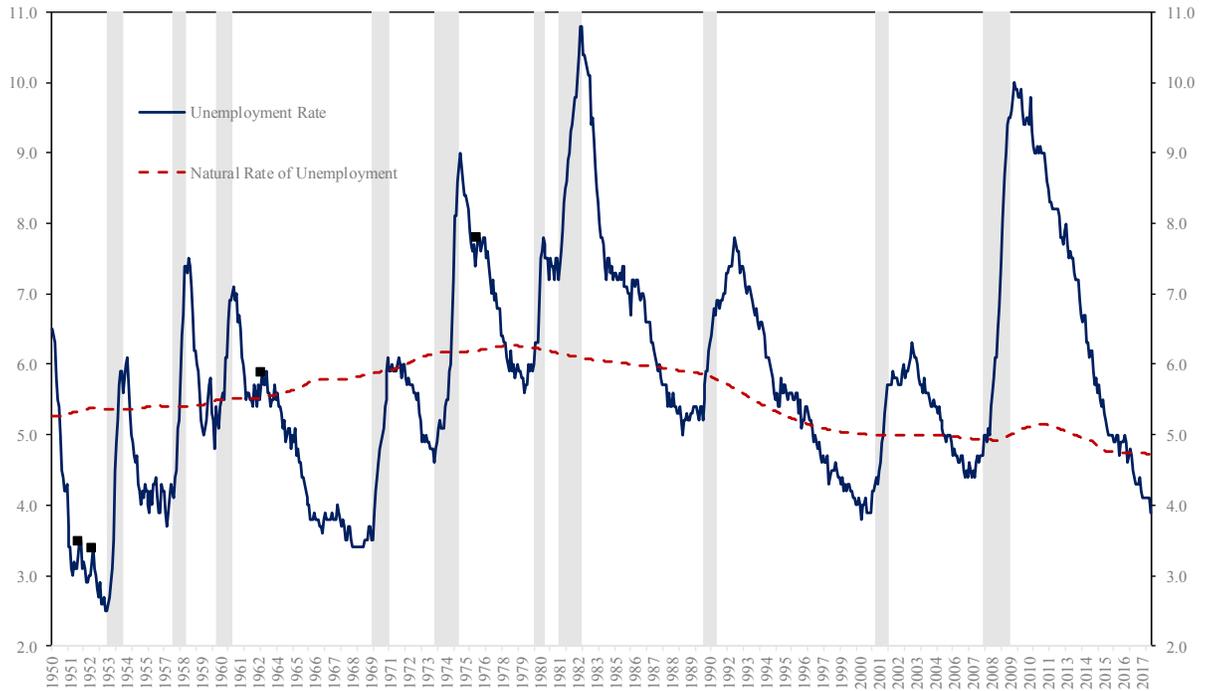


Notes: The real interest rate series is either the federal funds rate or the commercial paper rate minus the inflation forecast made by the staff of the Board of Governors in the Greenbook (later Tealbook). For a description of the series, see "Appendix: Real Rate of Interest" in Hetzel (2012). Forecasted inflation is for an overall index through 1979 and thereafter for a core index excluding food and energy. Shaded areas indicate NBER recessions. Heavy tick marks indicate December FOMC meetings.



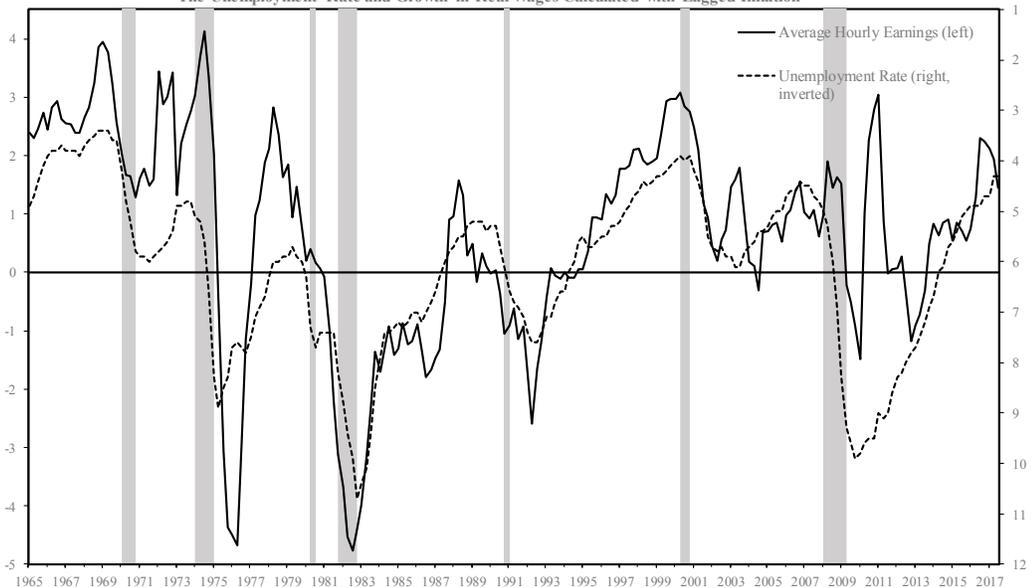
Federal Reserve Bank of New York. Economic Research. "The Yield Curve as a Leading Indicator," May 6, 2018.

Figure 7
Unemployment Rate and CBO Natural Rate of Unemployment



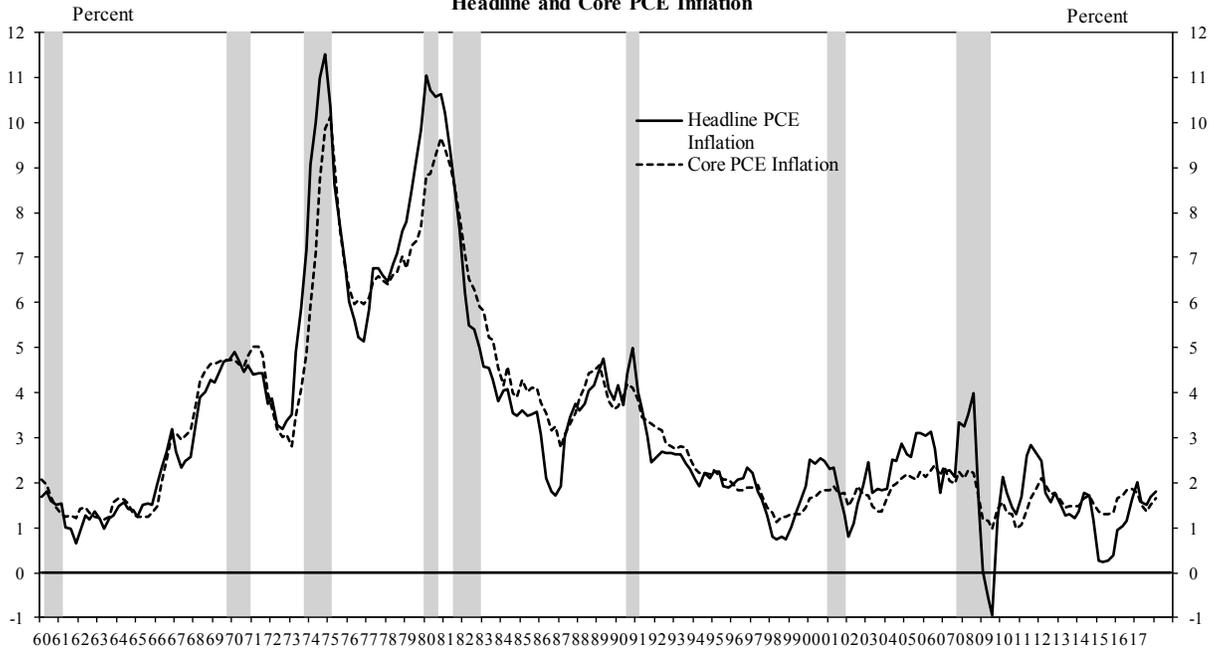
Notes: Monthly observations of the unemployment rate. The natural rate of unemployment is from the Congressional Budget Office. The black squares demarcate intervals of increases in the unemployment rate that cumulate to 40 basis points or more and that do not immediately precede a recession peak or follow a recession trough. They fall on the following dates: November 1951, August 1952, February 1963, and July 1976. Source: Haver Analytics.

Figure 8
The Unemployment Rate and Growth in Real Wages Calculated with Lagged Inflation



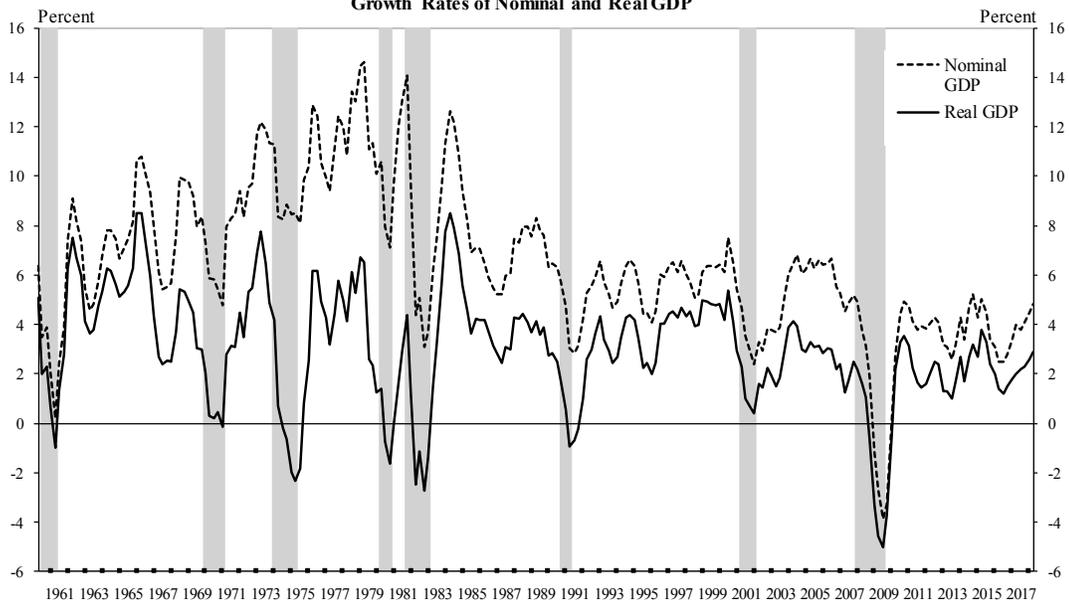
Notes: Observations are quarterly. Growth in real wages is 4-quarter percentage changes in wages minus 4-quarter percentage changes in prices lagged six quarters. Wages are average hourly earnings of production and non-supervisory workers: total private. Prices are the personal consumption expenditures (PCE) deflator. The unemployment rate is plotted on an inverted scale. Source: Data from St. Louis FRED.

Figure 9
Headline and Core PCE Inflation



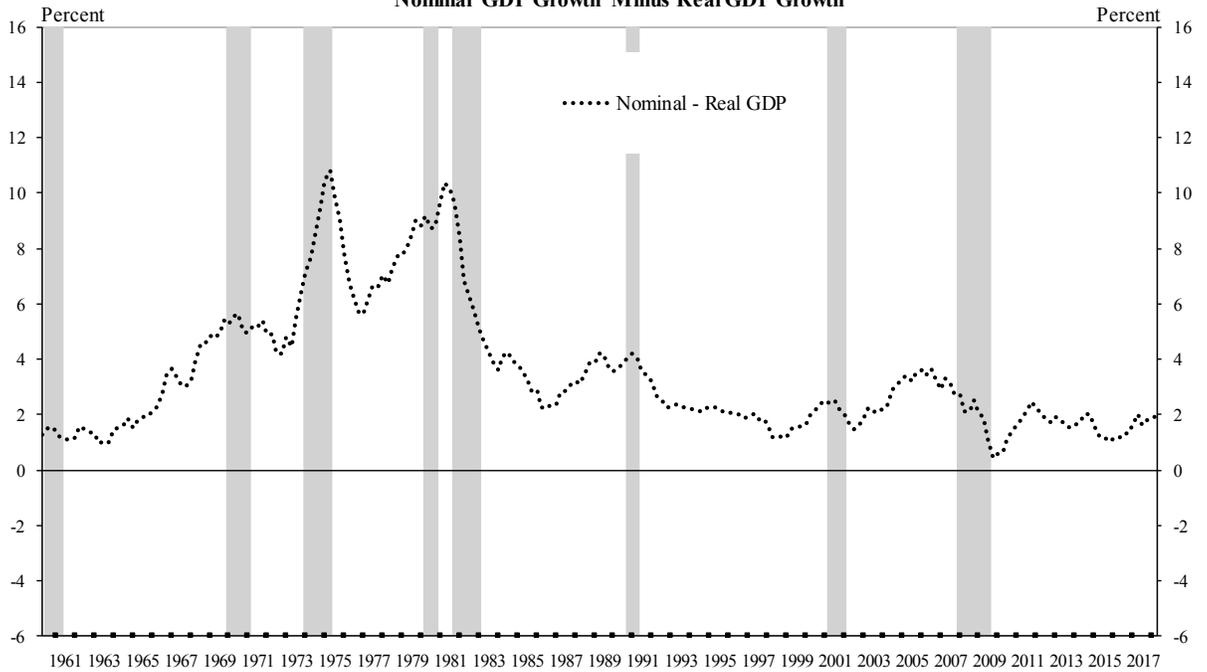
Notes: Quarterly observations of four-quarter percentage changes in the headline and core personal consumption expenditures (PCE) deflator. Shaded areas indicate NBER recessions. Source: Haver Analytics.

Figure 10
Growth Rates of Nominal and Real GDP



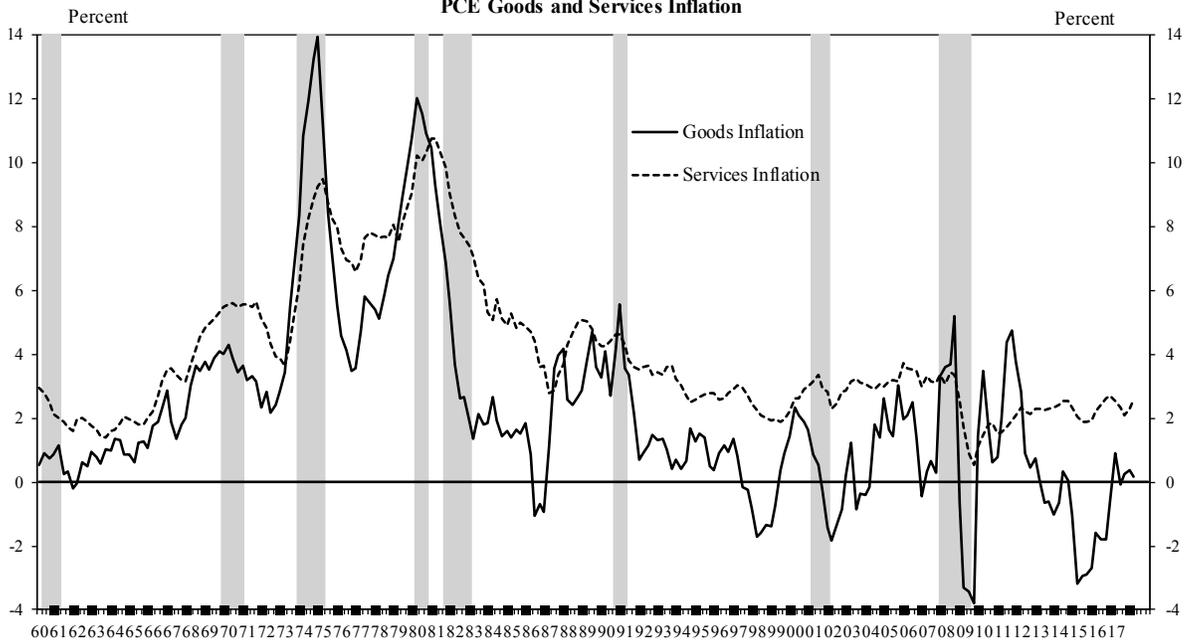
Notes: Quarterly observations of four-quarter percentage changes of real and nominal GDP. Trend lines fit to observations from 1960Q1 to 1979Q4 and 1985Q1 to 2007Q4. Shaded areas represent NBER recessions. Data from St. Louis FRED. Heavy tick marks indicate fourth quarters.

Figure 11
Nominal GDP Growth Minus Real GDP Growth



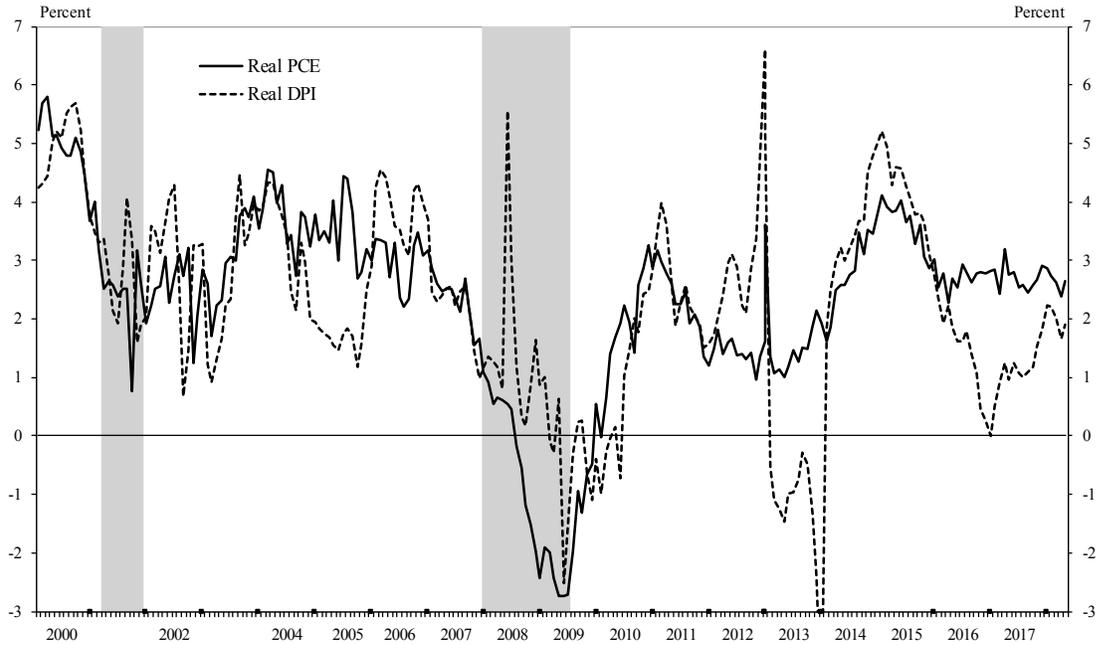
Notes: Quarterly observations of four-quarter percentage changes in nominal GDP minus four-quarter percentage changes in real GDP. Shaded areas represent NBER recessions. Data from St. Louis FRED. Heavy tick marks indicate fourth quarters.

Figure 12
PCE Goods and Services Inflation



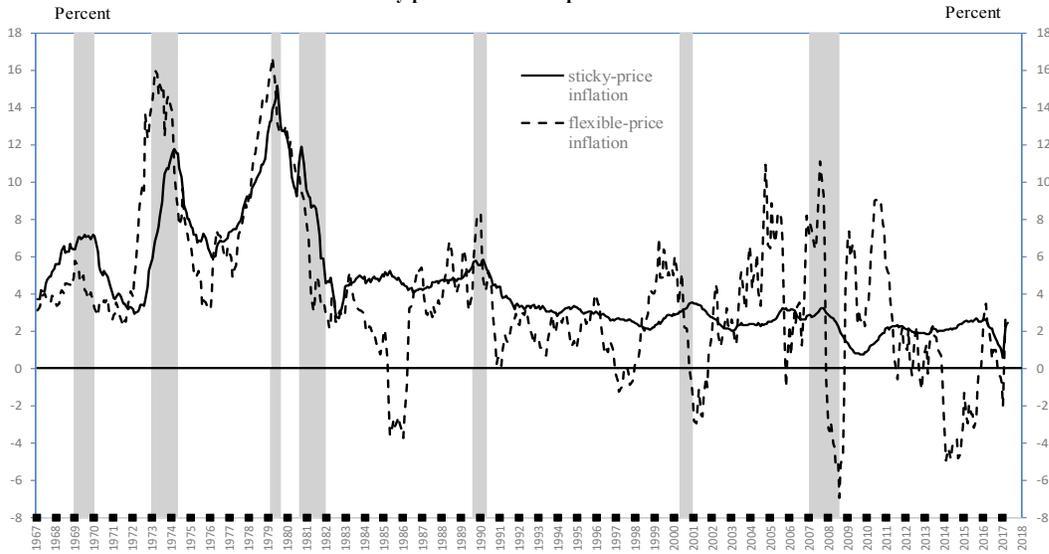
Notes: Quarterly observations of four-quarter percentage changes in the goods and services personal consumption expenditures (PCE) deflator. Shaded areas indicate NBER recessions. Heavy tick marks indicate fourth quarter. Source: Haver Analytics.

Figure 13
Real Personal Disposable Income and Expenditures



Notes: Twelve-month percentage changes in real personal consumption expenditures (PCE) and real disposable personal income (DPI). Data adjusted for microsoft dividend in December 2004. Upward and downward shifts in December 2012 and December 2013 reflect shifting of capital gains into 2012. Shaded areas indicate NBER recessions. Heavy tick marks indicate December. Data from St. Louis FRED.

Figure 14
Sticky-price and Flexible-price CPI Inflation



Notes: Observations are 12-month percentage changes in sticky-price and flexible-price inflation. Heavy tick marks indicate December. The years are centered below the January number for that year. For construction of the series, see Bryan and Meyer (2010). Source: Federal Reserve Bank of Atlanta.