Rules vs. Discretion Revisited

A Proposal to Make the Strategy of Monetary Policy Transparent

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Abstract

The movement toward increased transparency on the part of the Federal Open Market Committee (FOMC) has concentrated on additional explicitness about the forecasts of the economy by its individual participants. Especially with the funds rate near its zero lower bound, the FOMC has become more explicit about the funds-rate path it anticipates for the future. However, the FOMC has been much more reticent about articulating a strategy to guide monetary policy (that is, a rule). Without communication in terms of a rule, monetary policy at times becomes a source of instability. The reason is that the FOMC cannot reliably control how markets form their expectations of future policy actions. Moreover, learning is difficult without knowledge of how the underlying strategy of monetary policy has evolved. The recent experience of implementation of policy with a near-zero funds rate also highlights the importance of the management of expectations through a rule-based policy.

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Rules vs. Discretion Revisited:

A Proposal to Make the Strategy of Monetary Policy Transparent

Robert L. Hetzel

Knut Wicksell (1978, 3) said a hundred years ago in his *Lectures on Political Economy*, "With regard to money, everything is determined by human beings themselves, i.e. the statesmen, and (so far as they are consulted) the economists; the choice of a measure of value, of a monetary system, of currency and credit legislation—all are in the hands of society." Wicksell followed up by noting, "The establishment of a greater, and if possible absolute, stability in the value of money has thus become one of the most important practical objectives of political economy. But, unfortunately, little progress towards the solution of this problem has, so far, been made."[1]

The Federal Reserve System operates under a dual mandate from Congress to provide for stability in prices and maximum employment. Because the mandate is so general, it provides no guidance about the actual monetary standard that policymakers (Wicksell's "statesmen") have determined. What responsibility do our policymakers-statesmen incur to explain the monetary standard they have created? How well do they carry out that responsibility?

One key aspect of the behavior of the central bank that determines the nature of the monetary standard is the extent of its adherence to a rule. Using the traditional meanings accorded to the rules-versus-discretion debate, to what extent are the period-by-period decisions made by the Federal Open Market Committee (FOMC) constrained by the requirement of achieving stated long-run objectives? To a significant extent, FOMC behavior is rule-like, where by "rule" is meant a reaction function summarizing how the FOMC changes its policy variable in

[1] Wicksell first published his lectures in 1906. The reference here is to a 1935 translation with an introduction by Lionel Robbins.

response to incoming information on the economy. In particular, the FOMC is acutely attuned to inflationary expectations. At the same time, however, the rule that characterizes FOMC behavior has evolved over time without explicit articulation of that evolution by the FOMC.

The result is to obscure the nature of the monetary standard and its evolution. Two unfortunate consequences follow. First, it is difficult to determine what sort of rule will have a stabilizing or destabilizing effect. Second, the committee loses some control over how financial markets form their expectations of future policy in that it cannot be certain how markets understand the contingent character of the rule (reaction function). It then loses some control over whether those expectations are stabilizing or destabilizing.

Section 1 reviews the current professional consensus in favor of rules. The paper emphasizes the injunction of Robert Lucas that the FOMC should choose "among alternative stable, predictable policy rules, infrequently changed and then only after extensive professional and general discussion." Section 2 defines the terminology required for clarity of discussion of "monetary policy." Section 3 uses the characterization offered by Stanley Fischer of the extent to which one can portray FOMC decision making as rule-like.[2] Section 4 follows Fischer in using the August 2011 FOMC meeting as a case study.

Regardless of the extent to which one can characterize FOMC decision-making as rule-like, the FOMC chairperson does not characterize it as such. Section 5 argues for using the FOMC's Summary of Economic Projections (SEP) forecasts to move toward explicitly rule-based decision making. The change requires moving from an exercise based on forecasts of individuals to an exercise based on an FOMC forecast. Section 6 examines how the FOMC can

[2] Fischer was vice chair of the Board of Governors from May 2014 to October 2017. He had served as governor of the Bank of Israel from January 2005 to June 2013. The author is indebted to a referee for suggesting the need to make the discussion specific through the detailed overview of FOMC decision-making offered in the Fischer speeches referenced here.

learn by using the Great Recession as a case study. As made evident from this review, learning requires an assessment of the nature of inflation-output tradeoffs. Section 7 reviews the turmoil in financial markets that occurred at the end of 2018. The FOMC lost control of how markets form their expectations, in that markets were doing so on the basis of a rule that in the past had led to recessions.

1. A Professional Consensus for a Rule

The rules-versus-discretion debate has long occupied a place in the economics literature. Early on, Henry Simons argued for a rule because of the way in which it would shape expectations. Simons (1936, 367) writes, "Once well established and generally accepted as the basis of anticipations, any one of many different rules . . . would probably serve about as well as another." Simons wrote in an intellectual milieu of what John Maynard Keynes called "animal spirits," and his advice had no contemporaneous influence.[3] In the Keynesian heyday, economists made the argument that period-by-period unconstrained policy making would dominate a rule because at a minimum such decision-making could replicate the policy actions of a rule.

Simons's student, Milton Friedman (1962), challenged that logic by arguing from an analogy to free speech. Relative to an unconstrained government that decides on a case-by-case basis whether to allow free speech, a constitutional rule that guarantees free speech will engender more free speech because of the certainty that such speech will be tolerated. Later, Kydland and

[3] Keynes (1936, 161) argued that decisions based on expectations about the future necessarily had to rely on "animal spirits" rather than rational calculation. Keynes (1936, 154, 315) wrote,

> A conventional valuation [of a stock] which is established as the outcome of mass psychology of a large number of ignorant individuals is liable to change violently as the result of a sudden fluctuation of opinion due to factors which do not really make much difference to the prospective yield. . . . But, as we have seen, the basis for such expectations is very precarious. Being based on shifting and unreliable evidence, they are subject to sudden and violent changes.

Prescott (1977) formalized Friedman's logic, and Barro and Gordon (1983) extended it to the case of monetary policy.[4] Barro and Gordon assume that the central bank has an incentive to create surprise inflation in one period to lower unemployment but then promise never to do so again. With "discretion," nothing prevents the central bank from breaking its promise. Because the public anticipates that the FOMC will break its promise, the inflation does not come as a surprise. The result is then inflation with no benefit to unemployment. Policy is "time consistent" but in a bad way. The independence of the Federal Reserve Board (Fed) solves this problem by insulating the FOMC from short-term political pressures.

For most of its history, the Fed has been independent. Independence in itself, however, has not prevented significant episodes of destabilizing monetary policy. One prerequisite to ensuring stabilizing monetary policy in the future is an ability to learn from past mistakes. That ability requires knowledge of how the underlying consistency in FOMC decision-making has evolved in the past, as well as the identification of departures from that consistency. In this respect, the Fed should be more explicit about the character of its decision-making. It should be able to characterize explicitly the rule-like character of its decision-making. Put informally, it should be able to explain how the aspect of decision-making that requires judgment "washes out" over time and yields to a rule.

As used here, "discretion" has the general meaning of judgment unconstrained by an explicit formula. More generally, policy actions are undertaken unconstrained by an explicit model of the monetary standard, which details how a reaction function interacts with the

[4] In this literature, "discretion" can be thought of as a repeated game between the FOMC and the public in which the public moves last and trumps FOMC actions. The FOMC has an incentive to create surprise inflation to lower the unemployment rate, but it also cares about above-target inflation. The public understands those incentives. The FOMC sets an inflation rate above its stated target, but the public raises prices in anticipation so that actual inflation is anticipated. Inflation is high enough above target that the FOMC no longer has an incentive to create surprise inflation. However, with inflation being anticipated, there is no reduction in unemployment. With commitment, there is no game. The FOMC simply sets inflation at target and then also achieves full employment.

structure of the economy.[5] The "rules" camp, exemplified by the steady money growth rule of Milton Friedman (1960), would like to remove all judgment from the making of monetary policy. The "discretion" camp, in the past often represented by spokespersons for the Fed, has contended that the extensive amount of judgment required in the formulation of policy limits the practicability of rules.[6]

Based on the usefulness of a rule for shaping expectations, a professional consensus has solidified in favor of rules, as expressed by Robert Lucas (1981, 255):

> Our ability as economists to predict the responses of agents rests, in situations where expectations about the future matter, on our understanding of the stochastic [policy] environment agents believe themselves to be operating in. In practice, this limits the class of policies the consequences of which we can hope to assess in advance to policies generated by fixed, well understood, relatively permanent rules (or functions relating policy actions taken to the state of the economy). . . . Analysis of policy which utilizes economics in a scientific way necessarily involves choice among alternative stable, predictable policy rules, infrequently changed and then only after extensive professional and general discussion, minimizing (though, of course, never entirely eliminating) the role of discretionary economic management.

Lucas continues, "I have been impressed with how noncontroversial [the above argument for rules] seems to be at a general level and with how widely ignored it continues to be at what some view as a 'practical' level."

How, then, should one characterize FOMC decision-making weighed against this Lucas standard? Is it "rule-like" in that it conforms to the Lucas criteria stated above? To what extent does the FOMC impose continuity over time in its decision-making, and how explicit is it about

[5] In the 1970s, "discretion" referred to the period-by-period decision-making in which the FOMC took as given "slow-moving" variables like the expectation of inflation. FOMC procedures did not impose a discipline that required individual decisions to be compatible with long-run objectives like price stability.

[6] For example, Allan Sproul (1980, 124, 127), former president of the New York Fed, writes, "I find it impossible to swallow [Friedman's] prescription which would reduce monetary management to the definitive act of forcing a constant drip of money into the economic blood stream. It seems to me patent that the uncertain hand of man is needed in a world of uncertainties and change and human beings, to try to accommodate the performance of the monetary system to the needs of particular times and circumstances and people. . . . Money will not manage itself. It needs managers who are aware of the fact that they are dealing primarily with problems of human motivation and human reactions."

the nature of that continuity in its public communication? Although the meaning of *rules* and *discretion* has evolved, the terms continue to serve as a useful benchmark for evaluating the extent of the explicit discipline the FOMC imposes on its decision-making process.

Certainly, there is significant consistency in FOMC decision-making over time, and one can therefore characterize it as rule-like. Nevertheless, historically there have been episodes of departure from that underlying consistency, and the underlying consistency has occasionally changed in ways not foreseen at the time. The contention here is that the FOMC can do more to make explicit the underlying consistency in its decision-making. Over time, that explicitness will help to ensure that the FOMC exercises a constructive influence on how financial markets form their expectations.

2. A Semantic Road Map to Understanding the Monetary Standard

An understanding of the monetary standard is inherently difficult because it involves understanding how the behavior of the FOMC interacts with the price system that controls the behavior of the economy. Disentangling the two-way interaction between the actions of the FOMC and the evolution of the economy requires a formidable analytical apparatus in terms of a model of the economy and a historical narrative that identifies the correct model. No matter how complicated the journey to an understanding of the monetary standard, the start must be semantic clarity.

Monetary policy (MP) has four distinct meanings. First, MP "actions" are the values of the policy variable set each meeting. It could be the funds rate or, more generally, the funds-rate path expected by the FOMC and communicated to financial markets. Second, the MP "stance" connotes the degree of stimulus imparted by the FOMC to the economy. Measured in terms of its impact on the growth of nominal (dollar) GDP, it could be stimulative, neutral, or contractionary.

Third, MP "strategy" characterizes the consistency the FOMC imposes on its MP actions over time. It takes the form of a reaction function that explains how the FOMC alters its policy variable in response to incoming information on the economy. Finally, the monetary "system" constitutes how the MP strategy interacts with the economy to endow money with a well-defined value (i.e., determine the price level) and to determine how the price level interacts with relative prices (real-nominal or Phillips-curve interactions).

Milton Friedman (1988) refers to MP strategy:

> Every now and then a reporter asks my opinion about "current monetary policy." My standard reply has become that I would be glad to answer if he would first tell me what "current monetary policy" is. I know, or can find out, what monetary actions have been: open-market purchases and sales and discount rates at Federal Reserve Banks. I know also the federal funds rate and rates of growth of various monetary aggregates that have accompanied these actions. What I do not know is the policy that produced these actions. . . . The closest I can come to an official specification of current monetary policy is that it is to take those actions that the monetary authorities, in light of all evidence available, judge will best promote price stability and full employment—i.e., to do the right thing at the right time. But that surely is not a "policy." It is simply an expression of good intentions and an injunction to "trust us."

The rules-versus-discretion debate concerns MP strategy. To what extent is MP strategy rule-based as opposed to discretionary or judgmental? To the extent that MP strategy is rule-based, how explicit is the FOMC in communicating the rule (strategy)? To what extent does the FOMC commit to consistency in its MP strategy over time?

The answer to these questions is contentious for two reasons. First, often, proponents of a rule want a numerical rule for determining MP actions that eliminates all discretion. The contention here is that such a numerical rule is not feasible. At the same time, as explained below, the FOMC could structure its decision-making in a rule-like manner. Second, the FOMC communicates on two channels: one to financial markets and one to Congress and the general public. The way in which communication takes place depends on the channel.

To markets, the FOMC communicates its view of the most likely path for the funds rate. Because that path is contingent on incoming information on the economy, the FOMC must also communicate in a way that provides markets with an understanding of its MP strategy. However, to avoid conflict with congressional-channel communication, financial-channel communication takes place through minutes and speeches that require inference of the systematic part of MP strategy.

To Congress, the FOMC communicates its successful pursuit of the dual mandate. This communication takes the form of long-run forecasts of the economy in which both objectives (price stability and maximum employment) are achieved. The FOMC packages individual policy actions as optimal in the context of the contemporaneous behavior of the economy. The implicit assumption is that they concatenate to an optimal MP strategy and successful fulfillment of the dual mandate.

The FOMC renders the two channels of communication compatible by lack of explicitness over MP strategy. The chairperson controls the format of FOMC meetings to produce an MP action combined with language in the statement, which, followed over time, allows markets to infer the MP strategy. However, nothing in the format of FOMC meetings or the resulting minutes makes that strategy explicit. The format of FOMC meetings is not organized around the MP strategy. The chairperson imposes the continuity required to implement the MP strategy through the way in which he or she controls over time individual MP policy actions.

The Fed's MP strategy has evolved over time. Reconstructing its evolution is inherently difficult. Effectively, the Fed institutionalizes historical amnesia. One recourse, then, is to use a numerical shortcut, such as estimating a Taylor rule. However, that approach is controversial

because of contention over whether it yields reduced forms (measures of correlations) rather than structural relationships (measures showing the direction of causation). Learning about which MP strategies are stabilizing and which are destabilizing is difficult without a historical record that records those strategies.

The Fed is caught in a difficult political equilibrium. Moving to an explicit MP strategy to organize FOMC debate would lessen the control of the chairperson over the FOMC. More importantly, all MP strategies since the 1951 Treasury-Fed Accord are based on the lean-against-the-wind (LAW) procedures initiated by FOMC chairman William McChesney Martin. With these procedures, in response to sustained growth in output above potential measured by increased rates of resource utilization (sustained declines in the unemployment rate), the FOMC raises the funds rate above its prevailing value in a measured, persistent way (Hetzel 2008a). Such explicitness would limit the ability of the chairperson to communicate through the Congress channel in a way that deflects populist attacks. Populist members of Congress would claim that the Fed is controlling inflation "on the backs of the working man" by raising unemployment. "Allowing the price system to work" is hardly a cogent argument to a populist.

3. Rules vs. Discretion as Seen by a Fed Insider

The summaries offered below of the speeches by Stanley Fischer appear to place him on both sides of the rules-versus-discretion debate. The resolution offered here for the apparent conundrum provides insight into how to place FOMC decision-making along a continuum running from discretion (judgment) to rules.

Fischer (2017c, 1) appears to come down in favor of rules:

> It has been increasingly acknowledged that monetary policy implementation relies importantly on the management of market expectations. . . . Clarity about the central bank's reaction function . . . helps meet the central bank's policy targets, with the result

> that the markets are working in alignment with the policymaker's goals. . . . Clear communication of the Federal Open Market Committee's (FOMC's) views on the economic outlook and the likely evolution of policy is essential in managing the market's expectations.

The spirit of Fischer's (2017c, 1) argument is that the FOMC should "avoid unintended surprises in the conduct of policy." That spirit argues for consistency in and explicitness about MP strategy.

In the spirit of the Lucas quotation above, Fischer (2017b, 3) appears to make the case for implementation of a policy based on rules when he talks about the Board of Governors staff's model, FRB/US:

> An increase in the federal funds rate affects expectations of future values of that rate, which in turn affect interest rates on longer-term bonds, equity prices, and the exchange value of the U.S. dollar. Households and firms are forward looking. . . . They set out a plan—a contingency plan—for consumption, savings, and employment for the future. . . . So the expectations of decisionmakers, be they households, firms, or investors, are at the center of how monetary policy works—both in the real world and in FRB/US.

The FOMC must impose a consistency on its decision-making that causes the public to make forecasts of its future actions based on its MP strategy. That concordance is a prerequisite for causing the term structure of interest rates to respond in a stabilizing way to incoming news about the economy.

Fischer (2017b, 1) begins by recounting how, when he was a student at the London School of Economics in the early 1960s, he believed that economists could construct econometric models that would "accurately predict the future course of the economy." Given their objectives, policymakers could use the model to solve for "the desired values of the target variables." He then added that "it has not yet happened."

But in another venue, the Hoover Institution, Fischer (2017a, 1) gave a speech titled "Committee Decisions and Monetary Policy Rules," which carried the message that the FOMC at its meetings "should consult the prescriptions of policy rules, but . . . should avoid applying

them mechanically. . . . Policymakers might have good reasons for deviating from these rule benchmarks [interest-rate rules]. . . . They could appropriately behave in ways that are not very well characterized by simple monetary policy rules."

Fischer (2017a, 3) cites commentary by Don Kohn (1999) that policymakers "do not see their past actions as a very firm guide to current or future policy."[7] Fischer draws the conclusion that "policymakers will from time to time change their assessment of what rule they regard as the appropriate benchmark." The main thrust of Fischer's speech was that decision-making by committee is desirable but that it precludes use of a rule. Fischer (2017a, 4) argues that "committee decision-making is, *on average*, preferable to the use of a rule. . . . Adherence to a simple policy rule is not the most appropriate means of achieving macroeconomic goals" (italics in original).

Fischer (2017b, 3) asks the central question, "How does the FOMC choose its interest rate decision?" In response to his rhetorical question, Fischer (2017b, 4) explains that the FOMC's members look at the prescriptions of rules and model simulations as inputs. "In reaching its decision, the Committee will examine the prescriptions of different monetary rules and the implications of different model simulations." However, Fischer does not address why such models would be useful in predicting the impact of the FOMC's decision. In the spirit of Lucas (1981), to yield reliable forecasts the FOMC must have articulated the rule embodied in the model and have committed to it so that it knows with certainty that the rule shapes the expectations of the "decisionmakers, be they households, firms, or investors."

Fischer's characterization of FOMC decision-making is that at each meeting FOMC members consider a variety of rules and model simulations, but they then decide on an MP

[7] Donald Kohn was FOMC secretary from 1987 to 2002 and director of the Division of Monetary Affairs from 1987 to 2001. He became a member of the Board of Governors in 2002 and was vice chair from 2006 to 2010, when he retired from the board.

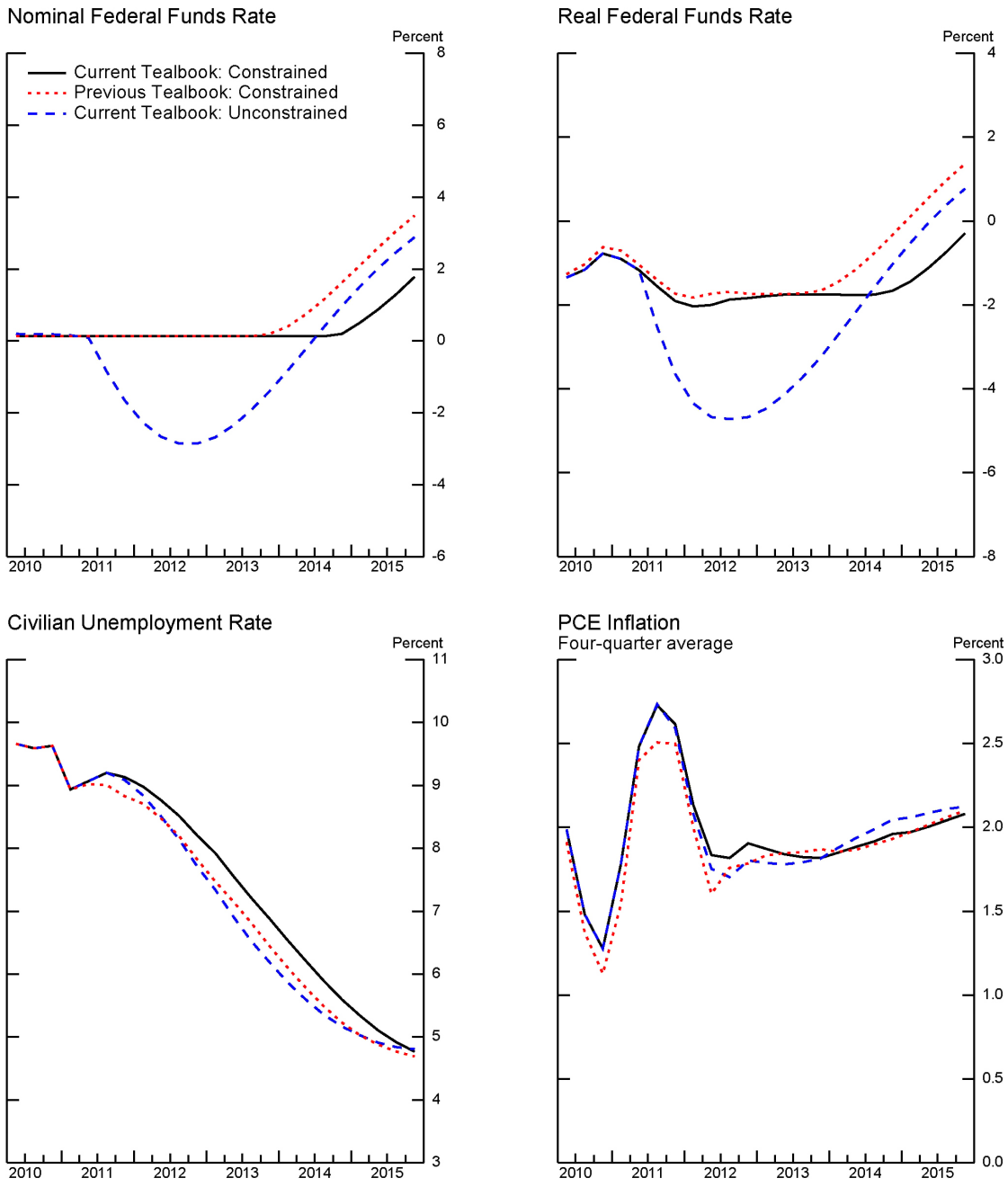
action based on information not necessarily contained in those rules. Fischer (2017a) leaves unanswered the question of how the FOMC fulfills the imperative stated elsewhere (Fischer 2017b) of disciplining the expectations of the public. What imposes the required consistency to the MP strategy? Perhaps the FOMC operates with an implicit, commonly accepted framework consisting of a rule and a model of the economy. Fischer uses the August 2011 FOMC meeting as a case study. For this meeting, was FOMC decision-making guided by a commonly accepted framework?

4. A Case Study in FOMC Decision-Making: August 2011

Figure 1 shows the "model simulations" referred to by Fischer for the August 2011 FOMC meeting (Tealbook Book B, August 4, 2011, 3).[8] How were they generated? Note first that the major forecasting effort by the staff of the Board of Governors is contained in Tealbook Book A in a series of tables. The Tealbook Book A forecast is judgmental. The staff imposes consistency in the components of GDP through accounting identities, but the forecast does not come from a single model.

[8] Before FOMC meetings, the staff of the Board of Governors distributes briefing materials informally termed the Tealbook: *Report to the FOMC on Economic Conditions and Monetary Policy*. Forecasts of the economy are contained in the Tealbook Part A (formerly called the Greenbook): "Book A—Economic and Financial Conditions: Current Situation and Outlook." Policy alternatives and simulations of the economy based on different rules are contained in the Tealbook Part B (formerly called the Bluebook): "Book B—Monetary Policy: Strategies and Alternatives." They are available with a lag of five calendar years on the Board of Governors website (https://www.federalreserve.gov/monetarypolicy/fomc_historical.htm). The Tealbook Part A referred to in the text is dated August 3, 2011. The Tealbook Part B referred to is dated August 4, 2011.

Figure 1. Constrained vs. Unconstrained Monetary Policy (2 Percent Inflation Goal)



Note: PCE = personal consumption expenditures.

Source: Board of Governors of the Federal Reserve System, *Report to the FOMC on Economic Conditions and Monetary Policy*, "Book B, Monetary Policy: Strategies and Alternatives," August 4, 2011, https://www.federalreserve.gov/monetarypolicy/files/FOMC20110809tealbookb20110804.pdf.

The three tables that follow show the top lines of tables from the August 3, 2011, Tealbook Book A. Table 1 ("Changes in Prices and Costs," Tealbook Book A, August 3, 2011, 99) presents predictions for inflation from the August 2011 Tealbook and the prior June 2011 Tealbook. Table 2 ("Changes in Real Gross Domestic Product and Related Items," Tealbook Book A, August 3, 2011, 96) contains forecasts of real GDP and its components. The top line in table 2 displays forecasts for real GDP from the August 2011 Tealbook and the prior June 2011 Tealbook. As shown in the tables, from the June to the August Tealbooks, predicted inflation for the year 2011 remained stable, going from 1.7 percent to 1.8 percent (personal consumption expenditures chain-weighted price index excluding food and energy). The key fact for the August 2011 meeting was the decline in forecasted real GDP growth from the June Tealbook. For the year 2011, predicted real GDP went from 2.7 percent to 1.8 percent, while annualized real GDP growth predicted for 2011Q3 fell from 3.9 percent to 2.9 percent. As was frequently the case, the change from one meeting to the next primarily reflected the incorporation of new data.

Table 1. Changes in Prices and Costs (Percent, Annual Rate Except as Noted)

Item	2010				2011				2012				2010[1]	2011[1]
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
GDP chain-wt. price index	1.5	1.5	1.4	1.9	2.5	2.3	2.1	1.2	.7	2.9	1.3	1.2	1.6	2.0
Previous Tealbook	1.0	1.9	2.1	.4	2.0	3.8	1.6	1.3	1.6	1.5	1.5	1.5	1.3	2.2
PCE chain-wt. price index	1.9	.3	1.0	1.9	3.9	3.1	1.5	1.1	1.6	1.5	1.4	1.4	1.3	2.4
Previous Tealbook	2.1	.0	.8	1.7	3.8	3.4	.8	1.4	1.4	1.5	1.5	1.5	1.1	2.3
Energy	13.7	-14.9	5.6	24.7	40.7	14.9	-5.2	-7.0	.8	1.9	1.8	1.3	6.2	9.3
Previous Tealbook	16.4	-17.5	5.4	24.3	40.6	17.1	-13.1	1.0	1.0	1.3	1.0	.5	5.9	9.6
Food	1.8	1.5	.3	1.4	6.5	6.4	2.6	2.0	1.4	1.3	1.4	1.4	1.3	4.3
Previous Tealbook	1.8	1.6	.3	1.4	6.3	6.7	3.0	2.0	1.4	1.3	1.4	1.4	1.3	4.5
Ex. food & energy	1.1	1.3	.8	.7	1.6	2.1	1.9	1.7	1.6	1.5	1.4	1.4	1.0	1.8
Previous Tealbook	1.2	1.0	.5	.4	1.4	2.2	1.7	1.4	1.5	1.5	1.5	1.5	.8	1.7

[1] "Change from fourth quarter of previous year to fourth quarter of year indicated."

Source: Board of Governors of the Federal Reserve System, *Report to the FOMC on Economic Conditions and Monetary Policy*, "Book A, Economic and Financial Conditions: Current Situation and Outlook," August 3, 2011, 99.

Table 2. Changes in Real Gross Domestic Product and Related Items (Percent, Annual Rate Except as Noted)

Item	2010				2011				2012				2010[1]	2011[1]
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Real GDP	3.9	3.8	2.5	2.3	.4	1.4	2.9	2.4	2.4	2.9	3.2	3.4	3.1	1.8
Previous Tealbook	3.7	1.7	2.6	3.1	2.1	1.9	3.9	2.9	3.1	3.3	3.7	3.9	2.8	2.7

[1] "Change from fourth quarter of previous year to fourth quarter of year indicated."

Source: Board of Governors of the Federal Reserve System, *Report to the FOMC on Economic Conditions and Monetary Policy*, "Book A, Economic and Financial Conditions: Current Situation and Outlook," August 3, 2011, 96.

Table 3. Other Macroeconomic Indicators

Item	2010				2011				2012				2010[1]	2011[1]
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Employment and production														
Nonfarm payroll employment[2]	-.1	.6	-.1	.2	.4	.4	.2	.4	.5	.5	.5	.6	.7	1.4
Unemployment rate[3]	9.7	9.6	9.6	9.6	8.9	9.1	9.2	9.2	9.1	8.9	8.7	8.5	9.6	9.2
Previous Tealbook[3]	9.7	9.6	9.6	9.6	8.9	9.0	9.0	8.9	8.8	8.6	8.4	8.1	9.6	8.9
NAIRU[3]	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Previous Tealbook[3]	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
GDP gap[4]	-6.4	-5.9	-5.8	-5.6	-6.0	-6.2	-6.0	-5.9	-5.9	-5.7	-5.5	-5.2	-5.6	-5.9
Previous Tealbook[4]	-6.0	-6.1	-5.9	-5.7	-5.7	-5.8	-5.4	-5.2	-5.1	-4.9	-4.6	-4.2	-5.7	-5.2

[1] "Change from fourth quarter of previous year to fourth quarter of year indicated."
[2] "Change, millions."
[3] "Percent; annual values are for the fourth quarter of the year indicated."
[4] "Percent difference between actual and potential GDP; a negative number indicates that the economy is operating below potential. Annual values are for the fourth quarter of the year indicated."

Source: Board of Governors of the Federal Reserve System, *Report to the FOMC on Economic Conditions and Monetary Policy*, "Book A, Economic and Financial Conditions: Current Situation and Outlook," August 3, 2011, 101.

The Board of Governors staff used its FRB/US model to generate the simulations shown in figure 1. The first step was to reconfigure the model by adjusting the intercept terms of its equations so that it reproduced the judgmental forecast made by the Board of Governors staff in Tealbook Book A. With these alterations, the staff then performed an optimal-control simulation using a quadratic loss function in which losses were the sum of squared deviations of (1) inflation from 2 percent and of (2) unemployment from the nonaccelerating inflation rate of

unemployment (NAIRU), which in table 3 ("Other Macroeconomic Indicators," Tealbook Book A, August 3, 2011, 101) is 6.0 percent. Simulations were performed under the assumption of perfect foresight, which is that private agents can forecast perfectly the implications of monetary policy for the economy and interest rates.

Fischer (2017b) also references rules that specify a value for the funds rate. Using the Tealbook forecasts for inflation and output, table 4, "Near-Term Prescriptions of Simple Policy Rules" (Tealbook Book B, August 4, 2011, 6), shows the forecasted values of the funds rate for 2011Q3 and 2011Q4.[9] The columns labeled "Unconstrained Policy" show values assuming that the zero lower bound is not binding. The inflation target was assumed to be 2 percent. Apart from Taylor (1993), all the rules place significant weight on the lagged term for the funds rate, which was held near the zero lower bound (ZLB). At the time, the target rate for the funds rate was 0 to 0.25 basis points. Despite the resulting constraint on the dispersion of estimates, the dispersion shown in the unconstrained column is significant. The forecasted value for the funds rate for 2011Q4 was 0.76 for Taylor (1993) and –2.2 for Taylor (1999).

[9] The estimated outcome-based rule and the estimated forecast-based rule are variations of the Taylor rule with lagged values of the funds rate on the right-hand side. The former uses realized values of inflation and output, and the latter uses forecasts. The first-difference rule is similar to the first-difference rule in Orphanides and Williams (2002).

Table 4. Near-Term Prescriptions of Simple Policy Rules

	Constrained Policy		Unconstrained Policy	
	2011Q3	2011Q4	2011Q3	2011Q4
Taylor (1993) rule	**0.36**	**0.76**	**0.36**	**0.76**
Previous Tealbook	*0.45*	*0.90*	*0.45*	*0.90*
Taylor (1999) rule	**0.13**	**0.13**	**-2.63**	**-2.20**
Previous Tealbook	*0.13*	*0.13*	*-2.25*	*-1.73*
Estimated outcome-based rule	**0.13**	**0.13**	**-0.19**	**-0.47**
Previous Tealbook	*0.13*	*0.13*	*-0.02*	*-0.15*
Estimated forecast-based rule	**0.13**	**0.13**	**-0.15**	**-0.48**
Previous Tealbook	*0.13*	*0.13*	*0.02*	*-0.15*
First-difference rule	**0.17**	**0.22**	**0.17**	**0.22**
Previous Tealbook	*0.31*	*0.46*	*0.31*	*0.46*

Source: Board of Governors of the Federal Reserve System, *Report to the FOMC on Economic Conditions and Monetary Policy*, "Book B, Monetary Policy: Strategies and Alternatives," August 4, 2011, 6.

As noted, Fischer uses the August 9, 2011, FOMC meeting as a case study. A problem with Fischer's explanation of how the FOMC reaches a decision is that, in the 162 pages of the transcript, there are almost no references to these simulations and the estimated policy rules yielding a funds-rate forecast.[10] They did not organize FOMC debate. One is left with Fischer's (2017b, 3) vacuous generalization that FOMC members "explain their policy choices and try to persuade other members of their viewpoints." What generalizations can one draw from the August 2011 FOMC meeting?

[10] Evans (Board FOMC Transcript, August 9, 2011, 48–49) mentions the Taylor rule to argue that it captured the spirit of the dual mandate. He refers to the loss function used in the optimal control simulations only to chide the FOMC for having a loss function more heavily weighted to inflation overshoots. Yellen (Board FOMC Transcript, August 9, 2011, 94) supports her recommendation for the statement language as "in line with the implications of the staff's estimated outcome-based policy rule and with FRB/US model simulations of the Taylor 1999 rule." Bernanke (Board FOMC Transcript, August 9, 2011, 88) argued that his recommendation for the statement language was consistent with the Taylor (1999) rule.

To look ahead to the conclusions of the overview, if one reserves the term *rule* for a numerical formula that yields a value for the funds rate each meeting, the FOMC does not have a rule. However, it has a rule of thumb for responding to incoming information. One can think of it as a search procedure for finding the natural rate of interest, which is the real rate of interest that maintains output at potential. Section 5 explores how to make explicit this rule of thumb.

What does one learn by reading the transcripts for FOMC meetings such as for the August 9, 2011, meeting? The focus of an FOMC meeting is the decision over a policy action, specifically, how to communicate to markets the FOMC's view for the likely path of the funds rate. Nothing in the format of the meeting provides for continuity over time. There is no explicit MP strategy to guide debate. The format for discussion of the meeting does not follow an analytical framework in which policy actions derive from minimization of a loss function subject to a model of the economy. Continuity is the responsibility of FOMC chairpersons, but they achieve it through their influence over the period-by-period decision-making of the FOMC.

The FOMC organizes its debate around the language of the statement. The first paragraph summarizes the change in economic activity since the last meeting. The second paragraph provides the committee's near-term outlook for the economy. The next paragraph places the decision on the funds rate and its likely path in the context of the characterization of the economy provided in the first two paragraphs.

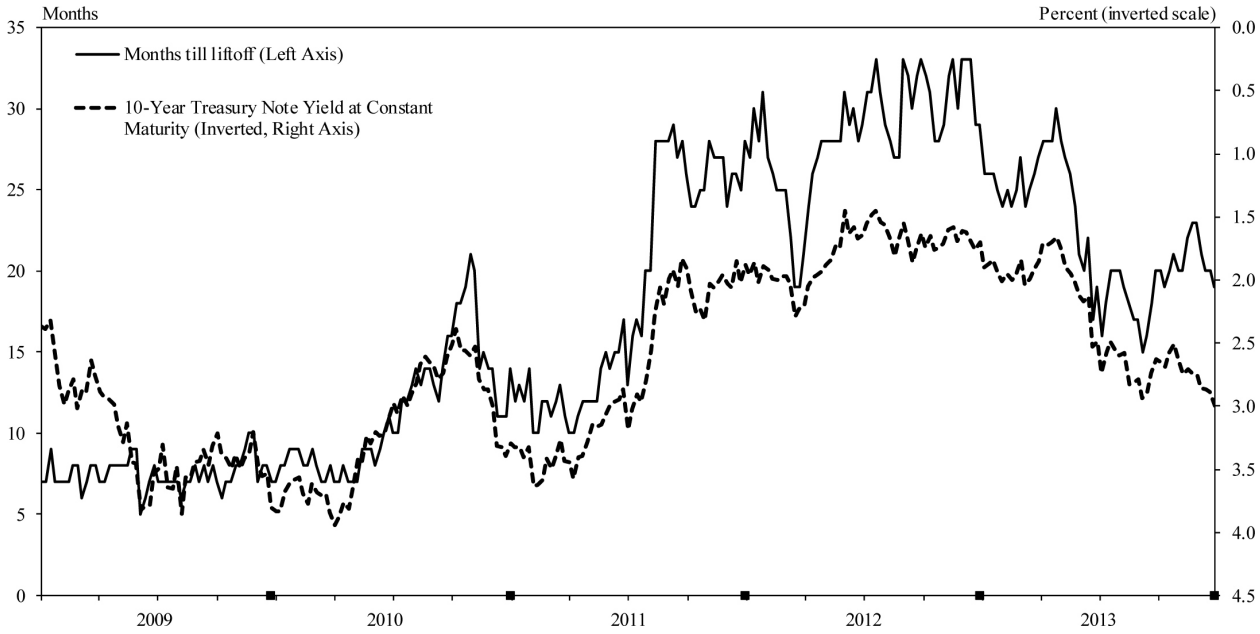
The statement issued after the August 9, 2011, FOMC meeting includes the following language. The first paragraph states, "Information received since the Federal Open Market Committee met in June indicates that economic growth so far this year has been considerably slower than the Committee had expected. Indicators suggest a deterioration in overall labor market conditions in recent months, and the unemployment rate has moved up." The second

paragraph includes the sentence, "The Committee now expects a somewhat slower pace of recovery over coming quarters than it did at the time of the previous meeting and anticipates that the unemployment rate will decline only gradually." The third paragraph contains the key sentence for financial markets: "The Committee currently anticipates that economic conditions—including low rates of resource utilization and a subdued outlook for inflation over the medium run—are likely to warrant exceptionally low levels for the federal funds rate *at least through mid-2013*" (italics added).

At the August 2011 meeting, the FOMC substituted "at least through mid-2013" where the June statement had used the language "for an extended period." In reference to the language in the first two paragraphs of the statement, Bernanke states that "simply darkening our statement . . . and taking no action [would] have one big . . . disadvantage. The big disadvantage is that I think the markets and the economy would react very poorly to that. It seems as though the Fed is saying that the situation has gotten significantly worse, but we're not willing to do anything about it" (Board FOMC Transcript, August 9, 2011, 87).

Bernanke's recommendation reflects the lean-against-the-wind (LAW) tradition instituted by former FOMC chairman William McChesney Martin. With a LAW rule of thumb, the FOMC raises the funds rate above its prevailing value in a measured but persistent way in response to sustained above-trend growth indicated by increases in rates of resource utilization and conversely for weakness (Hetzel 2008a). At the ZLB, the committee communicated its intention to implement a lower funds-rate path not through a funds-rate reduction but instead through language indicating a longer period before liftoff of the funds rate from the ZLB. Figure 2 shows the 10-year Treasury yield (inverted) and the estimated time to liftoff as measured by Fed funds futures markets.

Figure 2. Number of Months until Expected Fed Tightening vs. 10-Year Treasury Note Yield



Note: "Months till liftoff" refers to the number of months at or below 38 basis points on federal funds futures contracts. Data are weekly. Heavy tick marks indicate the end of fourth quarter.

Sources: Fed funds futures via Bloomberg and 10-year Treasury yield via Haver Analytics. Thanks to Torsten Slok of Deutsche Bank Securities for providing the idea.

With the change in language incorporated into the August 2011 statement, Fed funds futures began to show a significant lengthening of the time until the FOMC would start raising the funds rate from its near-zero lower bound. The market continually renewed its estimate of a distant liftoff until May 2013 with the bond market "taper tantrum." When Chairman Bernanke raised the possibility of reducing the rate at which the Fed was purchasing long-term government securities and agency mortgage-backed securities, markets inferred that the FOMC might also shorten the time to liftoff, and bond yields rose. After 2013, Fed funds futures markets exhibited a steady reduction in the estimated time to liftoff until reaching zero with the first increase in December 2015.

What can examination of the August 2011 FOMC meeting reveal about how to give content to these LAW procedures? Given the format for discussion, which eschews the sort of discipline that would be imposed by an explicit MP strategy or an analytical framework, one must study the debate and generalize about its implicit structure. To start, the FOMC has shared in the New Keynesian intellectual revolution based on the assumption that the price system works well in the sense that it determines well-defined market-clearing values of real variables (Friedman 1969). These "natural" values are those that would prevail in the absence of any monetary nonneutrality.[11] Actual-natural benchmarks for the economy then can be defined by the difference between the actual value of a variable and its natural value.

Committee participants take a stand on the state of the economy through implicit inferences about these benchmarks.[12] The key benchmarks are the output gap (the difference between actual GDP and potential GDP) and the growth gap (the difference between the underlying rate of GDP growth and potential growth). Before reviewing the actual arguments, I provide the economic background for the August 2011 FOMC meeting.

The FOMC go-around on the economy starts with a staff summary of the Tealbook Book A. At the August 2011 FOMC meeting, David Wilcox (Board FOMC Transcript, August 9, 2011, 17), the director of the Division of Research and Statistics, reported on "a seemingly unrelenting stream of negative news about the pace of the recovery that we received during the intermeeting period." As the Tealbook (Book A, August 3, 2011, 1) reports, "Real GDP is now estimated to have increased at an average annual rate of only 1 percent in the first half of this year, compared with our estimate of 2 percent in the previous projection." Table 2, which

[11] Monetary nonneutrality is "stickiness" in the price level, for example, as implemented in New Keynesian models. For an exposition, see Goodfriend and King (1997).
[12] "Participants" includes all members of the Board of Governors and the regional bank presidents. "Members" includes those who are voting.

reproduces the top line of "Changes in Real Gross Domestic Product and Related Items," shows the reduction. Annualized growth in real GDP for 2011Q3 went from 3.9 percent in the June Tealbook to 2.9 percent in the August Tealbook.

In terms of 2011 actual-natural benchmarks estimated by Board of Governors staff, the growth gap was –0.3 percent: 1.8 percent minus 2.1 percent. The 1.8 percent figure was the predicted growth in real GDP for 2011 (see table 1), and the 2.1 percent figure was the estimated potential growth for 2011 (from "Decomposition of Potential GDP," Tealbook Book A, 22, not shown here). At the same time, the estimated output (GDP) gap was –6.0 percent. The estimated unemployment gap was 3.2 percent: 9.2 percent minus 6.0 percent. The 9.2 percent figure was the estimated unemployment rate for 2011Q3, and the 6.0 percent figure was the estimated NAIRU. (The latter figures come from table 3, "Other Macroeconomic Indicators," Tealbook Book A, August 3, 2011, 101.)

The Tealbook (Book A, August 11, 2011, 1) offers only conjectures for the halting recovery:

> The specific identity of the forces imposing greater-than-expected restraint on the expansion is not readily apparent. One possibility is that the shocks that have hit the economy are more severe and more persistent in their effects on aggregate demand than we previously recognized. Another possibility is that the self-equilibrating tendency of the economy has been greatly weakened by the damage resulting from the financial crisis. A third possibility is that the economic weakness reflects structural factors—and a lower path of potential GDP—to a greater degree than we had been assuming.

The following paragraphs offer a brief summary of the discussion at the August 2011 FOMC meeting. The transcripts from that meeting show that none of the participants regarded the Tealbook as authoritative. The reality is that in real time there is no model, judgmental or otherwise, that yields accurate estimates of the natural values of real variables. Moreover, as illustrated by the decline in the forecasted value of real GDP for 2011 from 2.7 percent in the

June 15, 2011, Tealbook to 1.8 percent in the August 3, 2011, Tealbook, forecasting even the near-term evolution of the economy is problematic.[13]

Committee debate at the August 2011 meeting concentrated on the sign of the growth gap. Growth had slowed. However, the hawks argued that potential growth had also slowed. The growth gap therefore was at zero. Jeffrey Lacker, president of the Federal Reserve Bank (FRB) of Richmond, argued that structural change in the labor market owing to worker mismatch and a low probability of exiting long-term unemployment had raised the natural rate of unemployment (Board FOMC Transcript, August 9, 2011, 43). Charles Plosser, FRB Philadelphia, argued that recent US Bureau of Economic Analysis downward revisions to GDP growth reflected a lower rate of growth of potential output (Board FOMC Transcript, August 9, 2011, 53). James Bullard, FRB St. Louis, argued that the promise of a low funds rate for a long time would cause markets to expect deflation (Board FOMC Transcript, August 9, 2011, 57–58). That expectation would raise the real rate of interest and make policy tighter. Narayana Kocherlakota, FRB Minneapolis, talked about an "erosion of skills . . . translating into a corrosive effect on the supply side of the economy" (Board FOMC Transcript, August 9, 2011, 59).

Thomas Hoenig, FRB Kansas City, argued that "flooding more liquidity into the market" would not address the fundamental problem, which was the need for households to reduce debt burdens (Board FOMC Transcript, August 9, 2011, 61). Richard Fisher, FRB Dallas, contended that the slowdown in spending came from an undermining of confidence owing to nonmonetary factors, namely government negotiations over the debt ceiling. He argued that there was nothing the Fed could do to correct problems created by uncertainty over fiscal policy (Board FOMC

[13] Hetzel (2012a) uses forecasts from Tealbooks (formerly Greenbooks) from January 1980 through December 2005 and shows that, even for forecasts of GDP growth made in the last month of a quarter for the succeeding quarter, the accuracy of the forecasts was only slightly better than a simple extrapolation of past data. Simulations from the publicly available Federal Reserve System DSGE models always show a quick reversion to trend growth.

Transcript, August 9, 2011, 44, 116, 127). Ultimately, Presidents Fisher, Kocherlakota, and Plosser dissented. Lacker and Bullard were not voting members.

The doves, however, prevailed. The FOMC consensus was that the growth gap should be positive given a cyclically high negative output gap. The FOMC substituted "at least through mid-2013" for the language that had been used in the June statement, "for an extended period." Sandra Pianalto, FRB Cleveland, summarized the supporting consensus forecast of how the economy would evolve with a lower expected funds-rate path. "If the FOMC was currently publishing the fed funds-rate path that underlies our current economic projections, then the public would already know that we don't expect to raise the fed funds rate until about mid-2013, that we expect at that time the unemployment rate is going to be at 7½ percent, and that we anticipate having subdued inflation until mid-2013" (Board FOMC Transcript, August 9, 2011, 123). William Dudley, FRB New York, concurred. "This is the Committee. The Committee has a forecast. Now, people may disagree with the forecast, but is it unreasonable for the Committee to have a view, that the Committee, in its totality, today anticipates that this is what is likely?" (Board FOMC Transcript, August 9, 2011, 130).

What can one conclude from this case study? There is no numerical rule or structural model of the economy that provides the FOMC with the actual-natural benchmarks for the growth gap and the output (unemployment) gap. At the same time, the FOMC does arrive at a near-term forecast of the economy based on a consensus understanding of these guideposts. To arrive at a monetary policy action, the FOMC uses variants of LAW rules of thumb, which rely on estimates of the strength of economic activity and the implications for the change in the rate of resource utilization. That part entails organizing a myriad of pieces of information on the

economy. The starting point for discussion is the staff's judgmental forecast in the Tealbook Book A.

Policy has the spirit of guess and then correct as new information arrives. It entails a search procedure for the natural rate of interest. Although there is no numerical formula that reveals the natural rate to the FOMC or the associated actual-natural rate benchmarks for growth and the output gap, the search procedure imposes discipline and consistency. The issue, then, is to discover how to make that consistency and discipline explicit. The answer provided here is to adopt an FOMC Summary of Economic Projections (SEP) based on an explicit reaction function.

5. Using the SEP to Move toward Rule-Based Policy

Table 5 and figure 3 reproduce part of the December 2018 SEP. Table 5 reproduces the left-hand side of the table showing median values of the forecasts submitted by FOMC participants. The forecasts display the four-quarter growth rate of real GDP ending in the fourth quarter, the fourth-quarter unemployment rate, headline and core personal consumption expenditures (PCE) inflation over the four-quarter interval ending in the fourth quarter, and the funds rate. Figure 3, the so-called dot plot, displays by year the individual forecasts for the funds rate for the fourth quarter.

The SEP communicates to two different audiences. One audience is financial markets. Markets focus on median values under the assumption that they reflect the consensus view achieved by the FOMC chairperson. Markets are interested in the FOMC's estimate of the likely funds-rate path. They are also interested in how the path is likely to change in response to incoming information on the economy. The dot plot (figure 3) offers information on the estimate of the likely funds-rate path. Markets also watch how the quarterly changes in the economic

forecasts (table 5) affect this estimated path. “Revisions to the SEP tend to manifest themselves in the path for the federal funds rate deemed to be appropriate” (Fischer 2017b, 4).

Table 5. Economic Projections of Federal Reserve Board Members and Federal Reserve Bank Presidents under Their Individual Assessments of Projected Appropriate Monetary Policy, December 2018

Percent

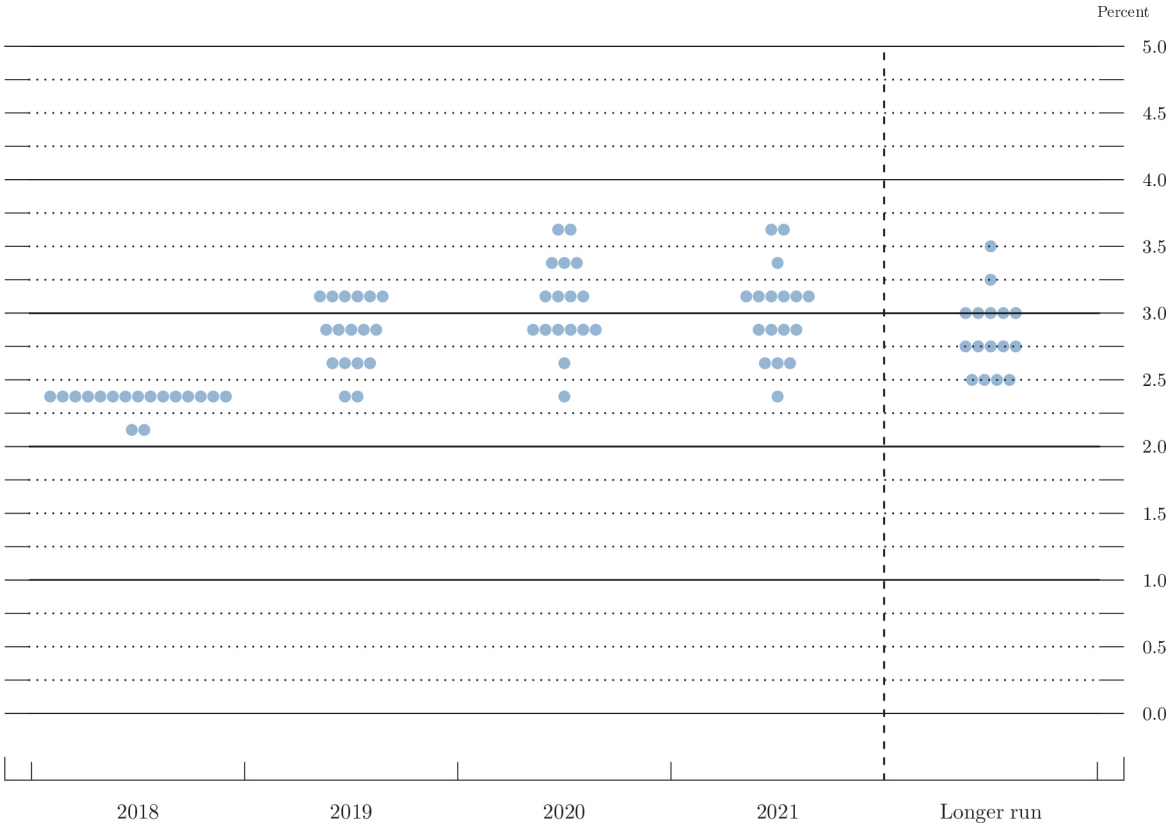
Variable	Median[1]				
	2018	2019	2020	2021	Longer run
Change in real GDP	3.0	2.3	2.0	1.8	1.9
September projection	3.1	2.5	2.0	1.8	1.8
Unemployment rate	3.7	3.5	3.6	3.8	4.4
September projection	3.7	3.5	3.5	3.7	4.5
PCE inflation	1.9	1.9	2.1	2.1	2.0
September projection	2.1	2.0	2.1	2.1	2.0
Core PCE inflation[4]	1.9	2.0	2.0	2.0	
September projection	2.0	2.1	2.1	2.1	
Memo: Projected appropriate policy path					
Federal funds rate	2.4	2.9	3.1	3.1	2.8
September projection	2.4	3.1	3.4	3.4	3.0

[1] “For each period, the median is the middle projection.”

[4] “Longer-run projections for core PCE inflation are not collected.”

Source: Board of Governors of the Federal Reserve System, “Projection Materials,” FOMC Meeting, December 18–19, 2018, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20181219.pdf.

Figure 3. FOMC Participants' Assessments of Appropriate Monetary Policy: Midpoint of Target Range or Target Level for the Federal Funds Rate



Source: Board of Governors of the Federal Reserve System, "Projection Materials," FOMC Meeting, December 18–19, 2018, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20181219.pdf.

Communication with financial markets requires an FOMC consensus and clarity about that consensus. The FOMC needs to reach a consensus so that the language of the statement and the public commentary of the chairperson convey a clear message to financial markets. Using the example of the May 2013 taper tantrum, in which bond rates rose when Chairman Bernanke mentioned phasing out the FOMC's policy of quantitative easing, Fischer (2017c) stressed how strongly the FOMC works to avoid "market surprises." Avoiding market surprises requires consistency in the FOMC's MP strategy over time. Fed watchers infer that consistency. It is not articulated by the FOMC as a rule.

The other audience for the SEP is Congress. The SEP builds in the message to the political system that the FOMC is pursuing the dual mandate. As Fischer (2017b, 2) puts it,

> [SEP] projections are based on *each individual's* assessment of appropriate monetary policy. Each FOMC participant writes down what he or she regards as the appropriate path for policy. *They do not write down what they expect the Committee to do*. . . . "Appropriate monetary policy" is Fedspeak for a policy that delivers on the Committee's interpretation of its legislated mandate. The fact that FOMC participants' forecasts are conditional on each participant's conception of the appropriate monetary policy . . . means that their forecasts will tend to converge over time to the Committee's 2 percent inflation objective and to each individual's interpretation of maximum employment. (Italics in original.)

As Fischer notes, the SEP records individual FOMC participants' forecasts of a number of macroeconomic variables based on an assumption of appropriate monetary policy. Unfortunately, the term *appropriate monetary policy* is without content. Each participant simply chooses a funds-rate path that makes his or her forecasts converge to the FOMC's inflation target and puts unemployment at its full-employment level. However, what model, if any, conditions those forecasts is lost.

There is no way to separate the forecasts made by individual FOMC participants, much less evaluate them for internal coherence. The individual forecasts are jumbled together as separate forecasts of real GDP, prices, the unemployment rate, and the funds rate. There is no identifiable, common set of conditioning variables (behavior of the exchange rate, stock market, and so on). There is no way to associate a participant's funds-rate path with his or her forecast of the economy. Fed watchers cut through the disconnected mass of information presented in the SEP by looking at median values under the assumption that they portray the consensus views of the FOMC achieved by the chairperson.

Any meaningful reform of current FOMC communication should start by making the SEP an FOMC forecast (Hetzel 2017). An FOMC SEP would make explicit what the FOMC must do in any event: namely, reach a consensus on a funds-rate path and a consistent forecast of

the near-term evolution of the economy. However, at present, that consensus is only implicit. Also implicit is the underlying consistency the chairperson imposes on how the FOMC changes its projected funds-rate path in response to incoming information on the economy—the FOMC's reaction function.

What would be required to implement an FOMC SEP? At its initial meeting of the year, in late January or early February, the FOMC would debate and presumably generally reaffirm its preferred reaction function. The first-difference rule, shown in equation (1), is illustrative.[14]

$$i_t = i_{t-1} + 0.5(\pi_{t+3|t} - \pi^*) + 0.5(\Delta^4 y_{t+3|t} - \Delta^4 y^*_{t+3|t}) \Big|, \quad (1)$$

where i_t is the funds rate for quarter t, $\pi_{t+3|t}$ is forecasted inflation three quarters ahead, and π^* is the inflation target. $\Delta^4 y_{t+3|t} - \Delta^4 y^*_{t+3|t}$ is the forecasted three-quarters-ahead annual average GDP growth relative to potential. For a discussion of the rule, see Orphanides (2003).

As is done currently, the exercise could be conducted quarterly starting with the March meeting. The Board of Governors staff would prepare its regular judgmental forecast highlighting the forecasted inflation miss and forecasted growth gap shown in equation (1). The staff would adjust the parameters in FRB/US so that it reproduced the judgmental forecast. It would then simulate the model using the reaction function chosen by the FOMC at the January meeting. A model-simulation SEP table would come out of this exercise. This preparatory work would precede the FOMC meeting by, say, a week. (FOMC meetings would not be scheduled right after the release of a significant economic statistic, such as employment numbers.)

There would be an FOMC "chat room" where FOMC participants could enter misgivings about the model-simulation SEP. The Board of Governors staff could engage the economists at the regional Reserve Banks over these misgivings. The FOMC meeting would start with a

[14] First-difference rule is from "Analysis of Policy Paths and Confidence Intervals" in Tealbook Book B, August 4, 2011, 43.

possibly revised model-simulation-based SEP. The Board of Governors staff could also offer alternative simulations and accompanying SEP tables. For example, the August 3, 2011, Tealbook Book A (85–90) offered alternative simulations based on different conditioning assumptions. One alternative simulation assumed that growth was being impeded by balance-sheet restructuring by households and businesses. Another assumed that the high unemployment rate would erode the skills of unemployed workers and lessen future labor productivity. Others included an increase in the NAIRU owing to labor force mismatch and spillover to the US economy from the financial crisis in the eurozone.

With this background, FOMC participants could sign on to the model-simulation-based SEP or argue for changes, perhaps based on a preference for one of the alternative simulations. The job of the chairperson would be to achieve consensus over an FOMC SEP on which members would vote. Based on the FOMC SEP, the FOMC would choose the statement language to communicate its associated funds-rate path.

The FOMC reaction function underlying the model simulations would reflect the model of the economy the FOMC believes is relevant for the design of monetary policy (the monetary standard). For example, Taylor's rule (1999), which is shown in equation (2), highlights the miss of inflation from target and the output gap. It lends itself to the formulation of policy in a world in which achievement of the dual mandate puts Phillips-curve tradeoffs between inflation and unemployment at the center of policy.

$$i_t = 2 + \pi_t + .5(\pi_t - \pi^*) + .5(y_t - y_t^*). \quad (2)$$

The format of the SEP tables would depend on the reaction function chosen. With the first reaction function (equation 1), table 5 would add a top line. The top line would display multiyear forecasts of the inflation gap and the growth gap, which correspond to the right-hand gap terms

in equation (1). With the second reaction function (equation 2), the top line would show multiyear forecasts of the inflation gap and the output gap. With a nominal GDP target, the top line would be a multiyear forecast of the growth rate of nominal output. To avoid noise in this measure, the statistic would be final sales to private domestic purchasers, which takes out the noisy series on net exports, inventories, and government expenditures. Moreover, it would be evaluated using a core deflator for the series that removes food and energy.[15]

The FOMC would continue to formulate a postmeeting statement in its present form. For SEP meetings, the minutes would summarize how the FOMC SEP disciplined the statement and funds-rate decision. Just as at present, individual participants would also submit their own SEPs. However, they would all take as given the FOMC reaction function. Associated commentary would allow the participants to express their opinions in a way that distinguished between disagreement over MP strategy and near-term forecasts of the economy.

An FOMC SEP would allow the chairperson to talk about MP strategy in terms of a reaction function. It would impose consistency over time in FOMC decision-making. Communication with financial markets requires such consistency. An FOMC SEP would make explicit that communication to the general public also. At the same time, the chairperson could treat the reaction function as a guidepost that yields consistency over time in the MP strategy rather than a definitive numerical formula for the funds-rate target. Reasons for deviating from the reaction function underlying the SEP in choosing a funds rate and an expected funds-rate path could include unusual uncertainty over the international situation or turmoil in financial markets.

[15] McCallum (1987), McCallum and Nelson (1999a, 1999b), and Sumner (1995, 2012, 2014, 2017) have explored nominal GDP targeting. See Hendrickson (2012) for how nominal GDP growth provided an overall discipline on MP strategy in the Greenspan era.

Proponents of a numerical rule that removes all discretion from the FOMC will not be happy with treating the reaction function only as a tool for organizing FOMC debate. Proponents of the status quo who reject an explicit FOMC formulation of MP strategy will also not be happy. The latter could argue that a consensus over an actual-natural growth gap and an actual-natural output gap would suggest a sense of false precision. The error bands would be enormous. However, that imprecision is a fact of life. Inevitably, policy making has the character of guess and correct.

Removing the current lack of explicitness about MP strategy by using a consensus FOMC SEP has political-economy implications. Lack of explicitness about this consistency has advantages for the FOMC chairperson. Historically, chairpersons have retained control of MP strategy through limiting the format of FOMC discussion to the choice of an individual policy action. The chairperson then determines the way in which the individual policy actions evolve over time to constitute an MP strategy.

The current lack of explicitness also renders difficult attacks on the FOMC. A populist critic needs no education to mount an attack on an MP strategy that makes evident the need to raise rates in response to sustained increases in rates of resource utilization evidenced by declines in the unemployment rate. In contrast, to attack individual policy actions requires maintaining an ongoing knowledge of the economy that is possible only for full-time business economists or Fed staff. Politicians are immediately out of their depth in a debate over the economy. Ultimately, one must decide whether to trust open debate and the American political process.

John Taylor (2017, abstract) makes the following criticism of monetary policy: “The line of demarcation between rules and discretion is difficult to establish in practice which makes contrasting the two approaches difficult. . . . Economic research also shows that while central

bank independence is crucial for good monetary policy making, it has not been enough to prevent swings away from rules-based policy, implying that policy-makers might consider enhanced reporting about how rules are used in monetary policy." An FOMC SEP would go a long way toward rectifying the issues raised by Taylor.

6. Learning from the Past

One striking characteristic of the preparation for FOMC meetings by the Board of Governors staff is the use of models to forecast the future but not to learn from the past. Given the relative returns from each exercise, the effort is misplaced. Using models with reaction functions (MP strategies) informed by in-house knowledge furnished by staff with long years of experience would impose the discipline required for learning from experience, as opposed to subsequent rationalization of whatever adverse outcomes occur owing to external forces. In the event of nominal instability (inflation) and real instability (recessions), the FOMC would first have to ask whether it had deviated from the MP strategy that had been providing consistency to its behavior. If it had not deviated, it would then have to question whether the MP strategy is optimal.

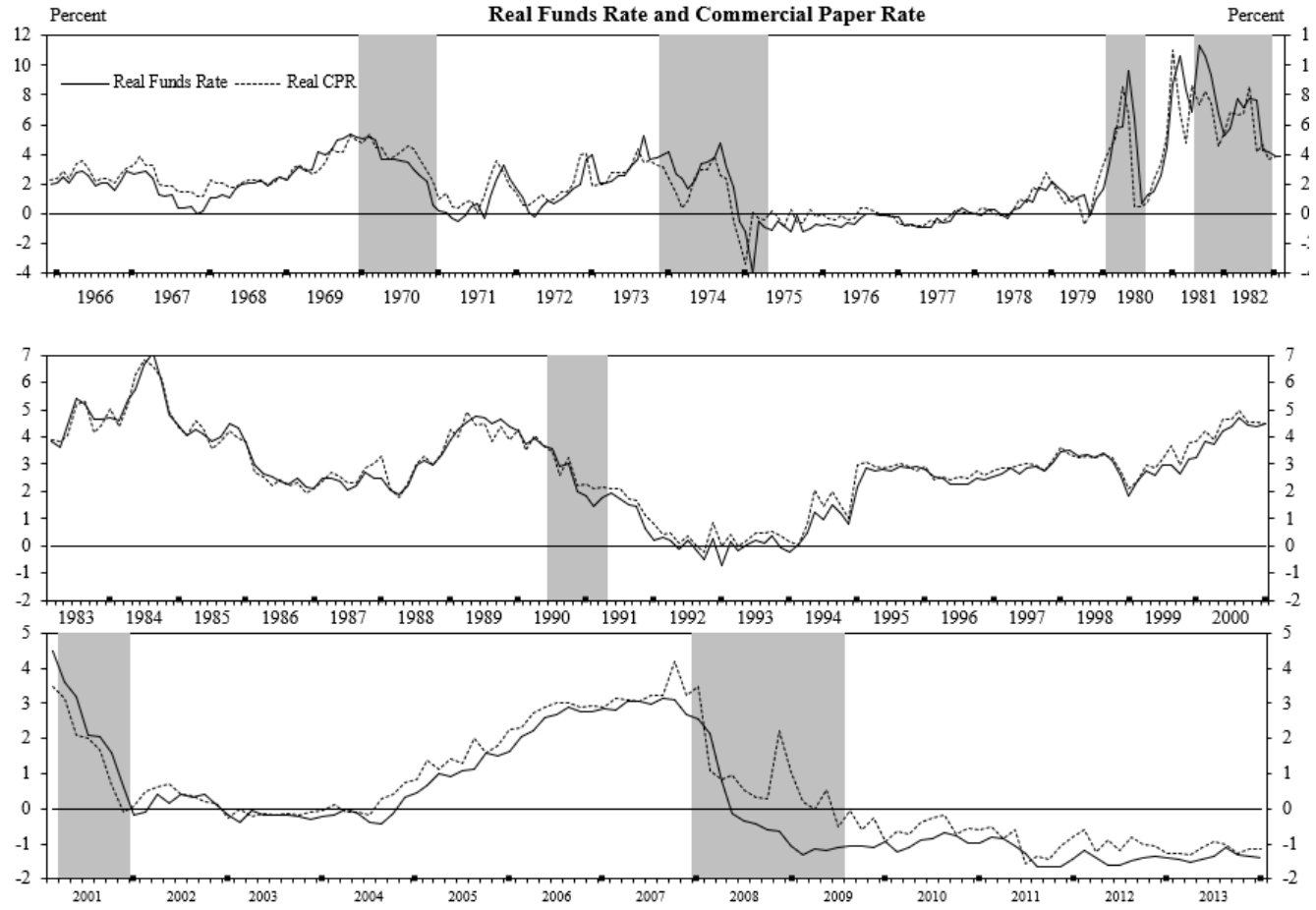
This exercise would inform the FOMC's choice of a reaction function. Specifically, for the initial meeting of the year, the Board of Governors staff would prepare historical simulations using its best estimate of the actual reaction function that organized FOMC decision-making.[16] It would use both its FRB/US model and its dynamic stochastic general equilibrium (DSGE) models. Highlighting recessions and the behavior of inflation, the FOMC would debate how it

[16] Because rule (1) does not require specification of the natural rate of interest, r^*, or the level of the output gap, it comes closest to the rule of thumb followed by the FOMC in the Volcker-Greenspan era. However, the FOMC departed from the rule after the 1987 Louvre Accord and the 1998 Asia crisis (Hetzel 2008a, 2008b, 2012b). See also Orphanides (2001) and Orphanides and van Norden (2002). For the 1970s, see Hetzel (2013) and Nelson (2005). For a general overview, see Hetzel (forthcoming).

could have improved on the historical experience with a different MP strategy. The staff would accompany its historical simulations with a historical narrative providing additional detail on the behavior of the FOMC not necessarily captured in a single reaction function.

To illustrate the kind of historical narrative that would be useful, the remainder of this section summarizes monetary policy during the Great Recession. Note first the similarities with past recessions and recoveries. Figure 4 shows a measure of the short-term real rate of interest for the funds rate and the commercial paper rate (see appendix). In economic recoveries, the FOMC begins raising the (nominal and real) funds rate when it believes that the recovery is strong enough to be self-sustaining. It wants to avoid the situation in which it starts raising rates and subsequently the recovery stalls. Politicians would then accuse it of "aborting" the recovery.

Figure 4. Real Funds Rate and Commercial Paper Rate

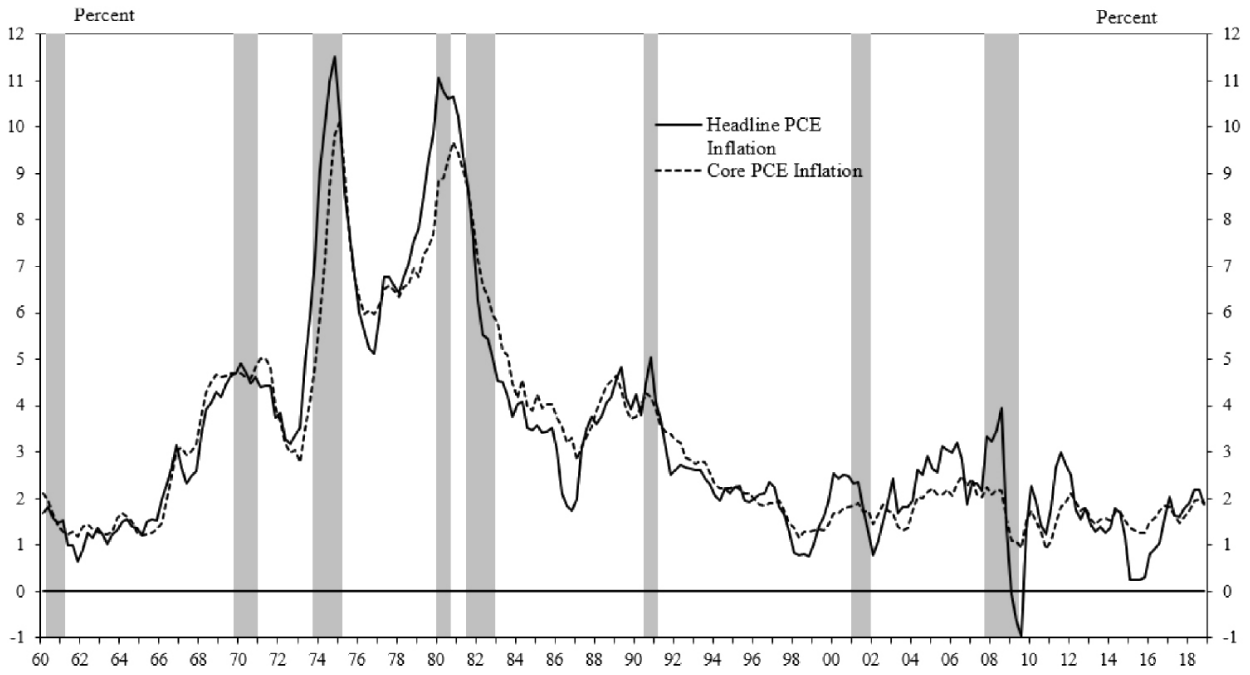


Note: The real interest rate series is either the federal funds rate or the commercial paper rate minus the inflation forecast made by the staff of the Board of Governors in the Greenbook (later Tealbook). For a description of the series, see the appendix. Forecasted inflation is for an overall index through 1979 and thereafter for a core index excluding food and energy. Shaded areas indicate National Bureau of Economic Research recessions. Heavy tick marks indicate December FOMC meetings.

Once it has begun the process, with rare, short-lived exceptions, the FOMC makes increases in the funds rate unidirectional. Increases continue until the economy weakens. Long-term bond rates then decline. This weakening starts before the cyclical peak in economic activity. As shown in figure 5, moreover, inflation has begun to rise. Concern for inflation then makes the FOMC reluctant to reverse course and to start the downward cyclical phase of movements in the funds rate. Combined with the decline in bond rates, the yield curve inverts and becomes a

leading indicator of recession. (Section 7 draws on this empirical regularity.) The economy enters recession with the short-term real rate of interest having attained a cyclical high.

Figure 5. Headline and Core Personal Consumption Expenditures (PCE) Inflation, 1960–2018



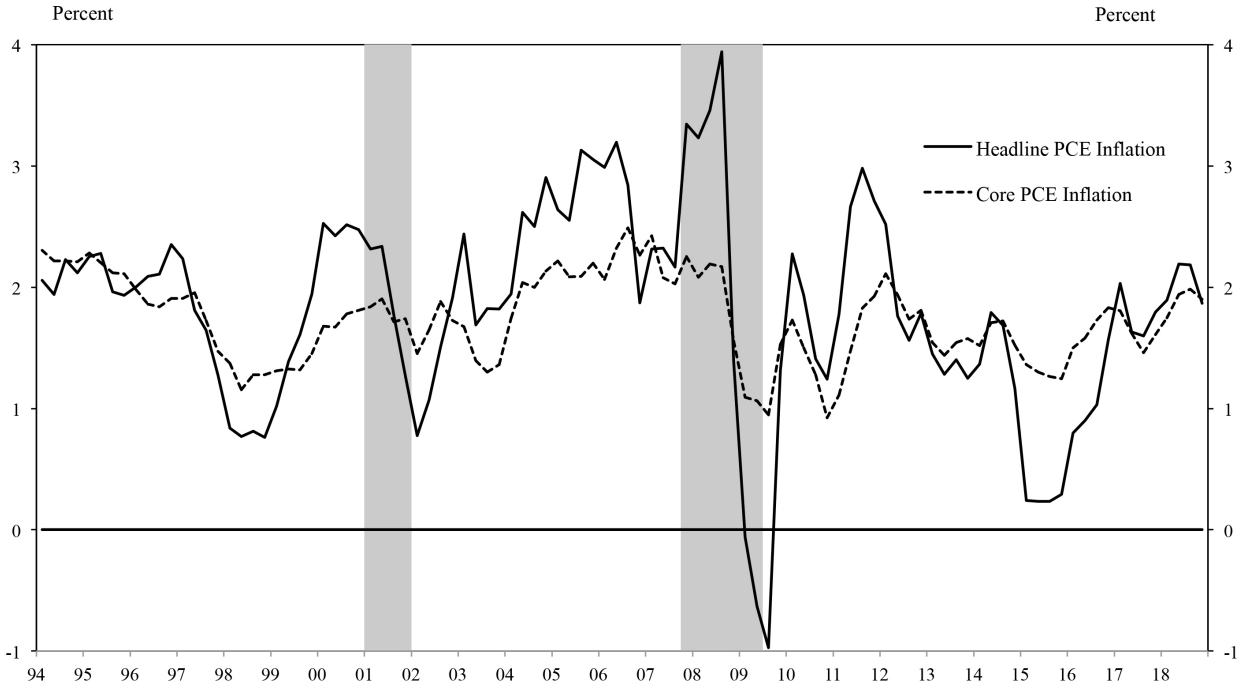
Note: Data are quarterly observations of four-quarter percentage changes in the headline and core PCE deflator. Shaded areas indicate National Bureau of Economic Research recessions.

Source: Federal Reserve Economic Data, "Personal Consumption Expenditures Excluding Food and Energy (Chain-Type Price Index)" and "Personal Consumption Expenditures (Chain-Type Price Index)," Federal Reserve Bank of St. Louis, June 12, 2019.

Figure 6 shows headline and core PCE inflation for the interval from 1994 to 2018. Over this period, core PCE inflation fluctuated narrowly between a range of 1 percent and a little over 2 percent. Over the interval from mid-2004 to mid-2006, the FOMC raised the funds rate, and the short-term real rate of interest rose from 0 to 3 percent. However, the FOMC did not raise rates aggressively enough to prevent an increase in core PCE inflation. Four-quarter percentage

changes in the PCE deflator went from 1.3 percent in 2003Q3 to an average of 2.2 percent over the interval from 2006Q2 to 2008Q3.

Figure 6. Headline and Core Personal Consumption Expenditures (PCE) Inflation, 1994–2018



Note: Quarterly observations of four-quarter percentage changes in the headline and core personal consumption expenditures (PCE) deflator. Shaded areas indicate National Bureau of Economic Research recessions.

Source: Federal Reserve Economic Data, "Personal Consumption Expenditures Excluding Food and Energy (Chain-Type Price Index)" and "Personal Consumption Expenditures (Chain-Type Price Index)," Federal Reserve Bank of St. Louis, June 12, 2019.

At the same time, a prolonged, enormous inflation shock took hold early in the first decade of the 21st century. The integration of the BRIC (Brazil, Russia, India, and China) countries into the world economy produced a strong demand for commodities and an increase in their prices. The price of oil (West Texas Intermediate) rose from $20 a barrel in January 2002 to $134 a barrel in June 2008. Headline PCE (four-quarter) inflation went from 0.8 percent in 2002Q1 to almost 4.0 percent in 2008Q3.

During the Great Recession, monetary policy followed the pattern of past recessions. The combination of a decline in output and disinflation can only occur with contractionary monetary policy.[17] Core PCE (four-quarter) inflation fell from its prior level of 2.2 percent to 1.0 percent over the interval 2009Q1 to 2009Q3 and to about 1.5 percent over the interval 2009Q4 to 2016Q1. Once the recession began in December 2007, the FOMC was slow to realize that a near-zero short-term real rate of interest was contractionary. Stimulative monetary policy would require a significantly negative short-term real interest rate combined with forward guidance to markets signaling the persistence of low negative real rates.

As shown in figure 4, with the onset of the recession in December 2007, the real funds rate declined. However, it did not become significantly negative until after September 2008, when it reached –1.3 percent in January 2009.[18] Only later did it become evident that the combined shocks of a decline in value of the housing stock and a decline in real disposable income, owing to the commodity-price inflation shock, required both a significantly negative funds rate and forward guidance to tilt down the slope of the yield curve. From January 2009 through December 2013, the real funds rate averaged –1.23 percent (figure 4).

A related problem was that markets expected a V-shaped recession. Always in the past, a sharp upturn had followed a sharp contraction. That presumption caused the Treasury bond rate to remain relatively high. Not until after July 2011 did the 10-year Treasury yield fall below 3 percent in a sustained way (figure 2). For monetary policy to be stimulative, moreover, the FOMC had to telegraph to markets that a significantly negative real funds rate would persist. The

[17] The moderate decline in inflation and the significant increase in unemployment were evidence of a relatively flat Phillips curve.

[18] In fall 2008, the Board of Governors introduced interest on excess reserves (IOER). The funds rate had fallen as a consequence of the reserves provision entailed by the special programs to channel credit to financial institutions with long-term, illiquid assets of uncertain value to offset the flight of the cash investors after the Lehman failure on September 15. The purpose of IOER was to prevent the markets from concluding that the FOMC had eased policy.

Fed's experiment with forward guidance did not begin in a determined way until quite late. At its March 2009 meeting, the FOMC adopted statement language that read "that economic conditions are likely to warrant exceptionally low levels of the federal funds rate for an extended period." As noted above, it basically kept that language until the August 2011 meeting, when it changed the sentence to finish "for at least through mid-2013."[19]

At the ZLB, forward guidance worked through extending the predicted liftoff date for the funds rate. Although the FOMC was tardy in exploiting forward guidance to lower the yield curve, its experience proved that monetary policy retains its potency even at the ZLB (see Bernanke, Reinhart, and Sack 2004; Goodfriend 2000; and Eggertsson and Woodford 2003). What is important is that the FOMC is aggressive in using forward guidance before the public becomes overly pessimistic about the future. When combined with forward guidance, large-scale asset purchases (quantitative easing) aided in maintaining optimism about the future by conveying a "whatever it takes" commitment to ensure economic recovery. Evidence that forward guidance was an effective policy tool is that it was employed only later in the eurozone (Hetzel 2018). The United States experienced a much more robust recovery (see also Kuttner 2018).

In its model simulations of historical experience, what FOMC reaction function should the Board of Governors staff use for the Great Recession? In the spirit of the case studies used here, it is illustrative to examine the August 2008 FOMC meeting. The spirit of the MP strategy was to balance a growing negative output gap against inflation the FOMC considered excessive. For both 2008Q3 and 2008Q4, the July 30, 2008, Greenbook forecast 2.6 percent inflation for

[19] At the initiative of Chairman Bernanke, the Open Market Desk began buying mortgage-backed security and agency debt in late November 2008. At its March 2009 meeting, in addition, the FOMC began buying longer-term Treasury securities and announced amounts for the totals to be undertaken. However, these actions did not constitute forward guidance for the funds rate. They were undertaken to counter perceived dysfunction in the housing and private credit markets and to provide monetary stimulus.

the core PCE, excluding food and energy ("Changes in Prices and Costs," July 30, 2008, 29). At the same time, the Greenbook forecast an output gap growing in magnitude from –0.3 percent in 2008Q2 to –1.6 percent in 2009Q3 ("Other Macroeconomic Indicators," July 30, 2008, 30). As a consequence of increased slack, the Greenbook forecast a decline in core PCE inflation to 2.1 percent by 2009Q1.

At the August 2008 FOMC meeting, Tim Geithner, FRB New York, stated,

> On balance, the rate of growth in underlying inflation suggests that growth in demand in the United States will have to be below potential for a longer period of time if inflation expectations are to come down sufficiently. This means that we will have to tighten monetary policy relatively soon compared with our previous behavior in recoveries—perhaps before we see the actual bottom in house prices and the actual peak in unemployment. (Board FOMC Transcript, August 5, 2008, 75)

In a break with precedent, the Bluebook did not contain an Alternative A, which would traditionally have allowed for an easing of the MP stance. The only MP actions considered then were maintenance of the existing 2 percent funds-rate target and an increase.[20] Governor Kohn stated, "About the output gap, the incoming information strongly suggests that we are on a trajectory that at least for some time will have the economy growing appreciably below the growth rate of its potential. The most obvious evidence is the persistence of a soft labor market" (Board FOMC Transcript, August 5, 2008, 76). Because of the FOMC's concern for inflation, discussion focused on when to raise the funds rate. Hawks wanted an immediate increase, while doves wanted a later increase. Chairman Bernanke stated that

> the unemployment rate . . . has risen as quickly as in previous episodes, and any look at the unemployment rate would suggest that this is something close to a normal recession dynamic. . . . So overall I think there is still significant downside risk to growth. . . . The speed at which we remove the accommodation—and I think it is clear we do have to do that relatively soon—should depend to some extent on how inflation evolves. . . . I welcome the ongoing discussion we should have about the pace of withdrawal of accommodation. (Board FOMC Transcript, August 5, 2008, 98, 100–101)

[20] The omission is indicative of the range of FOMC participants' attitudes. Input from the regional Federal Reserve Bank presidents as part of the creation of the Bluebook ensures that the Bluebook alternatives span their views.

Unfortunately, because of the lack of explicit discussion of MP strategy by the FOMC, there is no noncontroversial way to choose a reaction function for historical simulations that include the Great Recession. A Taylor rule highlights inflation-output tradeoffs. For 2008Q3, Taylor (1993, 1999) estimates the appropriate funds rate at 4.4 percent and 4.0 percent, respectively ("Near-Term Prescriptions of Simple Policy Rules," Bluebook, July 31, 2008, 25). At the time, the funds-rate target, 2 percent, was below these estimates. Model simulations with a Taylor rule would then show a positive (stimulative) shock to the stance of monetary policy in 2008Q3.

With a DSGE-model simulation, it can be hard to explain a recession as resulting from contractionary monetary policy because the assumption of rational expectations implies that all actors, including the central bank, know the structure of the economy. It follows that a reaction function would be optimal rather than a source of disturbances. DSGE estimation would then select real shocks that make the model fit. However, the ex post combination of disinflation and a significant negative output gap suggests use of a reaction function in which the FOMC repeatedly set the funds rate so that the short-term real rate of interest exceeded the natural rate of interest.[21]

The combination of historical narrative and model simulations highlights the issues that the FOMC confronts in the formulation of current policy: How does the FOMC control inflation? How should the FOMC manage Phillips-curve tradeoffs, that is, tradeoffs between misses of inflation from target and the output gap? In the context of debate in early 2019, the specific issue was how to maintain a long recovery while controlling inflation.

[21] With a New Keynesian DSGE model, the output gap depends on the cumulated sum of the contemporaneous and future interest rate gaps (the difference between the real rate of interest and the natural rate of interest). The contemporaneous natural rate of interest is generally not interesting because it is moved by so many factors in the real business cycle core of the economy. Simulations should show the cumulated sum of the interest rate gaps.

Consider two strategies, one preemptive and one reactive with respect to inflation. With the preemptive strategy, the FOMC moves aggressively to restrain a positive growth gap and lower it to zero at signs of stress on rates of resource utilization. Signs of stress are measured relative to the past behavior of cyclical lows of a variety of variables, but especially tightness in the labor market. There is no presumption that raising the funds rate prematurely is costly in terms of employment. Given the lack of a structural model of the economy that measures the natural values of real variables, the funds rate ex post will at times prove to have been too high and at other times too low. The choice of MP strategy, however, exercises no influence on the average level of unemployment.

With a preemptive strategy, ideally, inflation never emerges. The increase in the funds rate in 1994 was an example of preemptive MP strategy. Since the Great Recession, the ZLB constraint has emerged as a complicating factor. However, the experience with forward guidance in the recovery demonstrated that the FOMC can continue to conduct policy successfully through tilting down the term structure of interest rates. What is important is that the public remain optimistic about the future. That condition will prevail as long as the stance of MP is not contractionary. In the past, a contractionary MP stance has occurred when the FOMC has had to correct inflation overshoots from target.

With the reactive strategy, in contrast, the FOMC moves aggressively to restrain a positive growth gap to zero only after inflation rises above target. There is a presumption that raising the funds rate prematurely is costly in terms of lost employment. The FOMC possesses the ability to manage inflation-output tradeoffs. An additional consideration is the ZLB constraint. Episodes in which the ZLB constrains the ability of the FOMC to lower the funds rate will result in inflation undershoots from target that will counteract inflation overshoots.

7. Market Instability at the End of 2018

The 2018 year-end instability in financial markets furnished an episode of instability produced by a mismatch in the then current MP strategy and market expectations of future MP actions produced by a former destabilizing MP strategy. There was an extraordinary divergence between the pessimism of financial markets and the strength of the real economy. Market sentiment held that the FOMC would raise the funds rate until the yield curve "inverted," that is, until short-term rates rose above long-term rates. Based on the past record, that inversion would lead to a recession. Discretion, understood as the absence of an explicit MP strategy, made monetary policy into a source of instability. The reason is that the FOMC has trouble reliably shaping how markets form their expectations of its future behavior.

At the end of 2018, the performance of the economy appeared stellar in all respects. Following the June 2009 trough in the business cycle, the economy was enjoying the second-longest expansion on record after the 1960s expansion. Inflation measured by the core PCE deflator was almost right on the FOMC's target of 2 percent. The final revision for 2018Q2 real GDP came in at 4.2 percent with the third-quarter figure at 3.4 percent. Consumer spending, which makes up 70 percent of GDP, remained robust. The year-over-year growth in real personal consumption expenditures for the months July through November averaged 2.9 percent, with the comparable figure for real disposable personal income not far behind at 2.7 percent. At 3.7 percent, the unemployment rate was near its low of 3.9 percent in fall 2000 and the 3.4 percent low reached in February 1969. In 2019, the economy created more than 2 million jobs.

Economists forecasted continued growth. Fiscal policy was expansionary. A lifting of caps on discretionary spending made possible an increase in government expenditures by $300 billion over 2011 limits. Outlays for the military grew 6 percent in the fiscal year that ended

September 30, 2018 (*Wall Street Journal* 2018). The Atlanta Fed's forecast (GDPNow model) for 2018Q4 real GDP annualized growth was 2.7 percent on December 21, with real PCE growth of 3.7 percent. Bill Witherell (2018), chief global economist and portfolio manager for Cumberland Advisors, wrote on December 18, 2018,

> As 2018 draws to a close, economic growth in almost all economies, including that of the US, is moderating but is still expansionary and in most cases remains above long-term trends. For the year 2018 as a whole, global growth looks likely to be the same as for 2017, 3.7%, with advanced economies advancing at a 2.4% pace and emerging markets at a robust 5% pace. The recent moderation in growth appears likely to continue into 2019, but with annual rates for the year remaining very close to those for the current year.

According to the US Bureau of Economic Analysis's final forecast for 2018Q3, corporate profits rose 3.5 percent from 2018Q2 and 10.4 percent from 2017Q3. Yet the S&P 500 fell almost 18 percent from the end of September to December 22, 2018. Treasury Inflation-Protected Securities (TIPS) inflation compensation five years ahead fell from just over 2.0 percent in the fall to about 1.6 percent in December 2018. Between November 8, 2018, and December 28, 2018, the 10-year Treasury yield fell from 3.24 percent to 2.71 percent. The declines in these series presaged a recession.

The FOMC had long telegraphed to markets an increase in the funds rate of 25 basis points at its December 18–19, 2018, meeting. Economic forecasts uniformly had the economy growing around 3 percent in 2018. As recorded in the FOMC's SEP of December 19, 2018, the FOMC's median forecast for "longer-run" growth was about 2 percent. With that number taken as the FOMC's estimate of potential growth, the economy was growing faster than potential. The continued decline in the unemployment rate testified to the increase in the economy's rate of resource utilization.

Just before the announcement of the FOMC's statement and Chairman Powell's press conference, the Dow Jones was up 300 basis points. As expected, the FOMC announced a

quarter-point hike in its funds-rate target. The median increase in the projected funds rate presented in the SEP dot plot for 2019 fell from 3 to 2 percent. Nevertheless, with the announcement and the press conference, the stock market fell sharply.

What was wrong? Why would a strong economy abruptly enter recession? Of course, the world was and is a dangerous place. The United States and China could have been entering a trade war. Still, the United States is a relatively closed economy. The import content in total personal consumption expenditures was just over 10 percent in 2017 (Hale et al. 2019). Total bilateral trade with China was about 13.5 percent of that total (Walters 2018). The salient fact is that apart from the 1945 recession, recessions in the United States have always been associated with contractionary monetary policy (Hetzel 2008a, 2012b). But why should markets expect a monetary policy sufficiently contractionary to cause the economy to enter recession?

The answer here is that without an explicit MP strategy, the FOMC cannot reliably control how financial markets form their expectations of future MP actions. At year-end 2018, markets were looking back to past episodes in which the FOMC had raised the funds rate until a recession ensued. Subsequently, the FOMC calmed markets with assurances that policy was not on a preset path of funds-rate increases. However, the response was ad hoc. It would have been better to have had an explicit MP strategy in place.

8. Concluding Comments

In some ways, proponents of the rules side in the rules-versus-discretion debate are unrealistic. There is no numerical formula that will reliably allow tracking of the economy's natural rate of interest. MP strategy will always follow some version of William McChesney Martin's LAW procedures in which the FOMC moves the funds rate in a commonsense way to offset sustained strength in the economy that produces persistent increases in the rate of resource

utilization, and conversely in the event of weakness. Those procedures must entail a stable nominal anchor in that they are disciplined by the requirement of maintaining the expectation of price stability (or low, stable inflation). At the same time, tracking the natural rate of interest will always have something of the flavor of "guess and correct" as new data arrive.

Nevertheless, the FOMC can be more explicit about its MP strategy. An important step in this direction would be to make the current SEP into a consensus FOMC SEP. The FOMC can move toward fulfillment of the Lucas dictum: "Analysis of policy which utilizes economics in a scientific way necessarily involves choice among alternative stable, predictable policy rules, infrequently changed and then only after extensive professional and general discussion." In doing so, it will greatly facilitate learning about the "monetary system" that Wicksell pointed out is entirely the creation of our monetary "statesmen." Explicitness about the monetary standard that policymakers have created would require explicitness about their reaction function and the structure of the economy. They would have to explain the monetary standard in the language of economics: that is, using a model.

Appendix: Real Rate of Interest

This appendix summarizes Hetzel (2012b, 203).

The short-term real interest rate is the difference between the commercial paper rate (federal funds rate) and Greenbook inflation forecasts made by the staff of the Board of Governors before FOMC meetings. The commercial paper rate is for prime nonfinancial paper placed through dealers (A1/P1). The dates for the interest rates match the publication dates of the Greenbooks. Because observations correspond to FOMC meetings, they occur irregularly within the year, and starting in 1979 their frequency was less than 12 times a year.

Through 1979, inflation forecasts are for the implicit GNP deflator. The Board of Governors staff forecasts for "core" inflation became available only in January 1980. From January 1980 until February 1986, the gross domestic business product fixed-weight index excluding food and energy was used. Thereafter, until January 2000, the consumer price index excluding food and energy was used. From January 2000 onward, the personal consumption expenditures chain-weighted index excluding food and energy was used.

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