Improving U.S. Monetary Policy Communications

Stephen G. Cecchetti and Kermit L. Schoenholtz*

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Abstract

The Federal Open Market Committee (FOMC) publishes vast amounts of information regarding monetary policy, including its goals, strategy and outlook. By reinforcing the commitment to price stability and maximum sustainable employment, this transparency has helped improve U.S. economic performance in recent decades. Based on two dozen interviews with policy experts, we identify three objectives that guide our search for further improvements in communications practices: simplifying public statements, clarifying how policy will react to changing conditions, and highlighting uncertainty and risks. As examples, we propose a simpler post-meeting policy statement and the introduction of a concise Inflation Report, the elements of which already are mostly available in existing publications. A broader, systematic application of these objectives could also help the FOMC streamline other aspects of its communications.

* Cecchetti is Rosen Family Chair in International Finance, Brandeis International Business School, Research Associate, National Bureau of Economic Research, and Research Fellow, Centre for Economic Policy Research; Schoenholtz is Henry Kaufman Professor of the History of Financial Institutions and Markets, NYU Stern School of Business, and Director of the Stern Center for Global Economy and Business. This paper was prepared for the Federal Reserve's Conference on Monetary Policy Strategy, Tools, and Communication Practices (A Fed Listens Event) on June 4-5, 2019. It is traditional to use the introductory footnote to thank colleagues who contributed comments and advice. In this case, there were dozens of people without whom we could not have written this paper. First, 24 former senior officials, academics and market economists responded orally or in writing to our open-ended survey; many have agreed to allow us to quote them in the text. Second, numerous people offered their guidance and answered our numerous questions These include a number of current FOMC members, Lewis Alexander, Seamus Brown, Donald Kohn, Ellen Meade, Hiroshi Nakaso, Masaaki Shirakawa, and Paul Tucker. Third, we thank Scott Davis and Mark Wynne for sharing their data. And fourth, but certainly not last, Jonathan Robidoux carefully and diligently transcribed the oral interviews.

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I. Introduction

The job of central bankers is to use the monetary powers granted them to promote price stability, sustainable growth, and a stable financial system. They do this in an environment fraught with unavoidable uncertainties. But, in conducting policy, there is one uncertainty that policymakers can and should reduce: the uncertainty they themselves create. Everyone agrees that monetary policymakers should do their best to minimize the noise that their actions add to the environment. When policy is transparent and effective, people in the economy and financial markets respond to the data, not to the policymakers.

Over the past quarter century, the evolution of an ever more detailed inflation targeting framework facilitated a vast improvement in Federal Open Market Committee (FOMC) communication.[1] Over the same period, both the level and uncertainty of inflation have declined.[2] We infer that since the mid-1990s, the U.S. economy has been reaping the benefits of a credible commitment to price stability, including a communications framework that reinforces that commitment.

It is in this context that we take on the task of evaluating Federal Reserve's monetary policy communications and suggest further improvements. A set of two dozen interviews, as well as our reading of published work, leads us to organize our recommendations around three objectives:

- simplifying public statements, while conveying any divergence of views;
- clarifying how policy will react to changing conditions;
- and highlighting policy uncertainty and risks.

Our purpose in this paper is to discuss how policymakers can revise and enhance their agreed-upon communications practices to meet these objectives. In doing so, we take the annual Statement on Longer-Run Goals and Monetary Policy Strategy as the foundation on which all other FOMC communication should be built.

Simplifying public statements: Reaching the broadest possible audience requires communicating in plain English. Because the post-meeting statement conveys the key decisions, it is among the FOMC's most important communication tools, and should be accessible to a broad audience. We discuss how to simplify the statement to make it more readable while adding relevant information.[3]

[1] Appendix 4 provides a brief history of key changes in FOMC communications since 1993. Blinder et al (2008) review the theory and evidence regarding communication. In their study of 112 central banks from 1998 to 2015, Dinçer, Eichengreen and Geraats (2019) document the *global* trend toward greater monetary policy transparency.
[2] For example, the dispersion (as measured by the interquartile range of responses) in the Survey of Professional Forecasters forecasts of 10-year consumer price inflation has fallen by roughly 25 basis points per decade since 1991. See our discussion in Cecchetti and Schoenholtz (2019).
[3] See Haldane and McMahon (2018) on the need for innovation and experimentation in communication with the public.

Communication by multiple FOMC participants can foster confusion.[4] There is a sense in which this "cacophony" problem has been getting worse. Kliesen et al. (2019) report that the frequency at which Reserve Bank Presidents speak has risen by about a third over the past decade, so that today there are about 60 days per year when more than one of them speaks. Some of this reflects the necessary communication of differences in views—for example, when officials articulate the rationale for dissents—but we propose changes that could reduce noise and uncertainty.

Despite its great benefits, no one should take central bank independence for granted. Consequently, it is in the collective interest of FOMC participants to encourage what Alan Blinder refers to as "group accountability."[5] This means establishing practices and norms that make communications more effective. For example, one useful practice is to encourage each participant to explain the decision of the Committee; supporting it if they agree, or explaining their dissent, if they do not. To foster a stronger group mindset, participants could shift to using the first person plural ("we," "our," and "us") when explaining consensus decisions, and first person singular ("I", "my" and "me") when dissenting.

We conclude from our interviews that it would be useful to focus public comments more on the rationale for recent decisions, on the prospect for key policy drivers—such as inflation and economic growth—and on the justification for dissent, and less on the likely future path of interest rates. Furthermore, in the absence of an explicit commitment regarding future policy rates, communications should highlight uncertainty. As we discuss in detail, with the current federal funds rate target range at 2.25 to 2.50 percent, the FOMC has revealed that there is an even chance the policy rate will be between 1.0 and 4.2 percent by the end of 2021.[6] Taking all of this into account, we see little purpose served in answering questions like "How many interest rate increases (or decreases) do you believe are appropriate over the next year?" Unless there is Committee agreement, so that the message is coordinated and consistent, having 19 people provide their own version of forward guidance regarding policy rates is unhelpful.

Clarifying how policy will react to changing conditions: When growth, unemployment, inflation, and other financial conditions deviate from what they expected, how will policymakers react systematically and predictably? In the language of monetary economics, what is their *reaction function*? Increasing transparency on this front is a demanding task. To see why, note that a change in the policy rate could be the consequence of changes in the perception of current or expected future financial and economic conditions or in the desired response to these conditions. Moreover, even if every FOMC participant acts systematically, when perspectives on the economy diverge, new developments can shift the Committee median in complex ways.

[4] Throughout this paper, we follow the Federal Reserve's convention of referring to the FOMC voters as "members" of the Committee, and the combination of voters and nonvoters (the Governors plus all 12 Reserve Bank Presidents) as meeting "participants."

[5] See Blinder (2016).

[6] This range reflects the FOMC's 50-percent confidence interval of plus/minus 1.6 percentage points around the March 2019 SEP median projection of 2.6 percent for the end of 2021. See Reifschneider and Tulip (2017).

This leads us to focus on the Summary of Economic Projections (SEP), and how to use currently published information to derive a simple reaction function. We find the SEP useful, but also see considerable room for improvement. Current practice is to publish the linkage among the four variables included in the SEP only with a lag of five years. That is, in the initial release we do not know the inflation or unemployment projections that are associated with a given interest rate projection. Consequently, we cannot answer the simple question, does a particular FOMC participant project a relatively high interest rate because they believe the equilibrium real interest rate (r^*) is high, because they anticipate higher inflation and lower unemployment than their colleagues do, or because they believe in a more aggressive reaction to a shared forecast of these fundamentals?

To address this clear shortcoming, we recommend that the FOMC immediately publish the "matrix" that links the projections for growth, unemployment, inflation and interest rates for each FOMC participant. The matrix would help observers understand the Committee's collective reaction function, in part by facilitating inference about the nature and stability of the consensus. Ultimately, a true commitment to transparency also requires identifying respondents by name—information we currently receive only with a *10-year lag*! Associating names with the rows of the matrix not only makes it possible to link projections over time (something we expect observers will do probabilistically once they have the matrix), it also encourages greater discipline among the FOMC participants as they prepare forecasts. The result should enhance the SEP and FOMC deliberations and foster more systematic policy.

Highlighting policy uncertainty and risks: Communicating uncertainty about the likely evolution of the economy and the resulting policy path is essential. In our view, limited modifications to current FOMC practice could lead to significant improvements. Again, we look at the SEP. Publication currently occurs in two steps, with indicators of the uncertainty in the projections delayed by several weeks. This delay leads to what we view as an excessive public focus on the median projection.

We see a simple solution. The FOMC currently includes confidence intervals for its quarterly projections near the end of the complete SEP document. We urge the Committee to convert these to something closer to a fan chart, move them to the front of the publication, and release the complete SEP immediately following the FOMC meeting rather than three weeks later with the minutes.

Recommendations: With our three objectives in mind, we assess two of the most important elements of FOMC communications: the post-meeting statement and the SEP. We propose simplifying the statement and converting the SEP into a concise Inflation Report released with the Chair's press conference immediately following the meeting; both would refer to the FOMC's foundational statement on longer-run goals.[7]

[7] For the concise Inflation Report, we have in mind something like the Bank of England's brief visual summary ("In a Nutshell") of its Inflation Report, but constructed around the SEP. The BoE's latest (May 2019) visual summary is available at: https://www.bankofengland.co.uk/inflation-report/2019/may-2019/visual-summary.

For the statement, we describe the key elements and a set of principles that should guide its formulation. We also produce two succinct examples that present the relevant information. These examples are readable by a U.S. high-school senior (grade 12).[8]

Converting the SEP into a concise quarterly Inflation Report requires three straightforward changes: i) reorder the material, putting the uncertainty charts at the front; ii) include a brief narrative that focuses on uncertainty and risks to the outlook; and iii) include the matrix of individual respondents linking growth, unemployment, inflation, and interest rate projections. Our very simple version has fewer than 730 words and is readable by a high-school freshman (grade 9).

More broadly, a systematic application of the three objectives—simplifying public statements, clarifying how policy will react to changing conditions, and highlighting policy uncertainty and risks— also can help streamline other elements of FOMC communications, such as the meeting minutes. Indirectly, these changes also are likely to be a helpful coordinating device for FOMC participants' public commentary. For example, the post-meeting statement and the Inflation Report will naturally gain public attention, nudging participants to further clarify the implied reaction function, to state if and why they disagree, and to explain the key risks and uncertainties. The FOMC also could strengthen these incentives by encouraging such communication practices among participants.

We now turn to a detailed discussion of central bank communication. We base our recommendations and proposals in large part on comments gathered in the course of two dozen interviews during early 2019. Section II summarizes our interview methods and key results. In Sections III, IV, and V, we discuss central bank communication in general terms: why central bankers speak, what they should say, and how communication varies in the presence or absence of a policy rate commitment. In Section VI, we turn to the Summary of Economic Projections; first examining the median projections, then discussing the incremental value in publishing the matrix, and finally, addressing how to use existing published materials to communicate uncertainty and risks. Section VII describes our highlighted proposals: the simplification of the FOMC's post-meeting statement (with examples in Appendix 2) and the reformulation of the SEP as an Inflation Report (with an example in Appendix 3). Section VIII concludes with a brief recitation of our analysis.

[8] For reference, the text of this introduction has 1,660 words a Flesch-Kincaid grade level index of 13.7, consistent with the reading level of a college sophomore.

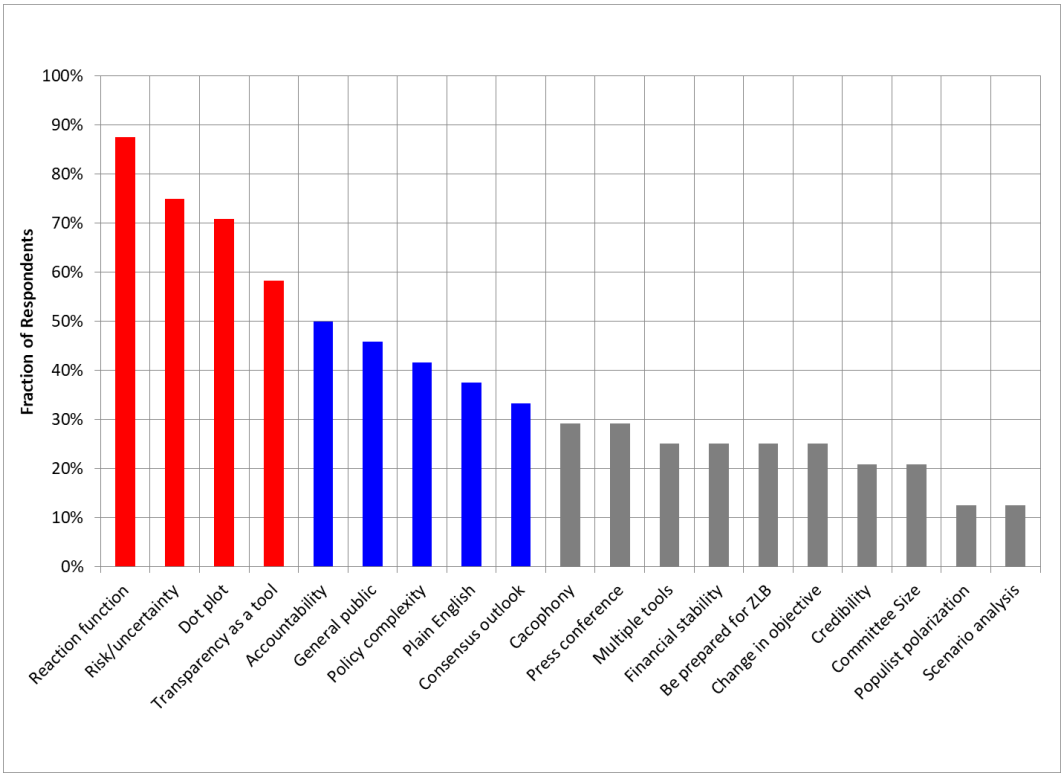
II. Interview Methods and Key Results

To help us understand central bank communication in general, and FOMC communication in particular, we contacted 35 former officials, academics and market economists. Of these, 24 answered three open-ended questions:[9]

1. What do you see as the primary objectives of FOMC communication?
2. How do you think FOMC communication should evolve over the next five to ten years?
3. What do you view as the greatest challenges to effective FOMC communication?

Figure 1 summarizes the responses.

Figure 1. Frequency of Topics Mentioned By Interview Respondents



Source: Written or oral responses to interviews of 24 former central bank officials, academics, and market economists in January to March 2019. See Appendix 1 for a list of those interviews and the dates. The allocation of responses by topic is based on the authors' judgment.

The most frequently mentioned topic is the desirability of having a clear understanding of policymakers' reaction function—the systematic element of the central bank's response to economic and financial developments that drives the expected path of policy. Robert Di Clemente captured the sense of the group when he said: *"If you ask observers 'what do you think the Fed would do if it appeared increasingly likely that inflation was going to rise by a percentage point or more in the next year,' the goal of*

[9] Appendix 1 reproduces our invitation to participate and lists those who agreed to answer our questions.

communications policy ought to be to find strong agreement about the likely course of action."[10] Three-quarters of those interviewed identified communicating the uncertainty and risks around the expected path of policy as a key topic. As Catherine Mann put it: *"What are the risks? You have to say something about the risks [to the outlook] and then say something about what the implications are for monetary policy."*

Seventy percent of our interview respondents mentioned the *dot plot* included in the Summary of Economic Projections (SEP). This is the visual display of FOMC participants' policy rate projections. (In Section VI, Figure 2, we reproduce the dot plot from the March 2019 SEP.) Comments about the dot plot were far from uniform, with some interviewees advocating its elimination and others suggesting modifications.[11] We agree with Peter Hooper: *"Don't ditch the dots."* Indeed, as Federal Reserve Bank of Cleveland President Loretta Mester recently argued, "Omitting the dot plot would not eliminate the uncertainty around the projections, the divergence in views across FOMC participants, or the fact that policymaking always entails learning and recalibration, but it would be a significant step back in transparency."[12] Our conclusion, based on the detailed analysis in Section VI, is that the publication of the dot plot does more good than harm, providing useful information that is difficult to convey in other ways.

Over one-half of those we interviewed mentioned the use of transparency as a monetary policy tool. That is, communication itself can be a policy instrument, complementing or substituting for conventional tools.

The role of communications as a tool is most prominent when it comes to forward guidance regarding a policy rate commitment, which we discuss in Section V. However, forward guidance also is relevant for balance sheet policy. And, it may be useful to provide contingent guidance regarding longer run policy strategy, such as the approach that policymakers plan to take when the policy rate hits the effective lower bound. As former-Chair Janet Yellen put it, *"[t]he FOMC could adopt a set of principles about how it expects to operate in future zero bound situations…That would provide more information than just changing a couple of words in the statement from a 2 percent inflation target to 2 percent on average."*

A number of respondents mentioned the need to communicate with the public in plain English. Lewis Alexander's comment is representative: *"Recently, Chair Powell argued in favor of using simple, non-technical, language to describe and explain the key economic concepts and evidence that drive FOMC decisions. I strongly agree."* Our proposals (in Section VII) for a simplified FOMC statement and a concise Inflation Report aim in part to address this concern.

Finally, we note that one-third mentioned the difficulty created by the "cacophony problem." As then-Governor Powell noted several years ago: "[M]arket participants often say that there are too many

[10] Italicized, attributed quotes that lack references come from our interviews. We include them with the explicit consent of the source. Quotes that are not in italics are from published sources.
[11] This "mixed assessment" is consistent with the survey findings of Olson and Wessel (2016).
[12] See Mester (2019).

voices saying too many different things about policy."[13] Based on the Brookings survey of FOMC communications, Wessel and Olson (2016) report that academicians and market participants want the Chair to speak more and the regional bank Presidents to speak less. While placing a large burden on the FOMC Chair, the post-meeting press conference partly addresses this critique: As William Dudley said to us: "*[One] advantage of having a press conference every meeting is [it might] tamp down the importance of all the other talk.*"

With this background, we turn now to the rationale for monetary policy communications, as well as to the content needed to make it effective.

III. Why Central Bankers Speak

"One of the biggest challenges for the FOMC is to reach multiple audiences effectively." Richard Berner

For most of the 20th century, central bankers were infamously silent about their goals and actions. The motto ascribed to the interwar governor of the Bank of England Montague Norman—"never explain, never excuse"—aptly characterized the approach of U.S. central bankers until about 30 years ago. Indeed, just a month after taking office on August 11, 1987, Federal Reserve Board Chairman Alan Greenspan remarked: [14]

> "Since becoming a central banker, I have learned to mumble with great incoherence. If I seem unduly clear to you, you must have misunderstood what I said."

A key goal of such obfuscation was to ensure *maximum policy discretion*. In their view, for central bank policy to be optimal, it was always to be free of constraint, including any limits that might arise from prior statements.

Today, however, central bankers have numerous reasons to speak clearly to a wide range of audiences. First, governments since the 1980s have delegated considerable operational independence to central banks. By overcoming the problem of time consistency, this independence allows central bankers to make credible commitments about future policy that lead to improved economic performance.[15]

To legitimize such a broad delegation of authority, legislatures must hold central banks accountable for achieving their legally mandated goals. This requires great transparency. As Paul Tucker put it: *"The first [objective of FOMC communication] is to explain to the public and the public's representatives in Congress how the Federal Reserve is going about exercising the powers delegated to it by Congress."*[16]

[13] See Powell (2016).
[14] *The Wall Street Journal*, as cited in Geraats (2007).
[15] See Cecchetti and Schoenholtz (2018) for a primer on time consistency, complete with links to classic references.
[16] See also Tucker's (2018) recent book on the delegation of power to an independent agency in a democratic society. As he notes on page 546, and Brazier (2019) describes, central bankers should think of themselves as "citizens in power, not in charge."

The requirement for democratic accountability means that the public at large is the most prominent audience for central bank communication. To be sure, central bankers do not seek to win elections: to be effective, their policy horizon should extend well beyond the electoral cycle. Nevertheless, over the long run, people who lack confidence in the competence and trustworthiness of central bank officials are unlikely to support the sustained delegation of authority.

Communicating with the voters and their representatives is difficult and requires both the development of a common vocabulary, and the willingness of officials to engage in public discourse that focuses on monetary policy. Chairman Bernanke's appearance on *60 Minutes* (mentioned approvingly by a number of our interview respondents), his lectures to students at George Washington University, and Chairman Powell's town meetings are the sort of outreach that helps build understanding and support.[17] The *Fed Listens* outreach and review, of which this paper is a part, is another welcome move in this direction.[18]

While technical language barriers can make communicating with the public difficult, communication with financial market participants is fraught for different reasons. The focus of financial markets on daily news encourages central bankers to comment on high-frequency developments. The result, as Peter Fisher puts, is that *"[T]he Fed has a recency bias…always giving the greatest weight to the most recent data."* Yet, giving in to this inclination weakens the long-term focus needed to make central bank commitments credible.

A related challenge arises from the fact that market participants react instantly when policymakers speak and act. Since financial conditions play a central role in the transmission of monetary policy to the real economy, central bankers naturally care how people in financial markets receive their messages. As Woodford (2005) notes:

> "[C]ommunication strategies improve only through a process of trial and error, even when central banks give considerable attention to the problem of how to tell the public more; for market participants must learn to interpret what the central bank is saying, and the central bank must learn to anticipate how its statements will be interpreted.

At the same time, policymakers can become overly concerned with the market reaction to what they say. Jeremy Stein put it succinctly: *"I view the obsession with not surprising the market as counterproductive. The Fed should aim to build a culture and set of norms whereby FOMC members worry less about the short-run market reaction to its statements."*

[17] Former Chairman Bernanke's lectures are available at: https://www.federalreserve.gov/aboutthefed/educational-tools/lecture-series-origins-and-mission.htm.
[18] For a listing of the "Fed Listens" events see https://www.federalreserve.gov/monetarypolicy/review-of-monetary-policy-strategy-tools-and-communications-fed-listens-events.htm.

IV. What Should Central Bankers Say?

Both theory and experience have taught central bankers that *limiting policy discretion* can help them achieve their legal mandate. This is the central lesson of the research on time consistency. Viewed in this light, communications that articulate the central bank's goals and translate them into observable policies buttress the credibility of the commitment to the Federal Reserve's legal mandate. Over time, consistent matching of words and deeds fosters trust.

Monetary policy is most effective when it influences expectations.[19] Expectations guide the consumption, investment and production decisions of households and business, while financial markets translate them into long-term interest rates and risk prices. For central bankers, stabilizing inflation expectations is central to stabilizing inflation. In a world with stable inflation expectations, central bankers also have greater flexibility to address temporary shocks that affect growth and unemployment.

Because it is intrinsically forward-looking, modern central banking is all about strategy and commitment. Simply promising to keep inflation low and stable lacks credibility, because policymakers have an incentive to renege on the promise if it is believed. From this perspective, transparency and communications are central components of a policy framework that—together with legally mandated goals and authorized tools—makes the commitment to price stability (and to other goals, such as maximum sustainable employment) credible. In some circumstances, such as at the effective lower bound for nominal interest rates, communications is among the most powerful central bank tools for this purpose.[20]

What central bankers need to say depends on the monetary policy transmission mechanism. Policy affects the economy primarily by altering financial conditions that influence consumption, investment, production, and employment decisions. Central banks are most effective when financial market participants *anticipate* their responses to economic developments and speed the adjustment of financial conditions.

Helping the public anticipate central bank behavior starts with an explanation of how central bankers view *current* economic conditions.[21] As a result, officials expend considerable effort explaining how they assess recent economic and financial developments. The Federal Reserve has introduced a range of tools for this purpose, including the publication of indexes that summarize financial conditions and the

[19] See de Haan and Sturm (2019) on the role of central bank communications in managing expectations.
[20] Bernanke (2015) states that "monetary policy is 98 percent talk and only 2 percent action."
[21] With the important exception of Morris and Shin (2002 and 2018), who highlight the potential for private herding, academic researchers typically view the central bank production of public information as welfare enhancing. See, for example, Svensson (2005) and Woodford (2005). The latter notes that, since policymakers have superior knowledge about their own reaction function, revealing it likely enhances welfare.

provision of nowcasts that allow for efficient, high-frequency updating of current economic activity estimates.[22]

The most important way to help the public form expectations about monetary policy is to explain how central bankers would alter policy in response to unanticipated economic and financial developments. To be useful, such explanations pre-suppose that policy is systematic, so that there is a reliable link between a set of circumstances and the monetary policy that follows. Explaining how policy would respond to a set of plausible scenarios—a large supply shock that boosts inflation, a deflationary shock that depresses interest rates to the effective lower bound, and so on—can go a long way toward illuminating policymakers' model of the economy. It also can reveal policymakers' preferences in the face of inevitable short-run tradeoffs among their objectives.

The systematic way in which a central bank responds to developments, both anticipated and unanticipated, constitutes a *monetary policy reaction function*. In line with the modern literature on monetary policy, explaining this reaction function tops the list of communications topics cited in our survey (see Figure 1).

One classic approach, based on optimal control theory, derives the reaction function by minimizing deviations from the central bank's stabilization goals in a specific model of the economy.[23] However, as Mark Gertler put it, *"We have some idea what [the true model of the economy] might look like, but we don't have a precise sense."* Since the optimal policy derived from one model may lead to severe underperformance when the model is wrong, policymakers often look to simple, robust rules for guidance. Recent editions of the Federal Reserve's semi-annual *Monetary Policy Report* reflect this approach.[24]

Communication is far easier—and more effective in achieving widespread understanding—in the presence of systematic policy. As Charles Plosser notes, *"The unwillingness to give up on discretionary policymaking makes their communications less informative, less transparent, and more complicated than they otherwise might need to be."* Nevertheless, even when policy is systematic, fundamental uncertainties limit predictability. In addition to uncertainty about the state and model of the economy, central bankers cannot anticipate the shocks that will inevitably arise. While a systematic policy should identify an expected policy path, these uncertainties imply a distribution around that expected path that may be very wide.

Communicating such unavoidable uncertainty may be unwelcome. To quote Dennis Lockhart, *"I don't think the FOMC or the Fed can satisfy financial markets because financial markets are looking for more*

[22] See, for example, the National Financial Conditions Index and the National Activity Index of the Federal Reserve Bank of Chicago, as well as the GDPNow and Nowcasting Report of the Federal Reserve Banks of Atlanta and New York.

[23] See, for example, Woodford (2003).

[24] Taylor (1993) is the seminal work on simple policy rules. Using a range of models, Cochrane, Taylor and Wieland (2019) assess the robustness of the simple rules discussed in the Federal Reserve's semi-annual *Monetary Policy Report* since July 2017 (see Board of Governors (2017), pages 36-39).

certainty than can be conveyed and can be communicated." Similarly, as Roger Ferguson noted, *"[M]arket participants want to know what the Fed is going to do next. That's the one question the Fed really can't answer with the kind of clarity and certainty that the market would like."*

Yet, revealing the distribution of policy prospects is no less (and can be more) important than illuminating the expected path (see Figure 1). In most circumstances, central bankers do *not* wish to commit to the expected policy, nor should they. Highlighting uncertainty is one way to demonstrate the absence of a firm commitment.

To deepen understanding of the limits of the central bank's toolbox, it is useful for communication to highlight circumstances when policy may go beyond a simple rule. For example, it is helpful to explain how the presence of an effective lower bound on nominal interest may prompt policymakers to deviate from the expected policy rate path to combat deflation risk, even if it means forgoing the usual objectives temporarily.[25] Such *risk management* considerations typically gain force when the probability rises of a high-cost tail event.[26]

Finally, institutional features influence what central bankers need to say. For example, the membership of the Committee changes each year. As former Chair Janet Yellen points out: *"For governance reasons, it is actually very hard to get a committee that is changing over time to bind itself to how it will behave in the future."* Consequently, to make its ultimate objectives credible, each January, the "new" FOMC re-commits itself (with only minor tinkering) to the Statement on Longer-Run Goals and Monetary Policy Strategy that informs all policy decisions.

V. Communications With and Without a Policy Rate Commitment

In thinking about the manner and timing of central bank communications, it is useful to distinguish two separate regimes. The first, which we label "normal," prevails most of the time when interest rates are positive. The second, which involves a "policy rate commitment," arises typically if central bankers wish to stimulate the economy further when the policy rate is close to the effective lower bound.

What is common to both regimes is the need to communicate the central bank's mandate (e.g. price stability and maximum sustainable employment). In addition, because private agents are forward-looking, and because policy's impact on the economy occurs only with a lag, communications must be forward-looking as well. Thus, policymakers need to make clear the expected policy path that arises from the central bank's reaction function.

In the normal regime, it is essential to convey the uncertainty regarding the path of the fundamentals that drive the reaction function. This is what officials mean when they describe policy as "data-dependent."[27] As new observations arrive, policymakers update their perceptions of the state of the

[25] For a discussion of risk management in monetary policy, see Greenspan (2004).
[26] The development of tools to anticipate such tail events—such as GDP at Risk—facilitates such a risk-management approach. See Cecchetti and Schoenholtz (2017).
[27] Williams (2019) is a recent, representative example.

economy and financial conditions, as well as of key unobservable variables in their economic model, and adjust the likely path of policy accordingly.[28]

In this setting, forward-looking communication—such as economic or interest rate projections—is unavoidably "Delphic" in character.[29] Regardless of what anyone might think, it emphatically is not a commitment to a specific interest rate path. Indeed, for communications to be effective, the central bank must persuade outside observers that when conditions deviate from forecasts, the policy path will, too.

In this normal regime, public understanding of the policy reaction function is sufficient for the central bank to deliver adequate stimulus to the economy when inflation falls below target, output falls short of potential, or unemployment exceeds its equilibrium level. In contrast, at the effective lower bound, delivering more stimulus than conventional tools permit may require a commitment to keep the policy rate "low for longer."[30] Under these circumstances, communication becomes a policy tool, altering financial conditions and economic prospects when policy rate changes cannot.

Going beyond a mere Delphic forecast, such an "Odyssean" commitment aims metaphorically to tie policymakers to the mast. The purpose is to reduce long-term interest rates and term premia that affect financial conditions more broadly. In this commitment regime, uncertainty about the policy rate path is naturally lower than in the normal regime.

Provided the commitment is credible, theory suggests that such "forward guidance" will be extremely powerful. In some benchmark macroeconomic models, this gives rise to a "forward guidance puzzle" in which a commitment to a one-off temporary stimulus has greater impact today the further in the future its implementation.[31] However, these models assume a degree of credibility and time consistency that is virtually never achievable. Indeed, where the voting members of the policy committee frequently change—as the FOMC does every January—it is nearly impossible to see how the current committee could provide credible commitments of interest rate actions in the distant future.

In addition to the limits imposed by its governance structure, the credibility of a monetary policy committee's interest rate commitment depends on the central bank's policy framework. Suppose for example, that inflation has fallen short of its target for some time. In a conventional inflation-targeting framework where "bygones are bygones," promising to keep interest rates low well after inflation rises to its target is likely to be less convincing than in an "average inflation" targeting regime where policymakers explicitly account for past misses.[32]

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[28] See Clarida (2018) for how data may be used to update estimates of the real rate of interest (r^*) or unemployment rate (u^*) that prevail in long-run equilibrium.
[29] See Campbell et al (2012) for the introduction of the terms "Delphic" and "Odyssean" in characterizing forward-looking FOMC communications.
[30] See, for example, Reifschneider and Williams (2000).
[31] See McKay, Nakamura and Steinsson (2016).
[32] The latter regime is "history dependent" in the sense that Woodford (2005) deems necessary for optimal policy.

In practice, policymakers make two types of Odyssean commitments: *date contingent* and *state contingent*.[33] A date-contingent promise is relatively easy to communicate: policymakers simply say that they will keep the policy rates at or near the effective lower bound for a specific amount of calendar time. Far from making policy data-dependent, a date-contingent promise is equivalent to announcing that policymakers are willing to short circuit their reaction function, ignoring economic and financial news until the commitment expires. If credible, date-contingent promises can have a powerful impact on financial conditions, as they mute private reactions to economic news, reducing volatility.[34] However, as conditions evolve, a central bank may face an incentive to renege.

Unlike date-contingent commitments, the state-contingent variety tends to reinforce the reaction function, helping to underpin credibility. In an inflation-targeting regime, for example, a common approach is to commit to a low policy rate path until key goals are satisfied: inflation (or inflation expectations) rises to its target, unemployment sinks to its equilibrium rate, or both. In a targeting regime that accounts for past misses, the commitment could go further: keep the policy rate low until *average* inflation over a specified period reaches its target.[35]

Several factors favor state-contingent commitments over the procedurally simpler date-contingent variety. First, they are less likely to strain credibility because they tend to amplify, rather than mute, the reaction function. Second, because they do not blunt private agents' responses to economic news, the transition to a normal regime—one without a policy rate commitment—is likely to be smoother. Once policy moves away from the effective lower bound, the case for state-contingent over date-contingent commitments becomes even stronger. Third, as Feroli et al. (2017) highlight, observers tend to focus disproportionately on the time-based aspects of communications even when policymakers seek to qualify the commitment.

To summarize our discussion thus far, effective central bank communication conveys a sense of policymakers' reaction function and a clear understanding of the uncertainty associated with the path of both the economy and policy. And, it conveys the desired messages in simple, widely-accessible, language. Through its various communication tools (discussed in Appendix 4), the FOMC is already working hard to meet these goals. The post-meeting statement and the Summary of Economic Projections (SEP) are two of the most important communications tools. When we come to our specific recommendations in Section VII, we propose some principles for simplifying and making the statement more informative. We also suggest using components of the SEP to construct a timely and concise Inflation Report.

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[33] The description and analysis of date- and state-contingent commitments draws heavily on Feroli et al (2017).

[34] Using a cross-country dataset, Ehrmann et al (2019) find that date-contingent promises with a *short horizon* (less than or equal to 1.5 years) actually increase the responsiveness to news and are not effective in reducing forecaster disagreements.

[35] See Yellen (2018) for a brief discussion of alternative targeting frameworks, including price-level targeting and nominal GDP targeting, as well as average inflation targeting. Mertens and Williams (2019) analyze the benefits of targeting average inflation and the price level for reducing the constraint of the effective lower bound. Gust, López-Salido and Meyer (2017) show that an asymmetric loss function can result in a "low for longer" commitment.

Before that, however, we turn to a discussion of the SEP in its current form. In our view, the SEP has been useful both in the presence and in the absence of a policy rate commitment. But, as we will explain, we believe that a straightforward reorganization of existing published material—including some modest additions and changes in timing—could bring further significant improvements.

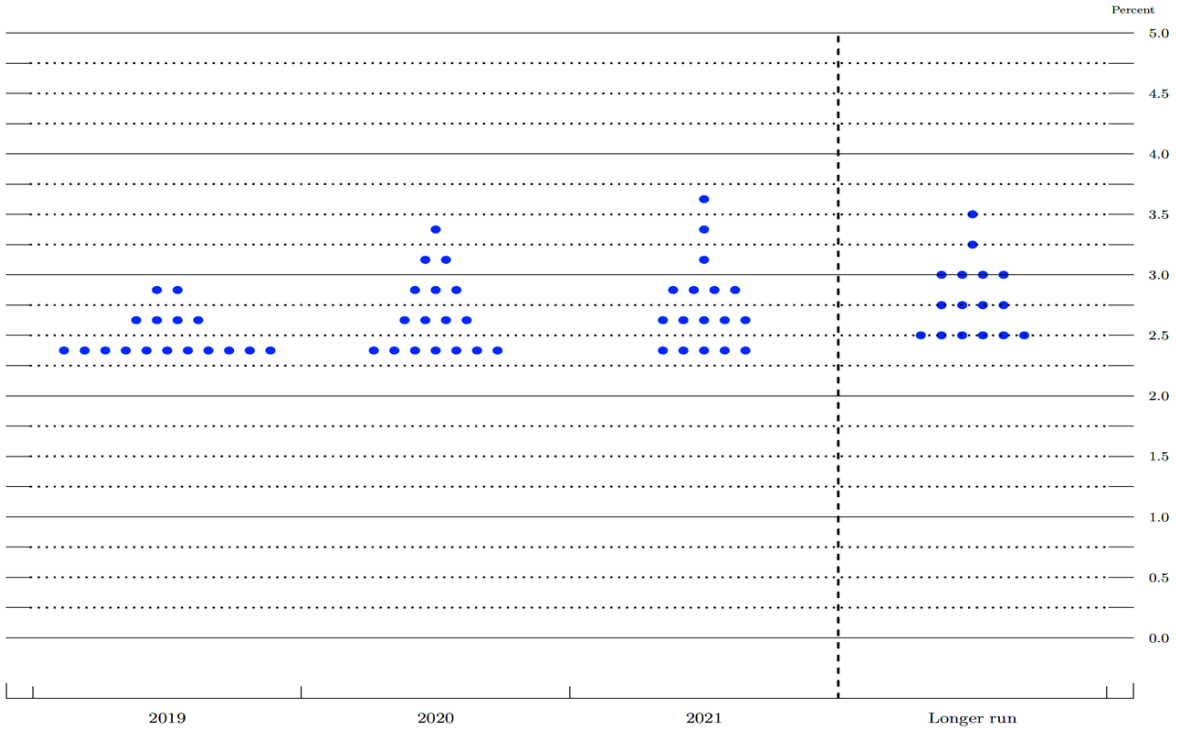
VI. What we learn from the current version of the SEP

"[I]f properly understood, the dot plot can be a constructive element of comprehensive policy communication." Federal Reserve Board Chairman Jerome Powell, March 8, 2019

In 2012, five years after they began its publication, the FOMC added explicit information on the federal funds rate to the SEP. At the time, the Committee probably hoped that displaying the breadth of support for keeping interest rates close to zero would bolster its "low for longer" commitment. This is surely no longer the case.

Today, what is the role of the SEP in the FOMC's communications framework? What can we learn from the release as it exists, and how might that information be enhanced and supplemented to meet the objectives of improving communication?

Figure 2. FOMC participants' assessments of appropriate monetary policy: Midpoint of target range or target level for the federal funds rate (end of period), March 20, 2019



Source: Copied directly from Figure 2, Minutes of the Federal Open Market Committee, March 19-20, 2019.

The current form of the SEP presents the median projections of economic growth, inflation and unemployment for the next two or three years, as well as a plot of the policy rate projections for all of

the FOMC participants (without identifying them). Financial market participants and the media focus intently on these "dot plots," like the one released following the March 2019 FOMC meeting and reproduced in Figure 2.

A bit like pathologists analyzing a biopsy, dotologists study these plots in an effort to divine the intentions of policymakers. When will the next policy rate move come? Will it be an increase or decrease? How many changes are coming over the next year? Over the next two years? The questions go on and on. The publication of the dot plot, and the questions it generates, has spawned a cottage industry of experts much like that which sought to identify actual policy shifts before the FOMC began to announce them in 1994.

In examining the dots, it is important to understand what they are and what they are not. Bernanke (2016) emphasizes that they are neither a policy commitment nor an unconditional forecast. Moreover, the dots themselves do not convey the considerable level of uncertainty associated with each individual's projections. Instead, the dots are a collection of projections from all FOMC participants (voters and nonvoters) "based on individual views of 'appropriate monetary policy'." As Bernanke explains, someone with views that clearly differ from the consensus would base their projections on their own views, not on what they believed is most likely to happen. Provided FOMC participants behave systematically, if we knew each individual's projections, then we could recover their approximate (implicit) reaction function. That is, the current procedure generates much more useful data than an alternative in which survey respondents would provide their view of the most likely future path of policy and the economy.

We now proceed to a more detailed analysis of the SEP. We divide the analysis into three parts, starting with a detailed look at the median projections. This information, including interest rate projections, is available quarterly since 2012. Next, we examine the incremental value of having the matrix of linked individual projections for unemployment, inflation and the policy rate. As of this writing, the FOMC has published this matrix—without the names of the FOMC participants—only for 2012 and 2013. The revelation of the names is set to begin with a 10-year lag in 2022. Finally, we look at uncertainty, both with respect to the future state of the economy and regarding the policy rate.

A. The Median SEP

"The SEP provides useful quantitative information about the FOMC's reaction function, and, in particular, why the projections of future interest rate changes." Bernanke (2016)

To the extent that the dot plot is merely a collection of projections, the format in which it first appears would seem to limit its usefulness. Until five years after its initial release, the SEP provides no means to connect the inflation, unemployment and interest rate forecasts of individual respondents. The reported medians (and ranges) need not reflect any particular FOMC participant's view or reaction function. Moreover, the mix of individuals shifts from year to year, as Governors and Reserve Bank Presidents change. In addition, only five of the 12 Presidents vote in each year, but the dots do not distinguish

voters and non-voters. So, one might be skeptical about using the information in the SEP to construct a coherent story about the FOMC's likely reactions to changing circumstances.

On closer inspection, however, we find that the medians contain very useful information. To come to this conclusion, we look at the 29 SEP publications from 2012 to 2018, collecting data on the median values for the policy interest rate, inflation (as measured by the core PCE price index), and unemployment.[36] Each SEP has forecasts for three or four years, resulting in a panel data set with 105 observations. Treating all these as if they come from a single (representative) policymaker, we estimate a simple Taylor rule where the policy interest rate *(i)* is set equal to the short-run equilibrium real rate of interest *(r^*)* for a given year, plus current inflation *(π)*, plus a coefficient (α) times the inflation gap *(π-π^*)* and another coefficient *(β)* times the unemployment gap (U-U^*):[37]

$$(1) \quad i_{t,s} = r_k^* + \pi_t + \alpha(\pi_{t,s} - \pi^*) - \beta(U_{t,s} - U_{t,s}^*) + \varepsilon_{t,s}$$

where the subscript t denotes the month-year of the SEP (e.g. March 2018), k is the year of the SEP (e.g. 2018), and s is the year for which the projection is made (e.g. 2018, 2019, 2020). The final term in equation (1), $\varepsilon_{t,s}$, is a mean zero, constant variance error. We estimate the short-run real interest rate each year, r_k^*, by including year fixed effects for each of the years 2012 to 2018.

Results from estimating equation (1) lead to several interesting conclusions. First, the SEP-implied short-run reactions to changes in inflation $(1+\hat{\alpha})$ and unemployment $(\hat{\beta})$ are 2.4 and 0.5 respectively.[38] That is, for each percentage point the median inflation projection lies above or below the target of 2 percent, the median policy rate projection moves by nearly *two and one half percentage points*. The SEP medians suggest far less sensitivity to the unemployment gap, with the policy rate moving by only about half a percentage point for each percentage point that projected unemployment moves relative to their estimate of the equilibrium rate *(U^*)*. While the estimated ratio of (*1+*α) to β is surprisingly high, this regression fits reasonably well, accounting for more than 75 percent of the variation in the panel of median interest rate projections.

Second, estimates of the implied short-run equilibrium real interest rate follow an interesting evolution. After adjusting for the 2 percent inflation target, we can compare our estimates of r_k^* with the longer run policy rate projections reported in the SEP, which we label r_l^*. Figure 3 shows the results of this exercise. The solid line is the estimate of the annual short-run r_k^* computed from the Taylor rule (recall that this is the estimate for the year the SEP is published). The shaded area depicts a 95-percent confidence interval around these short-run estimates. The dashed line is the median value of the longer

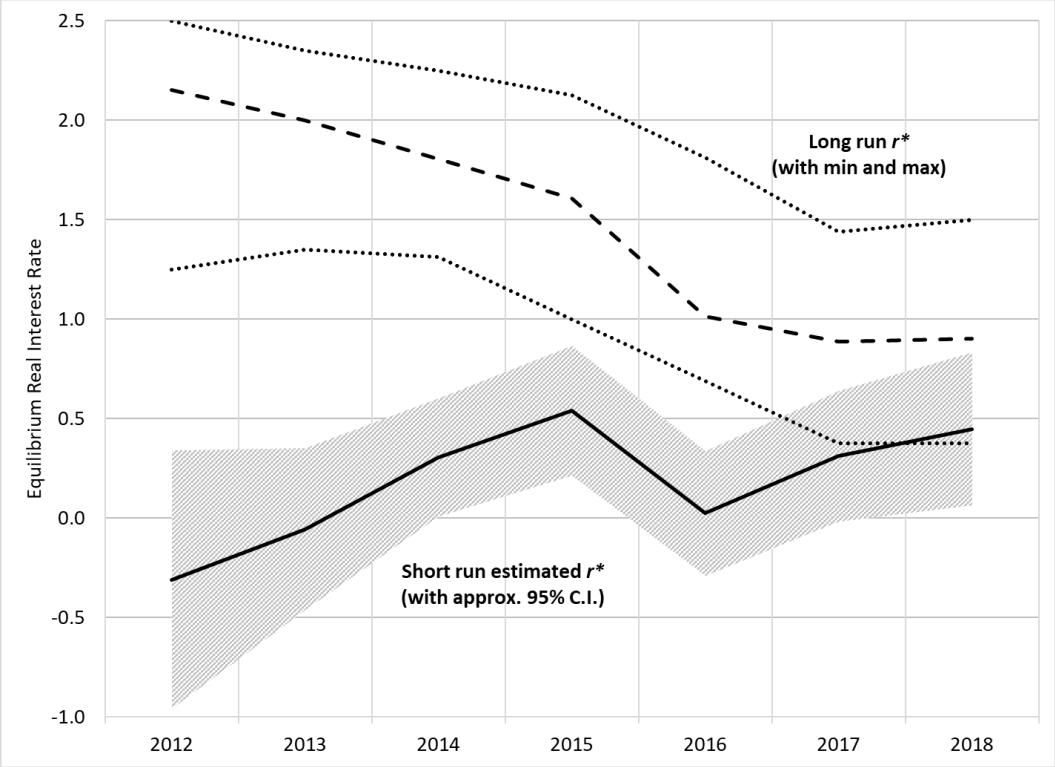
[36] In 2012, there were five SEPs, one more than the quarterly frequency in subsequent years.

[37] Since we use projections for the core PCE price index, the inflation objective π^* is equal to 2. To calculate the unemployment gap, we use the median of the "longer run" unemployment rate in each SEP release as our measure of U^*.

[38] The exact parameter estimates (with OLS t-ratios in parentheses) are $\hat{\alpha} = 1.39\ (4.91)$ and $\hat{\beta} = 0.47\ (2.81)$.

run r_l^* (the average SEP median federal funds rate in the longer run published that year minus the 2-percent inflation objective). The dotted lines show the range of the average minimum and maximum projections for r_l^* for the year.

Figure 3. SEP implied short-run and longer run equilibrium real interest rates (r_k^* *and* r_l^*), 2012-18



Source: Estimates of the short-run equilibrium real interest rate (solid line) are the time fixed effects in equation (1). The shaded area is 1.96 times the standard error of each years' estimate. Estimates of the longer run equilibrium real interest rate (dashed line) are the average of the median longer run nominal federal funds rate projections in the SEP less the 2 percent long-run inflation objective for the year. The dotted lines show the range of average minimum and maximum projections for r_l^* for the year. Data are from the 29 published SEPs from 2012 to 2018.

Note that the short-run r_k^* starts at a level below zero in 2012, rises gradually and approaches one-half of one percent in 2018. That is, the FOMC's recent forecasts for interest rates, inflation and unemployment are consistent with a short-run r_k^* of about 0.5 percent. Over the same period, the SEP median longer run equilibrium real rate, r_l^*, declines consistently. Starting above 2 percent (with a range

from 1.25 to 2.5 percent) in 2012, the March 2019 estimate of the contemporaneous longer run real interest rate is between 0.4 and 1.5 percent, with a median of 0.75 percent.[39]

This brief casual analysis of the data suggest to us that, even as currently published, the SEP medians are quite informative. They help us to understand the Committee's behavior as inflation and unemployment change, and they highlight the changing perception of what is neutral. Even over the turbulent period of the past seven years, the pattern is relatively stable: the implied levels of the short-run (and longer run) equilibrium real rate of interest evolve gradually as new data prompts FOMC participants to update their views.

B. The Incremental Value of the Matrix

"One recommendation would be to adopt the so-called matrix approach for the SEP in order to reinforce the link between the economic forecast and the policy outlook for each individual member."
David Greenlaw

Given the value of the medians, what is the incremental information of publishing the matrix that would allow us to connect the inflation, growth, unemployment, and policy rate projections for each individual FOMC participant? The answer is that it can help observers assess when the median or consensus might shift.

Unsurprisingly, the median view in a committee can be unstable. That is, even if all the participants follow a systematic, model-based, policy strategy, the identity of the median participant (and hence the properties of the median reaction function) can shift. To see why, consider the following extended example, in which the participants of a monetary policy committee fall into three distinct groups. They share much in common: their inflation target is 2%, their estimate of the equilibrium level of unemployment is 4% and their estimate of the short-run equilibrium real interest rate is 1%. Where they differ is the weight they attach in their reaction functions to the inflation and unemployment gaps, and to financial stability concerns. Specifically, each employs a variant of the following Taylor rule in equation (1):

$$(2)\quad i = r^* + \pi + \alpha(\pi - \pi^*) - \beta(U - U^*) + \gamma FS \ ,$$

where the added term, FS , is a financial stability indicator (such as financial system leverage or housing prices) which equals 0 or 1.[40] The values of the parameters in (2) distinguish the three groups, as shown in Table 1:

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[39] We note that the median value for r_l^* (0.9) in the final 2018 SEP is very close to the latest estimate (0.81) from the Laubach and Williams (2015) model published by the Federal Reserve Bank of New York.

[40] We see the inclusion of a more graduated financial stability indicator as a potentially realistic addition to the reaction function. For example, in prepared remarks delivered on May 14, 2019, Federal Reserve Bank of Kansas City President Esther George warn that "lower interest rates might fuel asset price bubbles, create financial imbalances, and ultimately a recession." See George (2019).

Table 1. Policy Rules for Three Distinct Groups

Group	α	β	γ
A	0.0	1.0	0.0
B	0.5	0.5	0.5
C	1.0	0.0	0.0

Group A reacts to unemployment movements above all else; Group B has a balanced approach; albeit one explicitly integrating financial stability considerations; and Group C is the mirror image of Group A, focusing exclusively on inflation deviations from the target. These differences could arise from diverse perspectives on the central bank's loss function, variation in the underlying model of the economy, or some combination of the two. For our purposes, what is important is that the committee divides itself into at least three groups.

Next, assume the median group controls policy outcomes so long as its members are able to obtain support from members of at least one other group. And, a group is willing to vote with the median if the result is less than 50 basis points from their desired policy choice; otherwise, they dissent.

Consider two scenarios that differ based on whether the financial stability indicator is 0 or 1. In each scenario, we look at examples where the only thing that varies is the unemployment rate. Table 2 displays the results of this exercise. Starting with the top panel, where *FS* is zero, Group B—the balanced group—is *always* the median (the shaded cell in the table). In addition, no group prefers a policy rate that is more than 25 basis points from the median, so the votes will be unanimous.

Table 2. Desired Policy Rate by Group

Scenario I. Financial Stability Indicator = 0						
Cases	**State of the Economy**			**Desired Policy Rate**		
	π	U	FS	**Group A**	**Group B**	**Group C**
1	2	3.5	0	3.50	3.25	3.00
2	2	4.0	0	3.00	3.00	3.00
3	2	4.5	0	2.50	2.75	3.00
Scenario II. Financial Stability Indicator = 1						
Cases	**State of the Economy**			**Desired Policy Rate**		
	π	U	FS	**Group A**	**Group B**	**Group C**
1	2	3.5	1	3.50	3.75	***3.00***
2	2	4.0	1	3.00	***3.50***	3.00
3	2	4.5	1	***2.50***	3.25	3.00

Note: The shaded cells denote the median voting group policy rate, and numbers in bold italics denote cases where a group will dissent.

The bottom panel of the table shows the results when financial stability is a concern (*FS* equals one). Now, in every case, Group B prefers a policy rate that is 50 basis points higher than in the absence of a financial stability concern. As a result, Group B is *never* the median. Instead, the median fluctuates between Group A and Group C (or both). Also, there will be dissents in every case (bold italics). In case 1,

Group C dissents because they set policy with a primary focus on inflation, which is at the target. In case 2, Group B dissents because their model implies tighter policy in response to financial stability risks. Finally, in case 3, Group A dissents because of their primary concern for unemployment.

This example highlights the challenge of deducing the reaction function for a *committee* even if all of the members are following systematic policies. Doing so requires understanding both the entire array of reaction functions, as well as when each group is likely to carry the day. To put it slightly differently, in order to understand how the committee will react to incoming information, we need to know how each individual's desired policy rate will change so that we can predict the voting pattern and assess the likely consensus. With the matrix, especially with projections linked across time, this would be possible.

With existing public information, we are unable to estimate individual policy reaction functions with any precision. Instead, to sketch what we might learn from the full matrix, we take the sparse information that is available and look for groups that might have similar systemic responses to changing economic conditions. The September 2012 SEP reports the matrix for 19 participants with projections through 2015: this gives us 76 observations. We divide the data into three groups based on the participants' 2015 federal funds rate projections: (1) the 2015 federal funds rate will be between 0.0 to 1.0 percent, (2) the 2015 federal funds rate will be between 1.5 to 2.5 percent, and (3) the 2015 federal funds rate will be between 3.5 to 4.5 percent. Taking these groups, we estimate three simple Taylor rules. The results are in Table 3. Note that the three groups differ in their estimates of the short-run r^*, as well as their implied reactions to the inflation and unemployment gaps (α and β).

Table 3. Monetary Policy Reaction Functions based on SEP Matrix, September 2012

2015 Funds Rate Range	Estimated short-run r^*	$\hat{\alpha}$	$\hat{\beta}$	R^2	Average U*	Average long-run r_l^*	Number of participants
0.0 to 1.0 percent	-1.15 (11.48)	-0.90 (3.51)	0.28 (5.05)	0.42	5.39	1.88	10
1.5 to 2.5 percent	-0.18 (0.62)	2.10 (2.01)	0.52 (2.94)	0.56	5.76	2.20	5
3.5 to 4.5 percent	1.69 (3.10)	-0.35 (0.07)	-1.43 (3.73)	0.58	5.88	2.31	4
Full sample	0.14 (0.62)	-0.08 (0.11)	-0.75 (5.61)	0.38	5.59	2.07	19

Notes: The table reports estimates of a simple Taylor rule: $i_j = r_j^* + \pi_j + \alpha(\pi_j - \pi^*) - \beta(U_j - U_j^*)$, where *j* represents the row of the matrix of projections, for groups distinguished by their three-plus year projection of the policy rate. Each participant provides four projections—2012, 2013, 2014 and 2015—so the number of observations in each sample equals the number of participants times four. Numbers in parentheses are OLS t-ratios.

As we mentioned in the introduction, a true commitment to transparency requires timely publication of the matrix *together with the participants' names*. Nevertheless, even without the names, and without

links across SEPs, new information-processing techniques likely will allow experts to extract more information from the matrix of projections. We would not be surprised to see a cottage industry of experts applying natural-language processing methods to policy-related speeches or writings in order to deduce the names, while using machine-learning techniques to identify relatively stable groups with common reaction functions. While the results of such exercises can help discipline policymakers (increasing the incentive to act systematically), it seems better to preempt such private policy discovery efforts, avoid the deadweight loss to society that they represent, and enhance transparency of the SEP directly by providing the matrix with the names at the outset.[41]

C. Interest Rate Policy Uncertainty

"I believe the current emphasis on the medians of these disparate projections in Fed publications and explanations also works to undermine the emphasis on uncertainty." Donald L. Kohn[42]

We now turn to the difficult but essential task of communicating uncertainty. Officials may be concerned that effective communication of uncertainty would underscore how little they actually know. However, it is important that the public understand the challenges of setting monetary policy—above all, that there is always considerable uncertainty and that a key feature of effective policy is a willingness to entertain differing assessments, correcting errors quickly as new information arrives. As Mervyn King emphasized to us, *"Talking very openly about the degree of ignorance is crucial. Explain what we don't know and don't apologize for it: this is being honest and frankly no one else knows either."*

Fortunately, the FOMC releases substantial information on uncertainty, but does little to attract attention to this valuable work. Based on the analysis of Federal Reserve Board economists, Table 2 in the complete SEP that is currently released with the FOMC meeting minutes includes estimates of error ranges (measured as the root-mean-squared historical prediction error) for projections of real GDP growth, the unemployment rate, inflation, *and* the short-term interest rate.[43] Since this appears three weeks after the initial SEP release, only die-hard devotees consume this critical information.

To see how informative these error ranges are, consider the information included with the March 19-20, 2019 meeting minutes. There we learn that, for the unemployment rate, the median projection two years ahead is 3.9 percent, with an error range of plus or minus 1.7 percentage points. This tells us that, given historical experience, there is a 70 percent chance that at the end of 2021, the unemployment rate will be between 2.2 and 5.7 percent. For inflation, the median is 2.0 percent, with an error range of plus or minus 1.1 percentage points, so the confidence interval goes from 0.9 to 3.1 percent. (For GDP

[41] Calomiris and Mamaysky (2019) highlight the incentive effects that natural-language processing (NLP) techniques can induce by enhancing transparency. NLP techniques are already being widely used in the analysis of central bank behavior. As noted in Appendix 4, Hansen, McMahon and Prat (2018) use NLP to assess the impact on FOMC deliberations of publishing the transcripts. Prattle (2018), a private vendor, employs NLP to assess the sentiment of policymakers at several central banks.

[42] See Kohn (2019).

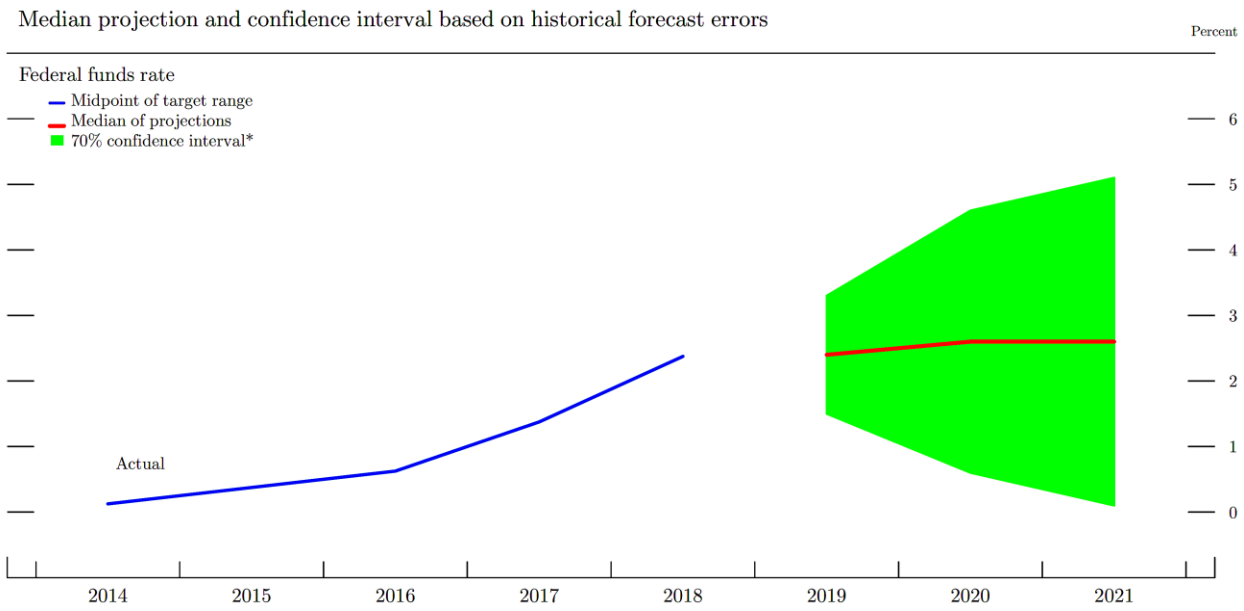
[43] See David Reifschneider and Peter Tulip (2017). Levy (2019a and 2019b) also recently proposed highlighting this material.

growth, the median projection is 1.8 percent, with root-mean-squared error of 1.9 percent—that is, the 70 percent confidence interval extends from -0.1 to +3.7 percent.)

Uncertainty regarding the future level of unemployment and inflation (and real growth) translates directly into uncertainty about the path of the policy rate. Here, again, the FOMC is remarkably transparent about the unavoidable lack of precision. In March 2019, the error range for the 2021 projection of the short-term interest rate is plus or minus 2.5 percentage points. Given the median projection of 2.6 percent, this means that the Committee believes there is a 70 percent chance that, at the end of 2021, the target interest rate will be between 0.1 and 5.1 percent. If the risks are symmetrical, that implies there is at least a 15-percent chance of returning to the zero lower bound in the next two years. (The 50-percent confidence interval for the policy rate over this same two-year horizon is plus or minus 1.6 percentage points.)

Since 2017, the FOMC also has published a chart in the full SEP that helps visualize the uncertainty in the interest rate path. Figure 4 reproduces the version included with the March 19-20, 2019 minutes. This fan chart makes clear that, while the median suggests little change in the policy rate over the next 2-plus years (in red), there is considerable uncertainty that increases with the forecast horizon.

Figure 4. Uncertainty in the March 2019 projections of the federal funds rate (with 70% confidence interval), 2019 to 2021

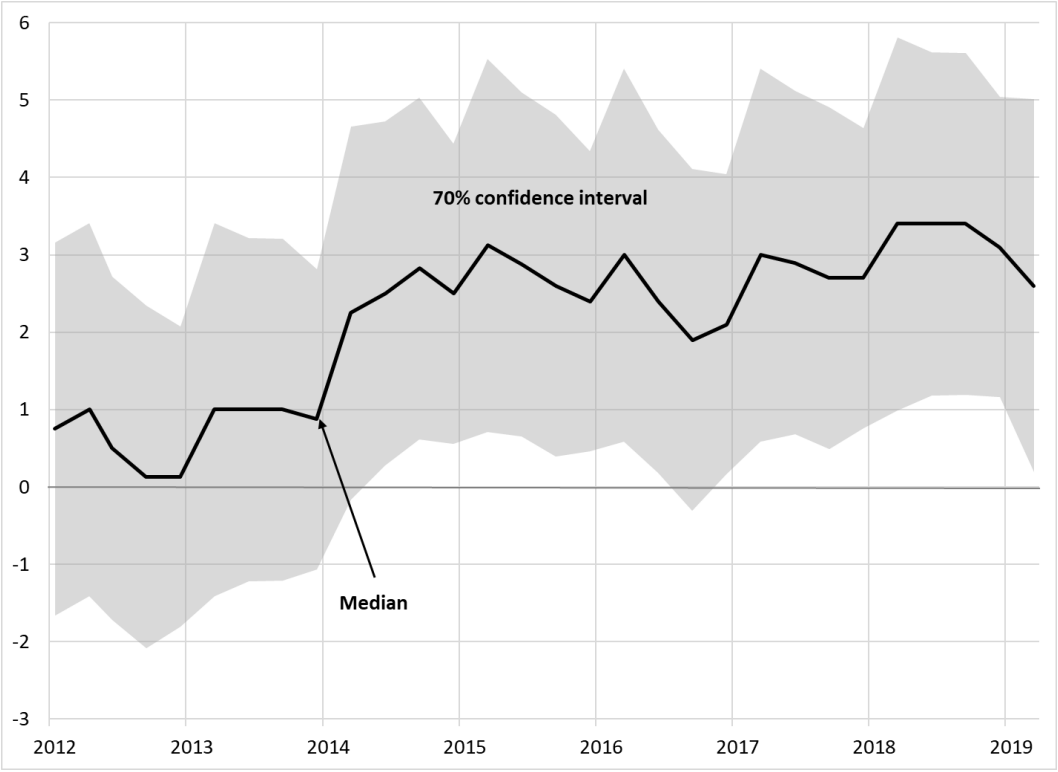


Source: We copy this image (enhancing the color) from the HTML of Figure 5, Minutes of the Federal Open Market Committee, March 19-20, 2019 on the FOMC's section of the Federal Reserve Board website.

To underscore the value of these published indicators of uncertainty, we examine the information from all 30 SEPs through March 2019, and combine it with the error ranges computed by Reifschneider and Tulip (2017) to generate a history of the uncertainty in the FOMC's two-year ahead policy rate projections. Figure 5 displays the result. The black line is the two-year ahead median, while the gray area

is the 70 percent confidence interval. Note that "two years ahead" is only an approximation, since the projection is always for the end of the calendar year that is two years ahead. We show the projections as of each publication date. For example, we plot the March, June, September, and December 2012 projections for the end of 2014 as four consecutive points in 2012. Specifically, the December 2012 median projection for the end of 2014 was 0.13 percent, with error bands ranging from -2.37 percent to +2.63 percent. (The fact that "two years ahead" is closer to December than it is to March explains much of the jagged pattern in the confidence interval: uncertainty declines as the forecast horizon shortens.)

Figure 5. Uncertainty in the two-year-ahead projections of the federal funds rate (quarterly with 70% confidence interval), 2012-March 2019



Source: Minutes of the Federal Open Market Committee, 2012 to 2019; Table 5 in Reifschneider and Tulip (2017); and authors' calculations.

In our view, this information about the uncertainty in the projections is severely underutilized. Indeed, we believe that with a bit of work, it would be possible to convert the SEP published with the meeting minutes (fan charts and all) into a concise Inflation Report that would be a centerpiece of the FOMC's communications framework—something that we discuss further, including providing an example, in the next section.

VII. Recommendations

Returning to where we started, three objectives guide our proposals for further improving FOMC communications: simplifying public statements, clarifying how policy will react to changing conditions, and highlighting policy uncertainty and risks. To illustrate the application of these objections, and how they help further improve communications practices, we provide examples of a re-formulated post-meeting statement and a concise Inflation Report; both refer to the FOMC's foundational statement on longer-run goals.

A. Simplifying the Post-Meeting Statement

To address the general public and their elected representatives, as well as financial markets, the FOMC must speak in plain language. A simple and easily readable post-meeting statement will, in our view, increase credibility and accountability, improving the effectiveness of policy.

With this objective in mind, we took a careful look at recent post-meeting statements. These tend to be complex, jargon-laden, press releases that a casual reader cannot easily absorb. To simplify them, we recommend focusing on just three elements:

- the statement of the decision, including votes for and against;
- the rationale for the decision, including the reason for dissents;
- and a discussion of uncertainties and risks.

For each of these, the FOMC should include information on both the policy rate target and the balance sheet.

We propose three principles to guide the drafting of the statement. First, keep it readable. In practical terms, we suggest aiming for the reading level of a high-school senior (grade 12), and capping complexity at what is readable by a college sophomore (grade 14). Based on standard measures of readability, this means keeping sentences short and avoiding words that have more than two syllables.

Second, to quote David Wessel: "*The FOMC should put more emphasis on its start-of-year statement of goals and objectives and refer to that when it is making policy decisions*." That is, each post-meeting statement should explicitly link the decision to the Committee's longer run goals.

Third, we encourage the FOMC to adopt the first-person plural in its communication. As we discuss in our introductory comments, the FOMC would benefit from practices that help make it more accountable as a group. For this reason, we believe it would be wise to drop references to the "Committee," as if it exists independent of the people involved, and substitute "we," "us" and "our." Where an FOMC participant wishes to express dissent, the substitute would be "I."

As examples, using information in the original statements and in the minutes released three weeks later, we constructed alternative statements for the December 2017 and March 2019 meetings. Both

meetings were associated with an SEP, while the first included dissents. The new versions, as well as the originals, are in Appendix 2.

As Table 4 shows, our alternative versions are shorter and much simpler than the originals. We also believe that they contain additional relevant information. Using the Flesch-Kincaid measure of readability, the grade level of the original statements exceeds 16, consistent with the reading ability of a college senior or a post-graduate student.[44] For December 2017, the last time there was a dissent, our alternative statement has a Flesch-Kincaid index of 12.5, so a senior in high school should be able to understand it. The alternative statement for March 2019, with a Flesch-Kincaid index of 10.7, should be readable by a high-school sophomore or junior.

Table 4. Comparing the Original and Alternative Versions of Two FOMC Statements

Statement Date	Number of Words		Flesch-Kincaid Grade Level	
	Original	Alternative	Original	Alternative
December 2017	427	270	16.3	12.5
March 2019	303	300	16.4	10.7

Note: The number of words and the grade-level readability index exclude the paragraph that reports the vote. We compute the readability index using the calculator at: http://www.readabilityformulas.com/free-readability-formula-tests.php. Both the original and alternative statements are in Appendix 2.

It may not always be feasible to achieve this level of readability, but in order to broaden access to the Federal Reserve's key policy decisions it is worth the effort to craft simpler post-meeting statements. If simplifying the statements results in some imprecision, there are other avenues for clarification, including the Chair's press conference and the minutes.[45]

To help explain its actions, we also suggest that the FOMC consider streamlining the meeting minutes. Currently, following long-standing historical precedent, the structure of the minutes follows the chronology of the meeting. As a result, this lengthy document places all the key material at the end. An alternative structure that aims to highlight the Committee's decisions, rationale and agreements or disagreements would completely reverse this order. It would begin with the Committee Policy Action (including balance sheet decisions), followed by the section entitled Participants' Views on Current Conditions and the Economic Outlook (including any discussion of balance sheet issues). The list of meeting attendants, comments from the Staff regarding developments in financial markets, and Staff reviews of the economic and financial situations, would be moved to the end (possibly in an appendix).

[44] Since the inception of the statement in February 1994, the median grade level is 16.6 with an interquartile range of 15.5 to 17.5. We discuss the evolution and context of FOMC post-meeting statements in Appendix 4, which includes a time series plot of the Flesch-Kincaid grade level and number of words for each statement (see Figure A2 in Appendix 4).

[45] In a three-page paper that uses only one-syllable words, Samuelson (1979) explains the fallacy of maximizing geometric mean returns in long sequences. The paper highlights the tradeoff between simplicity and precision, emphasizing the importance of setting a realistic goal for readability. Even with that caveat, however, the scope for simplifying the FOMC's post-meeting statements is notable.

B. An FOMC Inflation Report

Inflation reports are valuable tools. Central banks produce them both to focus public expectations formation on stated long-run objectives and to discipline pre-meeting preparations and post-meeting communication of the participants in the policy deliberations.[46]

Describing how current and prospective policy supports the central bank's mandate, these reports have both a backward- and forward-looking function. Retrospectively, they provide an evaluation of how policymakers have performed. This includes a discussion of the evolution of economic and financial conditions, and possibly some explanation of views on important unobservable variables like the long-run equilibrium real interest rate and unemployment rate (r^* and U^*), as well as a description of the level and growth rate of potential output. This summary and explanation of recent outcomes allows legislators, financial market participants and the public at large, to hold independent central bankers accountable for their actions.

Prospectively, the reports provide projections of key policy objectives along with a discussion of important drivers, uncertainties and risks. In addition, they identify and explain important divergences of views. This enhances transparency, shedding light on the reaction function and focusing the public debate on what policymakers believe to be the salient features in the outlook.

By creating accountability and transparency, inflation reports have a powerful influence on internal committee dynamics. The obligation to publish both an *expected value* and a *range* for projections of the state of the economy and policy (something like Figure 4) has a number of positive effects. It establishes staff priorities, increasing the quality of the background work needed, and it focuses the internal discussions necessary for reaching a consensus.

Of course, the FOMC does *not* engage in the consensus building associated with the production of a comprehensive Inflation Report like that of the Bank of England. And, in light of governance considerations, it is unlikely to do so in the future. Rather than an agreement among the FOMC participants, the SEP uncertainty measures shown previously in Figure 4 are historical forecast errors.

It is nevertheless critical that Federal Reserve policymakers agree on a mechanism for clearly communicating uncertainty. A change that features existing material more prominently can materially improve this dimension of its communications. Making the evolving scale and sources of uncertainty a focus of the Chairman's post-meeting press conferences, and of FOMC members' public remarks, would then follow naturally.

To do this, we suggest highlighting the range of uncertainty around the median projections by publishing material that now appears with the minutes—namely, the table that shows the historical projection error ranges and the fan chart for the policy rate—more prominently and quickly. The same applies to

[46] The Bank of England's (BoE) Inflation Report remains the classic example.

other figures included with the minutes that show the distribution of FOMC members' perceptions of the uncertainty and risks in their projections for GDP growth, unemployment, and inflation.[47]

Our preferred approach is to release these materials as part of the initial SEP (that is published together with the post-meeting statement), instead of waiting three weeks until publication of the minutes. And, rather than feature the table with the median projections, start with a chart like the one we reproduce above (see Figure 4). Were the FOMC to add a brief qualitative description of the current state of the economy, of the sources of uncertainty and risk, and of divergences in views, the result would be a concise Inflation Report that could become a natural focus of public discussion by FOMC participants between meetings.

Importantly, such a report need be neither long nor complex. The visual summary of the Bank of England's quarterly Inflation Report—the May 2019 version has 729 words, 4 charts and a Flesch-Kincaid grade level readability score of 7.7—could serve as a model.[48] In Appendix 3, we present a version based on the March 2019 meeting minutes and SEP. Our very simple version has fewer than 730 words, with a Flesch-Kincaid grade level score of 9.7.[49]

In a world where policymakers are rightly not committed to a specific interest rate path, the FOMC can and should exploit existing tools to improve communications regarding the uncertainty of the future policy path. In March 2019, for example, the Committee revealed there is only an even chance the policy rate will be between 1.0 and 4.2 percent by the end of 2021. That range probably far exceeded what most observers believed about FOMC policy uncertainty.

Highlighting the inevitable uncertainty by publishing the fan charts and the historical forecast error table together with the initial SEP, and then presenting these at the Chair's press conference, would help shift the public discussion. Rather than responding with false precision to questions about the median path of policy rates, a focus on the uncertainty associated with the outlook would help to align the Chair's public comments with the risks that the FOMC perceives.

The same goes for the public comments by FOMC participants. If, in addition to the Chair, the Governors and Reserve Bank Presidents were to focus their communications on explaining the sources of uncertainty, this would help counter any excessive public attention to the SEP median projections. Moreover, should one or more participants explicitly dissent, their comments can bring to light whether these disagreements arise from differing assessments of the current state and likely evolution of economic and financial conditions, or from different views about the appropriate policy responses to those conditions.

[47] For example, in the latest March 2019 minutes, participants' uncertainty about GDP growth is skewed high, while the risks were skewed to the downside.
[48] The May 2019 example is here: https://www.bankofengland.co.uk/inflation-report/2019/may-2019/visual-summary.
[49] These metrics exclude the report's data appendix.

In closing, we note that an Inflation Report that gives prominence to uncertainty also can be helpful at the effective lower bound. What is striking about the SEPs of 2012 is the narrow range of interest rate projections: these were largely stuck at zero until 2014 or 2015. Such a low-uncertainty SEP reinforced the FOMC's broad commitment to keep rates low for longer. Indeed, as Figure 5 reveals, the uncertainty bands around the projected policy rate extended below zero into early 2014.

VIII. Conclusions

We began by highlighting the enormous progress that the FOMC has made over the past quarter-century in developing a transparent communications framework that promotes accountability and allows for credible policy commitments. The FOMC already communicates a vast amount of information to a wide range of audiences. The FOMC also recognizes the role of communication as a policy tool of its own.

We applaud the Committee's achievements, and view our suggestions as incremental steps.

In line with comments received from two dozen former policymakers, academics and market practitioners, we look for further improvements in the communications framework based on three guiding objectives: simplify public statements, while conveying any divergence of views; clarify how policy will react to changing conditions; and highlight policy uncertainty and risks.

Our proposals to simplify the post-meeting statement and publish a concise Inflation Report are squarely in line with these objectives. The first seeks to broaden access to the Committee's most important written description of its actions, of the rationale for these actions, and of its ongoing concerns. The second aims to focus greater attention on the inevitable uncertainty involved in policymaking and on the Committee's commitment to correct any errors quickly and transparently as new information becomes available. Both link directly to the FOMC's Statement on Longer-Run Goals and Monetary Policy Strategy and can serve to coordinate more effectively FOMC participants' public communications.

We believe that implementation of these changes will add further to the effectiveness of FOMC communications in promoting the ultimate objectives of price stability and maximum sustainable employment mandated by the Federal Reserve Act.

Appendix 1. The Interview Process

On January 7, 2019, we sent the following email:

> Dear XXX,
>
> As you may know, the Federal Reserve is undertaking a review of its strategies, tools and communication practices. Included in this is a research conference in early June 2019 (see here). Vice Chairman Clarida and his colleagues have invited us to contribute a paper on communication to that conference. To prepare, we would like to interview former officials, academics and practitioners to get a sense of their views on the issue. Our hope is that you will agree to help.
>
> Would you be willing to answer a few questions either in writing or in a telephone interview?
>
> We have three questions:
>
> 1. What do you see as the primary objectives of FOMC communication?
> 2. How do you think FOMC communication should evolve over the next five to ten years?
> 3. What do you view as the greatest challenges to effective FOMC communication?
>
> You are welcome to send written responses. Alternatively, should you wish to do this over the phone, we would ask for permission to record and transcribe the interview. Regardless of how you respond to the questions—written, or oral and transcribed—we would attribute any of your responses (in the form of quotes or otherwise) only with your explicit approval.
>
> By way of background, we have interviewed central bank officials on several past occasions. For example, at the time of the tenth anniversary of European Monetary Union, we interviewed 17 senior officials for a paper entitled: "How Central Bankers See It: The First Decade of European Central Bank Policy and Beyond" (you can find it here).
>
> It would be most helpful if we could speak with you or obtain your responses by mid-February. Please let us know if you are willing to answer the questions, and if so whether you prefer to do it in writing or in the course of a 20-minute phone call.
>
> Thank you very much for considering our request.
>
> Happy New Year, and best regards,
>
> Steve Cecchetti and Kim Schoenholtz

We contacted 35 people. Of these, 10 responded in writing and 14 agreed to oral interviews. The list of those who responded is in the following table.

For the interviews, we began by asking for permission to record the interview. We then reiterated the ground rules for attribution, and then asked our questions. In some cases, following the three questions, we asked further clarifying questions.

Table A1. List of Interview Respondents (written or oral interview, with date)	
Lewis Alexander (written, 2/19/2019)	Peter Hooper (written, 2/26/2019)
Ben Bernanke (written, 1/15/2019).	Anil Kashyap (written, 1/7/2019)
Richard Berner (written, 2/7/2019)	Mervyn A. King (interview, 2/6/2019)
Seth Carpenter (written, 2/25/2019)	Dennis Lockhart (interview, 1/22/2019)
William C. Dudley (interview, 2/7/2019)	Catherine Mann (interview, 2/1/2019)
Robert DiClemente (written, 2/5/2019)	Frederic S. Mishkin (interview, 2/12/2019)
Roger W. Ferguson, Jr. (interview, 2/4/2019)	Charles Plosser (interview, 1/25/2019)
Michael Feroli (interview, 1/15/2019)	Jeremy C. Stein (written, 1/12/2019)
Stanley Fischer (interview, 1/29/2019)	Paul M. W. Tucker (interview, 1/16/2019)
Peter R. Fisher (interview, 3/1/2019)	Paul A. Wachtel (interview, 3/1/2019)
Mark Gertler (interview, 1/17/2019)	David Wessel (interview, 1/8/2019)
David Greenlaw (written, 2/21/2019)	Janet L. Yellen (interview, 2/11/2019)

Appendix 2: Simplifying the FOMC Statement

This appendix contains a comparison of the original and alternative formulation of the post-meeting FOMC statements for December 13, 2017 and March 20, 2019. For the alternative statement, we include headers for the sections that we would not expect to see in an actual release.

Original FOMC Statement for December 13, 2017

Information received since the Federal Open Market Committee met in May indicates that the labor market has continued to strengthen and that economic activity has been rising moderately so far this year. Job gains have moderated but have been solid, on average, since the beginning of the year, and the unemployment rate has declined. Household spending has picked up in recent months, and business fixed investment has continued to expand. On a 12-month basis, inflation has declined recently and, like the measure excluding food and energy prices, is running somewhat below 2 percent. Market-based measures of inflation compensation remain low; survey-based measures of longer-term inflation expectations are little changed, on balance.

Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee continues to expect that, with gradual adjustments in the stance of monetary policy, economic activity will expand at a moderate pace, and labor market conditions will strengthen somewhat further. Inflation on a 12-month basis is expected to remain somewhat below 2 percent in the near term but to stabilize around the Committee's 2 percent objective over the medium term. Near-term risks to the economic outlook appear roughly balanced, but the Committee is monitoring inflation developments closely.

In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to 1 to 1-1/4 percent. The stance of monetary policy remains accommodative, thereby supporting some further strengthening in labor market conditions and a sustained return to 2 percent inflation.

In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its objectives of maximum employment and 2 percent inflation. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments. The Committee will carefully monitor actual and expected inflation developments relative to its symmetric inflation goal. The Committee expects that economic conditions will evolve in a manner that will warrant gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data.

The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction. The Committee currently expects to begin implementing a balance sheet normalization program this year, provided that the economy evolves broadly as anticipated. This program, which would gradually reduce the Federal Reserve's securities holdings by

decreasing reinvestment of principal payments from those securities, is described in the accompanying addendum to the Committee's Policy Normalization Principles and Plans.

Voting for the FOMC monetary policy action were: Janet L. Yellen, Chair; William C. Dudley, Vice Chairman; Lael Brainard; Charles L. Evans; Stanley Fischer; Patrick Harker; Robert S. Kaplan; and Jerome H. Powell. Voting against the action was Neel Kashkari, who preferred at this meeting to maintain the existing target range for the federal funds rate.

Alternative FOMC Statement for December 13, 2017

Actions:

To foster maximum employment and price stability, we agreed to raise the target range for the federal funds rate to 1¼ to 1½ percent.

We will allow the size of our balance sheet to continue to decline, falling by $10 billion this month, and then by $20 billion per month starting in January 2018.

Voting for the FOMC monetary policy action were Janet L. Yellen, Chair; William C. Dudley, Vice Chairman; Lael Brainard; Patrick Harker; Robert S. Kaplan; Jerome H. Powell; and Randal K. Quarles. Voting against the action were Charles L. Evans and Neel Kashkari, who preferred at this meeting to maintain the existing target range for the federal funds rate.

Rationale for action and divergence of views:

Most of us believe that gains in consumer and business spending, aided by supportive financial conditions and an improving global economy, are keeping growth at a pace above trend. Some of us also expect that labor market pressures will show through to inflation over the next few years.

Two of us disagree with the interest rate decision, noting that inflation remains clearly below 2 percent, and preferring to wait until actual inflation moves closer to our long-term objective or expected inflation rises.

Uncertainties and risks:

The uncertainty of our projections for future growth, unemployment and inflation has not changed over the past few months, and remains similar to the average over the past 20 years.

While we see the near-term risks to the outlook as roughly balanced, changes in conditions could lead to faster or slower changes in policy. On the upside, fiscal stimulus or easy financial market conditions could drive inflation above our objective and growth further above its trend. On the downside, there is the chance that actual or expected inflation will fail to move up to our 2 percent objective.

Turning to the balance sheet, several of us note the importance of monitoring the impact of a fall in the size of our securities holdings on long-term interest rates and economic performance.

Original FOMC Statement from March 20, 2019:

Information received since the Federal Open Market Committee met in January indicates that the labor market remains strong but that growth of economic activity has slowed from its solid rate in the fourth quarter. Payroll employment was little changed in February, but job gains have been solid, on average, in recent months, and the unemployment rate has remained low. Recent indicators point to slower growth of household spending and business fixed investment in the first quarter. On a 12-month basis, overall inflation has declined, largely as a result of lower energy prices; inflation for items other than food and energy remains near 2 percent. On balance, market-based measures of inflation compensation have remained low in recent months, and survey-based measures of longer-term inflation expectations are little changed.

Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. In support of these goals, the Committee decided to maintain the target range for the federal funds rate at 2-1/4 to 2-1/2 percent. The Committee continues to view sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective as the most likely outcomes. In light of global economic and financial developments and muted inflation pressures, the Committee will be patient as it determines what future adjustments to the target range for the federal funds rate may be appropriate to support these outcomes.

In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its maximum employment objective and its symmetric 2 percent inflation objective. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments.

Voting for the FOMC monetary policy action were: Jerome H. Powell, Chairman; John C. Williams, Vice Chairman; Michelle W. Bowman; Lael Brainard; James Bullard; Richard H. Clarida; Charles L. Evans; Esther L. George; Randal K. Quarles; and Eric S. Rosengren.

Alternative FOMC Statement for March 20, 2019:

Actions:

To foster maximum employment and price stability, we agreed to maintain the target range for the federal funds rate at 2¼ to 2½ percent.

From May to the end of September 2019, we will slow and then cease the decline in our holdings of Treasury securities.

Voting for the FOMC action were: Jerome H. Powell, Chairman; John C. Williams, Vice Chairman; Michelle W. Bowman; Lael Brainard; James Bullard; Richard H. Clarida; Charles L. Evans; Esther L. George; Randal K. Quarles; and Eric S. Rosengren.

Rationale for action and divergence of views:

We foresee sustained real growth, a strong labor market, and inflation near our 2 percent long-run goal as the most likely outcomes over coming years.

As for the balance sheet, setting a date for ending the runoff of securities holdings reduces uncertainty and fits with our decision to continue setting policy in a regime of ample reserves.

There were no major disagreements.

Uncertainties and risks:

The uncertainty of our projections for growth, unemployment and inflation is similar to the norm over the past 20 years.

A number of risks could influence the path of interest rates. On the downside, these include softness in spending, a sharp decline in fiscal stimulus, the uncertainty from ongoing trade talks, Brexit, a further slowdown in Europe and China, and a failure of inflation to rise to the 2 percent target. On the upside, risks include a sharp rebound in consumer and business sentiment, a pickup in the trend rate of growth, and an increase in wage pressures. A few of us are concerned that financial stability risks could rise if policy interest rates remain low for longer.

Turning to the balance sheet, shrinkage beyond that planned entails costs and benefits. On the one hand, reduced securities holdings might lead to greater interest rate movements. On the other hand, a lower level of reserves in the banking system could help us learn about banks' demand for reserves. On balance, the scope for further declines in the size of the balance sheet after the end of runoff in September may be limited.

Appendix 3. A Concise Inflation Report

We construct a concise Inflation Report from information in the minutes and the SEP associated with the March 19-20 FOMC meeting and released on April 20, 2019. In the data appendix, we include the matrix of projections from March 19-20, 2013 as representative of what we recommend the FOMC publish immediately following each quarterly SEP meeting. We note that, when combined with the matrix published in the prior quarter, this information allows anyone who wishes to reproduce all of the charts in the complete SEP that accompanies the minutes.

Inflation Report, March 2019

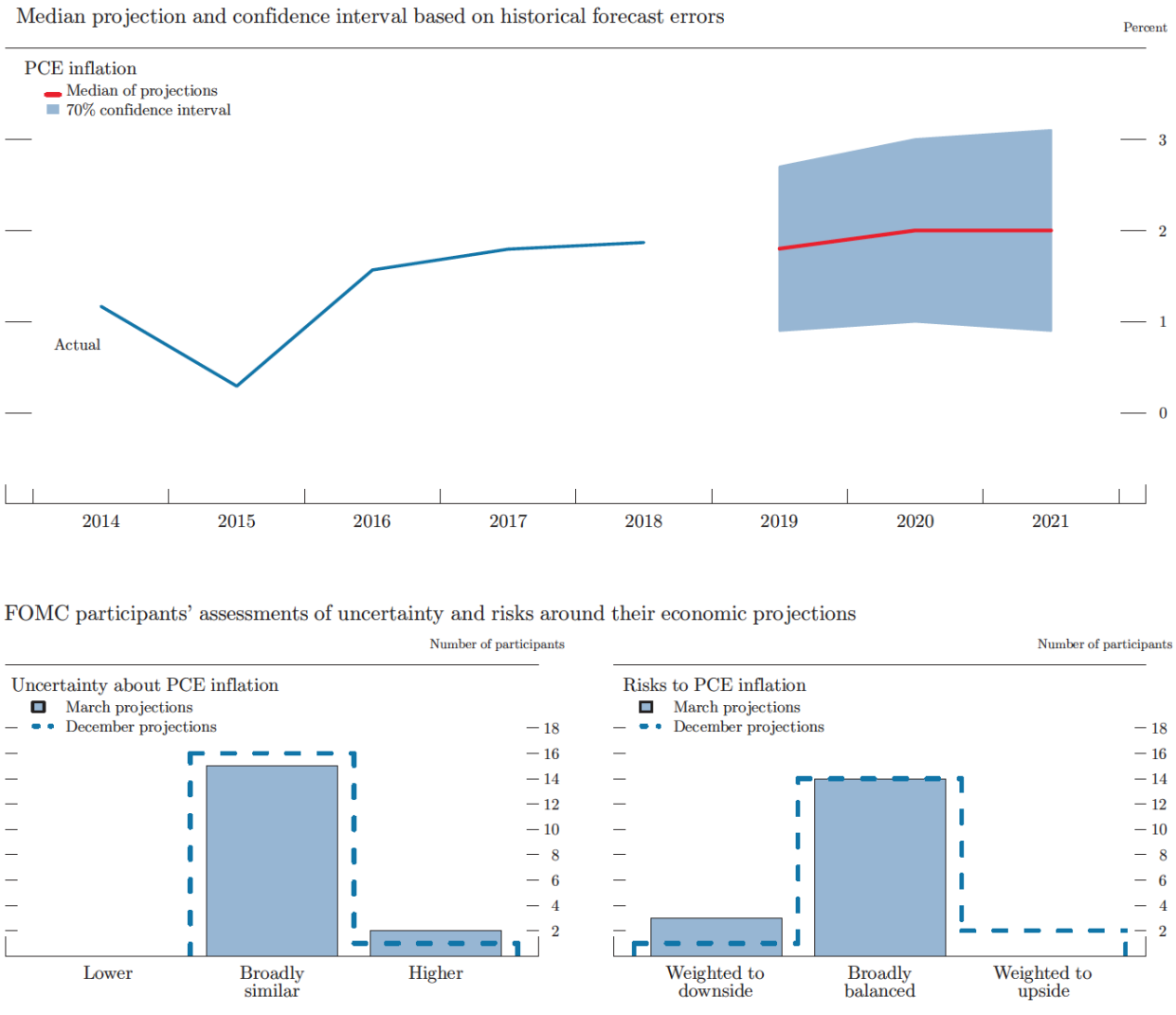
Consistent with our Statement on Longer-run Goals and Monetary Policy Strategy, a sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective are the most likely outcomes over the next few years. While there is considerable uncertainty, most of us, the FOMC participants, project that for 2019, 2020 and 2021, inflation will remain near target, growth will slow to a rate near 2 percent, the unemployment rate will remain slightly below 4 percent, and the policy rate is likely to remain steady.

Inflation near target

Largely reflecting earlier declines in crude oil prices, inflation has been softer than expected. Most of us view this as temporary, expecting inflation to rise to the Committee's longer-run objective of 2 percent over the next few years. At the same time, many noted that inflation has not risen much in spite of faster wage gains and the impact of higher tariffs. This suggests to some of us that long-term inflation expectations could be below 2 percent.

Over the next few years, most of us project inflation to remain steady near the long-run objective of 2 percent. We judge that the uncertainty of projections is roughly in line with historical levels, with an even chance that prices will rise at a rate between 1.2 and 2.8 percent rate by 2021. Rising wages and tariff increases pose some upside risk, but past low inflation also could lower inflation expectations, so that several participants see the risks tilted to the downside.

Figure 1. Projections for Inflation

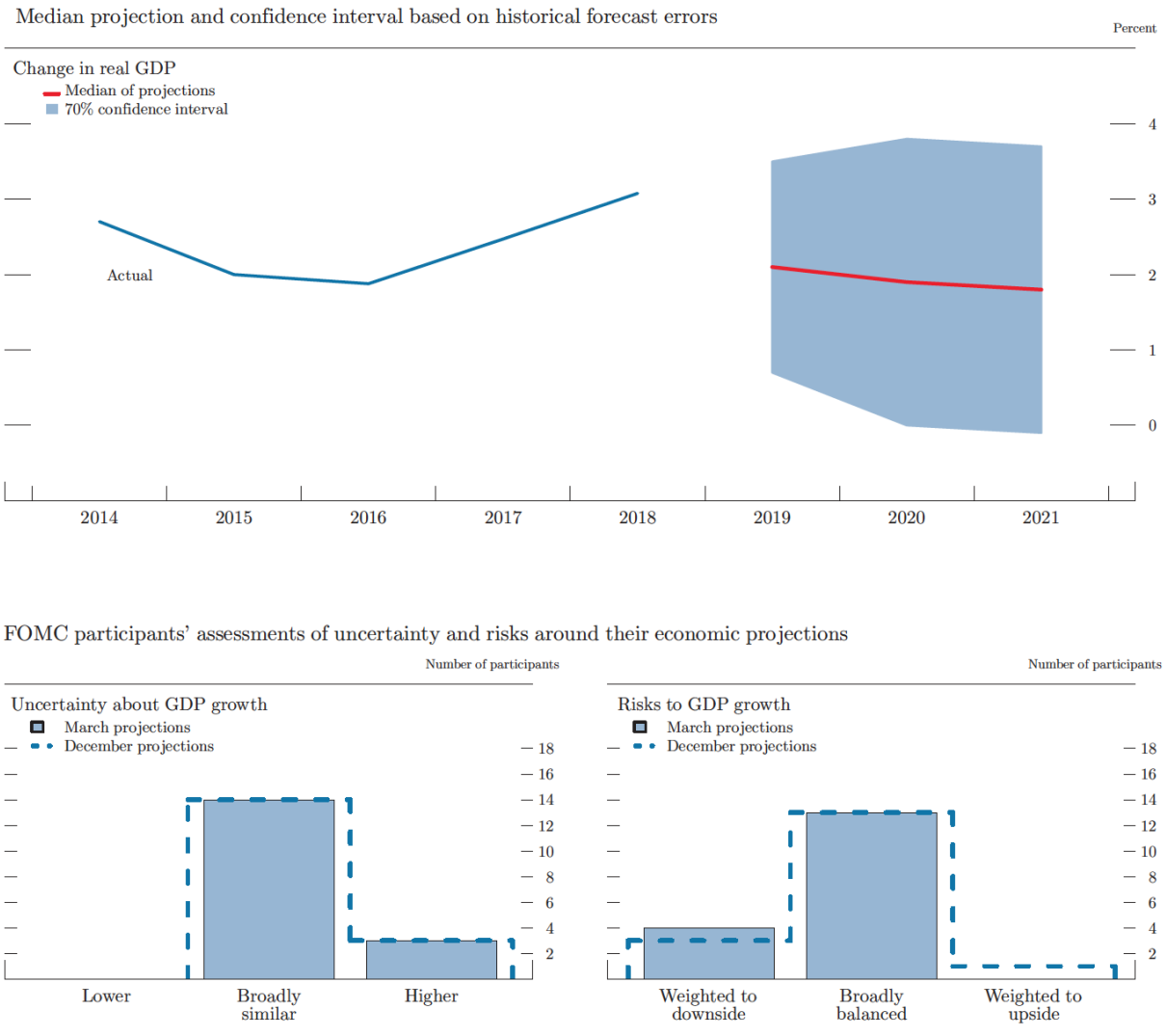


Growth slowing

The U.S. expansion is likely to continue, but at a slower pace than in late 2018, as growth slows abroad and the impact of 2018 tax cuts and increases in public spending wanes. In 2019 and 2020, growth likely will be closer to 2 percent, down from just over 3 percent in 2018. Even so, a strong labor market, rising incomes, and better financial conditions should sustain household spending.

Past levels of uncertainty imply that the chance of growth between 0 and 4 percent over the next two to three years is about 70 percent, but some of us view growth uncertainty as higher than in the past. A few of us see the risks as tilted to the downside, noting softness in housing, uncertainty regarding trade talks and Brexit, and the possibility of a greater slowdown in Europe and China. Estimates of growth in the longer run remain between 1.7 and 2.2 percent.

Figure 2. Projections for GDP Growth

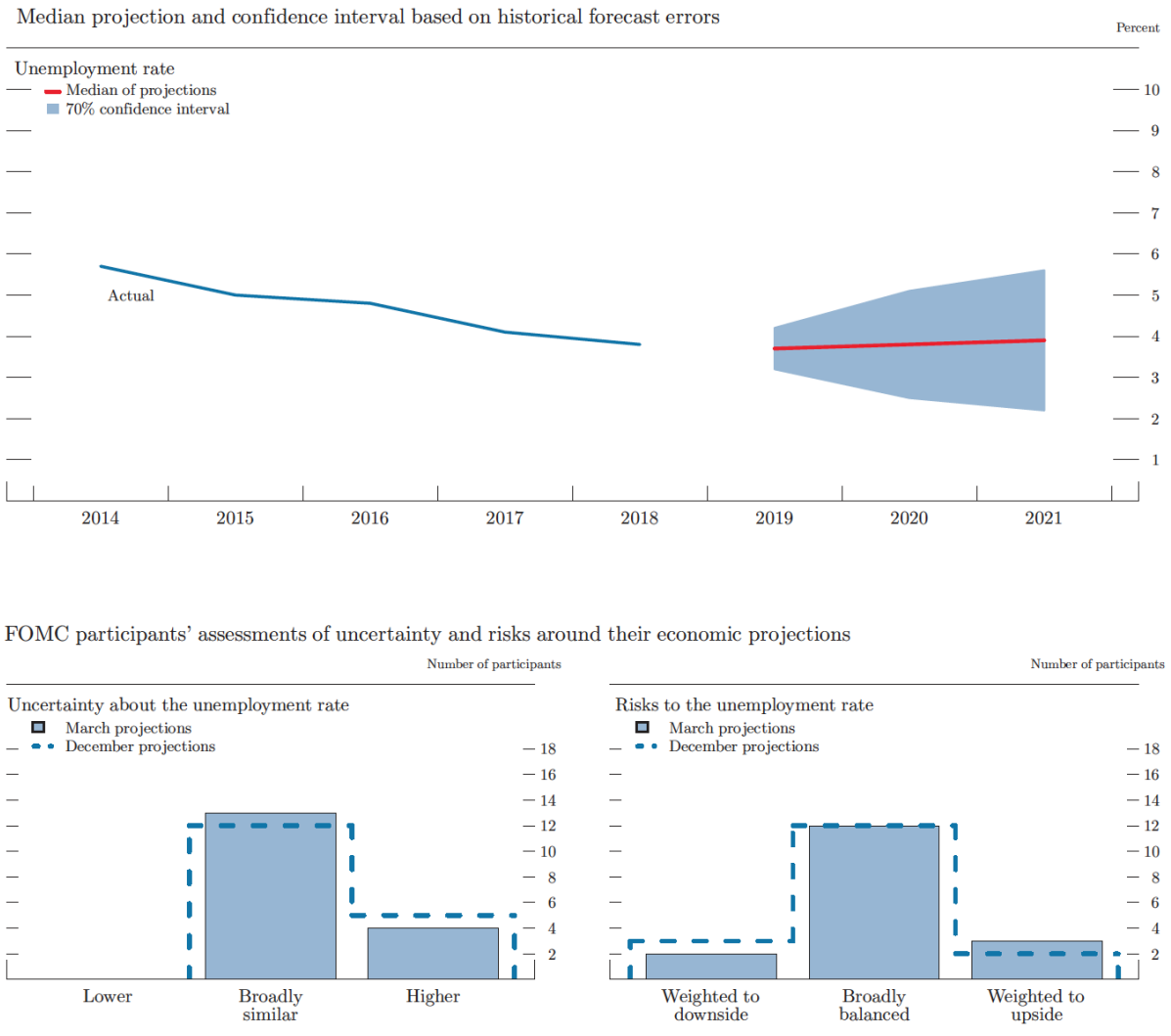


Unemployment rate stable

Labor markets remain strong, with solid job gains, a further increase in people returning to work, low layoffs, a near-record number of job openings, and reports of firms offering better pay and benefits to attract workers. Most of our projections show the unemployment rate barely rising over coming years, often remaining below the bottom of the range of projections for the longer run (from 4.0 percent to 4.6 percent). At the same time, some noted that the mix of low and steady inflation and rising employment points to further slack in the labor market.

Past norms imply an error range going from 2.2 to 5.6 percent for the projected unemployment rate in 2021. However, some of us are more uncertain about labor market projections than usual. Nevertheless, we generally see the risks around the unemployment outlook as roughly balanced.

Figure 3. Projections for Unemployment

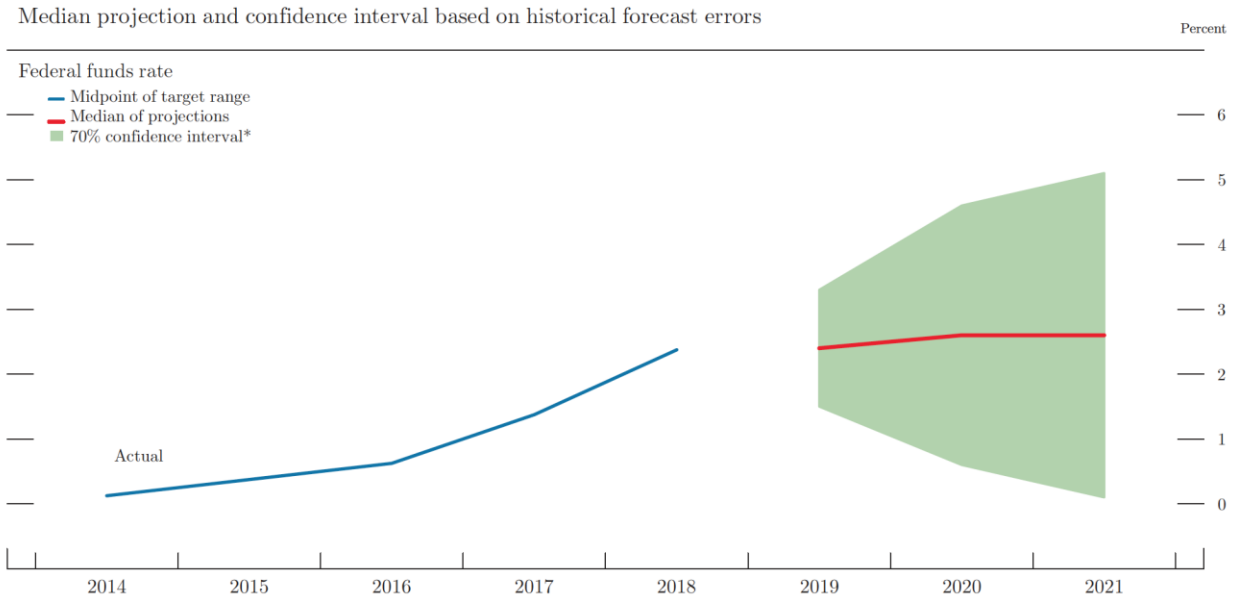


Policy rates steady

This year, a majority expects that the outlook and risks to the outlook will warrant leaving the policy rate unchanged. Some think that a continuation of above-trend growth could favor a modest policy rate hike, while others note that new data and risks could shift their views of the policy rate target in either direction. Over the next few years, many of us foresee the policy rate rising only slightly.

While the range of forecasts for the path of the policy rate widens after this year, the median projection barely changes, edging up to 2.6 percent at the end of 2021 from the current range of 2¼ to 2½ percent. Uncertainty around interest rate forecasts is very large compared to this small increase in the central forecast: based on past norms, there is only a 70 percent chance that the end-2021 target interest rate will be between 0.1 and 5.1 percent.

Figure 4. Projections for the Federal Funds Rate



Data Appendix

The following tables and figures provide more detail about the economic and policy projections of FOMC participants. Table 1 reports the median, central tendency and range for the March 2019 and December 2018 projections of real growth, unemployment, inflation, and the federal funds rate for the years 2019, 2020 and 2021, as well as for the longer run. Figure 5 plots the individual projections for the federal funds rate. Table 2 reports the error ranges, based on past norms, that are used to compute the shaded areas in Figure 1 to 4. Table 3 is the matrix of projections that links them by FOMC participant.

Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assessments of projected appropriate monetary policy, March 2019

Percent

Variable	Median[1]				Central tendency[2]				Range[3]			
	2019	2020	2021	Longer run	2019	2020	2021	Longer run	2019	2020	2021	Longer run
Change in real GDP	2.1	1.9	1.8	1.9	1.9–2.2	1.8–2.0	1.7–2.0	1.8–2.0	1.6–2.4	1.7–2.2	1.5–2.2	1.7–2.2
December projection	2.3	2.0	1.8	1.9	2.3–2.5	1.8–2.0	1.5–2.0	1.8–2.0	2.0–2.7	1.5–2.2	1.4–2.1	1.7–2.2
Unemployment rate	3.7	3.8	3.9	4.3	3.6–3.8	3.6–3.9	3.7–4.1	4.1–4.5	3.5–4.0	3.4–4.1	3.4–4.2	4.0–4.6
December projection	3.5	3.6	3.8	4.4	3.5–3.7	3.5–3.8	3.6–3.9	4.2–4.5	3.4–4.0	3.4–4.3	3.4–4.2	4.0–4.6
PCE inflation	1.8	2.0	2.0	2.0	1.8–1.9	2.0–2.1	2.0–2.1	2.0	1.6–2.1	1.9–2.2	2.0–2.2	2.0
December projection	1.9	2.1	2.1	2.0	1.8–2.1	2.0–2.1	2.0–2.1	2.0	1.8–2.2	2.0–2.2	2.0–2.3	2.0
Core PCE inflation[4]	2.0	2.0	2.0		1.9–2.0	2.0–2.1	2.0–2.1		1.8–2.2	1.8–2.2	1.9–2.2	
December projection	2.0	2.0	2.0		2.0–2.1	2.0–2.1	2.0–2.1		1.9–2.2	2.0–2.2	2.0–2.3	
Memo: Projected appropriate policy path												
Federal funds rate	2.4	2.6	2.6	2.8	2.4–2.6	2.4–2.9	2.4–2.9	2.5–3.0	2.4–2.9	2.4–3.4	2.4–3.6	2.5–3.5
December projection	2.9	3.1	3.1	2.8	2.6–3.1	2.9–3.4	2.6–3.1	2.5–3.0	2.4–3.1	2.4–3.6	2.4–3.6	2.5–3.5

NOTE: Projections of change in real gross domestic product (GDP) and projections for both measures of inflation are percent changes from the fourth quarter of the previous year to the fourth quarter of the year indicated. PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy. Projections for the unemployment rate are for the average civilian unemployment rate in the fourth quarter of the year indicated. Each participant's projections are based on his or her assessment of appropriate monetary policy. Longer-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The projections for the federal funds rate are the value of the midpoint of the projected appropriate target range for the federal funds rate or the projected appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. The December projections were made in conjunction with the meeting of the Federal Open Market Committee on December 18–19, 2018. One participant did not submit longer-run projections for the change in real GDP, the unemployment rate, or the federal funds rate in conjunction with the December 18–19, 2018, meeting, and one participant did not submit such projections in conjunction with the March 19–20, 2019, meeting.

1. For each period, the median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections.
2. The central tendency excludes the three highest and three lowest projections for each variable in each year.
3. The range for a variable in a given year includes all participants' projections, from lowest to highest, for that variable in that year.
4. Longer-run projections for core PCE inflation are not collected.

Figure 5. FOMC participants' assessments of appropriate monetary policy: Midpoint of target range or target level for the federal funds rate (end of period), March 20, 2019

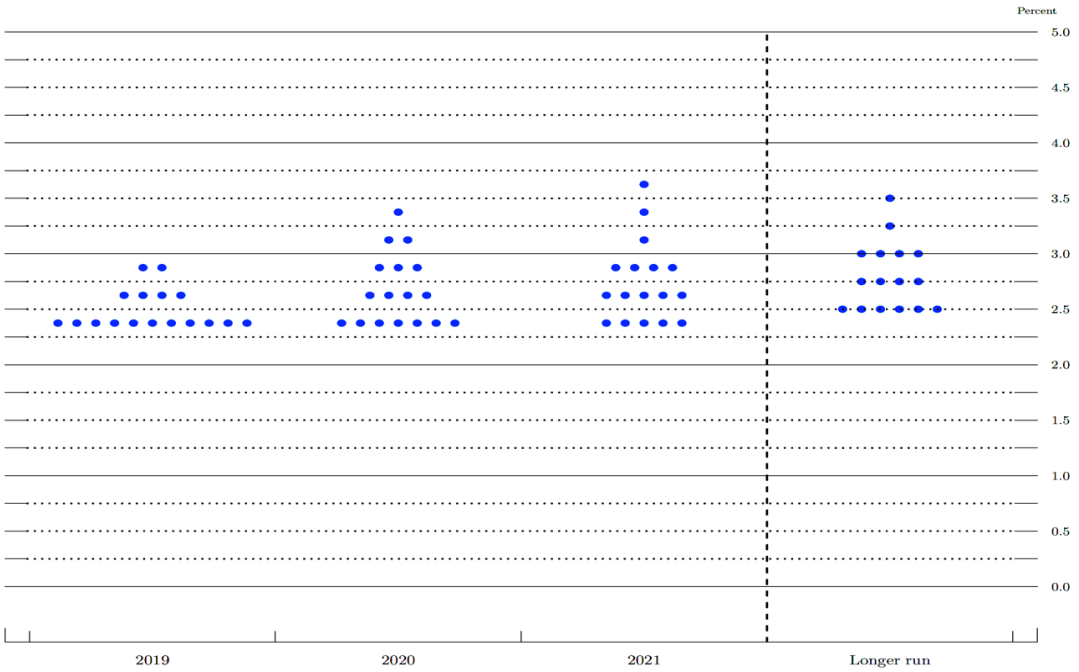


Table 2. Average historical projection error ranges, in percentage points

Variable	2019	2020	2021
Change in real GDP[1]	±1.4	±1.9	±1.9
Unemployment rate[1]	±0.5	±1.3	±1.7
Total consumer prices[2]	±0.9	±1.0	±1.1
Short-term interest rates[3]	±0.9	±2.0	±2.5

NOTE: Error ranges shown are measured as plus or minus the root mean squared error of projections for 1999 through 2018 that were released in the spring by various private and government forecasters. As described in the box "Forecast Uncertainty," under certain assumptions, there is about a 70 percent probability that actual outcomes for real GDP, unemployment, consumer prices, and the federal funds rate will be in ranges implied by the average size of projection errors made in the past. For more information, see David Reifschneider and Peter Tulip (2017), "Gauging the Uncertainty of the Economic Outlook Using Historical Forecasting Errors: The Federal Reserve's Approach," Finance and Economics Discussion Series 2017-020 (Washington: Board of Governors of the Federal Reserve System, February), https://dx.doi.org/10.17016/FEDS.2017.020.

1. Definitions of variables are in the general note to table 1.
2. Measure is the overall consumer price index, the price measure that has been most widely used in government and private economic forecasts. Projections are percent changes on a fourth quarter to fourth quarter basis.
3. For Federal Reserve staff forecasts, measure is the federal funds rate. For other forecasts, measure is the rate on 3-month Treasury bills. Projection errors are calculated using average levels, in percent, in the fourth quarter.

Table 3. Economic Projections, 2013-2015 and over the longer run (in percent)

[Note: This version reproduces the material released with the transcripts of the March 19-20, 2013 meeting. It is indicative of the matrix that we propose be released with the Inflation Report. Ideally, the Report would substitute the names of the participants for the numbers in column 1.]

Projection	Year	Change in real GDP	Unemployment rate	PCE inflation	Core PCE inflation	Federal funds rate
1	2013	2.6	7.4	1.3	1.5	0.13
2	2013	2.4	7.6	1.4	1.5	0.13
3	2013	2.8	7.3	1.3	1.6	0.13
4	2013	2.7	7.5	1.4	1.6	0.13
5	2013	2.8	7.3	1.3	1.6	0.13
6	2013	2.6	7.5	1.4	1.7	0.13
7	2013	2.3	7.5	1.7	1.6	0.13
8	2013	2.3	7.4	1.7	1.7	0.13
9	2013	2.6	7.5	1.3	1.6	0.13
10	2013	2.5	7.4	1.4	1.6	0.13
11	2013	2.3	7.5	1.5	1.5	0.13
12	2013	2.0	7.6	1.6	1.6	0.13
13	2013	2.4	7.5	1.3	1.6	0.13
14	2013	2.3	7.5	1.8	1.5	0.13
15	2013	2.6	7.4	1.8	1.6	0.13
16	2013	2.9	7.2	1.7	1.6	0.13
17	2013	3.0	6.9	2.0	2.0	1.00
18	2013	3.0	7.0	1.6	1.6	0.13
19	2013	2.5	7.3	1.5	1.6	0.13
1	2014	3.4	6.8	1.7	1.8	0.13
2	2014	3.2	7.0	1.6	1.7	0.13
3	2014	3.4	6.8	1.6	1.7	0.13
4	2014	3.8	7.1	1.4	1.7	0.13
5	2014	3.5	6.7	1.8	1.9	0.13
6	2014	3.4	6.9	1.6	1.8	0.13
7	2014	2.6	6.8	1.9	1.8	1.00
8	2014	2.9	6.9	2.0	2.0	0.13
9	2014	3.2	7.0	1.5	1.7	0.13
10	2014	3.3	6.9	1.7	1.8	0.13
11	2014	3.3	7.0	1.5	1.5	0.13
12	2014	2.6	7.0	1.9	1.9	1.00
13	2014	3.2	7.0	1.5	1.7	0.13
14	2014	3.5	6.4	2.0	1.9	0.13
15	2014	2.9	7.0	1.8	1.7	0.13
16	2014	3.0	6.9	2.0	2.0	0.50
17	2014	3.0	6.2	2.0	2.0	2.75
18	2014	3.2	6.1	2.1	2.1	1.75
19	2014	3.2	6.7	2.0	2.0	0.13

Table 3. Economic Projections, 2013-2015 and over the long run (in percent) (cont.)

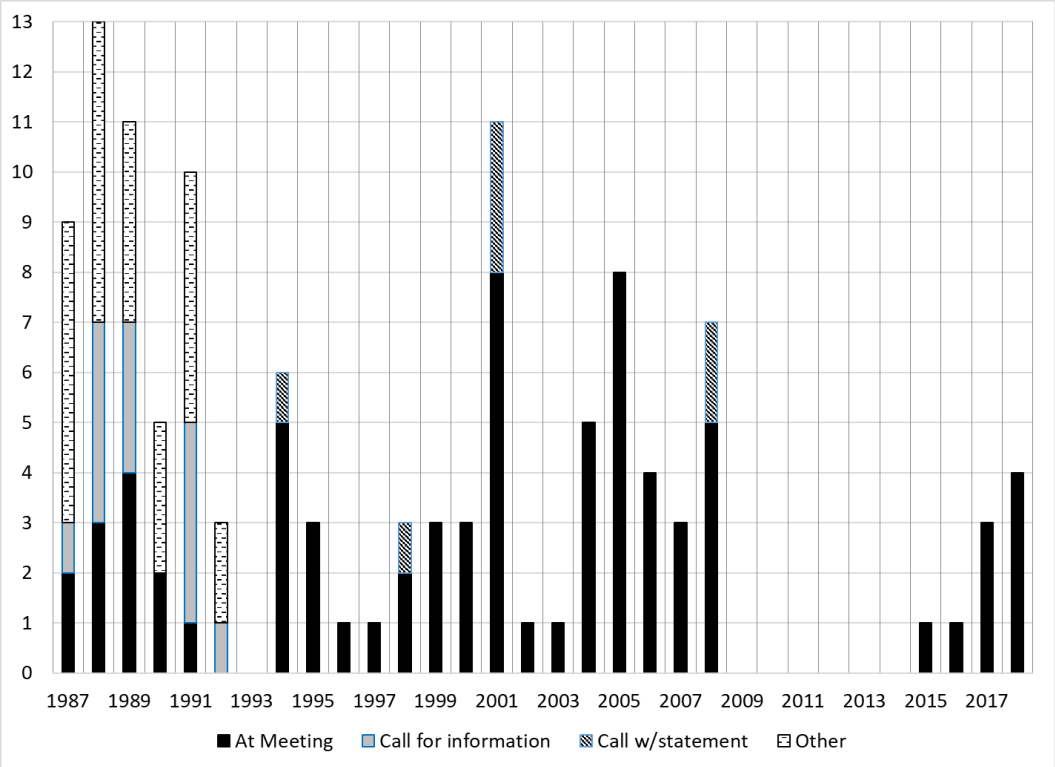
Projection	Year	Change in real GDP	Unemployment rate	PCE inflation	Core PCE inflation	Federal funds rate
1	2015	3.8	6.1	2.1	2.1	0.50
2	2015	3.5	6.3	1.7	1.8	1.00
3	2015	3.7	6.2	1.9	1.8	0.75
4	2015	3.7	6.0	1.6	1.9	1.25
5	2015	3.5	6.0	2.0	2.1	1.25
6	2015	3.7	6.1	1.7	1.9	0.50
7	2015	2.9	6.2	2.0	2.0	3.00
8	2015	3.0	6.3	2.0	2.0	1.25
9	2015	3.5	6.3	1.6	1.7	0.50
10	2015	3.4	6.4	1.9	1.9	0.50
11	2015	3.5	6.5	2.0	1.8	0.50
12	2015	2.9	6.5	2.0	2.0	2.00
13	2015	3.6	6.3	2.0	2.0	0.50
14	2015	3.5	5.7	2.0	2.0	1.00
15	2015	3.2	6.5	1.9	1.8	0.50
16	2015	3.2	6.5	2.0	2.0	1.25
17	2015	2.5	6.0	2.0	2.0	4.50
18	2015	2.8	6.0	2.6	2.6	3.75
19	2015	3.4	6.0	2.1	2.1	0.13
1	LR	2.5	5.2	2.0		4.00
2	LR	2.0	5.4	2.0		4.00
3	LR	2.3	5.3	2.0		3.80
4	LR	2.3	6.0	2.0		4.50
5	LR	2.3	5.5	2.0		4.00
6	LR	2.3	5.2	2.0		3.25
7	LR	2.1	6.0	2.0		4.00
8	LR	2.5	5.2	2.0		4.50
9	LR	3.0	5.4	2.0		4.00
10	LR	2.3	5.5	2.0		4.30
11	LR	2.2	5.4	2.0		4.00
12	LR	2.3	5.5	2.0		4.30
13	LR	2.5	5.2	2.0		4.00
14	LR	2.3	5.0	2.0		3.50
15	LR	2.5	6.0	2.0		4.00
16	LR	2.5	5.5	2.0		4.00
17	LR	2.5	6.0	2.0		4.50
18	LR	2.3	6.0	2.0		4.25
19	LR	2.3	6.0	2.0		3.50

Appendix 4. A Brief History of FOMC Communications

Over the past three decades, Federal Reserve communication has evolved dramatically in an effort to improve accountability and policy effectiveness.

Prior to 1993, there were no statements following FOMC meetings, no published minutes, no timely release of any FOMC materials, and certainly no press conferences. In other words, the FOMC never disclosed changes in policy. A cottage industry of experts outside the system had to figure things out by other means, such as the dissection of daily open-market operations. That process of "policy discovery" was costly and inefficient.

Figure A1. Number of changes in the federal funds rate target, 1986-2018



Source: Table 1 in Thornton (2004) and Federal Open Market Committee.

Opacity did not mean that the Fed kept policy stable. In fact, as of the late-1980s, there were interest rate targets of a sort, and these changed frequently.[50] Figure A1 displays a simple count of the number of federal funds rate target changes from 1987 onward. In 1988, Chairman Greenspan's first full year in office, the target changed 13 times. Of these, however, only 3 changes occurred at or around the time of one of the 8 scheduled FOMC meetings (black bars); 4 were announced to the FOMC, but not to the public, on impromptu conference calls (gray bars); and the remaining 6 were not associated with any

[50] Based on an analysis of meeting transcripts, Thornton (2006) concludes that the "FOMC effectively switched to a funds rate targeting procedure in 1982."

recorded FOMC communication (dashed-pattern bars). Put differently, it is not even clear when and how the FOMC members other than the Chairman learned of nearly half of the changes.

Since 14 of the 22 changes between August 1987 and May 1989 were smaller than 25 basis points, we suspect some of these were technical adjustments designed to keep reserve markets at the desired equilibrium level. Regardless, from today's perspective, three things stand out: changes occurred frequently; the bulk of the decisions to make the changes did not occur at a formal FOMC meeting; and, on many occasions, the Chairman did not appear to consult FOMC members prior to the policy implementation. Put differently, the FOMC Chairman really did control monetary policy.[51]

Table A2 reports notable developments in Federal Reserve communication policy. Two events in the early 1990s stand out. First, in 1993, the FOMC began publishing minutes of its meetings. (Initially released three days after the following meeting, the current practice of issuing minutes three weeks following a meeting began in 2004.) Second, on February 4, 1994, the FOMC released the first immediate, post-meeting, announcement of a policy change:[52]

> "Chairman Alan Greenspan announced today that the Federal Open Market Committee decided to increase slightly the degree of pressure on reserve positions. The action is expected to be associated with a small increase in short-term money market interest rates.
>
> The decision was taken to move toward a less accommodative stance in monetary policy in order to sustain and enhance the economic expansion.
>
> Chairman Greenspan decided to announce this action immediately so as to avoid any misunderstanding of the Committee's purposes, given the fact that this is the first firming of reserve market conditions by the Committee since early 1989."

For the next few years, the FOMC released statements in the aftermath of policy shifts. These were equally succinct, albeit including announcements of discount rate changes. Starting in July 1995, statements explicitly mentioned a numerical target for the federal funds rate; by 1996, they no longer referred to Chairman Greenspan; and in 1997 the statements began to include more than a one-sentence justification for the action. The current practice of issuing a statement following every meeting—regardless of whether the interest rate target was changed—began in May 1999. Only in March 2002 did these statements reveal members' votes. In other words, the statements we have come to expect are a recent innovation.

[51] For the comprehensive official history of FOMC communication in the last quarter of the 20th century, see Lindsey (2003).

[52] See https://www.federalreserve.gov/fomc/19940204default.htm.

Table A2. Communications Timeline: Notable Developments, 1993-2019

Date	Action
Mar 1993	FOMC begins publishing minutes following the subsequent meeting
Nov 1993	FOMC votes to issue lightly-edited transcripts after a five-year lag
Feb 1994	FOMC begins issuing statements when policy changes
Aug 1997	FOMC communicates directive to FRBNY Markets Desk in terms of a federal funds rate target
May 1999	FOMC begins issuing statement following every meeting
Mar 2002	FOMC begins publishing individual votes in each statement
Aug 2003	FOMC includes time-dependent forward guidance in post-meeting statement
Dec 2004	FOMC shortens lag in publishing minutes to three weeks
Nov 2007	FOMC releases first quarterly Summary of Economic Projections (SEP) as addendum to minutes, showing ranges and central tendencies of participants' growth, inflation, unemployment for up to three years
Nov 2008	Federal Reserve announces first large-scale asset purchase (LSAP)
Feb 2009	FOMC adds "longer-run" projections to SEP for growth, inflation and unemployment
Apr 2011	Quarterly press conferences begin; FOMC releases SEP summary statistics at press conference
Nov 2011	Histograms in SEP show assessments of balance of risks and of level of uncertainty compared to past 20 years
Jan 2012	FOMC publishes first "Statement on Longer-Run Goals and Monetary Policy Strategy" specifying quantitative target for PCE inflation of 2%
Jan 2012	FOMC participants' projections for federal funds rate added to SEP; "Dot plot" included in post-meeting summary
Dec 2013	Federal Reserve announces that it will start to taper LSAPs
Sep 2014	FOMC issues post-meeting statement regarding balance sheet normalization
Sep 2015	Medians added to SEP summary and to the SEP addendum to the minutes
Jan 2016	FOMC specifies inflation goal as "symmetric"
Jan 2017	FOMC releases "matrix" version of 2012 SEP with transcripts (five-year lag)
Apr 2017	Fan charts added showing forecast errors around median SEP projections
Jun 2017	FOMC releases "Addendum" specifying balance-sheet normalization plans
Jan 2018	Release of Participant Key for first SEP (Oct 2007; 10-year lag)
Jan 2019	Press conferences after every meeting (rather than quarterly)
Jan 2019	FOMC releases statement regarding monetary policy implementation with abundant reserves
Mar 2019	FOMC detail balance sheet normalization consistent with abundant-reserves policy management

Shading denotes key developments.
Source: Based significantly on "Federal Reserve's Transparency Steps," Reuters, January 25, 2012, and on Timelines of Policy Actions and Communications: Summary of Economic Projections, Federal Reserve Board. For communications since 2008 regarding forward guidance and balance sheet policies, see Timelines of Policy Actions and Communications, Federal Reserve Board.

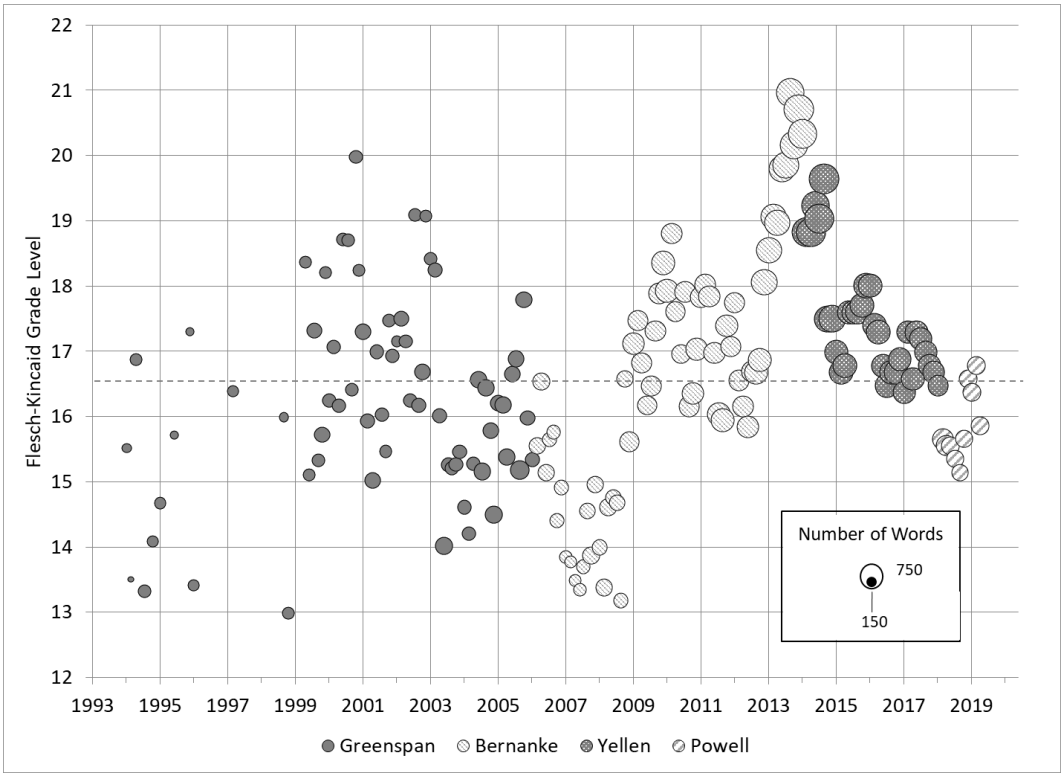
This move to public announcements marks a clear shift in the power structure of the FOMC. While the Chairman retains substantial influence over the direction of policy—controlling information and the tone of discussions in a way aimed at delivering a consensus for their desired outcome—the Chair's discretionary authority to change the interest rate target between meetings effectively disappeared.

The publication of the statements also represents an unprecedented increase in policy transparency. As we indicated earlier, prior to 1994, market participants would look for hints of policy changes in signals they scraped together from open market operations (OMOs), reserve data and weekly statistics on the size of the money stock—a process that required substantial technical expertise and the passage of time to observe various data. With the start of these announcements, there is no turning back. Since 1994, observers no longer ask whether policy has changed, but whether it will change. The debate is now completely forward looking.

Returning to the timeline, November 2007 marks the publication of the first Survey of Economic Projections (SEP). Over the next few years, the FOMC supplemented this initial version by adding projections for the longer run, histograms showing the balance of risks and level of uncertainty, and then the projection of the federal funds rate (the dot plot).

Finally, we note the FOMC Chair's press conference. Initiated in April 2011 as a complement to the publication of an enhanced SEP, it now follows every regularly scheduled meeting.

Figure A2. Complexity of the FOMC Statement, 1994-May 2019



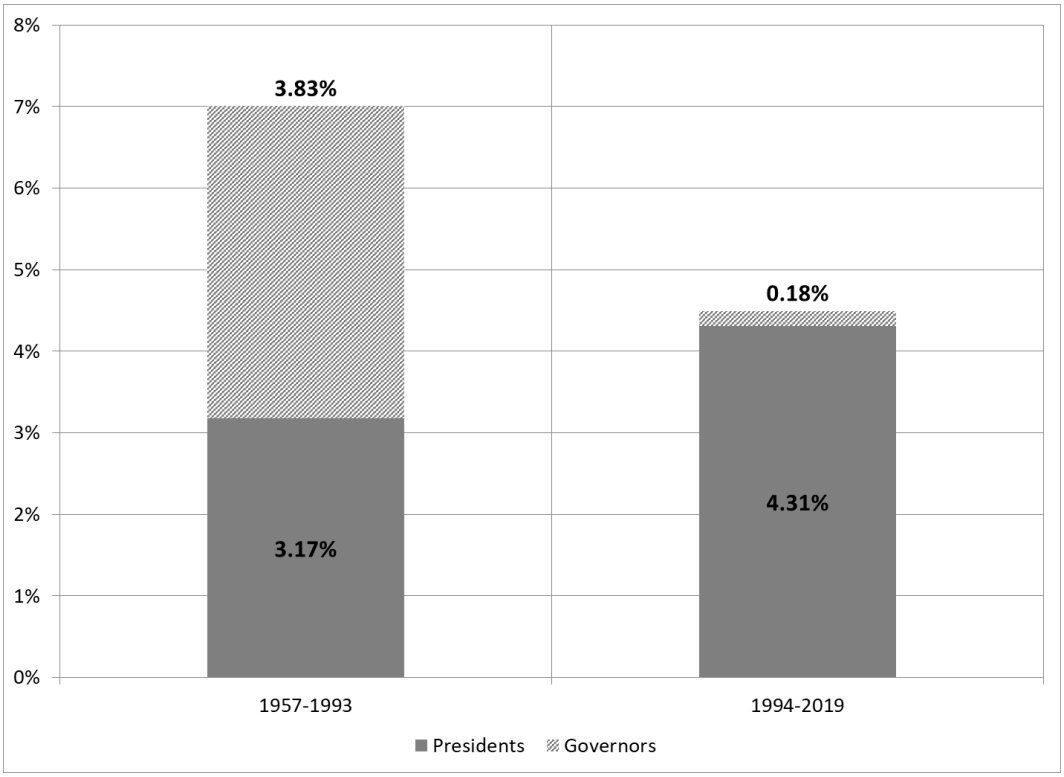
Note: The size of the bubbles indicates the number of words in the statement (see the internal legend). The dashed horizontal line represents the average grade level of 16.6.
Source: Davis and Wynne (2016) and authors' calculations using the readability calculator: http://www.readabilityformulas.com/free-readability-formula-tests.php.

Throughout this roughly 25-year period, the complexity and length of the FOMC statement has waxed and waned, but there appears to be no long-run trend. Following Davis and Wynne (2016), we use the

Flesch-Kincaid grade level formula, which converts a metric of complexity into a U.S. grade-level-reading equivalent. Figure A2 plots the results of this simple exercise, with the grade level on the vertical axis and the number of words in the statement reflected in the size of each bubble. We also distinguish the statements under each Fed chair—Greenspan, Bernanke, Yellen and Powell.

Policymakers and monetary economists alike believe in the value of transparency. They see it as a way to ensure accountability, create credibility, and improve the effectiveness of monetary policy. But the release of information does have limits for at least two reasons. First, laying decision-making open for all to see can damage the deliberative process, making it more formal and less open to controversial options. Second, increased communication runs the risk of sending confusing signals. As Lewis Alexander said, *"For statements of policy intentions to be useful they must be credible. Not doing what you said you were going to do undermines that credibility. This is a reason not to say too much."*

Figure A3. Dissents by FOMC voting members as a share of total votes (percent), 1957-2019



Source: Fraction of recorded dissents in votes over each time period. Based on data in Figure 2 from Thornton and Wheelock (2014); updates since 2013 by authors.

Has the extraordinary increase in FOMC transparency since 1993 muted the aggressiveness and weakened the quality of internal committee debate? As prima facie evidence, one could note the virtual elimination of open dissents by Governors since 1993 (see Figure A3). Meade and Stasavage (2008) find evidence that the publication of meeting transcripts, approved by the FOMC in October 1993, diminished subsequent incentives to dissent. However, there has been little change in the frequency of

dissent by regional bank presidents. Similarly, while confirming a "negative conformity effect" following the release of transcripts, Hansen, McMahon and Prat (2018) conclude that the "discipline effect"—the increased incentive to prepare for and to influence the deliberations—dominated. Likewise, Woolley and Gardner (2017) find no impact from the publication of transcripts on the use of reasoned arguments in the internal deliberations, even as voting patterns shifted.

In closing, Table A3 identifies as of May 2019 the FOMC's eight primary communication tools, including information on the frequency and timing of their publication.

Table A3. Summary of Primary FOMC Communication Tools, May 2019

Type	Frequency	Release Timing
Policy statement	8 times per year	After each meeting
Minutes	8 times per year	3 weeks after each meeting
Press conference	8 times per year	After each meeting
Summary of Economic Projections	4 times per year	After designated meeting
Monetary Policy Report to Congress	2 times per year	February and July
Speeches and other public remarks	Continuous	NA
Statement on Longer-Run Goals & Policy Strategy	1 time per year	January
Policy Normalization Principles and Plans	Updated periodically	After meeting

Source: Table 1 in Kliesen et al. (2019).

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Note: Central bank communication is an active area of research, with new papers appearing almost daily. As a result, our references are likely incomplete.

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