

**Meeting of the Federal Open Market Committee
April 30–May 1, 2019**

A joint meeting of the Federal Open Market Committee and the Board of Governors was held in the offices of the Board of Governors of the Federal Reserve System in Washington, D.C., on Tuesday, April 30, 2019, at 10:00 a.m. and continued on Wednesday, May 1, 2019, at 9:00 a.m.

PRESENT:

Jerome H. Powell, Chair
John C. Williams, Vice Chair
Michelle W. Bowman
Lael Brainard
James Bullard
Richard H. Clarida
Charles L. Evans
Esther L. George
Randal K. Quarles
Eric Rosengren

Patrick Harker, Robert S. Kaplan, Neel Kashkari, Loretta J. Mester, and Michael Strine,
Alternate Members of the Federal Open Market Committee

Thomas I. Barkin, Raphael W. Bostic, and Mary C. Daly, Presidents of the Federal Reserve
Banks of Richmond, Atlanta, and San Francisco, respectively

James A. Clouse, Secretary
Matthew M. Luecke, Deputy Secretary
David W. Skidmore, Assistant Secretary
Michelle A. Smith, Assistant Secretary
Mark E. Van Der Weide, General Counsel
Michael Held, Deputy General Counsel
Steven B. Kamin, Economist
Thomas Laubach, Economist
Stacey Tevlin, Economist

Rochelle M. Edge, Eric M. Engen, Anna Paulson, Geoffrey Tootell, William Wascher,
Jonathan L. Willis, and Beth Anne Wilson, Associate Economists

Simon Potter, Manager, System Open Market Account

Lorie K. Logan, Deputy Manager, System Open Market Account

Ann E. Misback, Secretary, Office of the Secretary, Board of Governors

Matthew J. Eichner,¹ Director, Division of Reserve Bank Operations and Payment Systems, Board of Governors; Michael S. Gibson, Director, Division of Supervision and Regulation, Board of Governors; Andreas Lehnert, Director, Division of Financial Stability, Board of Governors

Michael T. Kiley, Deputy Director, Division of Financial Stability, Board of Governors; Trevor A. Reeve, Deputy Director, Division of Monetary Affairs, Board of Governors

Jon Faust, Senior Special Adviser to the Chair, Office of Board Members, Board of Governors

Antulio N. Bomfim, Special Adviser to the Chair, Office of Board Members, Board of Governors

Brian M. Doyle,² Wendy E. Dunn, Ellen E. Meade, and John M. Roberts, Special Advisers to the Board, Office of Board Members, Board of Governors

Linda Robertson, Assistant to the Board, Office of Board Members, Board of Governors

Shaghil Ahmed and Christopher J. Erceg,³ Senior Associate Directors, Division of International Finance, Board of Governors; William F. Bassett, Senior Associate Director, Division of Financial Stability, Board of Governors; Joshua Gallin and David E. Lebow, Senior Associate Directors, Division of Research and Statistics, Board of Governors

Robert J. Tetlow, Senior Adviser, Division of Monetary Affairs, Board of Governors

Marnie Gillis DeBoer, Associate Director, Division of Monetary Affairs, Board of Governors; John J. Stevens, Associate Director, Division of Research and Statistics, Board of Governors

Jeffrey D. Walker,² Deputy Associate Director, Division of Reserve Bank Operations and Payment Systems, Board of Governors

Eric C. Engstrom, Deputy Associate Director, Division of Monetary Affairs, and Adviser, Division of Research and Statistics, Board of Governors

Glenn Follette, Assistant Director, Division of Research and Statistics, Board of Governors; Laura Lipscomb² and Zeynep Senyuz,² Assistant Directors, Division of Monetary Affairs, Board of Governors

Dana L. Burnett, Michele Cavallo, and Matthew Malloy,² Section Chiefs, Division of Monetary Affairs, Board of Governors

¹ Attended through the discussion of developments in financial markets and open market operations.

² Attended Wednesday session only.

³ Attended opening remarks for Tuesday session only.

Penelope A. Beattie,⁴ Assistant to the Secretary, Office of the Secretary, Board of Governors

David H. Small, Project Manager, Division of Monetary Affairs, Board of Governors

Juan M. Londono, Principal Economist, Division of International Finance, Board of Governors; Camelia Minoiu and Bernd Schlusche, Principal Economists, Division of Monetary Affairs, Board of Governors

Brian J. Bonis,² Lead Financial Institution and Policy Analyst, Division of Monetary Affairs, Board of Governors

Randall A. Williams, Senior Information Manager, Division of Monetary Affairs, Board of Governors

James M. Trevino,² Senior Technology Analyst, Division of Monetary Affairs, Board of Governors

Ron Feldman, First Vice President, Federal Reserve Bank of Minneapolis
Kartik B. Athreya, Michael Dotsey, Sylvain Leduc, and Ellis W. Tallman, Executive Vice Presidents, Federal Reserve Banks of Richmond, Philadelphia, San Francisco, and Cleveland, respectively

Evan F. Koenig, Antoine Martin,² Samuel Schulhofer-Wohl, Mark L.J. Wright, and Nathaniel Wuerffel,² Senior Vice Presidents, Federal Reserve Banks of Dallas, New York, Chicago, Minneapolis, and New York, respectively

David C. Wheelock, Group Vice President, Federal Reserve Bank of St. Louis

Patricia Zobel,² Vice President, Federal Reserve Bank of New York

Mary Amiti and William E. Riordan,² Assistant Vice Presidents, Federal Reserve Banks of New York and New York, respectively

John Robertson, Research Economist and Senior Advisor, Federal Reserve Bank of Atlanta

Justin Meyer,² Markets Manager, Federal Reserve Bank of New York

⁴ Attended Tuesday session only.

**Transcript of the Federal Open Market Committee Meeting on
April 30–May 1, 2019**

April 30 Session

CHAIR POWELL. Good morning, everyone.

PARTICIPANTS. Good morning.

CHAIR POWELL. This meeting, as usual, will be a joint meeting of the FOMC and the Board. I need a motion from a Board member to close the meeting.

MR. CLARIDA. So moved.

CHAIR POWELL. Without objection. As some of you know, Chris Erceg will be retiring on May 1 after more than 25 years of service to the International Finance Division and the Board and will be joining the IMF as a deputy director in the Monetary and Capital Markets Department. This will be Chris's 17th and last FOMC meeting. After working as a research assistant at the Federal Reserve Bank of Chicago during graduate school, Chris came to the Board as an economist in 1993, working on emerging market economies. He later played a major role in the development of the Board's global macroeconomic models, for which he was awarded the Board's Special Achievement Award in 2005. Chris's work on monetary and fiscal policy strategies has been featured in numerous memos to the Board and the FOMC. He's also well known and respected in academic circles and has published extensively in top journals. The Fed will greatly miss Chris's deep analytical contributions to its mission, as well as his pronounced dedication, enthusiasm, and collegiality. Chris, we wish you well in your new role. Please stand and be applauded. [Applause]

Let's turn now to our first formal agenda item, and our first agenda is the selection of a Committee officer. Our colleague at the Chicago Fed, Dan Sullivan, has taken on a new role at

the Chicago Fed, and Anna Paulson has been named director of research and executive vice president. Anna is here today. Welcome, Anna, wherever you may be. There you are.

[Laughter] And President Evans is prepared to make the nomination for Anna to serve as associate economist. President Evans.

MR. EVANS. Thank you, Mr. Chairman. I'd like to nominate Anna Paulson as associate economist. Anna is now executive vice president and director of research at the Chicago Fed. She joined the Chicago Fed as an economist in 2001 and has most recently served as associate director of research. During her tenure, she has worked on many System projects related to financial stability and monetary policy implementation and served on the Financial Market Utility Supervisory Committee. Thank you.

CHAIR POWELL. Thank you. Consistent with the Committee's practice, the motion is to select Ms. Paulson to replace Dan Sullivan as associate economist until the Committee's first regularly scheduled meeting in 2020. Is there a second?

VICE CHAIR WILLIAMS. I enthusiastically second the motion.

CHAIR POWELL. Any objection? [No response] If not, this selection is approved unanimously by the Committee.

Congratulations, Anna. We look forward to working with you in your new role. Please.
[Applause]

Let's begin our discussion of a long-run composition of the SOMA portfolio. As you know, this discussion is not intended to be decisional. Rather, the goal is to have an active discussion of the key macroeconomic considerations associated with SOMA securities holdings that can help lay the groundwork for reaching consensus at later meetings. I anticipate that the staff will come back to the Committee with additional analysis at some point later this year,

perhaps in connection with the strategic review that will include more detailed discussion of specific options for the long-run SOMA composition. When we revisit these issues later in the year, the aim will be to decide on and then communicate to the public our plans with regard to the portfolio. Let's get started with a briefing from Sam Schulhofer-Wohl and Antoine Martin.

Sam, would you like to begin?

MR. SCHULHOFER-WOHL.¹ Thank you, Mr. Chair. At the March meeting, you adopted an interim plan for the reinvestment of principal payments received from the SOMA portfolio after balance sheet runoff ends in September, and you indicated that you would revisit that plan in connection with deliberations on the portfolio's longer-run composition. Today, Antoine and I will describe how some key macro-financial variables can be affected by the longer-run composition and the transition to it.

As listed in the upper-left panel of the exhibit, our presentation will consider two illustrative targets for the long-run composition of the portfolio: one proportional to the maturity composition of the "universe" of outstanding Treasury securities and one containing only shorter-term securities. And we will describe two illustrative approaches for transitioning to these targets: a gradual approach based on directing reinvestments of principal payments received as well as new investments into a mix of securities spread across the target portfolio, and an accelerated approach that reduces the portfolio's weighted average maturity, or WAM, more rapidly by directing some purchases to Treasury bills. These targets and transition approaches make a variety of simplifying assumptions with the aim of clearly drawing out the key macro-financial tradeoffs and exhibiting basic magnitudes. Purely for illustrative purposes, we'll assume that the transition begins in January 2020. We'll also assume that the portfolio of mortgage-backed securities unwinds passively as principal payments are received, although you could of course also consider selling MBS.

The upper-right panel of the exhibit shows how the SOMA Treasury security portfolio's WAM would evolve for each of the targets and transition approaches and in the Tealbook baseline. With a proportional target and gradual transition, the portfolio's composition would match that of the target after about a decade and a half. If you used an accelerated transition approach, you could bring the WAM down to match the average maturity of the Treasury "universe" in about five years by rapidly acquiring Treasury bills. But it's important to note that the portfolio's overall composition would still be rather different from the target at that time, because Treasury bills would be greatly overrepresented. With a short target for the portfolio composition, it would take more than a decade and a half to match the WAM of the target portfolio, and even longer to match the overall composition. However, even with a gradual transition approach, a short target would bring down the portfolio's

¹ The materials used by Messrs. Schulhofer-Wohl and Martin are appended to this transcript (appendix 1).

WAM more rapidly than the accelerated transition to a proportional target because the short target would significantly change how maturing Treasury securities are reinvested.

Moving to a shorter-duration portfolio target would build capacity for providing economic stimulus through a maturity extension program, or MEP, that would exchange shorter-term securities for longer-term ones without increasing the size of the balance sheet. The middle-left panel of the exhibit shows the amount of MEP capacity in the portfolio—measured as the par value of securities with less than three years to maturity, relative to GDP—for different target compositions and transition approaches. In comparison, the MEP that the Committee conducted in 2011 and 2012 was about 4 percent of GDP. With a short portfolio target, the SOMA's MEP capacity would eventually be more than triple that size, relative to GDP. Nonetheless, even a proportional target portfolio would have substantial MEP capacity, exceeding the size of the MEP conducted in 2011 and 2012.

But holding shorter-duration securities to create MEP capacity could come at a cost in terms of the capacity to provide stimulus through a lower federal funds rate target. All else being equal, if the Federal Reserve holds more short-term securities and fewer long-term ones, this would leave more long-term securities in the hands of private investors. In our preferred models, an increase in private investors' holdings of long-term securities would drive up term premiums. The middle-right panel of the exhibit shows the model-implied total term premium effect, or TTPE, in each of the illustrative scenarios. In the staff's model, moving to a short-target portfolio is projected to raise the 10-year term premium by about 25 basis points in the short run, relative to the Tealbook baseline, and by about 80 basis points as of 2035. To gain some intuition for the magnitude of these effects, consider that moving to an all-short portfolio would effectively mean using the entire balance sheet to conduct the opposite of a maturity extension program. But let me emphasize that these term premium effects are illustrative, subject to many important caveats, and reflect many simplifying assumptions—which Antoine will discuss in more detail momentarily.

Because a large share of economic activity is tied to longer-term interest rates, an increase in term premiums would tend to require a lower setting of short-term interest rates to achieve any given configuration of macroeconomic outcomes. We used the Board staff's FRB/US model to explore what this means for the relationship between the SOMA portfolio composition and the federal funds rate path. The bottom-left panel of the exhibit shows the policy rate path that is required to achieve the same inflation and unemployment rates, as in the Tealbook baseline, under each of the four illustrative portfolio scenarios. Over the first few years of the transition, a short-target portfolio would require setting the federal funds rate about 25 basis points lower than in the Tealbook baseline to achieve the same macroeconomic outcomes, and in the long run, the policy rate would need to be about 85 basis points below the Tealbook baseline. All else equal, this would leave the Committee with less room to provide economic stimulus by reducing the funds rate in light of the lower bound. Antoine will now discuss some important ways in which these illustrative results might miss the mark.

MR. MARTIN. Thank you, Sam. The magnitude of the tradeoff between MEP capacity and space to reduce the federal funds rate target is highly uncertain because of the caveats about term premium effect estimates that Sam mentioned earlier and to which I turn now. The estimated parameters in the term structure model that we use have large variances. Other term structure models could imply different estimates—as could other models of the economy as a whole. The effect of changes in portfolio composition could also depend on whether the composition of the portfolio affects investors’ expectations about the future use of both conventional and unconventional monetary policy tools. Finally, the projected effects depend on whether and how the participants in the Treasury security market and in private markets change their debt issuance patterns in reaction to the FOMC’s decisions about the SOMA portfolio composition.

In the results that we have shown you so far, we have assumed that the composition of the total debt issuance of both private borrowers and the Treasury is held constant when the SOMA portfolio changes. So, when the Federal Reserve chooses to hold shorter-duration securities, private investors end up holding more long-term securities, which puts upward pressure on term premiums. Under this stark assumption, portfolio changes have large and permanent effects on term premiums—and, as a result, the appropriate federal funds rate path—because the reduction in the amount of duration in the SOMA portfolio corresponds one-for-one with increases in the amount of duration held by private investors. This modeling assumption is consistent with the staff’s analysis of the LSAP programs of the past decade.

But it is possible, or even likely, that the Treasury security or private debt issuers would eventually adjust their behavior in response to changes in SOMA composition. For example, if the Federal Reserve permanently targets securities of a particular maturity for purchase, the Treasury might accommodate that target by issuing more securities of the targeted maturity. And, indeed, such a step by the Treasury would likely be consistent with the Treasury’s goal of funding the government at the lowest cost over time. If so, the effects of changes in SOMA holdings might differ across the short and long runs. In the short run, changing the portfolio composition could influence term premiums and require offsetting adjustments in the federal funds rate path. But in the long run, the amount of duration risk held by investors and the resulting term premiums and policy rate path might be invariant to the Federal Reserve’s asset holdings. The speed of the Treasury’s adjustment might also depend on whether the Federal Reserve changes its portfolio composition by making open market purchases or by varying how maturing Treasury securities are rolled over at auction.

The bottom-right panel of the exhibit shows how the funds rate path might evolve if, instead of the staff’s usual modeling assumptions, the term premium effects of a change in portfolio composition fade to zero over a decade and a half. In the near and medium terms, moving to a short-duration portfolio still requires lowering the federal funds rate to offset tighter financial conditions resulting from the change in SOMA holdings. But, over time, the differences in policy rate paths between scenarios become smaller, although the dynamics of the model mean that the rate paths don’t

completely converge until after the end of the projection period. If term premium effects do dissipate in the way we've assumed here, it would be possible in the long run to structure the portfolio to provide more MEP space, without losing space for the interest rate tool.

I'll conclude by commenting on some potential market effects of announcing a plan to transition to a different portfolio composition. In the absence of sales, the SOMA's actual composition would change only gradually as existing holdings mature. Still, the announcement of a transition could on its own have immediate effects on term premiums, bond yields, and asset prices more broadly as investors anticipate future changes in the portfolio. As we previously noted, in the staff's model, a shift to a short portfolio is projected to increase the 10-year term premium by about 25 basis points on announcement. In the absence of any change in the policy rate, we would expect that 25-basis-point increase to show up in longer-term interest rates, and it would likely result in lower prices for the stock market and other risky assets, as well as lower inflation and less economic activity. However, if the FOMC simultaneously were to lower the federal funds rate path in order to keep macroeconomic outcomes unchanged, we would expect a much smaller net effect on longer-term yields and asset prices.

Investors do sometimes react more strongly than expected to announcements about the SOMA portfolio. For example, a shift to a short portfolio is projected to increase the 10-year term premium about 85 basis points in the long run, and it's possible that markets could move by that much immediately rather than gradually over time. The risk of an undesired or unexpected market reaction might be lowered by taking a measured and predictable approach to portfolio changes and communicating them well in advance. In addition, market reactions may depend on what inferences investors draw about overall policy strategy—both how the Committee plans to adjust the funds rate path, if changes in portfolio composition cause tighter financial conditions, and how the Committee intends to use its various policy tools in the event of a future economic downturn. Communicating choices about portfolio composition, and putting them in the context of the FOMC's overall policy strategy, might therefore reduce the risk of market volatility.

Our presentation has focused on some macro-financial issues that are important to your deliberations, but we want to note that the choice of portfolio composition has many additional dimensions that could be considered in future analysis. This concludes our prepared remarks. We would be happy to answer questions.

CHAIR POWELL. Thank you. Questions for Antoine, Sam, or both? President Rosengren.

MR. ROSENGREN. Thank you very much for a very interesting memo. And, I would say, my own staff and I had a spirited debate over the course of this past week talking about the

model and implications for portfolio choice. And just to give you the context of what the debate was about, normally we think about financial variables not having much of an effect on the long run, but real things having an effect on the long run.

When we think about monetary policy, most models are neutral in the long run but can have very substantial effects in the short run, and to understand the magnitude of those short-run effects, it's really important to understand the labor market dynamics. So what are the assumptions that give you something other than neutrality? The Modigliani–Miller framework is another example in which it doesn't matter if you switch debt and equity unless you have some other imperfections, and those imperfections actually give you some idea of what the scale of the effect is. So, for example, bankruptcy cost and taxes, if that's the vector that you're using to give the imperfection, then it kind of gives you a magnitude to how big the effect is.

When I looked at your model and saw that you permanently changed the term premium and permanently changed the equilibrium rate by 85 basis points—which is a pretty big number—and think about that as being a permanent effect, not a neutral effect, it struck me as unusual that you would be able to switch our balance sheet enough to have permanent effects when most models in the long run don't have monetary policy overall having that kind of permanent effect. Now, I understand you put a lot of caveats in the memo, and you talked about the caveats, and you provided the bottom-right panel as an example of thinking about what happens if this abates, but exactly how that happens and what the parameters are that generate that result are really important to think about for both the dynamics and the magnitude of the effect.

So I was wondering whether you had as spirited a debate as we did among Board staff. And just to get a better context of kind of how you debated the magnitude and the importance

that you were getting, understanding that you were given a difficult challenge—which is to meet the empirical results that we kind of saw when we actually did these things and still be able to talk about it in a reasonable way—could you give me a little more flavor of the debate that staff had about this model and kind of the long-run neutrality or lack of neutrality in this kind of model?

MR. SCHULHOFER-WOHL. We certainly did have a very vigorous debate. We were continuing to debate it last night, actually. The issue, I think, really comes down to this question of how issuers of debt—the Treasury as well as private issuers of debt—might change their behavior in reaction to a permanent change in the SOMA portfolio. So the term structure model we use, which is basically the Li and Wei model, is a model in which there are demands for different types of debt, and then if the supply of debt at different maturities changes, that changes term premiums. So if we change our holdings and issuers of debt don't change their behavior at all, then there's a permanent change in the supply of debt at different maturities, and that changes term premiums.

In contrast, if we say we are going to seek to hold debt of a certain type, as Antoine noted, that provides an incentive for somebody to issue that debt. And if they respond to it, then there might be less or no change in what is available for holding by private investors, and then in the term structure model that we use, there would be no change in term premiums once that reaction occurs. So the question is, really, what's the nature of that reaction, how fast does it happen, and how does it depend on all the things that we do?

It could depend, for example, on whether we're changing our holdings by changing how we roll over at auction, which has particular effects on the Treasury's issuance, versus making open market purchases—which would not directly affect what the Treasury is doing. So there's

just a whole lot of dimensions of understanding what this reaction is like that are clearly important to make progress on. We illustrated one example of what might occur, but you can conceive of others where the reaction is slower or faster. So we agree that this is a fundamental issue to better understand.

MR. MARTIN. Just to add one quick thing, another factor that we mentioned, which I believe is important, is how people believe the FOMC's reaction function changes, depending on the composition of the SOMA portfolio. If their expectation of future policy changes, then the effect on the term premium is also likely to change.

CHAIR POWELL. President Williams.

VICE CHAIR WILLIAMS. Yes, I just have a question. I was looking at these—a great memo, great charts, presentations. As I understand it, and this may be wrong, the Tealbook has an assumption—the black line in the upper right-hand figure—that we're going to reduce the weighted average maturity (WAM) from eight and a half years to six years over a particular path. It gives you a very similar term premium path of your particular, gradual, proportional change.

So if I were to do the thought experiment that we actually don't reduce the WAM at all and keep it at eight and a half years as opposed to what's in the Tealbook baseline and just say, you know, we'll leave it at eight and a half forever, what would this look like? My guess would be that the total term premium effect, TTPE, would remain at—well, that's my question. It's currently minus 130 basis points. What would happen to it then? And then what would the policy rate path look like in that scenario?

MR. SCHULHOFER-WOHL. The effect would be the opposite of the one we showed.

VICE CHAIR WILLIAMS. I'm asking about quantity.

MR. SCHULHOFER-WOHL. We haven't run that particular experiment. It would not be as large a difference as the shift from proportional to short, because staying where we are now versus going to the Tealbook baseline is a smaller move than that. So the lines would move in the opposite direction from what you see here for going to the short portfolio, but by not as much.

VICE CHAIR WILLIAMS. So my guess—just understanding how this model works—is that it would go from minus 130 to a more negative number.

MR. SCHULHOFER-WOHL. Yes.

VICE CHAIR WILLIAMS. And that it would stay at that more negative number. So if you say it goes to minus 140 or something like that, you would now have roughly 40, 50 basis points in the term premium effect in the long run lower, which would, based on my rough calculations from the memo, be a neutral interest rate that may be 40, 50 basis points higher than assumed in the Tealbook. Is that about right?

MR. SCHULHOFER-WOHL. Yes, that's correct.

VICE CHAIR WILLIAMS. I think just to try to keep in mind, the decisions we're making here are not decisions—we're not making decisions. But the experiments we're thinking about are about shortening the maturity composition of the SOMA portfolio and, therefore, tightening policy. Another option could be if we maintained the current WAM. That would actually work in the opposite way. That's all.

CHAIR POWELL. President Bullard.

MR. BULLARD. Thank you, Mr. Chairman. The Fed at one time had a bills-only doctrine, and then, gradually, over the postwar era, switched to other ideas about its portfolio. Based on the analysis today, should we redo the macroeconomic history of the United States and

reestimate our models to take account of the effects of the Fed's balance sheet on the evolution of the economy over the postwar era?

MR. MARTIN. That would be an interesting research project.

MR. BULLARD. Well, I have never seen an analysis that said that the WAM of the Fed was an important variable in explaining this postwar evolution.

MR. POTTER. That's true, but it might be true that it was an important part.

MR. BULLARD. Or another country.

MR. POTTER. Yes.

MR. MARTIN. There's a lot of factors that would be at play, but it would be interesting to see to what extent data suggest that it contributed somewhat.

MR. BULLARD. There aren't confidence bounds in these pictures. If we put confidence bounds in, what would they look like?

MR. SCHULHOFER-WOHL. It would be a lot.

MR. BULLARD. Would they cover the entire chart?

MR. SCHULHOFER-WOHL. The bounds around each line on the TTPE would be on the order of dozens of basis points. But if we produced bounds for the difference between those lines, it would be a lot smaller, because you're using the same term structure model to produce each line. So we don't think that the difference between those—

MR. BULLARD. Fifteen years out, the confidence bounds would cover the entire range of possibilities.

MR. SCHULHOFER-WOHL. But the bounds on the difference between the lines would not be enormous.

MR. CLOUSE. President Bullard, I was just going to comment on—I haven't done the exercise you're suggesting, of course, but we have looked at the balance sheet. Our colleagues at the Federal Reserve Bank of New York have produced a nice time series of the SOMA weighted average maturity over 100 years, and just as you say, during the '40s, you know, we had very high holdings of bills, but of course, that was directed specifically at capping yields. So I would say that the policy, during the '40s, anyway, was successful in capping Treasury yields. So it might be a little bit difficult to show that the variation over time had no effect on rates, which I took to be the point of your—

MR. BULLARD. Yes.

VICE CHAIR WILLIAMS. Can I do it two-handed on this? I mean, let's just remember that the Li and Wei model is actually estimated on data before the financial crisis, before QE. So, to answer your question, that model was looking at shifts in supply and shifts in the Treasury market and finding these effects, which are, I believe, consistent with our views of what the effects have been with QE. So it's not the case we're taking our QE experience and saying, "Therefore, we have a view on that effect." It's actually the other way. It's like we have a framework that was estimated and gives us these effects before QE that seem roughly consistent.

MR. POTTER. There's also Operation Twist in the 1960s as well.

VICE CHAIR WILLIAMS. Right. Yes, right.

MR. BULLARD. Okay, just—but there was Operation Twist in the '60s, and there was a literature on that. I thought that literature basically came out to the view that that was neutral.

VICE CHAIR WILLIAMS. No.

MR. BULLARD. That's what I—

VICE CHAIR WILLIAMS. Eric Swanson has a wonderful paper on this.

CHAIR POWELL. Simon.

MR. POTTER. The scale is what's important here. If the effect is small—for small amounts, if you just start scaling it up, it gets larger. That's what the models are actually showing. We can disagree, and I think that's what President Rosengren was saying, but they can't really scale in a linear way like that.

CHAIR POWELL. President Evans.

MR. EVANS. Thank you, Mr. Chairman. This is a fascinating discussion, and I'm not confident that I'm following all of it. And maybe I could ask President Rosengren just to compare the intuition. So it sounded to me like you were making a pretty clear point that we're talking about a change in nominal policy, and yet it's having a real effect on the economy and over arbitrarily long horizons, and that's a puzzle from thinking about monetary policy, where you wouldn't think that it should have permanent effects on the economy.

MR. ROSENGREN. Yes. So let me just follow up. These charts—

MR. EVANS. Which is an insightful thing to point out.

MR. ROSENGREN. These models go out to 2036, so it's a pretty long run. So this is telling us of the really big equilibrium effects, and that clearly affects the dynamics as well. And so I certainly think that we have big effects, but I think they're temporary, not permanent. And, as a result, a model that assumes that changing financial stocks have huge, real effects permanently seems not completely congruent with a lot of other financial market models that say that changing financial mixes or changing monetary policy do not have permanent effects on the real economy, for a variety of reasons, without putting in some imperfections. And those imperfections actually scale the magnitudes, both in the short run and in the long run, and usually those models do not have a big long-run effect.

So when I think about a model that has very substantial change in the real interest rate in the long term, I wonder whether, without—I can imagine a situation like this, and you made clear some of the underlying assumptions, so you could have an extreme preferred habitat model. That would be one way to do it. You could have firms not being willing to offset it, so firms seeing a very large change in, for example, the term premium. If they're risk neutral, you'd think they'd start issuing all at the short end rather than the long end. So it could be the Treasury; it could be the corporate sector.

And, in effect, how much of effect you get is how long it takes them to make that adjustment. But in that kind of model, you'd have no effect in the long run, and, in effect, the size that you expect, both in the short run and the long run, depends on preferred habitats and how quickly people are willing to change their own maturity structure to offset what we did. But this is a very different model, because it's an equilibrium model. So I just wonder whether this is the right model for understanding the observations that we have in the short run. And I guess I remain not completely convinced that by changing financial stocks, we'd have such a big magnitude on real things. I guess that was my underlying concern, and just to expand on—

MR. EVANS. If I could add to that dilemma—the kinds of models that we're appealing to are ones that we have become very comfortable with, where monetary policy is measured in terms of changes in interest rates, and we don't think about carrying around financial stock variables or money. We call it monetary policy, because these are money market rates. But, you know, we don't carry around a stock of money. And if we go back to the first time we tried to come up with the idea of what the portfolio balance effect was for QE1 and QE2, and we had to stop and think about the question: Was it the stock effect of how much we intended to do, or was it the flow effect? And, you know, as soon as your insight—which I think is a very good

one—that we’re having monetary policy exert a seemingly permanent effect on real variables, we should stop and wonder what it is about the model.

And maybe it’s the absence of these monetary stocks, which is morass for us to figure out, but maybe that takes us into an area in which we need to understand a little bit more about where the permanent effects come from and where there’s an adjustment that can be very long, and it could involve the price-level adjusting in a very stark way in order to make this all work out. But that just adds to the dilemma that I think you posed very nicely.

CHAIR POWELL. President Kaplan.

MR. KAPLAN. So I guess that would lead me to maybe a follow-on question that relates to this. We’d have to make judgments about how the private sector will react. But I agree with President Rosengren. My guess is, over enough time, if term premiums change, they would react. We don’t have to guess as much on how the Treasury will react, and that I assume we could have some communication and get some insight from them. And I would have thought in the period ahead when there may be less capacity for fiscal policy in a downturn, they might be glad that we had this dry powder, and they could give us some insight into how they would adapt their issuance. I’m just curious if we have any sense of that, because that is a major assumption, as you said, all things being equal. I doubt they would be equal. I don’t know if we have any sense of that.

CHAIR POWELL. I mean—tell me if this is wrong, I don’t think we have any sense of how they would react in normal times to a change in our portfolio. I think we do have a sense that—in the bad situation where we’re doing QE again—they might agree that they might move more slowly to re-lengthen the maturity of Treasury debt outstanding. There have been

discussions about that. I'm not aware of any discussions about how they would react to normal-times portfolio changes. Does anyone know differently?

MR. CLOUSE. I don't know differently, but, President Kaplan, one thing that we have discussed at length and not reached any answers on is exactly the point you're raising, particularly on our securities holdings that are rolling over. They are just add-ons at Treasury auctions. They are not part of the competitive auction. So you could imagine a scenario in which the Treasury just hands us whatever we want as our add-on, and then the question is, would they respond to that to maintain the weighted average maturity of the total portfolio by issuing longer-term debt, which is implicitly what is being assumed in the model, to drive yields higher? And there are a lot of questions about whether the Treasury would really act in that way. And I'm sure that they will be discussing these kinds of issues in upcoming quarters.

MR. KAPLAN. Just as a layman, my instinct would be, they would not do that. They would move to sterilize what we have done, and, therefore, it might mitigate your 25 to 85 basis point estimates, and that would have been my judgment. But just asking how you felt about it.

MR. POTTER. Well, what they could do is issue more at the short end, for example.

MR. KAPLAN. Right. That's what I'm saying.

MR. POTTER. But they will try to issue in the cheapest way that they can.

MR. KAPLAN. And they've got so much to issue across the spectrum that there wouldn't be a—I can imagine that's what I would do if I were them, but okay.

CHAIR POWELL. Further questions? Before we start the go-round, I just want to underscore for a second the nondecisional nature of this. The year is young, and yet we have already made a number of consequential decisions regarding the balance sheet. These have been market-sensitive matters, and I'm glad that we have been able to thread our way through them

without triggering adverse reactions. Now we have the federal funds rate unexpectedly moving up over the past couple of weeks, getting uncomfortably close to the top of the target range, and we'll be discussing that a little later. Clearly, there has been a lot going on regarding the balance sheet, and it's enough, it seems to me. I'm very pleased with the progress that we have made and with where we are on these issues, but I think it's wise to defer decisions on the maturity composition of the balance sheet until after we finish the runoff on September 30.

Markets will always be sensitive to news about the portfolio, but they may be even more while the balance sheet is still shrinking. Nonetheless, this is a great opportunity to begin discussing some of the key issues related to those decisions, as we will do today. And with that, let's begin the go-round with President Harker.

MR. HARKER. Thank you, Mr. Chair. I also want to thank the staff for, again, continuing terrific work on this issue and very important discussion. I am generally supportive of a maturity structure that would allow us to undertake an effective maturity extension program should we find ourselves up against the lower bound on interest rates in the future. Indeed, like many, I suspect that outcome is more likely than not during the next downturn, given that our projection for the longer-term funds rate is currently between 2.5 and 3 percent. As we are all well aware, in past recession episodes, we typically lowered the funds rate by much more than that to achieve our policy goals. The quantitative effects of the maturity extension program really are hard to pin down with any certainty. But the program did appear to make monetary policy more accommodative and send a reassuring signal to the financial markets that policymakers are ready to use all available tools to achieve our goals.

We should also keep in mind that LSAPs are always an alternative and, indeed, may have a bigger "bang for the buck" than maturity extension programs—though, of course, LSAPs

would increase the size of the balance sheet. And I do struggle to imagine states of the world in which policy rates will be at zero and we would be content with a maturity extension program and not use an LSAP first. An LSAP seems to be our first line of attack.

I do have some concerns, though. The first, which is actually very consistent with the comments that were just made in the question-and-answer period, is how our holdings of various maturities might affect the efficient functioning of financial markets. For example, at the end of 2005, the SOMA portfolio held Treasury securities of less than one-year maturity that represented about 25 percent of similar maturity Treasury securities outstanding. Our balance sheet is now much larger, and if our allocation was similar to that in 2005, we would hold about 40 percent of Treasury securities outstanding with a maturity of less than a year.

I am also concerned about whether, given the anticipated size of our balance sheet, having a large “footprint” in the market for short-term Treasury debt might impede efforts to promote financial stability. There appears to be a strong demand, as we all know, for short-term safe assets, and investors have historically paid a premium for holding Treasury bills, which have, of course, money-like characteristics. The private sector, as we were just discussing, can also issue liquid short-term assets. But, as we saw in the financial crisis, those assets can become problematic and promote financial instability.

I welcome further staff analysis that can clarify how the maturity structure of the SOMA portfolio might affect the efficient functioning of financial markets and macrofinancial risk. Of course, the future distribution of the Treasury’s security issuance could represent an important avenue whereby the SOMA portfolio could be substantially weighted toward the short end without any deleterious effects to the functioning of financial markets.

Now, given the benefits to us and a lack of the cost to the Treasury—a lot of what we were just discussing—I would hope that, beyond getting insights from the Treasury on what they are going to do, we might be able to explore some kind of coordination with the Treasury in the future. Regarding the costs and benefits of approaching the longer-run maturity composition faster or slower, my preference is that we get there sooner rather than later, although I do not necessarily view the short-maturity scenario in the memo, and the speed at which it hypothetically is obtained in the accelerated approach, as desirable policy. It's a great benchmark, but I can't imagine that being our policy. I think that it provides a useful benchmark, but it is an extreme scenario, and I think we just recognize that it is a benchmark.

More practical would be the long-run portfolio envisioned in the Tealbook where we match the distribution of outstanding notes and bonds but overweight on Treasury bills. My desire for a quicker transition relates to uncertainty about how long the current expansion might continue. As we saw at the end of last year, the economy seems somewhat vulnerable to negative sentiment, and the current expansion is already pretty long in the tooth. I recognize the possibility that shortening the duration of portfolio might put upward pressure on long-term rates. But I take the quantitative estimates of the term premium effects from the various approaches with several grains of salt, in view of the imprecision of these estimates.

As well, the model differences between gradual versus accelerated approaches are really not that big to begin with, so my preference would be for a faster transition to the longer run, together with a healthy dose of communication to explain many, many times our plans and intentions. In doing so, we must, however, be mindful not to purchase so much of any security that we place undue stress on financial markets. As with the overall long-run composition,

again, coordinating with the Treasury could allow the transition to be easier and, in some cases, more aggressive.

I am also very open to running down the MBS on our balance sheet at a faster pace than envisioned in the memo or Tealbook baseline in order to speed up the transition. So would limited sales of MBS make a meaningful on the speed of transition? We should know the answer to that. As well, we should consider communicating the balance sheet plan we are considering and either put it out for comment or let the Desk discuss it with market participants to ensure they are very, very comfortable with this proposal before we do anything. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. As Keynes famously noted, the “long run is a misleading guide to current affairs. In the long run, we are all dead.” It is the second sentence that is more familiar, but it is the first sentence that I want to emphasize today. We should aim for a sustainable path, a long-run steady state. But life in the economy cannot be described as “steady.” As we move through time, the economy faces a series of unpredictable shocks and changes in the behavior of market participants, and, as a consequence, changes to policy settings. After all, we describe monetary policy as being data dependent. Thus, compared with the memo, I would prefer to place relatively more weight on the short run to medium run. Monetary policy should be for the living.

In this respect, if we take the Tealbook as the baseline outlook, we are confronted with a projected path of the federal funds rate that, up to 2024, reaches only $2\frac{3}{4}$ percent. The real outlook associated with this federal funds rate is one of a prolonged growth recession of the kind we have yet to see in the post–World War II period. The Tealbook is well aware of the fragility

of its baseline outlook, and in the newly produced “Conditional Distributions of Macroeconomic Variables 2 Years Ahead,” it notes that the distributions are skewed to the upside in the case of the unemployment rate and to the downside in the case of real GDP growth. I believe this is the economic context in which the discussion about the composition of the Federal Reserve’s balance sheet should take place.

I appreciate the memo’s attention to the possibility that shortening the maturity of the portfolio will effectively reduce the equilibrium federal funds rate, and I also appreciate the fact that, should the shortening of the maturity occur in our lifetime, at least when measured in policymaking years, the reduction in the equilibrium federal funds rate will come at the worst possible time—namely, when the effective federal funds rate is already at low levels. But it is also important to consider the likelihood that, should recession occur in the environment projected by the Tealbook, a 275 basis point reduction in the federal funds rate will not be enough to offset even a modest-sized recession.

An increase in the unemployment rate above its natural level of roughly 200 basis points would, per estimates that are consistent with FRB/US, require a monetary policy offset in the federal funds rate of roughly 400 basis points for about two years. In short, whether the equilibrium federal funds rate is at $2\frac{1}{2}$ percent or at $1\frac{3}{4}$ percent, according to the memo estimates for the short-maturity portfolio, it may not make much of a difference from a practical standpoint. Policy is very likely to be constrained by the zero lower bound in the event of a recession even under the current maturity configuration, all skewed toward the long end of the spectrum of our portfolio.

My biggest concern right now is that, with a SOMA portfolio containing no Treasury bills and relatively few short-term securities, the scope for implementing a sizable maturity

extension program is quite limited, even as the chance of a near-term recession may be elevated. Having few short-term securities to exchange would likely force us to quickly undertake an LSAP program in the next recession. While I hope that future policymakers or a future Congress will see the wisdom in pursuing an asset purchase program in such circumstances, I would like to purchase some insurance against the possibility that we might be constrained in our ability to pursue LSAPs. As a result, in the near term, I would channel all the redemption flow into short maturities so that we have the capacity to conduct a maturity extension program when the next recession occurs. If we cannot build such capacity, we risk being constrained to follow a more timid response, and such hesitancy has not been helpful for the Japanese or European economic outcomes.

The memo is careful to highlight the uncertainty surrounding the estimated effect on the term structure of changing the maturity structure of our portfolio. I agree that the uncertainty is large, and I think that there are risks associated with the current maturity composition of our portfolio. Also, a term structure that has a small slope is a problem for any financial institution that profits from maturity transformation. Many banks, particularly smaller banks, derive the bulk of their income from the short–long spread largely by borrowing at short-term deposit rates and lending at long-term rates. Thus, their income depends, in part, on the existence of a positive term premium. If the term premium is negative and they try to maintain the profit margin, it implies taking on more risk.

An extreme example of this is the Norinchukin Bank, a large bank that focuses on fishermen and farmers in Japan. It has recently been publicly reported that the bank has amassed over \$60 billion in triple-A tranches of CLOs. I doubt that fishermen in Japan realize that their funds are supporting highly leveraged transactions in the United States, but this is an example of

how banks will reach for yield to maintain their returns. While this is an extreme example, negative term premiums likely encourage more movement into higher-risk activities, placing the economy at greater risk in the next recession. In sum, the term premium today is negative in part because of the composition of our balance sheet and that of other major central banks, which are highly skewed to holding long-term assets.

In addition, the heightened probability of hitting the zero lower bound in the next recession has enhanced the value of taking insurance against this risk by buying long-term Treasury securities that have no credit risk and are not callable. The depressed term premiums not only expose us to financial stability risks, but also increase the risk that we will have very few short-term securities to swap when the next recession occurs, removing a tool from our arsenal that I believe was quite helpful in stabilizing the economy during the last downturn. Finally, the theoretical model presented by the staff does not include signaling effects, which I believe are much more significant during lower-bound periods and does not fully explain why term premiums are so depressed currently, which I believe can be offset by shortening our portfolio. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Barkin.

MR. BARKIN. Thank you. I continue to support moving toward a significantly shorter-maturity Treasury portfolio. I do believe the policy space at the lower bound is valuable. I might also suggest that a short portfolio is actually more neutral than even a proportional one. By trading in securities that are closest to our liabilities, we leave it to the actions of the Treasury and private market participants to determine relative prices across the range of maturities. All that being said, the staff memo suggests that a shorter portfolio could come with a substantial

price. This is driven by the large estimate of the effect of our balance sheet composition on the term premiums.

The memo acknowledges the wide range of uncertainty around this estimate, and while I wouldn't argue with the direction of the effects, I tend to believe it would be considerably smaller. The evidence we have suggests most of the effect is in the announcement effect, and this evidence comes from the lower-bound period, as opposed to the more normal environment we have now. I was struck by the fact that even the accelerated approach to a short portfolio took so long. We might well have three downturns before 2035. I might instead then offer a practical alternative that I think is comparable to that just suggested by President Rosengren. We need to invest in short-term Treasury securities to go to either the short or the proportional endpoints.

So rather than announcing the endpoint, which could take a very long time to reach and could move markets, why not make a more limited announcement—announce that we plan to shorten our holdings by buying Treasury bills for, say, the next five years, while we continue to evaluate the longer-run alternatives for the portfolio? This would be a path to either end-state. It would minimize the announcement effect, which is a substantial part of the term premium risk, and it would give us time to better understand the models and the true effects. Thank you.

CHAIR POWELL. Thank you. President Evans.

MR. EVANS. Thank you, Mr. Chair. I'd like to thank the staff for a very informative memo. It helped my thinking a lot. This is a complicated issue, and I recognize this is not a meeting for making a firm decision. There are many moving parts to consider when assessing how the maturity structure of our balance sheet might factor into monetary policy strategy. Obviously, the staff had to make a lot of assumptions to do the analysis in the memo, and it

seems likely that the quantitative results are highly model specific—change the model, and we’re going to come up with different magnitudes. So there are many details to discuss if we were so inclined, but these caveats shouldn’t distract us from the basic message in the memo: There is no free lunch here.

Shortening the balance sheet maturity to increase space for future maturity extension programs comes with some important costs. Top on the list is a reduction in the neutral federal funds rate. This means less policy room above the lower bound. In other words, the more ammunition we give ourselves to do MEPs, the more likely it is we will have to use them, because we will be closer to the lower bound.

The staff’s excellent analysis points out that the difference in the neutral funds rate over the long run is unclear. The Treasury or the private sector might increase their supply of short-term assets in a way that would offset the effect of a shorter-maturity portfolio on r^* . But the eventual scope and scale of these changes are highly uncertain and would take some time to develop, and they could generate other costs. I’ll come back to this. I found figure 4, which is the bottom-left chart in the handout, useful to think about the r^* issue. It depicts the federal funds rate paths for two portfolio strategies: one with a short-maturity target portfolio and a neutral funds rate a little above $1\frac{1}{2}$ percent, and one with a proportional target portfolio and a neutral federal funds rate closer to $2\frac{1}{2}$ percent. We need to ask which of these configurations would yield better macroeconomic outcomes over time.

Because of the added cost of hitting the lower bound more frequently, for the short-maturity strategy to come out ahead, it would have to perform better at the lower bound. That is, its larger MEP capacity would need to be more successful at propelling us out of the zero lower bound than the actions we could take with a proportional balance sheet. Indeed, given the

potential differences in r^* , the short-maturity configuration probably would have to be a lot more successful in battling the zero lower bound to offset its increased frequency of hitting the effective lower bound. We're going to set ourselves up to have to use this capacity more often, because we've reduced the ammunition we have with just short-term policy rates. I have trouble seeing this being the case. The only way I see the short-maturity portfolio being superior here is if the Committee felt constrained from executing adequately sized LSAPs when faced with the zero lower bound. That is, if our concerns over increasing the size of the balance sheet were so large that they overrode doing what was needed to achieve our dual-mandate objectives.

Some have mentioned political-economy costs that might come with a large expansion of our balance sheet—not today, but in the past. And there are potential concerns related to financial instability. These risks clearly need to be considered, but I just don't see them as overwhelming the need to act aggressively when confronted with the lower bound. In tough circumstances, doing what it takes means just that, and this would include doing substantial amounts of LSAPs—notably, open-ended QE.

There are a couple of other reasons why I am more sympathetic to the proportional target portfolio. I think a portfolio in line with the maturity structure of Treasury securities outstanding appropriately keeps us at arm's length from the fiscal authority's debt financing decisions. In addition, I am concerned about how financial markets might respond to the Federal Reserve soaking up a sizable quantity of safe short-term assets if we went to a short-maturity portfolio. There clearly is substantial demand for such securities, and if the Treasury doesn't do so, the private sector might start creating a lot more of them on their own. Although more of these privately created securities could ultimately reduce term premiums and help increase short-run

r^* , these assets may also increase financial instability. We saw this all too well during the financial crisis when the safety of private short-term assets came into question.

Finally, I'd like to come back to the fundamental question I raised earlier. Do we really think constraints on our LSAP capacity are so big that a proportional target portfolio will deliver worse macroeconomic outcomes than a low- r^* short-maturity portfolio? If so, how would the public view this? I think the public would see us as hesitant to do what it takes when faced with the possibility of a prolonged stay at the lower bound. Such private-sector expectations of constrained policy responses can only be a negative factor when it comes to extricating us from the zero lower bound.

Given what I've seen so far, I favor the proportional target portfolio. I think I'm in the minority so far. I would need to see some pretty convincing new analysis before I could accept the short-maturity portfolio as a viable option. I'm thinking here about results from stochastic simulations that not only take account of the effective lower bound and the *ex post* effects of nonconventional policies, but also consider the influence of our perceived capacity and willingness to use MEPs and LSAPs on household and business expectations. I realize this is asking a lot, and it might take a good deal of time to do so, but if we are contemplating such a major change in our operating framework, we first need to be confident that a short-maturity portfolio could, indeed, be more likely to deliver superior macroeconomic outcomes. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Governor Clarida.

MR. CLARIDA. Thank you, Chair Powell. And thank you to the staff for excellent and timely work in this memo. I learned a lot from it. With r^* now low and likely to remain low for some time, we may need to use the balance sheet policy in a future downturn. The maturity

extension program could be an attractive option in providing needed accommodation in a future lower-bound episode. However, the scenarios in the memo associated with a shorter-maturity portfolio option give me some pause and, apparently, some others around the table have the same reaction. In these scenarios, the term premium jumps immediately, around 25 basis points, and then rises over time by up to 80 basis points. These are really big, big numbers.

This apparently comes from a large stock effect with the market realizing and pricing it up front that we'll eventually have a portfolio with a much shorter weighted average maturity. Now, as the memo highlights, the stock effect is hard to pin down with precision, and, like others, I suspect that the confidence intervals would be quite large and could be mitigated by other factors, including expectations, supply response, and I'll return to that in a moment. Targeting a proportional composition with a gradual transition does not result in an estimated large effect in the term premium, and in this perspective, it is the least risky, but at the cost of taking a very long time to get the WAM of the portfolio down even to the market levels.

In the short-maturity portfolio case, the funds rate consistent with the Tealbook baseline implies a policy rate path that is more accommodative because of this projected jump in the term premium—a point that Vice Chair Williams and others around this table have noted: There is no free lunch. In other words, if the term premium effect of upfront announcing a short-maturity portfolio is large enough, then the extra policy space to run a future maturity extension program comes directly at the expense of less policy space now. So there are several key questions, but one key question for us is, if we were to consider aiming for a short-maturity portfolio, how large would these effects on our baseline funds rate path be today?

Now, my prior, before reading the memo, was that the likely term premium effect of announcing a short-maturity portfolio would not be as large as projected in the staff memo. But,

obviously, if that estimate is accurate, this would be a very relevant consideration to us in thinking about our options. Now, to its credit, the memo raises issues about the robustness of these estimates, and these include large standard errors around parameter estimates; model selection choices; and expectations about future supply response, including the decisions of the Treasury. The large initial increase in the term premium under the short-maturity portfolio assumes that the market is completely surprised by this outcome, but I guess I don't know what the market is currently assuming about our actions, and there is some chatter already in line with a short tilt to the SOMA portfolio. If markets are already pricing in a significantly shorter-duration portfolio, then the increase in the term premium could be small or even zero initially. But, again, the standard errors are large, in our particular view.

I think related to this point, and I think several of you have mentioned this before, is that our communications on this particular topic would need to be very carefully calibrated and disciplined, because these are challenging issues for us, and they are even more challenging issues for others of good or bad will. Long-term bond yields and term premiums fluctuate for reasons other than the Federal Reserve's balance sheet, including Treasury security supply, global risk appetite, global interest rate differentials, volatility, and emerging-markets disruption, and I could add more.

An aggressive push to a short-maturity portfolio could require us to explain, in the future, an interest rate increase episode unrelated to our actions—why such a decision is not quantitative tightening and is not the sole cause for any increase in Treasury yields that may occur in coming years for any reason. We also need to be careful to manage expectations about our toolkit. If we are changing the composition of our portfolio to provide an MEP option in the future, our primary tool today is still the policy rate. Keeping expectations focused on the policy rate as the

primary tool might be an argument in favor of a proportional portfolio option. And also note that even with a proportional approach, as shown in figure 3, the policy space for a future MEP program would be comparable, at roughly 4 percent of GDP, to the size of the MEP program in 2011 and '12.

I'd like to add one more thing before I conclude. I'd also like to talk a little bit about an option that's not explicitly discussed in the memo, but it bears some similarity with the proportional portfolio accelerated. This option would be for us not to think so much about the bucket-by-bucket decomposition of our SOMA portfolio, but just focus on getting the maturity or the duration right. So, for example, a portfolio that's 60 percent 10-year Treasury securities and 40 percent 1-year Treasury securities would have an average duration and WAM of about 6 years. We could get there, certainly, a lot faster if we just focused on duration and not on the bucket-by-bucket composition and would have about \$1.4 trillion worth of MEP space at the current level of GDP. And it looks like, from the chart here, we could get there in 5 or 6 years. So, again, these are complicated issues, but if we move further down this road, we might want to think of a variant of this, which is just focusing on the WAM of the portfolio and not the individual composition of the buckets.

In conclusion, thank you to the staff. This was a good first start at this complex question, and I look forward to further such conversations. Thank you.

CHAIR POWELL. Thank you. President Daly.

MS. DALY. Let me start by saying, I really appreciate that we are discussing this today, well in advance of any decisions. It allows us to have many more careful deliberations with additional staff memos, which I'm sure you're thrilled to hear about. I would also like to thank the staff for the useful background memo. For me, too, it laid out very clear options—although

quite stylized, as many have mentioned—and it gave us a nice way to think about the cost–benefit framework and to compare the tradeoffs. And what was clear from the memos is: There is no free lunch. So I thought that was quite useful.

Now, in terms of the details, I’m going to echo President Evans and say that it’s really important when we think about the details of balance sheet composition to have an overall view of our monetary policy strategy. For the long haul, the maturity structure of the SOMA portfolio should be designed to provide optimal support for the implementation of whatever strategy we have. Our primary tool is the funds rate. We’ve communicated that. We believe that. And here the zero lower bound is the most significant risk we face, that we could encounter future constraints there. When we are constrained at the ELB, I view forward guidance, then QE or LSAPs, and finally MEP as the stack ranking for how we would use our tools, in part because maturity extension programs seem less potent with their weaker signaling effects, et cetera, so that would put an MEP last for me. As a result, I view making space for potential MEP programs as useful—but not a first-order consideration in our deliberations. And as the staff memo describes and Sam mentioned, even if we gradually move to a proportional portfolio, we will have more room as a percentage of GDP for MEP programs in coming periods than we had in either 2011 or 2012.

When I back up from all of that, while the simulations may be not quite right and there are many details and caveats that we’ve already learned about, I did see it as helping us figure out that a risk-management strategy between the two policy options and policy space writ large over the balance sheet or over our tools is important.

Now, of course, there are other important considerations in choosing a portfolio duration, and one issue is this concept of financial neutrality. As a public-sector institution, our decisions

affect the supply of debt available for the private sector. When we purchase longer-term Treasury securities and issue short-term liabilities like reserves, we alter the maturity structure of assets available to the private sector. Essentially, we are putting a wedge between the Treasury's decision about what to issue—its debt management—and what the private sector is actually able to hold. So being neutral in this regard would call for shortening our duration to minimize this wedge, leaving steady-state debt management to the Treasury. And I think this is a relevant concern, but one that should inform but not dictate our long-run maturity structure.

Whatever we ultimately decide, as many people have said about our long-run portfolio, in the short and medium term we need to continue to emphasize that our balance sheet discussions are technical in nature, in the background, and not a communication of the stance of monetary policy. This will be especially important if we move to a short-maturity portfolio, since the move may be interpreted as active tightening rather than just trying to get to a normal place—which we can understand, but the markets have had a history of misinterpreting. So, to my mind, this is consistent with pushing out our decisions or transition to next year, well after we've seen how the economy evolves.

Finally, when we do communicate our longer-run plans for the maturity composition of our balance sheet, I'm going to go back to something President Harker said. It would be important to reiterate and reiterate and reiterate that these choices do not preclude increasing the size of our balance sheet in the future; do not signal anything about our monetary policy implementation framework; and, importantly, are not part of the stance of monetary policy.

Thank you.

CHAIR POWELL. Thank you. President Bullard.

MR. BULLARD. Thank you, Mr. Chairman. I have several brief remarks on the assessment of the maturity extension program. I'm going to recap a version of remarks that I've made here before and at the Booth School event in New York City in February. There I argued that the leading theory of balance sheet policy for the United States is that it's a signaling theory and a signaling effect. My reading of the empirical evidence is that it's the signaling effects that have been the strongest. I realize that there's a wide variety of views on that. The basic idea is that when we're constrained by the effective lower bound, quantitative easing is effective, but only because it has a signaling effect. It means that a central bank is going to be lower for longer, and that's how it worked, and that's why we got pretty large effects here in the United States and, I think, both in Europe and Japan over the past eight years or more.

I will mention that it's unclear the next time there's a downturn whether we will actually need to do as much policy action on this dimension, because presumably the private sector would already believe that we're going to be lower for longer if we hit the effective lower bound again. So I think that's something to keep in mind when we're discussing how much policy space we're really going to need in the next downturn, taking into account the fact that we've built up credibility the first time around during the lower-bound episode that we just got through.

Now, when you move away from the effective lower bound, quantitative easing or quantitative tightening no longer sends a signal about the future direction of short-term interest rates. There the policy rate is already off the effective lower bound. The Committee is already saying what the future direction of the short-term rate is going to be. So the balance sheet policy one way or another is not really sending any more signal than what you're already sending. And this is why I argued that quantitative tightening (QT) is not QT in the current environment. And

this, in my mind, is why this Committee has been able to successfully reduce the size of the balance sheet since 2017 without any market effects, at least up until last December.

I would say, there's a caveat to this whole argument, which was brought up also at the Booth conference, which involves international considerations. You have to remember that these other central banks are still at the effective lower bound, and presumably the various types of policies that they're undertaking are sending signals about their future short rate policy and therefore could come back to influence policy here in the United States. I thought that was a good point that was made and an important consideration here. So, in this context, I have viewed the maturity extension program undertaken by this Committee as markedly less effective than quantitative easing. It's not clear that any signal is sent by the MEP. It's possible that you could get minor effects if markets are distorted, as it would be in the middle of the financial crisis—let's say, 2009—but markets today are not distorted in a financial crisis sense, and the memo is not contemplating that kind of distortion.

My baseline would be that, based on a signaling theory of why all of this is working, that this would have no effect at all. The empirical evidence and the anecdotal evidence seems to suggest that an MEP produces minor effects or possibly zero effects. And, having lived through it myself and watched market reaction at the time, I really think it didn't really do very much. It didn't seem to be a major topic in financial markets, perhaps because of the private-sector reaction that's been discussed around the table here, that the supply effects are undone by the private sector, which would come into the way the model is constructed. With this baseline assessment, I would say we should be able to undo the maturity extension program that we undertook a few years ago to lengthen the duration of our portfolio. We should be able to undo it

today without consequence. So if you just took that point of view, then you should go quickly, and some have argued that.

On the other hand, there'd be no reason to create policy space for a future MEP since it's not very effective in any case, and there's the possibility it could be misinterpreted by the private sector. The policy space is evidently 4 percent of GDP anyway, which would be plenty. I agree with President Daly in the kind of ranking of the importance of these various policies: forward guidance first, QE second, and then comes a maturity extension program. So this is kind of low on the list of possible alternative policies once the effective lower bound is encountered.

So I would say overall, then, that we could move very gradually toward our desired maturity composition of the SOMA portfolio and leave the composition of the Treasury portfolio up to the Treasury and not try to combat them by changing the asset composition in the hands of the public. I think if we want ammunition for a future downturn, we should be looking at potential quantitative easing programs, and for that we'd have to reduce the size of the balance sheet more than we already have. The Committee has discussed that on many occasions. I think we have probably got to a good place on that. So I'd leave it at that, Mr. Chair.

CHAIR POWELL. Thank you. President Kaplan.

MR. KAPLAN. Thank you, Mr. Chairman. And thank you to the staff for the great memo and great work on this and for this discussion. So, to start off, I respect and was taken by the estimates of 25 to 85 basis points on the term premium. And in this regard, I guess I have a philosophy to be risk averse or do no harm in whatever decision we make.

Having said all of that, I have a question, which is, couldn't we make gradual and well-telegraphed changes in shortening the maturity distribution of SOMA holdings and work with the Treasury and talk to them and coordinate with them in sterilizing the effects of these changes

in the term premium by them adjusting the maturity distribution of their issuance? In other words, I'd love us to do more in trying to figure out if we could work with the Treasury and coordinate with them to minimize these term premium and ultimately r^* implications. Maybe we can't, but I would love for us to explore this. I worry that one of the things that we are very good at, and we've got the ability to do much more easily than the Treasury, is change the maturity distribution of securities held by the non-Fed public quickly and at large scale. That is not something that I think the Treasury can do. We are well positioned to do it.

And I am very worried, as we deal with lower-bound encounters, that it's going to be important that we have this tool, notwithstanding what President Bullard just said—you know, I hope we explore his points more. I do worry, actually—and it may be just I am spending too much time in northern California—that we are not going to be able to increase the size of the balance sheet very easily, and I think there is going to be quite a debate in this country about our ability to increase the size of our balance sheet. I think there will be a debate particularly if we haven't shown an ability to unwind the effects of increasing the size of our balance sheet, and the fact that we have a much larger balance sheet today than we did back in '08, and that if we aren't able to unwind the maturity effects of what we did, I think it might reinforce for those people who say, “Boy, you guys should not be increasing your ‘footprint,’ because we’re going to have to live with this indefinitely.”

So I'm fearful that we may actually, in the next downturn, have to use our existing balance sheet, and we may not have the ability to greatly increase the size of the balance sheet. And for me, that means being well positioned and means gradually shortening the average maturity of the SOMA portfolio during good times so that we can sharply increase it if we decide to, if we come up against the zero lower bound.

These are more questions than answers, but my first priority, if we could do it, would be to gradually work toward shorter maturities. If we can't do that, then maybe we can do some variation for a portion of the portfolio, get there, and we'll have the debate when the time comes whether a maturity extension is fruitful. But I kind of feel very uncomfortable that if we don't make these changes or push ourselves more on this, I am concerned that we won't have this tool at all, and I think we need to at least have this tool as an option. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Governor Bowman.

MS. BOWMAN. Thank you, Mr. Chair. I also want to thank the staff for their research and memo, which were both very helpful to my thinking on this issue. I will start with the second question on what I perceive to be the benefits and costs of approaching the longer-run portfolio composition faster or more gradually. In my view, adjustments to the portfolio composition should be made with an eye toward a long-term strategy. Whether we proceed quickly or more gradually, it will be several years before we're able to significantly alter the maturity structure of our portfolio. Even a rapid transition would not give us any more policy space in the next few months or quarters.

Rapid changes, however, could pose a greater risk of unexpected sharp moves in asset prices. In addition, if we are going to change the composition of the assets that we want to hold, it's important, as others have noted, that we communicate our intentions very clearly and with advance notice to give the Treasury and market participants ample time to take on board the information and respond accordingly. The Treasury's long-held principle of gradual and predictable changes in debt issuance have seemed to serve it well. And unless circumstances change considerably, should the Federal Reserve become a source of volatility in the Treasury securities market, and would that challenge the principle of their predictable actions?

For the first question on macroeconomic considerations, the central question raised by the staff's memo is this: If we decide to hold more short-term Treasury securities in order to gain policy space for the maturity extension program at a later date, will we end up driving up long-term interest rates and be forced to lower the federal funds rate, diminishing the capacity for us to use our primary tool for monetary policy? The answer likely depends on how the Treasury adjusts to our announced strategy. If they issue more of the short-term debt that we aim to purchase, the upward pressure on term premiums could be minimized, which would likely lessen the need for us to lower the federal funds rate in response.

As we continue to consider this issue—as others have noted—I will find it helpful to see further analysis from the staff on how Treasury security issuance has related to changes in the Federal Reserve's holdings in the past so that we can better anticipate what might occur under this approach. I would also be interested in seeing further analysis of how the portfolio composition relates to our overall long-term strategy for monetary policy. As I said before, changes in the portfolio will take a long time. In fact, if our long-term goal is to hold a shorter maturity portfolio, we might never fully achieve that goal, because events could occur in the meantime that would warrant another MEP.

In that respect, the decision we would make is not whether to permanently have a proportional portfolio composition or to permanently have a short one. It would be more about whether we want to actively adjust the maturity of the portfolio over time to support our macroeconomic goals—perhaps lengthening the maturity when that is necessary to support the economy during downturns and then shortening the maturity during good times to build capacity for the future—or whether we prefer to have a more stable maturity composition regardless of where we are in the business cycle. Especially as we head into our review of our monetary

policy strategy tools and communications, it would be valuable to have further analysis of how these different long-term approaches for using the portfolio might affect the economy and our ability to achieve our goals. Thank you, Mr. Chairman.

CHAIR POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chairman. As the staff memo acknowledges, the tradeoffs in choosing a longer-run portfolio composition are complex and highly uncertain, and they depend on estimated models of the term premium, the unpredictable reaction of market participants and the Treasury, and other unknowns. That means both a decision about this and the communication is going to be very challenging. Historically, the composition of the portfolio reflected the desire for market neutrality and liquidity. The principle of market neutrality allowed the supply of securities issued by the Treasury, and private-sector demand for these securities, to drive relative market prices. Under the principle of liquidity, the Federal Reserve pursued a portfolio with a substantial amount of Treasury bills, which could be sold quickly, if needed, to sterilize liquidity injections in a crisis.

Today, with our expanded balance sheet and floor operating system, holding a liquid portfolio to sterilize future asset purchases is no longer needed. Instead, liquidity is potentially desirable for its option value, should a future maturity extension program be warranted. But moving toward a shorter-duration portfolio, as others have noted, would have uncertain effects on term premiums and the related stance of monetary policy. And the efficacy of exercising the option of maturity extension in an encounter with the effective lower bound is uncertain but, in my view, likely limited.

Given these uncertainties, it seems appropriate to aim for a longer-run portfolio composition that is neutral, one that is similar to the universe of outstanding Treasury securities.

Absent a financial crisis, this approach would allow the Treasury to determine the maturity structure of outstanding debt and private market participants to determine its relative price with little or no influence from the composition of our holdings. The speed with which we move toward a target portfolio appears to be of secondary importance. However, in view of the similarity of the estimated term premium effects under either the gradual or accelerated approach, I see little downside in moving at an accelerated pace toward a longer-run target portfolio.

Looking ahead, as we continue the discussion of portfolio composition, I would be interested in better understanding how our holdings of MBS may be influencing and possibly distorting pricing in the Treasury bond market. In particular, how do we define a market-neutral portfolio while holding substantial quantities of MBS? I also support, as the Chairman has noted, pushing this decision out. But as I look at reserve balances continuing to decline and the funds rate continuing to increase relative to the IOER rate, I do think it would be helpful to have a strategy in place to guide future asset purchases when we need to begin accommodating trend increases in nonreserve liabilities and possible increases in reserve demand. Thank you.

CHAIR POWELL. Thank you. President Mester.

MS. MESTER. Thank you, Mr. Chair. I thank the staff as well for the helpful analysis of the tradeoffs between holding a SOMA portfolio composed of shorter-term Treasury securities and one that is of longer duration. The general contour of the factors is pretty straightforward. Holding a portfolio of maturity that is similar to that of outstanding Treasury debt—the proportional target portfolio—is the most neutral in terms of the market, and that has some appeal. On the other hand, a shorter-duration portfolio would give the Committee more room to use the maturity extension program to lengthen the maturity structure without affecting the size

of the portfolio. It would be an additional tool to add accommodation once the federal funds rate has been brought down to its effective lower bound.

Given that our nontraditional policy tools are quite limited, having this tool more available, in addition to LSAPs, also has appeal. And I think President Kaplan's view, that if we don't shorten the portfolio composition we may actually face more opposition to using LSAPs in the future, is also worth considering. At the same time, the memo suggests that the tradeoff is less straightforward than it might seem at first. Conceptually, because term premiums may be higher if we held a shorter-duration portfolio, the federal funds rate to achieve any given macroeconomic outcome would need to be lower. This means the probability of hitting the lower bound would be somewhat higher under a shorter-duration portfolio. Thus, although there might be more ability to use the MEP if we target a short-duration portfolio, we might also find ourselves in the position of having to use it more often.

The magnitudes of these effects, however, are very uncertain, as the memo suggests. It would be useful to see the confidence bands on the figures in the memo. I suspect that there may be little statistical difference in the paths illustrated for the Treasury yields and the path of the funds rate. In addition, the effect on term premiums in normal times may be minimal. If a large part of the effective balance sheet policy comes through signaling effects rather than via portfolio balance effects, as research by Michael Bauer and Glenn Rudebusch suggests, then the duration of the SOMA portfolio could have little effect on term premiums in normal times. If so, there would be little difference in the magnitude of the federal funds rate under the two portfolio duration scenarios. Moreover, as the memo suggests, how the U.S. Treasury changes its issuance also matters for the effects on term premiums.

These considerations would push me toward favoring a shorter-duration portfolio, as it would make the MEP more available, with little effect on the likelihood of hitting the effective lower bound. But I must say, this isn't a strong preference, as the staff analysis also suggests that even under the longer-duration portfolio there would be as much MEP capacity as a percentage of GDP as we used in the 2011–12 period.

In some sense, our targeted composition may be a moot point. According to the staff's analysis, regardless of which longer-run portfolio composition we prefer, a gradual transition to our targeted portfolio will take 15 years or longer. During this long period, the odds are not insignificant that negative economic shocks will mean we will have to begin using our balance sheet tools again. And we may never get to our targeted portfolio composition.

So my preference would be to transition more quickly for a targeted portfolio by overweighting our purchases of Treasury bills during the transition. Now, we wouldn't necessarily have to limit our purchases only to Treasury bills, as under the staff's accelerated approach, because we don't want to absorb too much of the Treasury bill market. But moving more quickly would give us a better chance of getting closer to our targeted composition before the next downturn.

Finally, I would like to make two suggestions for future work as we move toward a future decision. First, it would be useful to explore the effects on markets of reducing our MBS holdings more quickly than currently envisioned. And, second, recent experience suggests that some market participants already believe that changes in our balance sheet are having effects on the market and on the stance of monetary policy. So I agree with Governor Clarida and others that how we communicate whatever we decide on our portfolio will be important, and we should start thinking through those communications now. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you, Mr. Chair. I appreciate the opportunity to discuss the long-run composition of the balance sheet and the analysis produced by the staff that is helping structure our thinking.

It would be preferable to have ample time to debate this complicated issue, although I think we should advance at least the part of our deliberations that is targeted on shorter-term reinvestments, as we may need to be in a position to describe our initial reinvestment plans sooner than we might have thought if it turns out that the steep part of the demand curve is encountered earlier than anticipated.

Before looking at the specific options on the table, it is useful to recall why this matters, some general principles for thinking about it, and how the composition of the balance sheet, in particular, fits into our overall framework for discussions about both monetary policy and financial stability. Providing clarity on where along the yield curve we intend to focus our purchases is important in providing clarity to market participants, and of course the key reason the composition of the balance sheets matters is that it may affect relative interest rates at different parts of the maturity spectrum, depending on the size of our “footprint” in the market.

Before the financial crisis, our predecessors didn’t give much thought to these considerations, largely because control over short-term interest rates, and to some extent expectations, were felt to give the Committee adequate influence over aggregate demand. But, with the growing recognition that we’re in a low interest rate environment, the balance sheet and its composition loom larger. Just as, during the crisis and its aftermath, the federal funds rate reached its effective lower bound and the Committee found that it was necessary to use purchases of longer-dated assets to provide sufficient support to the economy. Both the SEP

projections and market pricing anticipate we will remain in this kind of environment, which implies more time spent at the effective lower bound.

In this environment, there are four considerations that are influencing my thinking about the longer-run composition and the transition path. First, as we have discussed and as the memo nicely illustrates, balance sheet composition choice in the long run could have implications for the amount of conventional policy space relative to the amount of space for maturity extensions. Also, the matter of the yield curve and financial stability also may have implications for our current monetary policy stance—and, ultimately, for our framework governing monetary policy more generally.

The staff analysis focuses on the tradeoff between the relative space for conventional and maturity extension program policies. It provides a useful, clean, conceptual tradeoff between stylized options, but to do so it makes strong assumptions not only regarding how issuers of debt might change their behavior in response, but also about term premium effects on announcement of those changes in composition. And it's important to keep those assumptions in mind as we deliberate. In particular, in this context, if the Treasury's security issuance doesn't change, then the tradeoff between conventional policy space and the space to undertake maturity extension is essentially one-for-one. Shifting our portfolio toward shorter-duration Treasury securities essentially steepens the yield curve, but at the expense of compression at the short end. The Committee has stated that the interest on excess reserves is our primary policy tool, so safeguarding conventional policy space would argue in favor of moving toward a proportional maturity. If, instead, the Treasury were to issue more short-run securities to offset that reallocation toward the shorter end, then the compression of policy space at the short end would be commensurately smaller, which would make the short-maturity option a much more attractive

choice. As others have said, it's therefore crucial that we gain greater clarity on what the Treasury would likely do in response.

Regarding financial stability, one clear risk with moving to a short-maturity portfolio, if the Treasury doesn't increase its issuance on the short end, would be the potential for greater issuance of short-term assets by the private sector. As we saw in the financial crisis, there are risks associated with privately-issued short-term debt, particularly if markets consider those a close substitute for government-issued debt. That financial stability risk could be an important consideration for me.

On the other hand, leaning toward a proportional or longer-dated weighted average maturity portfolio may encourage greater reach-for-yield behavior. The benefit of greater policy space at the short end would be at the expense of a flatter yield curve. And as we have discussed in the context of the *Financial Stability Report* and elsewhere, a flat or even negatively tilted yield curve may encourage stretched asset valuations and high leverage, which may lead to an amplification of financial stability shocks. I would also want to give some thought to the implications of adopting an approach that, at least in the staff analysis, would tend to flatten the yield curve, all else being equal, making yield curve inversions more likely, especially in view of the strong signal that private-sector participants tend to take from the slope of the yield curve in judging recession probabilities.

A third point is that the memo importantly addresses the question of the speed at which the portfolio reaches its desired long-run composition under the double-neutral approach. It takes a very long time to reach a weighted average maturity that is similar to the market portfolio. The alternative accelerated option would seek to achieve a market-weighted average maturity in only five years, which would mean concentrating purchases exclusively at the short

end initially, and it would achieve that WAM through a barbell-shaped portfolio—quite different from our ultimate goal. This discussion serves to highlight that third critical consideration, which is the important potential interaction between the extent and speed with which we seek to shorten the maturity composition of our holdings and implications for financial conditions during the transition period.

Finally, the consideration of the long-run maturity composition should take into account the broader review of our monetary policy framework. This particular set of options shows us the tradeoff between conventional policy space and one possible approach in our framework, which is a maturity extension program. But if, instead, for instance, we wish to consider yield curve control at the front end of the curve, under which policy would progressively move out the front end of the yield curve to provide monetary stimulus once the funds rate reaches its effective lower bound, that could require purchases of Treasury securities in the affected maturities and, consequently, may imply something quite different for our target composition. Alternatively, if the federal funds rate's effective lower bound were moved into negative territory—something I don't prefer—this, in turn, could have quite different implications for that longer-run composition. So, in ideal circumstances, we should integrate the decision about that longer-run composition into our overall monetary policy framework review.

Now, of course, recent developments suggest that reserve scarcity may be coming sooner than many of us had expected. It is, therefore, possible that we will be growing our portfolio as soon as late this year, perhaps before the framework review is complete. In light of that possible eventuality, it is worth thinking about proceeding on a faster track on our decisions on reinvestments, at least for the first few years, much as we have done with regard to MBS. And in

that regard, I am looking forward to further deliberations on both those short-term purchases and our longer-term target. Thank you.

CHAIR POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Chair. I, like everyone, am very pleased that we are getting started early on this discussion, because it's a complicated discussion—as President Evans said, a lot of moving parts. It would be a very important decision, but one as to which we do have a significant amount of time. So this is early to be discussing it, and today I don't have any conclusions.

I don't even begin with a particularly ardently strong view, but there are some questions and considerations that I think will be important as we continue to think through this. So, in that regard, again, like everyone, I thought the staff memo was lucid and concise and very helpful in laying out a key subset of the factors that we will have to consider as we think about this—that subset being the monetary policy tradeoffs that we will face as we consider a proportional balance sheet relative to one weighted toward the short end.

The one-sentence summary of the memo, I think, consistent with how everyone has been looking at the memo, is that going short would have benefits in building policy space for future maturity extension programs while incurring costs of a potential tightening of the current stance of policy. So, looking first at the cost of going short, which is that the tightening of policy might result from our announcement of a short-duration portfolio, the staff's estimate is very large as to what the consequence of that would be, with a significant portion of that coming from the announcement effect.

The announcement effect—which is close to one-third of the staff's estimate of the ultimate effect—really depends on current market expectations. As Governor Clarida said, that

raises the question of, how sure are we of what current market expectations are? How big of a surprise is this really likely to be? There has to be some expectation that we could be moving to a shorter-duration portfolio. That has been widely discussed by financial market participants. And if our announcement is much less of a surprise, then we could expect much less of an announcement effect than 25 basis points. So I think it would be useful to have a better sense of what current market expectations are, and, obviously, there will presumably be significant uncertainties associated with that, but it would be good to understand how we've come to our understanding of what current market expectations are and how we can deepen that understanding.

Another point related to potential tightening from moving short is the assumption that many people have already commented on, that the Treasury and the private sector don't adjust their actions in response to our increased purchase of short-duration securities.

Now, for heuristic purposes, in helping us think through the dynamics of this decision, I think that's a very useful starting place, but it is almost certainly not the finish line. The current weighted average maturity of Treasury security issuance is very high relative to historical norms, and I begin the question of, what's the Treasury likely to do? From my experience of when I was put in charge of the Treasury security issuance some time ago when Jim Clouse and I were much younger people.

At the time, I wanted to reintroduce the 30-year bond, which would have had a material effect on the weighted average maturity of Treasury debt at the time, and I was taught by the Treasury staff that long-standing Treasury religion of which I was now expected to be a high priest, which limited one's capacity for heresy, was that over a long-run, 100-year horizon, we

would always minimize the funding costs of the taxpayer by issuing as much to the short end as possible, as opposed to trying to time the market.

Now, if you actually look at the Treasury's pattern of security issuance over the past several decades, if that is the Treasury religion, it is observed in the same way that Catholicism is the official religion of modern Europe. [Laughter] There is really quite wide variation in the weighted average maturity of the portfolio over the past several decades. But we are at the very, very high end of that maturity portfolio, and there is every expectation, I would think, that the Treasury will be seeking, in a more normalized monetary policy environment, to want to reduce the duration of the portfolio and, therefore, to issue more on the short end. And if they do that, that will mitigate at least some of the upward pressure on long-term yields that would result from our switch to a short-target portfolio.

So because such a reaction by the Treasury would presumably benefit both them and us, it seems at least reasonable to me to say that we might want to encourage such a shift in issuance by adopting a short-target portfolio. And I don't find it terribly offensive to our own internal religion to follow the suggestion that President Kaplan has of, why don't we just talk to them? Isn't it possible to coordinate with them?

Now, there is probably no one around the table who holds as a higher icon the Treasury–Federal Reserve Accord of 1951, but talking to the Treasury about coordinating this does not, in my mind, implicate anything that is included in that accord about the insulation of our monetary policy decisions from Treasury influence. This would be an entirely different dynamic that I don't think undermines that accord at all, if we were to seek to coordinate this with them, and there are strong reasons for us to do so.

Regarding the relative benefits of a short-duration portfolio, in the creation of space for unconventional policy, if you don't see the overall size of the balance sheet as a constraint on QE in the future, then the additional space for maturity extension provided by a short-duration portfolio is not particularly valuable. But I do see the advantage of keeping the balance sheet relatively small, and I do think that we will encounter more, quite real, obstacles, even if they are political rather than legal, in increasing the size of our balance sheet. And so I value the firepower that a short-duration balance sheet would give us within a fixed balance sheet envelope.

I have a more fundamental concern with the policy tradeoffs highlighted in the memo, and it is mainly this: If we move *de facto* to a practice where interest rates are always the preferred mechanism for tightening policy, while both interest rates and the balance sheet can be used to loosen policy, there would seem to be an inevitable ratcheting-up effect on both the size and duration of the balance sheet.

If we go with the proportional portfolio, might we not still find it valuable in the future to increase the duration in the next severe downturn, and then, presumably, coming out of that downturn we would, once again, favor increasing interest rates over decreasing duration, with the overall effect that Fed-induced distortions in the market for duration would only grow over time.

Now, this is over a long period of time, and maybe future FOMCs will find some solution to that. But I do think that the inevitable systemic consequence of not shortening our duration now is that we will be, over the course of some decades, significantly increasing both our duration and the size of our balance sheet.

Finally, I began at the outset by saying that the memo discussed a subset of the considerations that will be important for us, and I think that the monetary policy-centric

framework for assessing our balance sheet choice is important. It is probably the key consideration, but incomplete. There are other dimensions over which we might want to evaluate this decision when we ultimately make it, including the implications for financial stability, which Governor Brainard and others have talked about, or market functioning more generally. And that concludes my remarks. Thank you.

CHAIR POWELL. Thank you. President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman, and I would like to thank the staff for their excellent memo. I went into reading the memo probably more sympathetic with shortening the duration of the balance sheet than I ended up. After having read the memo, I was just surprised by how long it takes to get there. I think we are going to be overtaken by events. And I think that it's really unclear if we actually buy ourselves policy space, as others have articulated.

The term premium is not just uncertain in the long run. It is also uncertain in the short run. If you look at the term premium and how it actually behaved during the previous round of QE, when I look at it, it did the opposite of what I thought it was going to do. In many cases, the term premium went up when I thought it would go down.

I know we don't know the counterfactual, but I just think there is huge uncertainty about what the term premium—and the term premium, we act as though it's a scientific thing. It's a residual of all the stuff we can't explain. And trying to predict what the residual of what we can't explain is going to do is a very difficult thing to do. So I think we should just admit that—or at least for me, I don't—it's unclear if this will actually buy us policy space or not.

I really liked Governor Quarles's comments on what the Treasury will likely do, and he speaks with much more experience than I do. When I looked at this, I think it's almost obvious that the Treasury would respond and shorten the maturity of their security issuance in response to

a long-term strategy of us having a short portfolio. So, in that sense, it helps us on the policy space to mention—but I think there is a political cost associated with doing that.

So I look at this at the end of the day as a tradeoff of two political costs. One cost is, we're at the lower bound, and we want to buy long-term bonds. And the maturity extension is politically more palatable than just expanding our balance sheet. But as President Evans said, if we're at a lower-bound event, we just need to do what we think is the right thing to do. And if there are political costs, there are political costs.

The alternative scenario is, we buy short, and it looks like we're trying to support the Treasury's funding itself and funding their deficits. And I think that's an ongoing political cost that we would be bearing. So I would rather take the political cost in that lower-bound event of saying, "We need to do the right thing for the economy," than the alternative, which is on an ongoing basis to look like we are trying to support the Treasury's deficit financings, which is a higher political cost, in my judgment.

At the end of the day, I don't have a very strong view. I'm not here to pound the table. I think these are second-order effects, second-order considerations, relative to our other policy tools that we should think about. Thank you, Mr. Chairman.

CHAIR POWELL. Thank you. President Bostic.

MR. BOSTIC. Thank you, Mr. Chair. Like my colleagues, I would like to first thank the staff for putting together such a thoughtful analysis of the various aspects of how decisions regarding the long-term composition of the SOMA portfolio interact with policy levers and market participants. The analysis offered very helpful insights, despite the many sources of behavioral uncertainty that will affect outcomes.

In my mind, the primary consideration in choosing between the proportional and short-target portfolios lies in determining the Committee's preferences regarding the use of various accommodative tools. All of the moves being considered are at heart about how much juice various policy tools will have when the next crisis occurs.

A primary benefit of the shorter-duration target portfolio is that it would increase the amount of juice available for our maturity extension program should the Committee decide such a policy strategy was desirable. But the analysis suggests that there is a reasonable likelihood that this approach will force a tradeoff with our main policy tool, the interest rate target.

As noted in the memo, adding juice or policy space to a potential MEP would, thus, sacrifice juice in our interest rate tool, and this doesn't seem desirable. In addition, pursuing a shorter-duration approach feels to me like we would be effectively prioritizing an MEP approach over an LSAP approach when we feel that balance sheet tools might be necessary. I don't believe we have clear empirical evidence that an MEP would be more effective in adding monetary stimulus than an LSAP. So, in thinking about why one might want to do this, I think it really gets to the question of how important it will be to maintain a balance sheet of a fixed size—that is, what are the costs of balance sheet expansion?

Now, personally, maintaining a fixed balance sheet isn't critical or necessary for me. Therefore, I don't see strong benefits associated with juicing the MEP tool. But, if President Kaplan and Governor Quarles are right and we are constrained in increasing the size of the balance sheet for political reasons, then I might want to rethink this and come up with a different strategy.

As for the question of how fast to transition, once we decide where we are going, I tend to default to a gradual change as my preference. Any policy that we undertake with respect to

balance sheet composition will interact with the pattern of U.S. Treasury security issuance and other factors to affect long yields and the transmission of policy, as many have noted.

Given the uncertainty that comes with even the best modeling in this space, and the frequency with which financial market conditions can change, I would prefer to move slowly and with guidance from the Desk on market functioning and financial conditions. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Vice Chair Williams.

VICE CHAIR WILLIAMS. Thank you, Mr. Chair. Like I said earlier, I think the memo and presentation and this discussion have been very helpful. These are complex, complicated issues with a lot of different moving pieces.

I'm going to go back to some principles, picking up on President Bostic's comments, about thinking about monetary policy. And that's this decision we have made over and over again, which is that the short-term interest rate is our primary policy instrument. I actually think that is the right answer to the question.

First of all, we have learned from experience that moving the short rate up and down and adjusting it to changing economic conditions—something we have a lot of experience with, a lot of understanding of—we learned with QE that the issues of getting out from under QE are complex and much more difficult than perhaps we originally thought. We have the taper tantrum. We have the “paint peeling” episode. So we have seen that moving interest rates up and down has been something that I think we have a good understanding of. QE is just a harder ship to steer.

I think the uncertainty about QE effects is also very important. I want to make a couple of points on this. First of all, just from a kind of Bayesian policymaker point of view, if you

have one instrument that you have a lot of experience with—a good understanding of—and another where you have highly uncertain effects, the straightforward logic of that is, use the one that you have more experience with and more understanding of as your primary tool and use the other as needed. And I would apply that in terms of balance sheet policy.

Now, the important point that the memo made—and many people have said this—is that there is no free lunch here, and let me talk a little bit about that. First of all, the basic Board staff view, which is based on this Li and Wei model, which is a pure stock model—it's a forward-looking stock model. But it tells you that it's not roughly offsetting—these are exactly offsetting effects.

So any space you get on MEP is completely lost in terms of the neutral rate, under the assumptions of that model. And a number of people, including President Rosengren and others, have questioned some of those assumptions. But let's just be clear: At least in the model that we have been analyzing and using for quite some time, there is no benefit in terms of policy space from going to a shorter portfolio.

So you need to get some benefit out of this in terms of the economics. You need to go to some different model. It could be that you believe in flow effects, maybe signaling effects of these others, which would suggest that maybe in the short run they have effects, but not in the long run. But I would just like to point out that there is no free lunch in this case either. You are going to pay the price of a tighter stance of monetary policy during the transition period. Even if there's not a long-run effect, you do pay with—as you are shortening the portfolio, that pushes the term premium up for a number of years, and that is a lower r^* that you have to live with.

Now, when you think about a lower r^* that you have to live with for the next five years or something, that's kind of a scary thought. So if you think about an r^* that's 2½ percent, and

today—or half our real rate and going down to close to zero, maybe negative—that’s a situation in which, obviously, our policy space would be quite limited.

The last point I will just make about this is, a lot of people have mentioned that these effects that are in the memo are uncertain. I think we need to be clear about what that means. If you buy the model, the baseline model, the uncertainty works on both sides. So, for example—and President Bullard actually made a point like this, which I agreed with—if you think that an MEP has small effects, then it has small effects on r^* . But you’re not getting anything. That’s not like a free lunch. It means that you’re not seeing a lower r^* , but you also are not getting the additional policy space. So everybody who says, “Well, it’s uncertain,” that type of uncertainty, at least is not a help at all.

Now, I’d go back to some of the issues that a number of people brought up about communication. President Daly said we want to make sure that we communicate a shortening of the duration of the portfolio as not being active tightening. I think that’s a hard thing to do because it actually is a tightening of monetary policy. So it’s really hard to convince people that something is not a tightening when in fact, at least in our models, it would be. And I also think the signaling effects that we talked about, well, maybe it’s signaling, not the stock effect, that’s also challenging.

Over the next couple of years, we’re telling everybody we want to keep the interest rate roughly where it is, but at the same time we’re tightening on the balance sheet in terms of duration. We have seen in the past six months that QT stories, whether we agree with them or not, obviously can affect financial conditions and confuse our messages.

I want to go back to what Governor Brainard and Governor Quarles said. I do think that this discussion is best thought of in the context of our framework discussion. If we’re really

going to seriously have, as President Daly and President Evans and others said, a real decision on the ordering of our tools, how we plan to use our tools, what are the constraints that are on our tools, that really does fit into this broader framework discussion. So if we're going to give up some space on the short end, or with MEP, or however you think about this, I think that should be part of that broader discussion.

You know, I do think this is a question that none of us should have a great deal of confidence that, with another couple memos, we're going to get absolute clarity on. This is still a little bit of uncharted waters. I do go back—I think President Kaplan's remark—I would argue, if we do no harm and try not to go after "the perfect" here, but to go after, hopefully, something that will both work well over the next several years—because I agree with President Rosengren, we're not going to solve the long-run problem—but will also position us well for what I view is the inevitable episode of being at the lower bound and needing to be able to respond.

The last comment I will just make is on the Treasury. I agree with President Kaplan and Governor Quarles that we should be engaging with the Treasury. I see that as independent of our decisions. I think it would be great if the Treasury decisions were more supportive of the macroeconomy. And so, regardless of how exactly we decide to adjust our portfolio, obviously, some of the decisions regarding issuance actually affect financial conditions, and that's a good discussion. Thank you.

CHAIR POWELL. Thank you. So, very interesting discussions, much to think about, and I'm particularly glad that this is a nondecisional meeting, because I have to say I really do not feel in any way ready to make a decision.

I'll offer one comment and then move to the main thing I want to say, which is this question of the extent to which an MEP is fully offset by a lower neutral rate. If you take that to its limit, then why would we reduce the maturity profile at all? In fact, why wouldn't we lengthen it? But I think that's, frankly, unsustainable. I mean, I really do think you put yourself in a position there where you have proven that you can remove duration from the marketplace and create a very large balance sheet, but you actually can't put that in reverse. And I think that really is something that would be hard to defend. So it leaves us in quite a difficult position.

In terms of the pace, as others have pointed out, the pace of movement toward whatever solution we choose, a gradual pace takes so long, and I think we need to think of ideas to get there faster. And it may be that Governor Clarida's idea of just going with an unbalanced portfolio, taking the short route to shortening the WAM, is worth thinking about.

I also think it's worth thinking about less ambitious goals in terms of what we say here. Rather than saying we're going for a proportional portfolio or going for a short portfolio, we say we're moving in this direction over a period of time and we'll be in touch. So, much more to do there.

I want to come back, though, to the issue of the Treasury and how that matters, because there it does seem to me their choices matter a lot in terms of what's left for us to do. And so one question is—and others have talked about this—would the Treasury, through its own actions, substantially lessen any term premium effects associated with shortening if we do shorten? And I guess my instinct is the same as many others—that they would—but I don't see this as something that we would leave to assumptions or guessing. It seems to me that we'd be having a conversation about this.

A different question, and it will lead me back to the first question, is, how would the Treasury respond to another episode in which we're at the lower bound and we do LSAPs? And that would depend heavily to some extent on the extent to which the Treasury offsets our actions.

We don't know with any confidence what would happen, but I think it's helpful to recall what happened, how the Treasury responded the last time around. When the economy turned down sharply, the deficits blew out, and the weighted average maturity of Treasury debt shortened a great deal, because the Treasury issued at the short end because it doesn't want to increase the coupon sizes in an irregular way. And then, after the crisis ended, the Treasury set out to lengthen that weighted average maturity gradually.

Now, there were discussions, as many of you know. There were discussions between our institutions at the staff level in which our folks pointed out that the Treasury's plan would offset the effects of our purchases, but the Treasury went ahead anyway. Then Larry Summers and coauthors produced a research paper in 2014 that argued that the Treasury's extension of the WAM for Treasury debt outstanding ultimately offset about one-third of the duration removal of our LSAPs, and the paper urged the Treasury and the Federal Reserve to coordinate our asset purchases and our management of duration—our thinking about duration—with debt management on an ongoing basis.

And that was a suggestion that I found uncomfortable in commenting on the paper at its Brookings presentation—to the emphatic displeasure of Professor Summers. And I still harbor those concerns. I think, at a minimum, it's worth pausing on that threshold and thinking pretty carefully.

I also, though—and this goes to something others have said—argued at that time that the Treasury's WAM extension could be thought of as exogenous to our LSAP decisions in the

sense that the Committee did the amount of QE that we thought was appropriate, given the WAM extension, so that the effects of the WAM extension could have been nil.

Now, with the benefit of further thought and hindsight, that seems to me to be not quite right. I think it's more accurate to say that the Chairman did as much QE as then-Chairman Bernanke could get the Committee to agree to, and that the WAM extension did likely reduce the power of our asset purchases to some extent—not because of some external political constraint, but because of what the Committee was willing to do in real time. And I saw the tail end of that and, indeed, was part of it in 2013. And that was despite Chairman Bernanke's commitment to do whatever it takes—a commitment that I fully share—as I suspect we all do.

So, in recent years, there have been discussions between the Treasury Borrowing Advisory Committee and the Treasury on this issue, and I do think it's plausible that if we were to find ourselves in that situation again, the Treasury would decide to hold off for some period on reextending the weighted average maturity of Treasury debt to its long-run desired level—for example, for five years or, for example, for a period until the unemployment rate goes below some level. And I'm guessing that that wouldn't have much effect in the model, but I suspect it would have a real effect, because I do think signaling effects are very important in the crisis. I think a lot of the research supports that, and that would leave us with more policy space.

But regarding the normalization era rather than the crisis era, I do think that one of the things we need to think about is how and whether to engage with the Treasury, just to understand what they would do.

And so I will leave it there. Okay. Show of hands on whether we should have lunch now or go ahead and do the Desk briefing. All those in favor of having lunch now? [Show of hands]
[Laughter]

MR. BULLARD. Lead by example.

CHAIR POWELL. The Desk briefing? [Show of hands] The lunches have it.

[Laughter] We'll resume at 1:00 sharp. Thank you.

[Lunch recess]

CHAIR POWELL. Okay. Let's turn now to the Desk report from Simon and Lorie, which will also cover the annual swap line renewals. Simon, over to you.

MR. POTTER.² Thank you, Mr. Chair. As summarized in the top-left panel of your first exhibit, financial conditions generally eased over the intermeeting period. Treasury yields declined, adding to their substantial drop since September. Meanwhile, the S&P 500 index rose to record levels. However, the intermeeting change masks a more significant drop in Treasury yields and federal funds futures-implied rates in the days just after the March FOMC meeting. As illustrated by the blue lines in the top-right panel, at their lowest points, the 2- and 10-year Treasury yields had fallen by nearly 30 basis points, and, at that time, the 10-year–3-month Treasury yield spread had inverted.

Market participants attributed these moves in part to the larger-than-expected decline in the SEP “dots” as well as weaker-than-expected euro-area data, which rekindled concerns over global real growth. Later in the period, stronger-than-expected Chinese data reduced those growth concerns somewhat, while U.S.–China trade and immediate Brexit risks also receded. That said, below-expectations core U.S. inflation data have contributed to the decline in yields. Meanwhile, expectations for moderate domestic growth alongside a “patient” FOMC have boosted U.S. risk assets.

With respect to the evolving interpretation of “patience,” many of the Desk’s survey respondents who had still expected hikes in 2019 before the March meeting revised their modal forecasts lower to reflect no expected change in the target range this year. As shown by the dark blue bars in the upper part of the middle-left panel, nearly all respondents anticipate a flat path through December, consistent with the March “dots.” Furthermore, as you can see in the lower part of the panel, a plurality of respondents also forecast no change to the target range next year, though about one-third expect hikes and roughly one-fourth expect cuts in 2020.

Consistent with this, and as demonstrated by the shift from the light to dark blue bars in the middle-right panel, the average probability assigned to no change in the target range in 2019 rose significantly, from 38 percent to 63 percent. Meanwhile, the average probability assigned to the next policy action this year being an increase fell notably and is now only slightly higher than the average probability assigned to

² The materials used by Mr. Potter and Ms. Logan are appended to this transcript (appendix 2).

the next policy action being a decrease, which was little changed. Several cited subdued inflation as a contributing factor to these changes.

For context, in the Desk's surveys, the average probability distribution for two-year-forward one-year PCE inflation was not much changed since the last time we asked a similar question in June 2018, with the average probability-weighted mean expectation remaining at around 1.9 percent. However, in their qualitative responses, a number of survey respondents noted that subdued realized inflation posed downside risks to their inflation outlook. However, some highlighted that potential changes to the Federal Reserve's policy framework, such as the adoption of average inflation targeting, posed upside risks.

Regarding the bottom-left panel, the paths based on unconditional mean expectations as well as market-implied rates became slightly more downward sloping since the March meeting. How do we reconcile the implied rate cuts in this path with the general survey consensus regarding no policy rate change in the near future, the fact that a hike is still seen as slightly more likely than a cut, and that the average expected probability of returning to the effective lower bound over this horizon edged lower?

First, with respect to the downward slope, although market participants see downside risks as having receded somewhat, as I will discuss in a moment, a number of risks remain prominent in their outlook. On average, survey respondents still see a nearly 30 percent chance of returning to the lower bound by 2021, which continues to weigh on the unconditional federal funds rate expectations.

Second, with respect to the shifts down in the mean and market-implied paths, investors have increasingly discussed the possibility of modest rate cuts as "insurance" against a future negative shock, particularly in light of subdued inflation. Several pieces of dealer commentary have mentioned this in the past week, and, as illustrated in the dark blue portion of the bars in the bottom-right panel, the average expected federal funds rate conditional on not returning to the lower bound declined slightly. Additionally, as shown in the top-left panel of your second exhibit, conditional on the next policy action being a cut in 2019, on average, survey respondents place a higher probability on 25 basis points or 50 basis points of cuts this year relative to the previous survey. Thomas will discuss these issues more in his briefing.

Similar to the survey-implied probability of returning to the lower bound, as shown in the top-right panel, the average probability of the United States entering a recession by end-2021 inched slightly lower. Several survey respondents cited improved U.S. and Chinese growth prospects, relative to their heightened concerns around the year-end, as driving this modest decline. Chinese data, especially PMIs and aggregate credit growth, have generally exceeded analysts' expectations over the period, with Desk contacts also crediting Chinese policy stimulus and perceived progress in U.S.–China trade negotiations for the improvement in risk sentiment. As

you can see in the middle-left panel, the Shanghai Composite stock index has risen considerably year-to-date.

The survey average probability of recession by end-2021 is still nearly 70 percent. Although market participants perceive some reduction in risks associated with Chinese growth, U.S.–China trade, and Brexit, significant uncertainties related to these remain, along with continuing concerns about the outlook in Europe.

While some market participants expect improved prospects for Chinese economic activity to eventually boost growth in the euro area, euro-area data continue to suggest sluggish growth, and recent readings have generally fallen short of forecasters' expectations. This, along with the growing conviction among investors that the ECB has limited policy space with which to ease in response to negative shocks, has weighed on sentiment.

Recall that in March, the ECB announced a number of measures, including an extension of forward guidance on interest rates and another round of targeted long-term refinancing operations alongside significant downgrades to its growth and inflation forecasts that disappointed markets, leading to declines in euro-area rates and equities, as shown in the middle-right panel.

Since then, ECB officials suggested that the staff are studying the potential implementation of a tiered deposit facility scheme, which would allow the ECB to maintain policy rates at current or lower levels for a longer period of time, while alleviating some pressures on bank profits. These communications prompted declines in forward EONIA pricing and increases in bank stock prices.

Furthermore, while the Brexit deadline was pushed out to October 31, uncertainty regarding the ultimate outcome has weighed on business sentiment in the United Kingdom as well as the euro area. Indeed, the pound sterling and the euro depreciated by 2.6 percent and 1.8 percent against the U.S. dollar over the intermeeting period, contributing significantly to the trade-weighted dollar's strength since March.

U.S. equity valuations have also risen markedly since late December, increasing the potential for a disappointment in growth or earnings to pressure stock prices lower. The VIX is also back to its low levels seen in early October of last year, increasing risk asset vulnerability to a potential uptick in volatility.

Relatedly, there has been growing market debate about the increased frequency of volatility “events,” such as observed in February 2018 and 2018:Q4. By some measures, such events appear to have become more common. For example, the red line in the bottom-left panel tracks the number of times that a five standard deviation change in the S&P 500 index is observed within a three-year window, using daily returns over a rolling 30-day horizon. As you can see, this count has increased to multi-decade highs. One interpretation of this phenomenon put forth by some in the market is that periods of low volatility coincide with growth in negative skew

positions and, when coupled with lower liquidity, contribute to large volatility events. An alternative interpretation is that a smaller absolute change in the S&P could appear extreme in a low-volatility environment.

For example, the five standard deviation metric looks quite different using alternative parameters. As shown by the light blue line, the count of volatility events appears less unusual using three years of daily returns to calculate the baseline standard deviation.

Market liquidity and how its relationship with volatility has changed is at the center of this debate. The bottom-right panel summarizes some “takeaways” that we received at a recent workshop in New York attended by market participants using systematic investment strategies, electronic liquidity providers, and sell-side analysts.

On the one hand, some argued that the rise of pro-cyclical volatility-sensitive systematic investment strategies, combined with increasingly automated trading by nondealer market makers, has led to an environment where liquidity evaporates more quickly and significantly during times of market stress. This group used the phrase “liquidity is the new leverage” to summarize their views.

However, some highlighted that liquidity has always dried up in times of stress, even under the dealer-centric model of liquidity provision, as we observed in 2008. Others argued that there is enough heterogeneity among types of systematic strategies and that assets under management of such strategies are much smaller than those of actively managed funds, potentially limiting their aggregate effect on market conditions. It was also noted that electronic liquidity providers may have an economic incentive to step into the market when volatility increases in order to take advantage of wider bid-ask spreads.

All in all, there’s a lot we don’t yet understand about volatility events, their effect on financial stability, and the roles of liquidity and changes in market structure. However, as we have observed, volatility can spike quickly from low levels, and there are a significant number of sophisticated market participants who believe that the type of market dynamics we observed in February and December last year might be more intense in the next episode.

I will conclude with a few operational updates on reinvestment purchases, then turn to the swap lines before Lorie’s report on money market and reserve conditions.

First, on reinvestments, in light of the declines in interest rates since November last year, as shown in the top-left panel of your third exhibit, the Desk forecasts that agency MBS principal payments will exceed the \$20 billion cap sometime this summer. The current projection indicates principal payments of \$18 to \$21 billion per month from May through September, suggesting any potential MBS reinvestment would be modest in size.

Even if MBS principal payments stay below the cap, the Desk will continue conducting regular small-value operations of agency MBS in the to-be-announced, or TBA, market.

From now on, the Desk will conduct these MBS purchase operations using uniform MBS, or UMBS, rather than Fannie Mae and Freddie Mac securities, starting with the small-value operations scheduled between May 2 and May 13. The Desk conducted a small-value purchase of UMBS in the TBA market on April 4 to confirm its operational readiness to transact in this new security. The Desk is also currently revisiting its previous plans to convert some of the existing SOMA Freddie Mac holdings into UMBS, given recent changes to Freddie Mac's conversion process.

Beginning in October, based on the Committee's new and revised Balance Sheet Normalization Principles and Plans, the Desk will reinvest any MBS principal payments in Treasury securities through secondary market purchases, subject to a maximum amount of \$20 billion per month.

In terms of composition, purchases will be conducted across maturity sectors such that the distribution of monthly purchases will be roughly in line with the distribution of Treasuries outstanding until the Committee decides on a target for the longer-run composition of the SOMA portfolio and a transition approach to this target.

Purchases will be conducted on a mid-month-to-mid-month basis. The Desk plans to release a statement and a related set of FAQs in the last week of May. Lorie and I would be happy to take any questions on this.

Starting in May, the caps on Treasury redemptions will be lowered to \$15 billion from the current level of \$30 billion. For context, previous and projected redemptions and reinvestments of proceeds associated with maturing Treasury securities, as well as projected secondary market purchases resulting from MBS principal receipts, are shown in the top-right panel in the dark blue and light blue bars, respectively.

Regarding the swap lines, as discussed in the memo sent to the Committee on April 19, Steve and I request that the Committee vote to renew the North America Framework Agreement and applicable related agreements, or NAFA arrangements, with the central banks of Canada and Mexico. We also ask that the Committee vote to maintain the standing liquidity swap lines with the Bank of Canada, the Bank of England, the Bank of Japan, the European Central Bank, and the Swiss National Bank. All of our foreign central bank counterparts support the continuation of these arrangements. As shown in the middle panel, recent usage of the dollar liquidity swap lines has been low.

The network of bilateral standing swap lines with these five central banks promote global financial stability and confidence in global funding markets in times of stress. They have become an important feature in global financial markets. For example, as a safeguard ahead of Brexit, the Bank of England and ECB decided to

activate their standing sterling–euro swap line, offering to lend euro to U.K. banks on a weekly basis.

The standing liquidity swap lines also support the approach that the Federal Reserve, along with other major central banks, endorsed that there should be “no technical obstacles” to central bank capabilities to provide liquidity quickly to a systemically important financial market utility. As a reminder of this role for the swap lines, we also recirculated a 2012 memo highlighting the potential use of swap lines to address a dollar liquidity shortfall at a prominent central counterparty such as the London Clearing House, which is a major clearing house for U.S. dollar interest rate swaps and other types of U.S. dollar transactions globally.

It’s important to note that this reauthorization does not constitute automatic approval of any request to use the lines. All drawings related to U.S. dollar liquidity swap lines are subject to the approval of the Chair, while all drawings on foreign currency liquidity swap lines, and those related to the NAFA arrangements, require FOMC approval. The FOMC may unilaterally terminate its participation in the liquidity swap lines and the NAFA arrangements at any time with six months’ written notice. If the Committee chooses not to renew its participation in the NAFA arrangements, the related agreements would cease when they are currently set to expire on December 12.

Finally, a full list of upcoming and completed small-value exercises is located in the appendix.

MS. LOGAN. I’ll begin on exhibit 4 with a summary of reserves conditions and an assessment of the recent firming in money markets and then turn to considerations for a 5 basis point technical adjustment to interest on reserves.

As shown in the upper-left panel, reserve balances declined \$150 billion over the intermeeting period and reached a low point of \$1.46 trillion on April 23, the lowest level since December 2012.

As shown in the upper-right panel, the net decline in reserves stemmed from a reduction in the SOMA’s agency MBS and Treasury holdings of \$46 billion, bringing the asset side of the balance sheet down to \$3.92 trillion, and a shift in the composition of items on the liability side, predominantly related to the increase in the Treasury General Account, or TGA.

As is typical at this time of year, the TGA was volatile during the intermeeting period. In early April, the Treasury reduced bill issuance and allowed its balance at the Federal Reserve to fall in anticipation of individual tax receipts, which, when they came in, subsequently boosted the TGA to over \$400 billion after the tax date, causing reserves to fall sharply over the last two weeks of April.

In this environment, the distribution of rates on traded volumes in overnight unsecured markets shifted higher, including in the federal funds market. As shown in the middle-left panel, the effective federal funds rate rose to 2.44 percent, 6 basis

points below the top of the target range. On April 24, the effective was less than \$200 million in volume away from printing at 2.45 percent, 5 basis points below the top of the range, and, while not shown in the panel, the effective federal funds rate was at 2.45 percent yesterday.

Through our market outreach, surveys, and data analysis, four main factors have emerged as supporting this upward pressure.

First, the April 15 tax day caused broad-based deposit and money fund outflows and a large and rapid decline in reserves, resulting in more banks with reserve balances near their lowest comfortable level of reserves as reported in the February Senior Financial Officer Survey. Many of these banks responded by borrowing more in Federal Home Loan Bank, or FHLB, advances and overnight funding, particularly federal funds. The increase in advance volumes also drew down FHLB liquidity buffers, reducing the amount of cash FHLBs lent in the federal funds market.

The combination of broad-based deposit and money fund outflows and reserve declines of this magnitude is not a new phenomenon, and slight upward pressure on overnight rates has been witnessed in recent years around tax dates.

However, with reserves now \$542 billion lower than a year ago, many banks are operating closer to their lowest comfortable reserve levels, which appears to have increased the effect of these outflows on federal funds and other money markets. This seems consistent with having reached a level of reserves where the aggregate demand curve for reserves slopes gently upward. As shown in the middle-right panel, the spread between the volume-weighted average federal funds rate and IOER now shows a modest, but statistically significant, sensitivity to daily changes in reserve levels.

Second, while the decline in the aggregate reserve level was foreseeable, the distribution of declines across individual bank reserve balances was less so. In aggregate, reserve balances of survey respondents remained well above the total lowest comfortable level of reserves reported by those banks, as shown in the bottom-left panel. However, numerous individual bank reserve balances fell near their respective lowest comfortable reserve levels by period-end, suggesting that distributional frictions may also have contributed to the firmness of money market rates.

Importantly, the bulk of the surplus reserves relative to lowest comfortable reserve levels is concentrated at a few banks. For example, among U.S. G-SIBs, as shown in the confidential data in the bottom-right panel, surplus reserve balances are concentrated at the top two reserve holders, which together have roughly \$150 billion in surplus reserves, or over 30 percent of all surplus reserves held by survey bank respondents.

Third, elevated repo rates passed through to federal funds, as FHLBs shifted some of their liquidity investments out of federal funds and into repo, further reducing

federal funds volumes. Repo spreads, which are shown in the top-left panel of your fourth exhibit, were, in part, pushed higher because of tax-related outflows from government money funds, which reduced the supply of cash lent into repo markets. The firmness in repo occurred despite a reduction in Treasury bill supply of roughly \$100 billion.

Fourth, the benefit of the liquidity coverage ratio calculation for larger banks of borrowing from FHLBs, as well as more limited alternatives for regional banks to obtain short-term funding, increased the premium for federal funds. As demonstrated in the top-right panel, this premium can be seen in the spread between the median federal funds and Eurodollar rates, which now stands at 4 basis points. However, as shown by the growth in the light blue and green bars of the middle-left panel, the volume of transactions occurring at rates above IOER has increased in Eurodollars as well, suggesting that the firmness in money markets is not isolated to factors specific to LCR-motivated borrowing from FHLBs in federal funds.

Taken together, in an environment where more banks are operating closer to their lowest comfortable reserve levels, the broad-based reduction in reserves associated with the tax date expanded demand for funding and, at the same time, decreased the supply of lending in federal funds. Elevated repo rates, also heightened to some degree by the tax date, contributed to the upward pressure. Though a few banks lent some of their reserve surplus in repo markets in reasonably high volumes, this was insufficient to fully reduce repo rates or redistribute reserves.

As we look ahead, the effective federal funds rate seems likely to move slightly higher today given the April month-end date. Over March quarter-end, the effective increased by two basis points, before retracing the following day. Similar to the end of March, we expect demand for federal funds to temporarily increase from banks that calculate the LCR on month-end dates. Repo rates are also higher this morning as dealers contract their balance sheets for the statement date, which may also pressure federal funds higher. Additionally, as shown in the middle-right panel, staff estimates indicate reserves may decline \$48 billion today, to \$1.40 trillion, because of a \$30 billion maturity in SOMA Treasury security holdings and an expected modest rise in the Treasury's account balances.

After today's month-end, some of the factors that I described as having pressured federal funds rates higher should ease in the coming days, and others may diminish as banks find more permanent sources of funding or adjust their business models over time. However, it is also possible that this pressure could persist, as the effective has continued to remain at the new higher level rather than decline following increases before. Perhaps that's because these events have tended to reveal information and alter bargaining dynamics between borrowers and lenders of federal funds and in other funding markets. Additionally, as shown in the reserves projections panel, pressures may reemerge, as reserves are projected to decline further to new lows in the second half of May, and, with lower levels of reserves, large and rapid changes in individual bank reserve balances could prompt bouts of upward pressure similar to those witnessed recently.

In this context, and as noted first in the bottom panel, the staff assesses that a 5 basis point technical adjustment to interest on required reserves and interest on excess reserves would be appropriate at this time, reducing both rates to 2.35 percent. If the Board were to take this action, it would bring the IOER rate to 15 basis points below the top of the target range and 10 basis points above the bottom of the range and the overnight RRP offer rate.

As the effective federal funds rate nears a level of 5 basis points below the top of the range, the spread at which the previous two technical adjustments were made, expectations for another technical adjustment at this meeting have increased but, without a discussion in the March minutes, they remain lower than when previous adjustments were made.

Second, as with the previous technical adjustments in June and December 2018, an adjustment is intended to foster trading in the federal funds market well within the target range. By providing more space for the effective to trade above the IOER rate but within the target range as reserves continue to decline, a technical adjustment would provide time for the Committee to learn more about the effects of distributional frictions on money market rates, and if the gentle slope observable in panel 19 will steepen further as reserves fall to new lows.

Third, a technical adjustment would reduce the spread between the IOER rate and the overnight RRP offering rate to 10 basis points, the smallest since the introduction of the overnight RRP facility. At the moment, the staff do not assess significant risk of increased take-up at the overnight RRP resulting from this 10 basis point spread, because repo rates are trading well above the overnight RRP offer rate. However, if it becomes appropriate in the future to lower the IOER rate further, the Committee might first consider where to set the overnight RRP offer rate relative to the range in order to lower this risk.

For example, the Committee might wish to maintain the overnight RRP offer rate at a spread of 10 basis points below the Board's intended setting of the IOER. Keeping a sufficiently wide spread could mitigate the risk of a situation in which market overnight rates drop close to the bottom of the target range and usage of the overnight RRP increases substantially, thus lowering reserves in the banking system below levels that are considered ample. Of course, the Committee could also consider other approaches to lowering this risk such as imposing an aggregate limit on the capacity of the overnight RRP facility or widening the target range.

Finally, were a technical adjustment to be implemented following this meeting, it would be the first time such an adjustment would occur without a simultaneous increase in the target range. Lowering the IOER rate at a nontightening meeting could help to signal that the adjustment is solely technical, aimed at realigning market rates within the target range to reduce the risk that the effective would move persistently outside the target range.

There may be concern, however, with the “optics” of taking an action that deliberately lowers the policy rate, against the backdrop of the Committee’s current “patient” stance and recent discussion of preemptive, or “insurance,” cuts. Even so, a technical adjustment is relatively small in its effect compared with other factors moving short-term rates and would only serve to offset the recent rise in the effective federal funds rate. A change at this time, rather than between meetings, would have the benefit of concurrent communications at the Chair’s press conference emphasizing the status of the change as a technical adjustment and not a change in the stance of policy.

Thank you, Mr. Chair. That concludes our prepared remarks. We would be happy to take any questions.

CHAIR POWELL. Thanks very much. Before we turn to Q&A, I’d like to make a few short comments about the recommendation for the technical five basis point reduction in the IOER rate. I think there’s a good argument to be made for making the adjustment at this meeting. A revised version of the implementation note that reflects a change in the IOER rate was distributed yesterday. As in the past, the implementation note would be clear in stating that the Board acted to adjust the IORR and IOER rates to support the Committee’s intention that federal funds remain well within the range established by the FOMC.

I have a question, and then other questions, too. So if you look at charts 20 and 21, if I just look at the right chart, it suggests that excess reserves relative to lowest comfortable reserve level are concentrated in two firms, and I guess I wonder why a firm would want—in other words, it seems like we’re anticipating that redistribution will happen of these reserves that are above the lowest comfortable level.

But it seems like there’s some kind of a real preference, that they actually like these reserves. Do we have any reason to think that they will be—what’s our comfort level that they will be distributed in time for it to matter?

And then, second, if you look at the chart on the left, I guess it suggests that, if I’m reading this correctly, there are similar amounts of, call them “excess reserves,” in non-G-SIBs

and FBOs, big and small. So I guess I'm really asking, what's our level of comfort that there is a pool of reserves that will be fairly, in a timely fashion, redistributed so that we will get all the way to September?

MS. LOGAN. As you note when you look at panel 21, the surplus reserves are concentrated in those two firms, and if you look across other types of banking types that were included in the reserves condition report, it's similarly concentrated, even at those banks that are smaller. So in all the categories it's pretty concentrated.

In terms of how they are redistributing, we know that J.P. Morgan, for example, as repo rates have risen well above the IOER rate, has been doing a lot of activity transferring from reserves to repo, in light of the movement in rates, so that there is some redistribution taking place. But some of that activity might end up back at J.P. Morgan, given who they're doing their repos with. So the redistribution that is taking place may not be efficient to the banks that are close to their LCLoRs or trying to stay above them.

I would also note that we see from the survey and from our market intelligence that some of the banks with these high concentrations of the surplus have suggested that to redistribute an unsecured overnight market, they would do so only at rates well above IOER because of the capital charges associated with doing overnight unsecured lending. So I think that, for now, we're most likely to see the redistribution taking place through repo, and then that distribution may not be fully efficient to those firms.

I would note that in chart 20 we normalized it here in the ratios but, in dollar terms, most of the reserves are in one category on the left. So while the FBO or the non-G-SIB or the non-G-SIB smaller domestic banks are still in aggregate above their LCLoRs, it's small in dollar terms relative to the G-SIB category.

CHAIR POWELL. So, bottom line in mind, does it not seem, though, that there may be an equilibrium here where the reserves are just distributed in this way, and that you'll observe scarcity even though some banks say they have more than they need, but they're not trading away from them—they're just sitting?

MS. LOGAN. It may just take rates to move pretty high in repo or fairly significantly in unsecured rates in order to get that redistribution to take place, to incent them to do so. So I would say that we are seeing some redistribution. So I think that's very positive to how the system is working, but it's not fully efficient redistribution.

MR. POTTER. I think the discussions we've had with the bank on that—if rates are high enough, they will be lending out quite a lot of cash, and, as Lorie said, that cash, through however the system works, might come back to them because we don't control where the cash goes after it's lent out.

I think one of the criteria there will be what their payment flow looks like. So not to make it sound worse, but if the payment flow gets more noisy at that bank, then the lowest comfortable level that we survey could actually go up. One of the things that might happen as reserves get lower is that the predictability of payments will drop. The reason they dropped from about \$100 billion to \$80 billion in reserves was because they felt more comfortable with the payment flows during that time.

CHAIR POWELL. Other questions? President Rosengren.

MR. ROSENGREN. On a related topic, when we estimate where we're getting to the steep part of demand for reserves, do we have a model that takes into account, perhaps, this preferred habitat of some banks, or do we just assume that the spreads that are here don't persist and go away?

And a second question is about the volatility that I see in 22, in which it looks like there are more spikes since the beginning of this year than there were in previous periods. Is there anything to read into that volatility, or, as I've combined the Chair's comments with seeing a little bit more volatility here, does it give us less confidence about where the steepness occurs and how long we can wait before we have to expand our balance sheet?

MR. POTTER. Right now, we'd estimate for every \$100 billion dropped in reserves, the volume-weighted federal funds would go up 1 basis point. So we've got plenty of space. What we have seen is that the slope has increased over the past two years. So, first, it wasn't a significant slope. Now it is definitely statistically significant, and one of the issues we're tracking is, is that going to keep on rotating up.

Relative to the LCLoR numbers that we use where we just add those up, it's hard to know. That doesn't take account of what the distributional issues were and how hard it might be for banks to maintain those ratios.

MS. LOGAN. Just in terms of their repo volatility that we're seeing on this chart, we have seen since the year-end more volatility on the month-end statement dates. The year-end, I think you recall from a previous presentation, was very high. We had a couple of factors noted for that. One is that dealer positioning of holding Treasury securities is very high historically right now, and when that positioning is high, then repo rates tend to react to that because they fund that in repo. And, second, there was some coincident Treasury settlement taking place on that day.

I think the other thing that we're learning, though, is, as they anticipate that the month-end date may be high, they pre-position before that. So it's not just that the statement date volatility is just taking place on the statement date; it could be happening in the days around that

as well as there's more pre-positioning and volatility. So it's a little bit unclear to us exactly why the volatility is taking place around the statement dates, and it's not just that one day. It's a couple of days around it.

MR. POTTER. The chart is actually showing around those days. If you show the days, it's a little bit steeper. Today I think it's going to be, what, probably 40 basis points above interest on reserves.

CHAIR POWELL. President Daly.

MS. DALY. I want to just follow up on Chair Powell's question. Looking at chart 21 for context—so if we looked at a different time period, would we see a similar type of distribution tilted, and then we'd see it resolve in the way that we think it will, that they'll trade?

MS. LOGAN. I think in the pre-crisis period, there was just a lot more trading in federal funds or in overnight unsecured markets. So I think the distribution of reserves was a much more efficient system. Post-regulatory change and—then because of all the reserves in the system, there's just not an active federal funds market. The federal funds market is largely this FHLB-related market.

And I think what we've been hearing from some of these institutions is that to trade in overnight unsecured and federal funds, the rates would have to be pretty high to induce them to do that, given the balance sheet costs.

MS. DALY. Okay. So we could see this persist unless those adjustments occurred?

MS. LOGAN. I think so.

MR. POTTER. But banks should look at this, look at the business model, look at the deposits, the term funding. They should be adjusting to this. It's not our job to adjust it for them, but they should be adjusting and learning from this pattern.

MS. DALY. Right, but am I right about—I'm just asking for clarification. The speed at which they do that is unknown to us?

MR. POTTER. Exactly.

MS. DALY. Okay.

CHAIR POWELL. Other questions? President Bullard.

MR. BULLARD. Could I get clarification of what's being requested on the swap lines?

MR. POTTER. For the NAFA ones, we would like you to renew those lines. That's with Mexico and Canada.

MR. BULLARD. Okay.

MR. POTTER. For the standing swap arrangements, we'd like you to maintain those. They do not have a contract date like the NAFA ones where they expire, but you have the option at this meeting to tell us that you would not like to continue with those, and, after six months, we and our counterparties can at that point walk away from them.

MR. BULLARD. So the NAFTA is up for—

MR. POTTER. Renewal.

MR. BULLARD. —renewal. Does that affect us at all in the Congress?

MR. POTTER. I apologize. The USMCA, no. These are separate arrangements that we have with the Bank of Mexico and

MR. BULLARD. So we refer to NAFTA when we talk about this, but it doesn't have actually anything to do with the treaty itself?

MR. POTTER. It's the North American Framework Agreement and other documents, which is associated with NAFTA, but—

MR. BULLARD. And was not renegotiated as part of the new—

MR. POTTER. There have been aspects of the Treasury swap line with the Bank of Mexico that have been changed. That's gone from \$3 billion to \$9 billion, and there are some terms in that that we are looking at right now because we execute on that swap line for the Treasury—the debt.

MR. BULLARD. What is the policy with respect to other possible swap lines? During the crisis we opened up other swap lines. Are we maintaining that policy as well by voting for this today?

MR. POTTER. No. No, we are not. This just relates to the standing swap lines and the NAFA swap lines. It has no relationship to any other possible swap line. These are the set of swap lines we have.

MR. BULLARD. So you would come to the Committee if we wanted to open up others?

MR. POTTER. It is something the FOMC decides. It's not something the Desk decides. One thing I'll note is, the growth of swap lines among central banks is quite large, and at some point we should brief you just on how many swap lines are out there between central banks, I think, following some of the models that the Federal Reserve put in place in 2007 and '08 with the major central banks.

MR. KAMIN. We frequently get inquiries from foreign officials about the availability of a swap line for them, and we always caution that that is a decision of the FOMC and that, though we provided those during a crisis situation, the FOMC does not regard the current situation or however it has been in the past few years as a crisis situation, and their inclination is not to expand the network.

CHAIR POWELL. The question is generally expressed in the following form: "I know you're going to say 'no,' but I have to ask." Vice Chair Quarles.

MR. QUARLES. So how will this decision be communicated?

MR. POTTER. To a counterpart?

MR. QUARLES. To—no, not to our counterparts. I assume we'll tell them that. But to the world.

MR. POTTER. This will appear in the minutes of—

MR. QUARLES. It will appear in the minutes. It's not like a separate press release or something, but it will be noted in the minutes that we have done this.

MR. POTTER. Correct.

MR. KAMIN. And then we will be reauthorizing it in January as part of the foreign—

MR. POTTER. Yes.

MR. KAMIN. —currency authorization.

MR. POTTER. Which makes people's heads spin, but we authorize the Desk to do this in January. But you can have the agreements lapse with the other central banks at this time of the year because that gives us a six-month runway.

MR. QUARLES. And there was no particular reaction when we authorized in January?

MR. POTTER. There is not particularly for the swap lines. With the other major central banks, it's viewed as part of the fabric of the global financial system.

CHAIR POWELL. President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman. Back to the topic of the reserve levels, I think you may have said this, Lorie, and I apologize if I missed it. Assuming that the Committee goes ahead and makes the 5 basis point technical adjustment today, are you expecting that the Committee will need to do that again between now and September, or how would you handicap that?

MS. LOGAN. I think that, as I said, if you go back to chart 25, you will see that there will be another fall in reserves at the end of May. And then, looking ahead, there will be another decline going into the July FOMC meeting. After that point, it's very hard for us to do projections, because we're not sure how the Treasury is going to respond to managing the debt ceiling. So I think we'd be very hesitant in our projections up to that period.

I think that over this next intermeeting period, the technical adjustment will give you plenty of room to learn more about how the money markets respond to this volatility in reserve levels, and I think at that point we can come back with that experience and be in a better position to think about how money markets might respond to that next drop in reserves.

MR. KASHKARI. Okay. But I guess what I'd take from that is, I'm not hearing alarm in your words or your tone, that you're all really concerned about this, or that we're in kind of a dangerous area right now.

MS. LOGAN. No, I think we're seeing some signs of firmness across money markets. They're playing out more predominantly in federal funds, given the nature of that market. We're seeing some in Eurodollars as well, but nothing too concerning at this point. It's a very gentle slope, and I think the next intermeeting period will give us an opportunity to learn more about the volatility of reserves at this level, and then I think we can do another assessment and then share that with you at the next meeting.

MR. POTTER. But we are descending to reserve levels we haven't seen since 2012 or maybe 2011 coming up, and we are trying to be careful.

MR. KASHKARI. Thank you.

CHAIR POWELL. Vice Chair, with a two-hander.

VICE CHAIR WILLIAMS. Yes. I mean, I think that this is a good question, but this picture also shows us that we're in a good place. We have about two months of no downward trend in reserves, at least according to our forecast, but quite a bit of volatility. And this is getting back to President Daly's question and Lorie's answers to some of these questions. This is going to be a good time for us to reassess the alternative stories about what's happening, how much redistribution we see.

But why it's a good time is because it's not going to be a time when reserves are overall shrinking by a lot. So I do think over the next few months we're going to get a much clearer picture about what's happening and maybe a better diagnosis of where the demand curve for reserves really is.

CHAIR POWELL. Governor Clarida.

MR. CLARIDA. I've seen these charts before, but I never noticed. On exhibit 25, is it just a coincidence that there are these sharp downward spikes right before our FOMC meetings? And, if so, maybe we should adjust our calendar. [Laughter]

CHAIR POWELL. Or have fewer meetings.

MR. CLARIDA. Coincidence?

MS. LOGAN. That's largely coincidental. I mean, I think our Treasury maturities are in the mid-month and the end of the month. So they do look around, but I think it's largely coincidence.

CHAIR POWELL. Other questions for Simon or Lorie on anything, not just on the—

MR. POTTER. Well, on the Desk briefing. [Laughter]

CHAIR POWELL. On the Desk briefing. Okay. [No response] Seeing none, I'm now going to ask for separate votes on the renewal of the NAFA arrangements and the liquidity swap

arrangements. Of course, only current FOMC members may vote. Let's start with the NAFA arrangements, our standing swap lines with Canada and Mexico. Do I have a motion to approve?

VICE CHAIR WILLIAMS. So moved.

CHAIR POWELL. Any comments? [No response] All in favor. [Show of hands] Any opposed? [No response] The renewal of the NAFA swap arrangements is approved. Now for the renewal of the liquidity swap arrangements. Do I have a motion to approve?

VICE CHAIR WILLIAMS. So moved.

CHAIR POWELL. Any comments? [No response] All in favor. [Show of hands] Any opposed? [No response] The renewal of the liquidity swap arrangements is approved. Finally, we need a vote to ratify the domestic open market operations conducted since the March meeting. Do I have a motion to approve?

VICE CHAIR WILLIAMS. So moved.

CHAIR POWELL. All in favor. [Show of hands] Thanks very much. Let's now turn to a review and discussion of the economic and financial situation. Stacey Tevlin, Beth Anne Wilson, and Bill Bassett will provide the briefings. Let's give people a minute to get set before we start. [Pause]

CHAIR POWELL. Okay. Let's go ahead. Stacey, over to you.

MS. TEVLIN.³ Okay. My materials are in the packet that says "Material for Briefing on the U.S. Outlook." Since our previous meeting, the growth picture has improved, but inflation has come in softer. I'll start with the latest price data. Panel 1 shows a version of a chart that Chris Nekarda presented in his Board briefing last week. The dashed line shows our March Tealbook projection of the monthly change in core PCE prices, expressed at an annual rate, while the three dots show the considerably weaker readings for January through March that we received since then.

The key question, of course, is, how much of the weakness is transitory and how much, if any, we should take as a signal that the trajectory of inflation is lower. Typically, we don't take much signal from a miss in any one month. For three

³ The materials used by Ms. Tevlin are appended to this transcript (appendix 3).

consecutive months of downside misses, however, we need to dig deeper to see if the detailed data can shed light on whether the surprises were idiosyncratic and perhaps transitory. In the current circumstance, there are a couple of price categories—for instance, portfolio management and apparel—for which we can make a reasonable case that the misses were idiosyncratic. But there were also a number of downside misses that have no special stories attached to them.

Another way to sort through these incoming data is to consider alternative inflation measures that attempt to reduce or eliminate the influence of idiosyncratic relative price changes. One such measure uses a factor model to try to identify shocks that are common across detailed categories of prices. The common component from that model, shown by the blue line in panel 2, moved down much less than core inflation in February and ticked up in March, as the model attributed much of the core inflation decline to idiosyncratic movements. Another such measure, the Dallas Fed's trimmed-mean series, edged down in January but has moved back up to 2 percent. We read these smoother measures as suggesting that we should take just a portion of the recent lower data onboard as signal.

Accordingly, as you can see back in panel 1, we have penciled in a partial bounceback in inflation as some of the recent surprises get reversed, which boosts our monthly inflation projection a little above our March forecast in coming months. Even so, because we have not completely reversed the incoming surprises, the 12-month change in core PCE prices—the solid red line in panel 3—which fell to 1.6 percent in March, moves up only gradually and remains below our previous projection through the end of the year. We now expect that the 12-month change in core PCE prices will be running at 1.8 percent by the end of the summer and remain at that level through year-end, with total PCE inflation—the black line—expected to run roughly in line with core.

Panel 4 summarizes our updated near-term outlook. As shown in the top line, GDP rose 3.2 percent in the first quarter, well above our expectation in the March (and April) Tealbook. However, much of this strength reflected a large contribution from net exports and a sizable buildup in inventories (lines 6 and 7). We expect the contributions coming from these two categories to move lower this quarter. Private domestic final purchases, line 3, contributed just 1.1 percentage points in the first quarter, but we expect growth in this component to step up this quarter. Overall, we continue to think that output growth is in the process of slowing from the 3 percent pace posted over all of last year. Over Q4, Q1, and Q2, we look for GDP growth to average 2.3 percent—the rightmost column. This average is up two-tenths relative to March, though I would note it is still down three-tenths since our January projection.

In this projection, we made two consequential changes to the assumptions that underlie our forecast. The first, our new policy rule, which we use mechanically to set our path federal funds rate path, is discussed on your next exhibit. Our decision to change our policy rule was a response to our view that the rule was not meeting all the objectives that we set for it—objectives that are laid out in panel 5. First, our policy rule should be a transparent mechanism so that policymakers can see what we

are doing and there is no appearance that we are trying to manipulate the policy debate. Second, the rule should generally be unchanging from round to round, so that it does not distract from inference about what is happening in the economy. Third, it should be consistent with any guidance or communication that the FOMC has given about how rates are being set, so that it gives a decent projection of what will actually happen. And, finally, the staff policy rule should yield a reasonable overall economic projection that can be the basis for a useful Committee discussion.

As had become increasingly apparent, our previous rule was no longer meeting these final two objectives. In the March Tealbook, for example, our assumed rule-based policy rate path—the blue dashed line in panel 6—was considerably steeper than the path implied by the median responses from the March SEP, the circles. And the immediate rate hikes implied by our old rule were at odds with the Committee’s “patient” language. This discrepancy masked the fact that our underlying economic projection was much stronger than the Committee’s—a situation that muddled comparisons.

These considerations led us to modify our assumed rule, as described in panel 7. We considered a variety of ways to change the rule but, in the end, decided simply to make it less responsive to resource utilization. There are a number of reasons that the median policymaker might appear to be downweighting the output gap. We are not taking a stand on the precise reasons but view our new rule as able to encompass a number of them. Let me also make clear what our rule is not. The rule is not necessarily optimal policy, nor is it likely to align with Committee actions under all economic conditions. Indeed, there may be a more complicated policy rule that would characterize this Committee’s policy behavior under most conditions. But if there is, we haven’t yet uncovered it, and our current rule can be thought of as a local approximation to some global rule. This change to the policy rule results in a much flatter trajectory for the funds rate over the forecast period, the solid blue line in panel 6, which in turn lowered our projected paths for longer-term interest rates and the exchange value of the dollar and boosted the path of equity prices.

The blue portions of the bars in panel 8 isolate the overall effect that this change to the policy rule has on the level of GDP in each year of the projection. By the end of 2021, the revisions to financial conditions implied by the new rule raise the level of output about 1 percent above our March forecast. Note that if we had taken on only the revisions represented by the blue bars, we would have ended up with GDP growth rates that seemed too high to us, based on our understanding of the macro shocks hitting the economy and how they are likely to evolve.

As it turns out, a portion of this upward revision was offset by several other changes we made to the projection in this round. First, we took onboard the downward revision to measured household wealth for last year that was reported in the most recent release of the Financial Accounts of the United States, and we also took on higher oil prices. Together, these two factors, which are included in the red portion of the bars, shaved about $\frac{1}{4}$ percent off of the level of output by the end of the medium term. Second, we also took the opportunity to assess other aspects of our

procedures that may have been providing unnecessary lift to our projection. This assessment did not yield a single “smoking gun” as to why our projection had more underlying momentum than many other forecasts. But we did find a few small areas, shown by the gray portions, which, taken together, led us to shave another couple of tenths off of the level of output by the end of 2021. Putting all these pieces together, the level of real GDP at the end is about 0.6 percent higher than in our previous projection.

As shown in panel 9 of your next exhibit, with the output gap widening somewhat further in this projection, the unemployment rate is expected to edge down, ending the projection at 3.5 percent. I would note that the revision we made to the unemployment rate in this projection is smaller than what a straight read of our standard Okun’s law relationship would imply, because we continue to assume that in a tight labor market, further increases in labor demand will be partly met by a larger-than-typical increase in labor force participation.

Some of this decline in the unemployment rate may be reported on Friday, when we receive the April employment report. We are projecting the unemployment rate will edge down from 3.8 percent to 3.7 percent. The data we have in hand on April employment, produced by the payroll processor ADP, are shown by the black line in panel 10 and currently point to job gains of 139,000 based on data through April 20, which suggests the second quarter got off to a reasonable start.

The continued tightening of the labor market is expected to put further modest upward pressure on core inflation, as shown by the red portions of the bars in panel 11. The bars in this exhibit decompose past and projected core PCE inflation into the contributions of various fundamental determinants. The recent low inflation readings that we have received and that I discussed in exhibit 1 leave 2019 core inflation lower than we can explain in terms of fundamentals; this is captured in the figure by the yellow region of this year’s bar. We have not carried any of this unexplained weakness into next year. A deviation from fundamentals of this magnitude is not especially unusual and, typically, is not persistent.

This panel also shows the other consequential change we made this round to the way we put together the staff projection. As you can see from the gray regions of the bars, the staff assumption for the underlying rate of inflation—the rate we think inflation will return to, absent slack or supply shocks—is constant at 1.8 percent through 2021; in previous rounds we had it edging up toward 2 percent. With little evidence that inflation expectations—which we think are closely related to underlying inflation—are trending higher, we think that a flat trajectory is a more sensible assumption. (Thomas will show measures of inflation expectations in his briefing later this afternoon.) All told, we now expect that core PCE prices will rise 1.9 percent in both 2020 and 2021 as continued tightness in resource utilization offsets a small drag coming from import prices and pushes core inflation slightly above its underlying level.

And, finally, for a few years we have been showing various economic indicators, usually the unemployment rate, broken out by race and ethnicity. Today I'd like to highlight another indicator. Recently, the Board's staff have used data from the Financial Accounts of the United States and the Survey of Consumer Finances to produce a set of Distributional Financial Accounts, or DFAs. The DFAs provide the first timely, quarterly, high-quality measure of how wealth is distributed across households. It is a rich data set with many interesting results, but for now, panel 12 provides just one interesting cut of these data. Specifically, the chart shows the evolution of average household wealth since 2004 by race and ethnicity. In addition to highlighting the large absolute differences in per-household wealth holdings that exist across some of these groups, these data indicate that these discrepancies have widened noticeably further in the past three years. With that, I'll turn it over to Beth Anne.

MS. WILSON.⁴ Thank you, Stacey. I can literally say without exaggeration that this forecast is hot off the press. This morning we got critical real indicators for a daunting number of economies, including the euro area, China, Canada, Mexico, Taiwan, and Korea. And it was a decidedly mixed bag. On the plus side, first-quarter euro-area GDP rose 1½ percent from below 1 percent in Q4. And after Chinese GDP came in at a strong 7.3 percent in Q1, today April official Chinese PMI data retraced only a bit of their March surge. On the minus side, however, the flash GDP release for Mexico showed a contraction in the first quarter (as did Korea's advance release last week). The perplexing decline in Mexican GDP is enough to drag our estimate of aggregate foreign GDP growth (the solid line to the left) down a bit further in the first quarter. But with growth picking up in the two big regions—China and the euro area—that were particularly concerning for global risks, faint hints of improvement in global trade, and expectations that some of the Q1 weakness will be transitory, we see global growth bottoming out and moving up.

Our expectations for the path of inflation, primarily thanks to rising oil prices, look a touch higher as well. In addition, although medium-term risks endure, some acute near-term threats, including that of an imminent trade war with China and an abrupt no-deal Brexit, have waned. That said, certainly compared with September and even December, the path of foreign real GDP growth and inflation in the Tealbook is more subdued. Moreover, as seen in slide 3, even this softer outlook is predicated on significantly more monetary policy accommodation, as judged by both market expectations and our own projections and, in some cases, greater fiscal stimulus.

The revisions to the interest rate and output paths Stacey just described for the United States have also left a "footprint" on the international forecast (discussed on slide 4). For starters, the more robust U.S. outlook and lower interest rates provide some boost to foreign growth in coming years. And the lower U.S. interest rate path means less dollar appreciation (shown to the left), putting the level of the dollar about 2¾ percent lower at the end of 2021 than in March. On balance, these changes have

⁴ The materials used by Ms. Wilson are appended to this transcript (appendix 4).

raised our projection for exports (in the middle) and boosted imports (on the right), though not enough to overcome the negative surprise of the first-quarter data. And we are left with a roughly neutral net export contribution to GDP, on average, over the forecast.

Having so dispensed with the international forecast, on the next slide I would like to take a moment to celebrate this day in history. On April 30, 1859, the first weekly installment of Charles Dickens's *A Tale of Two Cities* was published, the abridged initial sentence of which famously reads, "It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness . . . it was the spring of hope, it was the winter of despair." Clearly, Dickens was confused or a splendid two-handed economist. [Laughter] Either way, what better introduction to a discussion of uncertainty?

For over two years, the International Finance Division has been spearheading a network to study global risk, uncertainty, and volatility, or GRUV. Within the Board and beyond, we have shared research and thinking on fundamental sources of uncertainty (that is, macro, policy, political), how these are measured, and how they affect financial markets and the real economy. This work was inspired, in part, by listening to conversations around this table. Today I'd like to tell a "Tale of Two International Uncertainties," highlighting our efforts to understand the economic effect of uncertainty about foreign economic growth and about trade policy.

Uncertainty about economic conditions abroad is frequently mentioned as a risk, a crosscurrent, or a headwind to the U.S. outlook. However, there is little empirical work linking foreign uncertainty to U.S. economic conditions. To begin, slide 6 presents three uncertainty metrics: the ubiquitous text-based measure of economic policy uncertainty, EPU, created by Baker, Bloom, and Davis; a financial market-based metric, the VIX; and an econometric-based measure of real economic uncertainty, REU, which measures whether the economy has become more or less predictable month to month. This measure is based on a 2015 AER paper by Jurado, Ludvigson, and Ng and recent work by Ludvigson, Ng, and Sai Ma at the Board.

Note that the VIX, although calculated for U.S. equity prices, is almost perfectly correlated with implied volatility abroad. But we have both foreign and domestic measures for the EPU and REU, using the global EPU produced by Baker, Bloom, and Davis and building our own measure of foreign real economic uncertainty, using the same methodology as Ludvigson and others. To do this for a broad range of indicators for the foreign G-7 economies plus Switzerland, we construct monthly forecasts using an even broader range of real and financial variables. The volatility of these forecasting errors averaged gives us an idea of the uncertainty of the real economy each month. The country-specific REUs are aggregated into a single foreign series, shown in the bottom panel.

As can be seen, all three types of measures share some common spikes but appear to be capturing different aspects of uncertainty. In particular, the more sentiment-based uncertainty measures, the EPU and the VIX, are more volatile and have moved

up notably in the past year, especially the global EPU, reflecting concerns about the policy and growth environment abroad. In contrast, the more objective REU measures have stayed subdued, suggesting that, for all the sturm and drang, the underlying behavior of the economy has not been that unusual.

Slide 7 shows the effect of a one standard deviation shock to each U.S. uncertainty measure on U.S. IP and equity prices, estimated from a standard monthly VAR that includes the usual cast of financial and real characters. For all U.S. measures, an increase in uncertainty is associated with a decline in industrial production (the left chart). However, the decline is much more pronounced and statistically significant for the REU measure. Shocks in all the uncertainty metrics also weigh on equity prices (on the right).

With this set-up, slide 8 addresses the motivating question, how has uncertainty about foreign economic conditions weighed on the U.S. economy? Including the VIX and domestic and foreign REU in our VAR, we evaluate the effect on U.S. IP of a one standard deviation increase in foreign REU. As seen to the left, foreign economic uncertainty has a significant negative effect on U.S. IP (the brown line). Performing the analogous exercise for foreign EPU, we also observe a negative, though smaller, effect (in teal).

How can we assess recent developments in light of these results? The chart to the right shows that foreign real economic uncertainty has moved little over the past year, suggesting only a modest effect on the United States now through this channel. In contrast, the global EPU has jumped sharply, pointing to a potentially larger hit. We are hesitant to take these figures too literally, but the results provide more concrete evidence that uncertainty regarding economic conditions abroad has negative consequences for the U.S. economy.

I now turn to the second tale of international uncertainty, that of trade policy (slide 9). As seen to the left, since the middle of last year, world GDP, IP, and trade have slowed sharply, prompting concerns that this may reflect the drag due to higher tariffs and greater ambiguity regarding trade policy. Many factors may drive the global declines, however, and it has been difficult to find a clear link between economic outcomes and uncertainty about trade policy. A research paper by my IF colleagues, “The Economic Effects of Trade Policy Uncertainty,” synthesizes much of the work we have done on this topic. Dario, the two Andreas, Matteo, and Patrick, or DAAMP—their suggestion, not mine—begin by building two text-based measures of trade policy uncertainty, or TPU—an aggregate index based on word searches of major newspapers (the teal line on the right) and a firm-based measure constructed by searching the transcripts of quarterly earnings calls of thousands of listed firms (seen aggregated in brown). By both metrics, trade policy uncertainty has soared since the end of 2016.

Estimating the effect of this uncertainty on the economy is challenging, as aggregate indexes of trade policy uncertainty showed little variation for decades before the current spike. DAAMP come at this problem in three ways. The first is to

extend the measure of aggregate TPU to exploit variation in trade uncertainty associated with sizable shifts in trade policy during the Nixon and Ford Administrations, as well as recently. This series allows them to identify a significant effect of TPU on aggregate U.S. investment, the magnitude of which implies that the recent jump in TPU may have lowered investment 1½ percent, seen in line 1 of the table.

The second approach exploits the fact that firm-level variation in trade policy uncertainty is often sizable, even when aggregate variation is small. From the results of firm-level investment regressions, including firm TPU and some additional calculations, they quantify the hit to U.S. fixed investment from the recent spike in TPU to be 1 percent (line 2).

The third approach uses a novel open-economy DSGE model incorporating domestic tariffs, retaliation, and uncertainty about future tariffs. With this calibrated model, DAAMP are able to assess how the recent lengthy anticipation of tariff hikes and the general rise in uncertainty about trade policy can affect demand. The results of the model (line 3) again suggest a combined negative effect on investment of about 1 percent over a few years.

The approaches differ, but the results are remarkably consistent—a modest 1 to 1½ percent drag on the level of investment over several years, which, given the share of investment in the U.S. economy, translates into a hit to GDP growth of around a tenth a year.

Why, then, have concerns about uncertainties posed by trade policy seemed so proximate, including by many of your corporate interlocutors? DAAMP's work may help shed some light on this. As discussed in slide 11, the effect of trade policy uncertainty, though modest in aggregate, has hit certain industries and firms particularly hard. The scatterplot shows industries with a higher proportion of firms mentioning TPU in their earnings calls last year (the *x*-axis). These firms saw much weaker investment growth (the *y*-axis).

Moreover, for TPU-affected individual firms, the drag on investment has been hefty. For the 10 percent of firms that cite TPU in their earnings calls, the subsequent decline in investment is estimated to average about 20 percent over the first year. This result likely generalizes—for industries and countries abroad that are more open and have been more targeted by trade policy, the effects of TPU could be more sizable. Thus, although the research here and other evidence suggest that, so far, the rise in trade policy uncertainty is unlikely to explain the bulk of the global slowdown in trade and GDP, our analysis points to greater risks should trade uncertainty broaden.

Stepping back, while this briefing may feel like a novel, it is really just the first installment of our GRUV-y tale. We will continue to push forward in our efforts to understand global risk, volatility, and uncertainty. But, for now, it is a far, far easier thing I do, to hand it off to Bill Bassett. [Laughter]

MR. BASSETT.⁵ Thank you, Beth Anne. My materials are titled “Material for Briefing on Financial Stability Developments.” As you know, the Board will be publishing its second public *Financial Stability Report* in the next few days. This briefing pulls generously from the work by System staff and the authors in preparing that report and also the work on vulnerabilities from elevated business debt done earlier this year. Although business debt remains a concern and major financial asset prices have increased in recent months—with some stock market indexes touching nominal record highs—the continued resilience of the household sector and key financial intermediaries suggest a reasonably limited potential amplification of shocks.

Many indicators of valuation pressures have returned to the fairly high levels seen before the significant easing of those pressures last December. For example, the forward price-to-earnings ratio of S&P 500 firms (chart 1) has moved back noticeably above its historical median. Meanwhile, spreads on high-yield corporate bonds (the black line in chart 2) are well below their median values over the past 20 years. Spreads on leveraged loans (chart 3) have taken longer than other financial assets to recover from the December “risk off” episode and remain above their historical medians, but they continue to slide downward. In real estate markets, incoming data on residential home prices point to continued but somewhat slower growth, and commercial real estate prices (chart 4) have shown signs of cooling in recent data. However, home-price-to-rent ratios are running somewhat above a staff estimate of their trend, and CRE capitalization rates remain very low.

As shown in chart 5, the story of nonfinancial-sector leverage continues to be divergent. Household debt outstanding has grown at a slower pace than GDP (the orange section) for more than a decade. In contrast, the ratio of noncorporate business debt to GDP (the red area) is relatively unchanged, and the ratio of corporate debt to GDP recently hit an all-time high (the purple area). Even so, the cumulative scale of the increase in this ratio pales in comparison to the increase in household debt in the mid-2000s, and business debt growth has slowed recently.

Nonetheless, the composition of newly issued business debt also appears to be getting riskier. Net issuance of leveraged loans has been solid since a temporary pause around year-end, and the riskiness of those loans continues to increase: The share of new loans having debt-to-EBITDA multiples of six times or more, the red bars in chart 6, rose to more than 40 percent in the first quarter. If sustained, that fraction would be by far the largest, eclipsing the previous annual peaks in 2007, 2012, and 2018.

Chart 7 shows the share of outstanding corporate bonds by credit rating, both now (the red bars) and compared with 12 months ago (the dotted outlines). Net issuance of junk bonds has been subdued in recent months, which has led to a small decline in the share outstanding for that category. However, the continued buildup of bonds at the lower end of investment-grade, which has created a so-called triple-B cliff, is a

⁵ The materials used by Mr. Bassett are appended to this transcript (appendix 5).

vulnerability—that is, the risk that an economic downturn combined with already high leverage could create an avalanche of newly downgraded junk bonds that would significantly increase the amount of below-investment-grade debt relative to the demand for that type of debt.

Of course, the financial position of the holders of business debt is an important factor in considering the ultimate consequences of a large wave of corporate downgrades. Life insurance companies are the largest institutional holders of corporate bonds and have maintained leverage ratios—the blue line in chart 8—at about the middle of their 20-year range. While life insurers are not required to mark their holdings to market, a wave of downgrades would have significant negative effects on their regulatory capital ratios and perhaps market confidence in their financial condition. On a brighter note, bank capital levels (not shown) have declined only a little from their post-crisis highs despite higher payouts the past few years. As discussed in the special topic memo distributed in February, the staff believes that banks are well positioned to absorb even quite significant losses should they emerge from the risks they are taking in business lending. Moreover, confidential data on hedge fund leverage indicate that it declined materially during the market swoon at the end of last year, and the most recent SCOOS suggests that there was not a resurgence of leverage in that sector during the first quarter. Taken together, the staff continues to assess vulnerabilities from financial leverage as low overall.

Vulnerabilities from liquidity and maturity transformation in the financial system also seem little changed at a relatively low level. We remain cognizant of the structural vulnerability inherent in the ability of investors to withdraw funds from debt mutual funds far more quickly than the underlying assets can be sold and settled. As shown in chart 9, bank loan funds have continued to sustain moderate outflows through the first quarter of 2019 after having experienced record outflows in December. Nonetheless, the market has continued to function well, and secondary market prices of loans have largely retraced their earlier declines. Meanwhile, high-yield bond funds have seen consecutive months of meaningful inflows for the first time in more than two years.

In recent years, we have been highlighting the move away from prime money market funds after the SEC reforms were put in place at the end of 2016. However, with the rise in interest rates, it appears that investor appetite for retail prime money funds—the light blue area in chart 10—is clearly increasing. And assets of institutional prime funds—in dark blue—grew about 16 percent last year, though they still remain just a fraction of their previous highs. Likewise, we are increasingly hearing about deposit pricing pressures from banks, but we still see the high levels of liquid assets and decades-low reliance on short-term funding instruments at those firms (chart 11) as significant sources of resilience.

Finally, turning to chart 12, we are closely studying potential risks to financial stability from the increased interconnectedness created by bank lending to nonbank financial firms. This chart shows that the rapid growth of such commitments in the past six years has resulted in a nearly 80 percent cumulative increase to about

\$1.3 trillion, of which roughly half is undrawn. As we focus on the dark blue and beige regions at the bottom, note that almost \$400 billion reflects financing of standard business, real estate, and consumer finance companies that are mostly small and diversified. Two other areas, however, may reflect additional bank exposure to risky business debt. Specifically, moving up the stack a bit, the gray area shows the substantial growth in financing provided to special purpose entities, which include facilities supporting CLOs and asset-backed securities. In addition, the still-thin but widening slice of red at the top represents exposure to private equity, business development corporations, and credit funds, which in turn are important direct providers of business credit. The staff continue to monitor and learn more about banks' activities in this diverse and rapidly growing business line.

In sum, the staff continues to see low financial and household leverage combined with contained funding risks working to offset concerns about high asset valuations and elevated corporate indebtedness. That concludes our prepared remarks, and we would be happy to address any questions.

CHAIR POWELL. Thank you. Questions for our briefers? President Kashkari.

MR. KASHKARI. Thank you, Mr. Chair. Stacey, I've got two questions for you. You made two big changes that you talked about in the Tealbook. One is the policy rule, and the second was your view of underlying inflation. I applaud you for both of those changes, so I appreciate your making them. The one thing that you didn't change, which is your view of the output gap—I'm just curious, did you think about it, or did you talk about it and kick it around? Because instead of changing the policy rule, you could have just reassessed the output gap and gotten to the same place, and that would also explain the underlying inflation. So I'm just curious how you all think about it.

MS. TEVLIN. We did talk about changing the output gap. We talk about changing the output gap every round, multiple times, for years and years, right? So that's a regular—

MR. KASHKARI. I'm going to keep asking.

MS. TEVLIN. —part of our discussion. We didn't see evidence this time that led us to think we were in a place that we were uncomfortable with. We did think about changing our

natural rate or some other pieces of the projection in order to change our policy rate path, and we did talk about a lot of different ways that we might change our policy rule.

When we were trying to set the policy rule, we wanted to calibrate it according to what you all are telling us about what you're thinking. And your natural rate, I think, is at 4.3 right now—at least the median, not yours personally. In order to really change the gap a lot, we would have had to take on something that was different from what you were reporting in the SEP. We also could have imagined some short-run natural rate that was much lower than the long-run natural rate now. We thought that would be pretty complicated, to be carrying around more starred variables, guessing at what you all were thinking about starred variables that are at odds with what's in your SEP, and we thought it was simpler to move in this direction. But there are obviously a lot of different ways we could have done this. We were hoping that this one was a way to encompass a variety of views because we weren't going to be able to please everyone.

MR. KASHKARI. Fair enough. Thank you. My second quick question is on your chart on average household wealth, which is panel 12. I just have to ask—are the units right?

MS. TEVLIN. Yes.

MR. KASHKARI. It just seems like they're much larger than I would have expected across the board.

MS. TEVLIN. These are means. Even within these groups, there is an awful lot of wealth inequality, and so I think these are looking pretty high because there are just some really rich people on the high end.

MR. KASHKARI. Okay. Thank you.

CHAIR POWELL. President Daly.

MS. DALY. I want to follow up on the u^* question. So I know what you're trying to do, and that's totally fine. But does your staff view differ when you go into your calculations? And what would it take you to move u^* down relative to, say, 4.5 percent or something—I guess it's 4.5?

MR. CLARIDA. No, 4.6.

MS. DALY. Okay, 4.6. So what would it take for you to move it down? What kind of information would you be taking in?

MS. TEVLIN. We look at a few different things when we're deciding what we want u^* to be. We have a couple of different state-space models, which are currently suggesting that we're in an okay place. As you know, we also look at demographic factors, things like that. We take all of these things together, and I think we would need to see a lot of them move in a particular direction. We do debate this actively every time. There are definitely people on the staff who would like to lower it and other people who feel like that's what we always do when we get to this point in the cycle and then end up regretting it. We're certainly open to more ways of analyzing this. It's an ongoing discussion.

CHAIR POWELL. President Bullard.

MR. BULLARD. Thank you. I have a question for Beth Anne about trade policy uncertainty. I'm looking at page 10 of the handout here—the effects look like minus 1 to a minus 1.5 there. I just want you to step back from the model and give me an interpretation of these results here. Markets are thinking that the shock won't last all that long because we'll get some resolution of the uncertainty. This will go away, and to some extent they are already pricing in that kind of thing going on. So how should I think about this? How persistent is this shock? And what are the risks here? Suppose we don't get resolution to trade policy uncertainty

and it turns out to be more of a permanent shock. Would these numbers get a lot bigger? Or if this turns out to be a very temporary thing, would these estimates turn out to be a lot smaller?

MS. WILSON. One of the ways in which we can look at that particular question is in the context of the model. And the simulation that's done in the model looks at two different shocks. One is, let's say there's an anticipation of higher tariffs, with some probability two years in the future that we're going to raise tariffs and some probability we won't. That gets at the attenuated anticipation that some market participants or businesses and firms may be experiencing. Another is to get at the overall uncertainty—which is that the mean tariff is the same, but for the range, there's just a greater chance of having a much higher tariff or a much lower tariff.

I think your question is a little mix of both—which is, for an extended period, we don't know what the outcome will be. In the model, sort of calibrated to the current economy and the size of the shocks that we're experiencing now from the indexes, we see that just the pure weighting effect has about half of this. So it wouldn't necessarily be much larger. I think what we're finding is, what would be larger is if the tariffs themselves were broader—they hit a much broader range of products, they hit a broader range of firms and industries or countries, or even if that period of uncertainty were prolonged even more than is in our model. So we're already, in our own economy, a year and a half, or two years, into this. I think you could see bigger effects, certainly, than we're seeing now.

MR. BULLARD. As a policymaker, should I worry about the idea that the consensus on trade is broken down, and you're just not sure what's going to happen over the next five years, let's say? That would be the kind of thing that would get the bigger shock, I guess?

MS. WILSON. I think that has to do with how we measure trade uncertainty. This particular metric is sort of a sentiment-based one. I think what you're talking about is that the

fundamental structure of the trade environment has been shaken, and how do we estimate the effects of that? And that, to my mind, seems like something that should be fairly large, and the sentiment indicators may not be picked up or may not be experienced by a broad number of firms. And so either we need better metrics to capture the size of that effect or, as it becomes more sustained and more ingrained—

MR. BULLARD. So you don't think that's what people are talking about when they answer those kinds of questions in a survey? They're not thinking of exactly that, but—"I don't know what the heck the trade relations are going to be like in the future, and, therefore, I don't know how to run my business."

MS. WILSON. So these are news-based, or—

MR. BULLARD. Yes.

MS. WILSON. These are news-based. So it's what fraction of major newspapers are running stories about great uncertainty. And those articles don't distinguish, necessarily, between "The whole structure of our trading system may be in doubt" and "Boy, steel and aluminum are really, really upsetting people in this country" or "Soy farmers are really upset about this." So I think it's some mix of that, and that goes to, I think, the framework of how we're trying to better capture uncertainty. And so I can't speak—in this way, I don't think we're completely capturing that.

MR. BULLARD. Okay. Thank you.

MR. KAMIN. President Bullard, if I could just add on to Beth Anne's remarks. So we've been trying to reconcile, in some sense, three sets of information. One of them is, basically, discussions about trade policy and trade policy uncertainty as we see in the media and as your corporate contacts are reporting. A second factor is reaction of financial markets to news

about trade policy. And then the final set of information is about actual responses in the real economy. And we've been trying to reconcile with other information the fact that there is both evidence of worries about trade policy, as is evident in the news, and strong financial market responses to trade policy. Both of those are strong responses to trade policy that don't seem to line up with the fact that actual economic responses, as evidenced by investment, seem to be small.

What it could be is just that the economic responses are being masked by a relatively strong economic environment here in the United States, with tax cuts, still low interest rates, et cetera, et cetera. And then if we move to a situation in which, basically, the trade talks with China failed and a much more pessimistic mood set in, and that coincided with some cooling of the economy, that's when you could see much more adverse responses.

MR. BULLARD. Thank you.

CHAIR POWELL. Further questions? [No response] If not, then let's begin the opportunity to comment on financial stability with President Mester.

MS. MESTER. Thank you, Mr. Chair. I really appreciate the work that the staff is doing to assess risk to financial stability, and I think the Board's public semiannual *Financial Stability Report* is a really important enhancement to our communications.

While there has not been much change in the level of risk since the previous report, business debt remains a concern, and standards and terms have continued to deteriorate. And the losses on these loans could amplify an economic downturn. So I think it's appropriate that the report highlights this particular vulnerability. I also think that the section reporting on the collective market and public-sector views on financial stability risk is a useful addition that could help us identify nascent risks in the broader financial sector.

Now, the relationship between financial stability risks and macrostability risks, and the use of macroprudential tools in monetary policy to address these risks, are important topics facing the Board of Governors and this Committee.

Last November, the Conference of Presidents Committee on Financial Stability held its second tabletop exercise, a guided discussion meant to further clarify our thinking about the strategy for dealing with an economy facing increased financial stability risk. Governor Brainard, chair of the Board's Financial Stability Committee, along with Presidents Kaplan, Kashkari, Rosengren, Williams, and myself, participated in this exercise. And I want to take the opportunity to thank the System team, led by Ned Prescott of the Cleveland Bank staff, for constructing the exercise and leading us through it. I have sent the Committee the staff's write-up, which we plan to make into a working paper for public release. I thought it would be useful to summarize some of the findings for you today.

The exercise entailed a two-part hypothetical scenario that included a boom period and a downturn and generated tensions between macroeconomic and financial stability goals. In the first stage of the exercise, the economy in the second quarter of 2020 was assumed to be doing well. Inflation was close to target, and the labor market was healthy, with low unemployment. The FOMC had been gradually tightening monetary policy, and the markets were expecting 50 basis points more of tightening over the next 12 months. But the economy also faced some financial stability risks in the form of high valuations of nonfinancial business debt, commercial real estate and equities, and levels that exceeded their current levels. Although the staff presented us with three potential risk scenarios that could play out in six months' time, we were not told which would occur so that our first-stage analysis wouldn't be influenced by knowing in advance what was going to happen.

In the second stage of the exercise, six months had passed, and it had become clear that a negative CRE shock had hit and output growth was slowing. Commercial real estate prices and transaction volumes had dropped sharply and delinquencies were rising, with a significant effect on some regional and community banks.

Now, our discussion of economic conditions and appropriate monetary policy and macroprudential policy actions to take in each stage of the exercise generated some insights that I think will help inform the FOMC's and Board's financial stability work. The first insight was that it would be useful to have more granular information pertaining to emerging risk, including who is exposed to leveraged lending and commercial real estate risk.

Second, during a boom, our macroprudential tools are limited in their ability to control risk in an asset class or, more narrowly, in institutions. The use of guidance has been constrained by the GAO's interpretation that guidance is regulation. And putting regulations in effect takes significant time, given the procedures that must be followed.

The countercyclical capital buffer is a broad tool affecting all asset classes in which a G-SIB bank invests, so it's more useful for providing resiliency than dealing with risk in a narrow asset class.

The stress test can be more targeted, but because it doesn't apply to all banks or to nonbanks, risks can migrate. Under the proposed changes, regional banks would no longer be subject to annual stress tests, so it would be worth thinking about whether dividend payments could be restricted in those off-years in case a regional bank's portfolio were to quickly deteriorate.

Although other tools have some limits on how they can be used to address a rising risk, the Board's new *Financial Stability Report* is an important communications tool that could be a way to implement some moral suasion against risky activity.

A third result of the exercise was that both the CCyB and stress-test tools entail potential tensions between macro and microprudential goals during a downturn. On the one hand, if the CCyB had been increased, keeping it on during a downturn would help mitigate risks at the bank level, but dropping the CCyB could support lending in a weak economy. Balancing these tradeoffs may be difficult. It may be useful to look at high-frequency indicators when deciding whether or not to release the CCyB in addition to the low-frequency indicators and trends that will be used when deciding whether or not to increase it.

Similar tradeoffs also affect the stress tests. In a downturn, making the scenarios tighter may help lower risk, but making them looser can support lending. Moreover, there are potential risks to releasing the results of a failed stress test, which could put liquidity pressure on the bank, thereby weakening the bank.

These lessons and the discussions we had during the exercise show that there are no easy answers for balancing our financial stability and macrostability responsibilities. In my view, although we may prefer to use the macroprudential tools for financial stability, they are limited—which does suggest that monetary policy may need to play a role, at least in some cases. In addition, the constraints on our macroprudential tools reinforce the need to provide the structural resilience of the financial system across the business and financial cycles when using our tools of capital and liquidity requirements, regular stress testing, resolution planning, and working with the industry to enhance strategies and improve cyber resiliency. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. I'd like to add some exclamation marks to the box in the *Financial Stability Report* that discusses vulnerabilities associated with elevated business debt. I thought it was a very good, but very sobering, discussion.

The memo shows that the quantity of leveraged loans and high-yield bonds is now more than \$2 trillion. This is substantially larger than the subprime residential real estate market in 2007. Banks are highly connected to the leveraged loan market, particularly through their involvement in collateralized loan obligations (CLOs). They are among the largest underwriters, they hold significant shares of the triple-A tranches and mezzanine financing of CLOs, and they extend credit to asset managers and other investors that are active in this market. Asset managers are quick to note that the triple-A tranches of CLOs performed much better than collateralized debt obligations (CDOs) during the crisis, that CLO structures have improved for greater credit enhancements.

There are two important caveats, however, attached to these observations. First, CLO holders can suffer large losses when prices on triple-A tranches fall because of a downgrade. One of the largest losses for processing banks during the financial crisis arose from the markdowns of such high-quality tranches.

Second, CLO vulnerabilities may expose firms to rollover or refinancing risks. You may recall that CLO issuance virtually halted for several years during the financial crisis. I am not optimistic that the next recession will be much different in this respect, and such a seize-up could place great strain on non-investment-grade firms needing to roll over or refinance their loans. I am not confident that in a recession, banks will be anxious to step in to provide additional

financing to these firms. The likely result would be significant financial distress that would exacerbate any downturn.

I view the CLO market as being driven to a large extent by reaching-for-yield behavior. It is not surprising that Japanese banks have a large presence in this market in both the United States and Europe. Faced with low domestic rates for an extended period of time, these banks find the substantial premiums on CLOs relative to Treasury securities attractive, coming from a yield-starved environment. As I understand it, significant yield usually comes with significant risks. Significant reaching for yield shortly before a major downturn did not go well in the previous recession, and I don't expect it will go much better in the next recession. I view this as a significant financial stability risk.

What can the Federal Reserve do, given that we don't have authority over asset managers or the power to regulate CLOs? This is very consistent with what President Mester just said, but I think we could shine a much brighter light on this risk. Among the things we could do are highlight this risk in the public *Financial Stability Report*; require holding companies to report both their overall exposure to CLOs and leveraged loans and how much of their income is derived from leveraged loans; stress-test the potential run on leveraged loans in a recession; encourage international bank reporting of exposure and working with the Financial Stability Board; and encourage, through the FSOC, that the OFR study this issue and prepare a report on asset managers' exposure to CLOs and leveraged lending. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you. We will soon be publishing our second *Financial Stability Report*. As it will show, since the December turbulence, valuations of risky assets have rebounded, in some cases to new highs, and leverage among risky corporate borrowers has

resumed its ascent. The level of valuations is now again in the elevated range of our vulnerabilities assessment. The overall valuation of the stock market has regained its previous peak, and investors' appetite for risk is again quite high.

Concerns about elevated valuations are amplified by vulnerabilities from business debt, which is close to the highest level experienced over the past 20 years and concentrated among the riskiest borrowers. The ratio of debt to assets for speculative-grade and unrated firms is close to its highest level in those two decades, and that's also true for corporate borrowers overall. Moreover, firms that have high leverage, high interest expense ratios, and low earnings in cash holdings have been increasing their debt loads the most.

As we look at business-sector assets in more detail, commercial real estate capitalization rates have been declining steadily since 2010. They're at historically low levels, implying very high valuations of commercial real estate relative to rents. And levels of risk appetite in this sector remain very high.

As we know from previous downturns, a high level of corporate indebtedness is an important amplifier, with highly indebted businesses reacting to adverse shocks by making outsized pullbacks in both employment and investment.

Currently, over half of the record large "universe" of investment-grade bonds outstanding have the lowest investment-grade rating. Any downgrade of these bonds in the face of a negative shock would move these bonds to the high-yield market, testing the liquidity of that market and potentially inducing forced sales by bond mutual funds.

There are similar concerns in the area of leveraged lending, in which elevated levels have been accompanied by an erosion in lending standards. The most telling indication of that erosion

is the share of covenant-lite transactions, which now represents roughly 80 percent of the entire market, up from less than 30 percent of the market a decade ago.

Bank loan mutual funds have become increasingly important in this market, purchasing about one-fifth of newly originated leveraged loans. It's encouraging that, during the December turmoil, those bank loan funds were able to meet redemptions in the face of a record \$13 billion in net outflows for the month, which accounts for nearly 10 percent of net assets. But these vehicles are inherently vulnerable, due to the mismatch between the liquidity of potential redemptions and that of loans that are highly illiquid, and it would be premature to assume they would perform as well in a more prolonged period of stress.

In particular, an important reason loan funds fared so well in December is that managers of CLOs saw the assets sold by the funds as an investment opportunity, and that can be viewed as positive because the structure surrounding CLOs is, in principle, more resilient than those mutual funds. CLOs currently hold the majority of institutional leveraged loans, about \$700 billion, and exhibited resilience through the Global Financial Crisis, as was mentioned earlier. The CLO investor base has shifted toward investors with longer-term capital commitments, and, as frequently stated, banks hold roughly half of triple-A-rated tranches. But, of course, we know that in a prolonged period of stress, those ratings would themselves come under pressure, and the stronger structures may be offset by the weakness of the underlying loans.

On balance, it's hard to know with certainty how today's structures will fare in a period of prolonged stress when defaults are rising, which was not the case in December. In addition, we don't know much about how CLO managers would compare with banks in terms of workouts with their corporate borrowers under prolonged stress conditions, and we don't fully understand the identity of the ultimate owners of CLO tranches and what incentives those managers have to

provide market liquidity during stressful periods. The *Financial Stability Report* provides some detail on the holders. But, apart from large domestic bank holdings, there's considerable uncertainty about the other ultimate holders.

More broadly, the low interest rate environment suggests that very low long-term interest rates are likely to continue, providing the backdrop of an ongoing “reach for yield” environment. Valuation pressures are likely to remain elevated and may rise further as the economic expansion continues. Those increasing valuation pressures will leave the economy more vulnerable to negative shocks.

I've noted previously the increasing link between financial imbalances and the business cycle. One reason this pattern may have emerged in recent cycles is the flattening of the Phillips curve. In particular, in the 1960s, '70s, and '80s, when the Phillips curve was steep, there would be a natural tendency for the Federal Reserve to raise interest rates to sustain full employment and target inflation as the expansion continued. In contrast, in the past few cycles and today's environment of a very flat short-run Phillips curve, there may be very little impetus from tighter resource utilization to inflation and, accordingly, little reason to raise rates when the economy does well. At the same time, sustained good economic conditions are naturally conducive to risk appetite and tend to push up asset valuations.

In the steep Phillips curve era, rising interest rates as inflation rose along with employment would have damped the increase in asset prices and risk appetite. Today, those mechanisms aren't at work, which may mean a tendency for financial excesses and imbalances to grow late in the cycle.

A key implication is that we can't rely on monetary policy to restrain the financial cycle as much as was the case in the past. In order to position monetary policy to support the return of

trend inflation to its objective with a positive output gap, we should be looking to other macroprudential tools to temper the financial cycle.

One mechanism many other central banks are using is to build countercyclical resilience by activating the countercyclical capital buffer. We've talked in previous meetings how that has the double benefit of building extra resilience at the core of the system and then being released as the economy weakens to allow banks to lend more when lending is most needed.

If those macroprudential tools can't be deployed adequately, monetary policy would need to carry a greater burden in leaning against financial excesses. And that would be unfortunate, in my view, because it may undermine the sustained achievement of our inflation objective. We'll get back to these issues again when we talk about policy tomorrow. Thank you.

CHAIR POWELL. Thank you. President Barkin.

MR. BARKIN. Thank you. Let me add to the chorus on corporate debt. As I'll say in the economics go-round, I've been thinking about recent events through the lens of sentiment, and I want to emphasize the macroeconomic implications of corporate leverage, as Governor Brainard mentioned and as discussed in the memo.

With companies so leveraged, we're living in a somewhat different world, one where a negative shift in the economy or even in beliefs about the economy would likely spread faster than we're accustomed to. Leveraged companies have a bias toward defensive action: cutting employment, stopping investment, and pricing for volume. This is consistent with Beth Anne's analysis of the effect of real economic uncertainty on industrial production. All that creates the potential for increased volatility, particularly to the downside, and we may want to further incorporate that into our models and into our thinking. Thank you.

CHAIR POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Mr. Chairman. I'll start by briefly reviewing where I see financial stability and talk a bit about how our stress tests deal with the potential incurring of losses by the highly leveraged corporations that we have been talking about and also deal with some of the related work on this that's being done at the Financial Stability Board.

First, financial conditions have continued to improve since the turbulence we saw late last year. A number of asset prices have returned to their previous levels, but the more accommodative tone of FOMC communications has been an important factor in boosting those asset prices. In general, as a result, risk appetite still seems a touch below the levels that we hit last year.

In the financial stability and vulnerabilities discussion at the meeting of the Financial Stability Board that we held last Friday, generously hosted by Vice Chair Williams, there was a general sense that we had had a test of systemic resiliency at the end of last year—perhaps not a grueling test, but a genuine test—and that the system had passed. And the situation among high-yield bonds and leveraged loans is particularly notable. Spreads on those assets had ground down to post-crisis lows before widening dramatically last fall. Issuance of certain kinds of leveraged loans completely ceased for a time last December, we'll all remember, and since then spreads have contracted again but remain solidly in the middle of their post-crisis ranges as opposed to the extremes. And as Governor Brainard mentioned, looking at last year's test, we saw notable outflows from bank loan mutual funds holding these types of loans without really any disruption in the system, notwithstanding the maturity mismatch between their liabilities and these assets. Finally, commercial real estate remains "frothy," but price gains appear to have slowed, and residential real estate markets on a national basis aren't too far from the levels that would be suggested by fundamentals.

I turn now to debt owed by households and businesses. The long and continuous deleveraging of the household sector seems to be continuing, 2018 being the 11th year in a row that household debt grew less than nominal GDP. Now, if we're all talking about business debt, and that is perfectly neat and right, underwriting standards have been eroding since the end of the recession, and the riskier forms of debt—the combination of leveraged loans and high-yield bonds—have accelerated in recent quarters.

It's worth keeping the rise in business debt in perspective, however. Business debt has risen relative to GDP in recent years, but that increase does not appear outsized from a cyclical perspective. Business debt always tends to rise relative to GDP in expansions, and this expansion has been no exception. In particular, the path of business borrowing looks nothing like the rise in household debt from a decade and a half ago that was a harbinger of systemic issues, as opposed to a business cycle.

Regarding individual corporations, the leverage of the most exposed firms is quite high by historical standards, but it stopped growing a few years ago. It's been going sideways since. So, that said, with the issuance of this combination of high-yield bonds and leveraged loans picking up in recent months, it's important that we keep an eye on developments there, but that we also keep them in perspective.

Given the elevated level of business debt, it is important to understand whether key financial institutions are particularly exposed. Pension funds and life insurance companies, with their long-maturity liabilities, are the traditional holders of corporate debt in the United States. An increase in corporate defaults would put pressure on those institutions, something that we saw play out in the late 1980s, the early 1990s. But life insurance companies look pretty strong

for the moment. We should continue monitoring developments, but, again, there doesn't seem to be a particular reason for concern there.

The nation's large banks have to demonstrate annually that they can pass our stress test. So let me just take a moment to highlight the key features of the stress test, and President Rosengren asked about some of them that relate to business debt. In short, I think that the exercises severely stress banks' direct exposures as well as a range of plausible indirect exposures to give us confidence, again, in the systemic stability of the current situation.

Each year, there are key elements of the scenarios that we put forward that are essentially repeated with minor variations, and those key elements provide a great deal of direct stress on loans to corporations and private businesses as well as loans that are backed by commercial properties. In particular, every year's scenario features movements in the stock market, in the triple-B spread, and commercial real estate prices that are on a par with what happened in the Great Recession. We test that every year.

Banks can have indirect exposures, too, obviously—for example, loans to the nonbanks that play an increasingly important role on the business credit market. But the stress tests pick up loans and other connections to nonbanks and subject them to losses associated with a severe recession. A sudden increase in corporate defaults might be accompanied by disruptions in financial markets as participants retrench suddenly, but in the stress test, the effects of this kind of panic are picked up by the global market shock. Each stress test essentially has two different shocks, a macro shock and then a market shock, and the market shock picks up exactly those sorts of potential follow-on effects as well as the assumption that each bank's largest counterparty defaults.

So I think the core of the financial system, the largest banks and their broker-dealer subsidiaries, are in a position to weather the consequences should we see a business-sector downturn, because we are testing this with really quite severe stresses every year.

Now, of course, one of the reasons we're concerned about bank underwriting standards is that this is an "originate to distribute" market. So where has all the risk been distributed to? A benign possibility is that these risks are spread across a range of long-term investors, pensions, insurers, direct holdings to mutual funds that are well placed to bear the risk, and, again, we have had at least a test, if not a tough test, at the end of last year that that may be exactly what's happening. But we shouldn't be satisfied with conjecture, we should dig deeper, and so at the Financial Stability Board we have stood up a process at the beginning of this year to assess exposures of major intermediaries of all types across all jurisdictions to leveraged loans and the increased corporate debt.

As President Rosengren noted in the previous go-round, Norinchukin Bank was a large purchaser of CLO exposures, and anecdotally we have heard from the large participants in these markets that Japanese banks in general have accumulated large exposures. But what we're doing at the Financial Stability Board is to quantify and to look very precisely, again, across all jurisdictions as to where those bodies are buried, where those exposures lie. We expect to complete that during the course of this year, and that would allow all of us in all jurisdictions to have a much better sense as to whether there are policy steps that would be appropriate. Thank you.

CHAIR POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chair. I, too, want to thank the staff for their work on this *Financial Stability Report*. The report does continue to point to historically high asset price

valuations and corporate indebtedness with growing exposure to riskier lending, as highlighted in chart 12 of the staff briefing handout, still with assurances that bank capital is strong, at least relative to pre-crisis levels. And I appreciate Governor Quarles's confidence and his views on the resilience of the system.

Yet, even as the noted vulnerabilities remain prominent, large banks continue to pay out significant shares of their earnings and advocate for reduced capital positions. In fact, as stated in the quantitative surveillance materials, common equity Tier 1 ratios at G-SIBs were unchanged, on net, over the fourth quarter.

As Tealbook A highlights, among its alternative scenarios, a downturn with financial amplification is typically a more severe one. Whether or not we realize this kind of scenario, such a possibility argues in the direction of further strengthening capital positions at a time when credit flows are solid and profitability is high. This would seem consistent with the objectives of countercyclical capital policy and well aligned with this Committee's interest in supporting long-run economic health and the financial stability outlook. Thank you.

CHAIR POWELL. Thank you. Vice Chair Williams.

VICE CHAIR WILLIAMS. Thank you, Mr. Chair. I anticipated that there would be a lot of discussion of corporate debt buildup and CLOs and leveraged loans and related stuff, so I'm actually not going to talk about that. But I do want to pick up on President Rosengren's earlier comment that in a very low rate environment, there was a greater risk of reach for yield behavior, and we should be looking for that. I completely agree with that.

I went through the report, which I also thought was very good and very helpful, pretty carefully. And I have been watching this elevated asset price issue, which Governor Brainard highlighted in her summary of the report, and I think this is just a recurring topic that in a very

low rate environment—and especially now that we seem to be at the end of or near the end of this tightening cycle—understanding what is a normal asset price and what are the movements in asset prices given the rate environment is really important.

When I went through the details of the report, actually, I think it is a bit of a mixed message there. Equity prices have clearly bounced back, but that's not because of strong profits, or it seems to be more of a discount factor. The long rates are lower, and equity prices have come up. In fact, when you look at the chart, it shows the equity price premium relative to a 10-year Treasury yield that's not particularly low relative to history. So there's no real sign, at least on the equity price premium, of elevated prices.

You see the same thing when you look at the bond prices adjusted for expected losses. That's roughly at its historical mean. If you look at capitalization rates, I agree they have come down a lot, but, again, relative to 10-year yields, real yields, they are not particularly low.

What I think is most interesting is what's happening in the housing market. I actually had that on the top of my list the past year or two, that house prices kept growing and growing relative to trend, but we have seen some slowing in house price appreciation. Interestingly, I thought there was a great chart in the draft of the report that showed the distribution of house prices across metropolitan statistical areas (MSAs). And one of the lessons to me of the housing bubble and crisis was this enormous distribution—that if you look at the means, you really were missing the picture, because the really hot markets were the ones that were going to kill us, not the ones that were cold all along. Again, looking at things today, there are some elevated areas that are more elevated than others, but the distribution across MSAs actually looks pretty normal, and the house-price-to-rent ratio is only a touch elevated relative to history. And, again, if you

thought about this in terms of a lower 10-year real yield, it's probably right around its historical norms.

I only bring this up because I know that we're all focused on the corporate debt, but I think we should be looking holistically through all of these markets for signs of excesses. And my own reading is that the slowing of house prices, the slowing of commercial real estate prices—kind of, my reading of the stock market is that we're not seeing any real buildup or excesses, at least right now, in terms of those segments, at least so far. Thank you.

CHAIR POWELL. Thank you. And that wraps up our financial stability opportunity to comment, and we will now take a coffee break and resume in 19 minutes at 3:20 on that clock. Thanks.

[Coffee break]

CHAIR POWELL. Okay. Let's pick it up with the economic go-round, beginning with President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. The GDP report for the first quarter was stronger than I anticipated. Although the household sector was weak, with soft consumption in residential investment, as I had expected, other components of GDP were stronger. If the weakness in consumption were to persist, that would be concerning. However, I am viewing the lull in the first quarter's household-sector activity as a temporary reaction to government shutdowns and stock market declines that have been reversed.

We also cannot rule out the possibility of some residual seasonality in these data. March retail sales data, as well as discussions with businesses in the First District, suggest strong growth in sales in March and April. So my expectation is that growth in the first half of the year, and 2019 as a whole, is likely to be above my estimate of potential growth.

While growth surprised on the upside, incoming information on inflation has been weaker than expected, as noted in the earlier report. However, for a variety of reasons, it seems likely that the recent softness in inflation indicators will prove temporary. Most of the softness was registered in idiosyncratic areas. Consistent with this, the CPI trimmed mean and the median CPI did not show the same softness as the overall series. Furthermore, labor markets remain very tight, and I expect labor costs to continue to drift higher. Finally, energy prices appear to be firming. For all of those reasons, I expect the four-quarter moving average of inflation to bottom out in the spring and then gradually move up over the remainder of the year, which is generally consistent with the Tealbook. To reiterate: Soft inflation readings might be more of a concern if I thought labor markets were going to ease significantly. However, I view labor markets as quite tight—and if my forecast of real GDP growth above potential growth this year is correct, they will likely get a bit tighter.

Consistent with generally tight labor markets, we are seeing some increases in labor disputes. In New England, the Stop & Shop grocery chain, which employs more than 30,000 workers, went on strike over Easter. Full-time workers at Stop & Shop are reported to earn \$21.30 an hour. But, interestingly, the dispute was focused on pension and health benefits. The strike highlights a potential upside risk that benefits will be more of a focus in labor disputes, and that overall compensation increases will be driven by benefits in the face of tight labor markets.

My own forecast differs from that of the Tealbook in this respect. The Tealbook has the employment cost index (ECI) moving from 3 percent for 2018 down to 2.7 percent in 2021 despite the unemployment rate falling to 3½ percent. In contrast, even though I do not have the labor markets tightening quite as much, I expect the ECI to continue to gradually move up.

Another factor affecting inflation over time is likely to be firms' ability to mark up prices over unit labor costs. While the detrended nonfarm markup has risen from 2000, it has been declining more recently. My staff has produced some evidence that lagged declines in the markup are associated with positive changes in inflation in both aggregated and disaggregated industry data. This effect arises even after controlling for the unemployment gap and long-run inflation expectations, thus suggesting an independent channel for labor costs through the markup. The logic is conventional: As labor costs put pressure on markups, firms are more likely to raise prices. Thus, if unit labor costs continue to outpace inflation, eating away at margins, I would be more confident that recent softness in inflation will be reversed. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Governor Clarida.

MR. CLARIDA. Thank you, Mr. Chair. With the GDP data now in, we see the economy expanded at a robust 3.2 percent pace in the first quarter of 2019, which was an upside surprise, given the government shutdown and the generally soft data that did arrive in the first part of the quarter. But, looking underneath the hood, we learned that the underlying momentum in private demand slowed in Q1 and has, in fact, been slowing since last summer. Nominal GDP growth advanced just 3.8 percent in Q1 and has also been declining over the past year and is now running at a pace a full percentage point slower than last summer.

So should I be concerned that this slowdown in momentum, which I attribute at least in part to the cumulative effects of our policy normalization actions, will continue throughout 2019 and drag down GDP growth below the 2 percent pace that I projected in the March SEP? Based on the analysis in the Tealbook for this meeting—which, by the way, I thought was excellent—that would not be my baseline. Indeed, given the recent upturn in U.S. data, as tracked by

various price indexes, our patient policy stance, the rebound in financial conditions, a strong labor market, and some indications that global growth may pick up later this year, I'm in basic agreement with the Tealbook upgrade to our baseline outlook for 2019 relative to the outlook in March. I'm in the relatively optimistic camp for trend growth, and I see it at 2.2 percent, so this upgraded outlook for 2019 is close to my estimate of the trend rate.

Now, the upgraded outlook for growth does depend on an expected rebound in consumption; solid, if not robust, contribution from investment; a positive contribution from fiscal policy; and perhaps also some modest positive contribution from residential investment, given the decline in mortgage rates. I broadly agree with this analysis of the baseline trajectory in these contributions. If it plays out, then we might see some further decline in the unemployment rate. But depending on labor force participation, we might not. I remind you that because of a coincident increase in participation in the past 11 months, since May 2018, the unemployment rate is unchanged for the past 11 months, notwithstanding 3.2 percent GDP growth and strong gains in employment during that time.

Now, I acknowledge that, ultimately, labor force gains will cease and underlying demographic forces may prevail. But prime-age participation still remains below previous peaks, and there may still be some room to run this year for this boost to aggregate supply.

In regard to aggregate supply, with GDP up 3.2 percent in Q1 and aggregate hours worked increasing less than 1 percent, productivity growth in Q1, when it's released, will likely show a sharp pickup from the fourth quarter of last year.

It might be tempting to declare that a scenario with growth near my trend of 2.2 percent and an unemployment rate not far below my u^* estimate of 4.1 percent would represent a soft landing, but I don't think that would be accurate unless it was also consistent with PCE inflation

rising to 2 percent and staying there. But that's not a feature of the Tealbook baseline for this year, nor is it part of my outlook. In fact, after seeing the Q1 inflation data, I think, if anything, there may be some downside risk to my projection of 1.8 percent for core PCE inflation at the March round. And if this plays out, then, to me, 2019 in this baseline would look more like a soggy than a soft landing.

Now, I note that 1.8 percent core PCE inflation is equal to the staff's estimate of underlying inflation, and they have correctly, I believe, incorporated this model of underlying inflation into their forecast for the next several years. Again, we talk about inflation expectations. There are different surveys, but the Michigan survey has been fluctuating in a very low range, and, indeed, the most recent print is tied for the lowest ever recorded. The staff estimates of expected inflation over the next five years derived from the TIPS curve, after adjusting for liquidity and term premium factors, are in the range of 1.8 percent or below. So I think these bear watching.

To conclude, in terms of risks to the outlook, they do, to me, appear to be somewhat more balanced than I thought in March. The U.S. data flow has been coming in on the positive side of expectations. The same could be said of Chinese data, and, indeed, today Europe surprised on the upside for the first time in a while. But global policy uncertainty remains elevated, as we heard a moment ago. Financial conditions do fluctuate, and it does make it difficult to extract signal from noise. In particular, we should recognize the tailwind due to the decline in bond yields that's occurred, and I think only part of that is due to a repricing of our policy rate path, with term premium factors also important. Indeed, the staff baseline now incorporates a rise in the term premium into positive territory over the forecast horizon. This suggests to me that when we think about economic scenarios, we would be well served to resist the temptation to see the

world in binary terms, with either strong growth and rising inflation or falling growth and falling inflation. There's a third scenario, very plausible—roughly trend growth, with stable inflation somewhat below 2 percent. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Daly.

MS. DALY. Thank you, Mr. Chair. The economy is in a good place. The tug of war between mood and data that has characterized the past several months seems to have concluded. Confidence is high, retail sales and employment have rebounded, and GDP growth in the first quarter came in well above expectations. While I continue to expect growth to slow toward a more sustainable pace this year, overall the economy remains healthy.

Now, my business contacts are also pretty upbeat about near-term growth and near-term prospects. In fact, I have been struck about how little the gyrations over the past several months have tempered their hiring and investment plans. As I mentioned before, they did table some marginal projects or delay them, but more and more I'm hearing that they're adapting to this new world in which it's more volatile, and they're starting to look through monthly ups and downs. As one of them put it, they are learning to be data dependent, and it doesn't mean "data point dependent." So I think this is potentially a shock absorber that we didn't have, perhaps, in December.

Of course, not everything in the 12th District is rosy. The turmoil at Boeing is taking a toll on the Seattle region and Washington State more broadly. Boeing is a key employer in the Northwest, with connections across a wide range of industries that support the production of its airplanes. And if this continues, it will be felt well outside the District, across a number of regions in which the country produces, and that's been detailed in the Tealbook.

Now, with the real-side economy doing well, in a healthy place, the weak inflation readings are again in the spotlight. But they are also, I think, more spotlighted, because you would expect, with the economy rebounding, more positive information on inflation. So the question is, what do we make of these readings? And along lines similar to what Stacey and others have noted, I've mentioned before that the gains and losses in inflation we have seen over the past several years—two years, really—come from these acyclical components of inflation. If you divide inflation into acyclical versus cyclical sectors, you see that most of the movements up and down are coming from these acyclical sectors. These are the ones that respond to idiosyncratic factors, including regulatory or policy changes or just other things that are temporary or more persistent. The point is that, in contrast, the contributions coming from the cyclically sensitive sectors have barely budged. They're the ones that should typically respond to slack, but that contribution has been flat for the past couple of years.

So the real question is, what's up with cyclical inflation? Why isn't it moving in the way we would project if the unemployment rate is coming down? One explanation of the tepid response of cyclical inflation is that the economy has been adding supply as the expansion has progressed, which would be a positive supply response. And this is something that Arthur Okun thought about back in the 1970s. He hypothesized that a high-pressure economy, like the one we've been running, would indeed increase employment, especially among less-advantaged people, as well as boost labor supply, and thus aggregate supply, in the short run, if not in the long run.

One way this can happen, if you think about it, is detailed in the Tealbook box. It's when firms that are pressed to fill vacancies lower their standards or recruit more intensively, essentially make it easier for workers who might not have been qualified in a downturn to be

qualified in an upturn. And if this happens, then that would be a positive labor supply response and a positive supply shock. This is consistent with work that we've done in San Francisco that talks about recruiting intensity. Recruiters focus more on recruiting individuals when the economy is hot than they do when the economy is cold.

Now, to see if the factors of skill movements and recruiting intensity actually make a material difference in labor supply, in a recent paper for the Brookings Institution conference, written by me and my coauthors, Bill Wascher, David Wilcox, and Stephanie Aaronson—it's our Fed family event—we evaluated whether these factors are actually influencing labor supply. And we've talked about this before, so I thought I'd spend a moment just going over what we found. We specifically evaluated Okun's hypothesis—that a "hot" economy will bring in new workers and boost labor supply, particularly among these less-advantaged groups. In general, we find that this has happened, especially among women. Women tend to experience the hot economy by getting into the labor force and having an intensive margin increase as well. So unemployment rates go down, labor force participation rates go up, and you can even find some evidence that hours move.

In terms of inflation, if you think this is going on, then this would mute inflation pressures, because you're getting this positive supply shock, and that's something that you can see happening in the short run. Now, we didn't find much evidence, nor have others, that this persists in the sense of positive hysteresis, but you really don't need that if you're worrying about short-term muting of inflation. The positive supply response would be a factor, explaining what we see today.

Another potential factor, and one we've also been thinking about quite a lot, is that robots could be taking over people's jobs, and that automation is essentially in there mucking up the

works of the labor market and the relationship between the labor market and inflation. So the idea is really a simple one—if workers think that they can be automated away, they're much less likely to ask for a wage increase, because they already recognize that if they bargain too much, their jobs will be replaced with robots.

In recent research at the Federal Reserve Bank of San Francisco, some economists explored this using an actual model, thinking about a standard macromodel in which firms and workers are bargaining over wages—but the innovation is that, in the model, the firms can also just move to automation, to a robot. If you think about that model, and you take it to the data—they use time-series data on labor market variables and productivity—they found that the threat of automation in this model actually substantially affects inflation. The interesting thing is, that's on the historical piece. If they look today, it's not a factor holding down inflation right now, largely because, as we have seen, business investment and capital deepening isn't what it was in previous periods. But if you want to forecast forward, even if the positive supply shock wears off and we run out of juice there, the threat of automation, as capital deepening occurs, could be another factor holding down inflation in the future.

If you put both of those things together—threat of automation in the future, and the positive supply shock we have now—these are both factors that could be holding down inflation today and could present downside risk to our future inflation forecast.

So when I look at all of these things—and I especially focus on the cyclical component of inflation—the slow recovery of that piece, or the lack of recovery, has tilted, for me, the inflation risk to the downside. It's not quite worrisome yet, but I think it is confusing enough that it bears more thought. And this is a topic I'll return to tomorrow in our policy discussion. Thank you.

CHAIR POWELL. Thank you. President Mester.

MS. MESTER. Thank you, Mr. Chair. There has been little change in my assessment of the Fourth District economy since our previous meeting. The Cleveland Fed staff's diffusion index that measures the difference in the percentage of business contacts reporting better versus worse conditions held steady in April with a reading of 20. Most contacts expect growth in their businesses to be about the same in 2019 as in 2018, although manufacturing and freight industry contacts noticed some first-quarter weakness. At least some of that weakness was due to their clients having pulled orders forward in an attempt to avoid tariff-related price increases.

Manufacturers in the District that are domestically focused are faring better than those that have relatively high exposure to international markets. Our directors anticipate real GDP growth to be between 2 to 2½ percent this year.

District labor market conditions remain strong. After being 4½ percent for all of last year, the unemployment rate edged down to 4.3 percent in March, more than ½ percentage point below the Cleveland staff's estimate of its longer-run normal level. Year-over-year growth in payroll employment was ¾ percent in March, a bit slower than earlier this year but still well above the Cleveland staff's estimate of its longer-run trend.

Firms are dealing in a number of ways with the continued difficulty in finding qualified workers. Some business contacts are limiting drug screenings to the extent they can, and more are actively recruiting from the population of ex-offenders. Many firms are raising wage rates for entry-level workers from around \$10 an hour to \$15 or more an hour, not quite as high as the Stop & Shop in Boston but still a strong increase in wages. Some firms are aggressively adjusting compensation for current employees to limit turnover. For example, a general contractor in northeast Ohio raised wages by 10 percent for some critical staff in the hope they would not explore other opportunities.

Finally, some firms noted that they are increasingly turning to automation as a way to address limited labor availability. Although wage pressures persist, nonlabor cost pressures continue to ease, especially in manufacturing, where prices of industrial metals, petroleum products, and shipping services have fallen. Despite this, a relatively high percentage of contacts continue to report increases in their own product prices.

Regarding the national economy, incoming data over the intermeeting period were mixed. It now appears the first-quarter growth was stronger than expected, but this mainly reflects a strong contribution from inventory. So it might come at the expense of second-quarter growth.

Business investment has slowed considerably since last year, but earnings are supportive of continued growth. Manufacturing activity has also slowed, but survey-based indicators remain consistent with continued expansion. And the housing market remains subdued. On the other hand, consumer spending appears poised to pick up significantly in the second quarter after a slow first quarter, so I continue to expect moderate output growth over the first half of the year and growth at or slightly above my trend pace of 2 percent over the next couple of years.

This slowdown in growth compared with last year reflects the effects of waning fiscal stimulus, past reductions in monetary accommodation, and softer global growth. The risks to the forecasts are similar to those at the time of our previous meeting. Trade policy and weak growth prospects in major foreign economies are downside risks. But, on the positive side, a favorable resolution of some of these key uncertainties are an upside risk, as is the significant easing of financial conditions compared with earlier this year.

The labor market continues to be strong. Averaging through the ups and downs in the recent data, payroll gains have averaged 180,000 per month over the first three months of the

year. The unemployment rate has been 4 percent or less since March of last year. And the broader U-6 measure has moved down over the past year. Labor force participation rates have held at an above-trend level. So this strength has led to a pickup in wage growth over the past two years, in line with productivity growth and inflation.

If the economic expansion is to be sustained, it's likely that job growth will need to decelerate from its current strong pace to a pace more in keeping with trend, which most estimates put in a range of 75,000 to 120,000 per month. Despite this gradual moderation, job gains over the next few years should be strong enough to keep the unemployment rate under 4 percent, well below estimates of its longer-run level, which I put at 4½ percent.

The inflation readings were disappointing. As expected, recent headline PCE inflation has been soft, reflecting the drop in energy prices in the fourth quarter of last year. Oil prices have since moved up, so some of this weakness is expected to reverse. More of a concern, core PCE inflation has also softened to 1.6 percent in March. Even the market-based measure of core PCE inflation, which the Cleveland staff analysis indicates has been a more accurate predictor of future headline PCE inflation, softened in March. At this point, it does appear that the softness in core inflation may be transitory, reflecting unusual moves in particular components such as the payroll and imputed prices of financial services. Supporting this interpretation is that the median and trimmed-mean measures of CPI inflation have remained steady for the past couple of months.

Despite the softer readings on inflation, inflation expectations have been broadly stable in recent weeks. The five-year, five-year-forward estimate obtained from the Cleveland Fed's model of inflation expectations was essentially unchanged from March to April although a bit below readings from 2018.

In view of the health of the economy and the stable inflation expectations, the most likely case is that inflation will move back up later this year and run near 2 percent over the remainder of the forecast horizon. But I'm somewhat less confident in this forecast, given the recent inflation readings. That said, if growth remains at or above trend, labor markets remain tight, and inflation expectations remain stable, we might have to accept that inflation could remain somewhat below our target for some time.

Providing more accommodation under these conditions would seem to run counter to the balanced approach we describe in our statement on long-run goals and policy strategies, risking creating distortions and inefficiency in a labor market that is already well beyond maximum sustainable unemployment, risking destabilizing inflation expectations on the upside, and potentially encouraging financial instability.

If to boost inflation on a sustained basis requires boosting inflation expectations, it may take more-aggressive action than would be consistent with the balanced approach. Instead, we may need to practice opportunistic inflation, just as the Committee practiced opportunistic disinflation in the 1990s. Under current economic circumstances, this would mean keeping the funds rate at current levels for longer than would otherwise be the case, despite the continued strength in labor markets, and allowing inflation to drift back up. Of course, if we end up in a situation in which they underrun, and inflation is indicative of deteriorating aggregate demand or destabilize inflation expectations, this will be a different story, which might require action.

Finally, I want to say a word about the Board staff's revision of the policy rule used in the Tealbook to generate the path of the funds rate on which the forecast is conditioned. The Tealbook plays an important role in our policy deliberations by helping to coordinate our discussion on the outlook and key risks. So, for some time, I have been concerned that the

increasing divergence between the Tealbook's projected funds rate path and those of the market, private-sector forecasts, and FOMC participants could eventually work to undermine the Tealbook's credibility and usefulness to the Committee. I appreciate that the staff has tried to address this concern. That said, I do think it's important that the Tealbook provide an independent view and not just mirror the Committee's views on policy, which could end up being wrong. Selecting a rule that fits the SEP just because it fits the SEP would be too self-referential, providing less useful information to the Committee.

Also, the staff suggests that they don't view the new baseline rule as permanent, in that it's specific to the state of the economy. But, if the rule is allowed to change too often, this would tend to make it harder to infer policy guideposts and rules that have been shown in research to work robustly across models and economic conditions.

The approach taken in the alternative scenarios this time illustrates this potential problem. The scenarios now allow the rule to change, because the staff is predicting the Committee will change its behavior based on the economic conditions within the scenario. This prediction may be correct, but the variation in rules across scenarios makes it hard to assess the risk captured by the alternatives, because both the shocks and policy behavior change across scenarios. Given that the alternative scenarios are not constructed to produce normative prescription, I'd prefer to see the results of using a consistent rule across the simulations to illustrate the risk.

Now, while it's important to have some continuity in the rules we use in our models and to inform our thinking, I don't mean to imply that the rules should never change, but I do think we should think through what objective criteria—like changes in underlying economic fundamentals or the transmission mechanism—would suggest that a different reaction function would yield better economic outcomes.

In a recently published economic commentary, Ed Knotek of the Cleveland staff examines the fit of some simple Taylor-type policy rules to FOMC participants' median SEP policy rate path submissions, and he finds that the Committee appears to be putting about half the weight on the unemployment gap than it has in the past, with little change in the weight on the inflation gap. The change in the rule might reflect some reluctance to put as much weight on the unemployment gap, given the uncertainty associated with estimates of u^* and the gap. But an alternative explanation is that participants have not actually changed the weight on the unemployment gap, but instead believe that the labor market is less tight than what is implied by an unemployment gap derived using the participants' estimates of the longer-run unemployment rate.

Further analyses along these lines would be helpful if we want to preserve the ability of simple policy rules to provide useful benchmarks against which we can check our own policy assumptions. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Bostic.

MR. BOSTIC. Thank you, Mr. Chair. Sentiment from Sixth District contacts remained generally upbeat this cycle. Business leaders expect 2019 to be another solid year for growth, and I came away from these conversations with the sense that these folks are comfortable with the current environment. In short, what I'm hearing is a lot like what I'd expect to hear at a time when resource gaps are closed and inflation is trending fairly close to target.

This comfort extends even to firms with a heavy amount of international exposure. Contacts in this space until recently have been very vocal regarding escalating trade tensions and the prospect for additional tariffs. This is the trade policy uncertainty, or TPU, that was discussed by Beth Anne and studied by the emerging IF super group, DAAMP. [Laughter]

However, at a Trade and Transportation Advisory Council meeting this cycle, we actually had to prompt many of the participants for their thoughts regarding risks to their operations. The lack of concern and worry was somewhat surprising, with most members noting no significant effect to date on decisionmaking.

What we did hear was that global risks, while not completely absent, are believed to have substantially dissipated, and the prospect of deterioration in conditions is not on their radar. Interestingly, they were generally confident that there would be positive resolutions to the current skirmishes between the United States and some of its trading partners, and this is akin to the dynamic that President Bullard described earlier. But, I should note, my contacts' decisionmaking has not changed, and the tendency toward more muted investment remains. And this would suggest that the TPU effect, to the extent that there is one, is likely still holding.

Now, in preparation for this meeting, I heard more reports of upside risks, especially on consumer spending and housing. A regional beverage bottler and distributor noted his sales for the year are already above plan even after a very slow start during the winter months. And a national housing manufacturer touted that conditions in the housing market appear to have improved markedly in March and early April, in part due to the lower trajectory in rates.

This lack of concern appears to have spilled over into labor markets as well. Despite tight labor markets, many businesses appear to be pushing forward with hiring plans. Our employers offered all of the usual soundings regarding difficulty finding and retaining talent. In addition, as was alluded to by President Daly and Governor Clarida, a few contacts noted diving deeper into labor pool to find workers. Predictably, there were a few grumbles among this group that their latest hires were less than ideal, but it is difficult at this point to disentangle whether these murmurs were a sign that we've significantly pushed beyond the full-employment

boundary, considering that many of these firms were undeterred in their expectation that they will continue to be able to add to payrolls. And they did ultimately make the hires. While wage growth measures have moved up some, I have not been able to detect any battle royal over talent that would result in an upward wage price spiral.

Regarding prices, much of the recent softness in the incoming indicators appears to be a symptom of a relatively noisy price change distribution, and, at this point, I'm placing a bit more faith in the signal provided by trimmed-mean measures of underlying inflation that suggest that inflation remains at or just a bit below our price objective.

In my view, the risks to the inflation outlook remain balanced. I am a bit skeptical of the notion that underlying inflation has softened materially since the end of last year, and while I admit that inflation hasn't exactly taken flight in the face of what appears to be relatively tight labor market conditions, I am not yet ready to concede that the link between the two is completely dead.

The current state of the Phillips curve is reminiscent of a famous Monty Python skit about a dead parrot, and at this point, notwithstanding President Daly's research and analyses, I'm still siding with the shopkeeper. And, yes, I do know how this scene actually plays out. [Laughter] I would not be surprised if yelling into the air at the Norwegian Blue—in our case, further tightening in labor market conditions—serves to startle Polly awake. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Harker.

MR. HARKER. I really need to follow that? [Laughter] All right. Well, thank you, Mr. Chair. So, regarding the forecast, I'm in general agreement with the staff's near-term forecast of economic activity, although I continue to be concerned, like others, that the softness of inflation

may be more long lived than is anticipated in the staff projection. Inflation has been stubbornly below target for quite some time, and projections that it will return to target or slightly exceed target have likewise been incorrect for an extended period of time. And I, like President Daly, have inflation risks totally to the downside.

The Tealbook outlook is also consistent with the anecdotal reports of various Third District contacts indicating that activity has picked up modestly in recent weeks. Comments suggest that the economy will achieve modest growth this year, and people seem a bit less concerned than they were just even a couple of months ago. After experiencing a bit of a wobble at the start of the year, economic activity in the Third District has shown a slight pickup. Employment growth in the District is at trend, and labor markets appear to be healthy in most MSAs. As well, employment gains are broad based across various industries, and the unemployment rate was 4 percent in March. All 18 MSAs in the District have unemployment rates that are at decadal lows. Also, the labor force participation rate in the District has picked up, and the March reading on initial claims was the lowest since 1990. So, all in all, the labor markets are good in the Third District.

Currently, though, there is a divergence between manufacturing and nonmanufacturing in the District. Although our manufacturing survey experienced a moderate bounceback in April, it is currently above its nonrecessionary average. The index is noticeably lower than it was last year, and expectations have moderated as well. Regarding activity outside of manufacturing, our nonmanufacturing sector is posting strong overall growth, and both new orders and sales were elevated in April. Respondents remain fairly optimistic about growth over the next six months.

One area of notable and noticeable weakness in the District, unlike Atlanta, is residential investment. Permits remain flat, and the value of residential contracts have been falling.

Additionally, architectural firms are reporting less business, which I think is a real harbinger of what we're seeing across the District.

My staff has looked at, I think, an important area for us. The staff has recently analyzed the heterogeneity in regional income growth. Over the period from 1980 to 2015, real incomes of those below the 90th percentile have generally been flat, while incomes of those in the 90th to 95th percentile have risen modestly. For Philadelphia, the ratio of income of a household at the 80th percentile to one that is at the 20th percentile has increased from 4.5 in 2000 to 5.8 in 2017, which is in line with, for example, what Boston has experienced, but below that found in New York. So the region is experiencing a noticeable increase in income inequality, and we will have more to say about that in the coming meetings as we dig deeper into this issue.

Shifting gears for one minute, I wanted to give one anecdote on the international front that I thought was just interesting. It's from a contact who produces auto parts in Shenzhen, out of the Shenzhen area of China. The Chinese government plans to make Shenzhen the next Silicon Valley. I mean, that is their plan. This contact was informed that his firm needed to vacate the factory they had in that area by 2022 despite having a lease that ran through 2027. So, of course, they started the planning process of getting out of there by then. Recently, the Chinese government came back and asked him to remain till 2027, which is a sign that this grand plan of becoming the next Silicon Valley of the world is not happening as they anticipated. So I think it's just one interesting sign of what we're seeing on the ground in China today.

So, to summarize: The economy in the Third District and nationally seems to have stabilized, with recent data mitigating any concerns I have of a sustained slowdown. However, the softening in price pressures does represent a concern, and the lack of any inflationary

pressure will continue to be a focus of mine and inform my policy positions over this and subsequent meetings. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Barkin.

MR. BARKIN. Thank you, Mr. Chair. Economic activity has evolved a bit stronger than I predicted at our previous meeting. I certainly wasn't expecting 3.2 percent GDP growth in the first quarter. Real GDP seems likely to grow faster than trend, and the labor market remains healthy. It helps me to circle back to the fourth quarter and recognize that, above and beyond the hard data, we had what I think of as a sentiment shock. There's a significant drop in business, consumer, and investor confidence driven by and overreacting to international weakness, trade concerns, fragile markets, and the looming government shutdown.

The Michigan Index of Consumer Expectations fell over 10 points from September to January. The Conference Board's CEO survey fell 13 points in the fourth quarter. The stock market fell 20 percent from October 3 to Christmas Eve. The ISM New Orders index fell 10 points in December. In our Fifth District, new orders index for manufacturing fell 45 points from September to January.

Sentiment drops like this can affect the real economy and may well have played an important role in the drop we saw in retail sales and business investment early in the year. Weather surely contributed as well. But by mid-February, things had settled. The government shutdown ended. The stock market rebounded. Trade uncertainties seemed less pressing. China started to recover. Brexit was delayed. Perhaps we were relevant, too. The sentiment measures began to improve. At our previous meeting, like many of you, I predicted that the weakness would prove transitory, and it is encouraging to see signs of a rebound. Employment, auto sales,

and retail sales were all strong in March. New claims for unemployment insurance hit a 50-year low.

Now, in assessing the outlook, I distinguish between consumer and business sentiment. Consumer confidence is anchored by a strong labor market, good income prospects, healthy credit markets, and high savings. Once the environment settled, they were ready and able to resume spending in March. And I expect, like many of you, solid consumer spending to continue for the rest of this year.

Based on my conversations with business contacts, however, I think their recovery will be slower. Many firms have high leverage. Executives have elevated risk assessments persisting from the Great Recession, and there are increasing doubts arising from the length and weakness of this expansion. While these executives tell me they've not cut back on hiring or investment, they have now had risks crystallize, and they say we won't see them doubling down. There are still ample reasons for uncertainty, including trade, the debt ceiling, and continued political turmoil. Executives see the upside as limited, and they are cautious. Consequently, I expect business investment to slow relative to last year. This is also in the Tealbook forecast.

Finally, I believe that sentiment also played a role in the unexpected weakness of inflation in the first quarter. Many businesses set price increases to start at the beginning of the year. First-quarter pricing is often an opening bid on efforts to take prices higher. Over time, market reaction determines what can be sustained. But the sentiment shock in the fourth quarter likely led businesses to have less courage and led purchasing departments to push back harder. Perhaps, as a result, we had less inflation in the first quarter than would have occurred without the sentiment shock. Because of the annual nature of this price listing, the effect of this shock may well last several quarters. Thank you.

CHAIR POWELL. Thank you. President Evans.

MR. EVANS. Thank you, Mr. Chair. We've had disappointing news on inflation. All the incoming data on domestic economic activity has improved since last round. Meanwhile, the reports from my directors and other contacts didn't change very much. My contacts did experience some softer activity early in the year, but they remained fairly sanguine about solid underlying trends in domestic demand and continued labor market strength. So they also weren't terribly excited about the pickup we've seen in recent national data, and some had already seen easing price pressures. To them, it's all been pretty much more of the same.

Commentary about international growth did improve this round, although the standards for improvement are quite low. For example, a large temporary help firm saw a glimmer of hope in Europe because the trends there seem to be stabilizing. Growth was slow, but at least not getting slower. A large U.S. automaker also indicated that its business in Europe was looking a little better, and, of course, the news from China points to more government stimulus and higher growth at least for the near term. Some contacts also are expecting positive news about a trade deal between the United States and China. I suspect, however, that they would be satisfied with just a cessation of hostilities and don't expect any breakthroughs on major long-standing structural issues.

In financial markets, our contacts say investor demand is strong across asset classes, and banks in the District report ongoing competitive pressure on rates and terms in CRE and C&I. This is a good environment for borrowers. For example, one large nonfinancial firm rated their borrowing conditions as a 4 on a scale of 5.

Regarding wages and prices, although reports of labor shortages continue unabated, we didn't hear much about stronger wage growth. That said, one major temporary help agency did

see some acceleration, with year-over-year increases in production worker wages moving from 3.4 percent in Q4 to 3.7 percent in the first quarter.

There was little commentary about inflation, but the news I did hear did not suggest rising inflation pressures. A couple of large manufacturers mentioned that commodity prices had stabilized or turned down some, with one noting he saw no reason to raise his product prices any more this year beyond the modest increases that were already in place.

For the national outlook, the incoming monthly data suggest that the first-quarter weakness in private domestic final demand likely will turn out to be a minor pothole. Downside risks remain, but they appear to have abated a good deal. We boosted our forecast of real GDP growth in 2019 to 2¼ percent. Our outlook for 2020 and 2021 is mostly unchanged. We are projecting a moderate slowdown in growth beginning next year, largely reflecting the declining impulse from fiscal policy. We see the unemployment rate averaging 3¾ percent over the projection period, and our long-run neutral rate is 4.3 percent.

The news on inflation has not been good. The recent data on core inflation have softened considerably. Perhaps there are special temporary factors operating. However, I am highly sympathetic to the Tealbook's revised views about underlying inflation. I remain quite concerned that inflation expectations could stay stubbornly low relative to our objective.

To combat this, I think we need a flat policy rate path and strong communications of our commitment to a symmetric 2 percent inflation target. This combination should gradually lift inflation expectations over the course of the projection period. In this setting, we project the core PCE inflation will move up and reach 2 percent by 2021 and modestly overshoot target after that. I think I've been forecasting that for quite some time. If, instead, I took onboard the Tealbook's

revised view that underlying inflation will remain stuck at 1.8 percent through 2021, then I would be writing down a below-target forecast.

In sum, while I am feeling better than I did earlier in the year about the outlook for growth, I am more nervous about the inflation outlook. My baseline assumption continues to be that we can generate a mandate-consistent path of inflation with a flat policy rate path and strong communications about symmetry. Time will tell if that is enough. With an unemployment rate of 3.8 percent, one would think delivering on our inflation mandate should be easy, like falling off a log, but instead, it's proving to be pretty difficult. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Bullard.

MR. BULLARD. Thank you, Mr. Chair. I have just a few remarks on the economy. I thought I'd start with remarks on the new Tealbook policy rule, which is closer to the modernized Taylor rule that I discussed at this table and in public presentations. Generally speaking, I have felt that the Taylor (1999) rule is interesting from the 1990s perspective but that too much has changed since that time—and in the use of the rule, too much is taken as constant since the 1990s, which is no longer constant. So generally I applaud the change, which I feel is long overdue. I think this sets up a better baseline for the Committee from which to have a policy discussion.

Moving the output gap coefficient in the policy rule from alpha equals 1.0 to alpha equals 0.2 is a reduction by a factor of 5. My eyeballing of the rolling regressions that inform this kind of reduction was to reduce it by a factor of 10, but 5 is close enough. So 0.1 or 0.2 probably doesn't make too much difference.

The most important thing is that we're recognizing the empirical evidence on the lack of feedback from real activity to inflation in the past two decades. It brings the Tealbook baseline

closer to private-sector assessments of the current state of the economy, which I think is also important.

The new rule calls for a mostly flat path of the federal funds rate. I see this as appropriate at this juncture. I would not have a projected increase in 2020. I would just leave it flat. But other than that, it's very close to my own policy outlook.

There are possible other adjustments that we want to make to modernize the Taylor (1999) rule, one of which we have already partially made and the other that we haven't. The one we haven't made is to use inflation expectations instead of actual inflation in the Taylor-type rule. We could use some measure of market-based expectations as a deviation from the inflation target over the forecast horizon. That would give you some forward-looking element to the rule. This has been discussed in the literature, certainly since the 1990s. When Taylor was originally writing, there were no TIPS market data, so that did not get established in the United States until the late 1990s. I do see current inflation expectations, like many around the table, as somewhat lower than desired.

The other adjustment that we could make is on r^* , which has been heavily discussed around the table. We have lowered our r^* baseline, I think, as a group and within the Tealbook. I think you could take r^* even lower based on global considerations and model-free assessments of trends in global short-term interest rates. If you just look at the data, it looks very low globally. It doesn't look like it's moving up nor is there any notion of trend, or of mean reversion. So, I think, for the time being, r^* is going to be even lower than what we are thinking it is over the forecast horizon.

So these additional considerations would suggest that the current policy setting is actually mildly restrictive. But despite this moderately restrictive stance, I remain hopeful for a soft

landing, akin to the one achieved by this Committee in the mid-1990s following the 300 basis point normalization in 1994 and 1995.

On the real economy, Eighth District anecdotal information remains focused on steady growth. I think many of you know that agriculture is a weaker sector in part because of trade war effects and also because of very wet conditions across our District, delaying planting and causing other types of problems. Labor markets continue to improve. We do hear a lot of stories of inventiveness by firms in hiring workers, consistent with remarks by Presidents Daly, Mester, and Bostic.

Nationally, GDP surprising to the upside in Q1 does change our narrative to some degree. The Fed nowcasts on the eve of the release of the first-quarter initial estimate were 2.1 percent and came in at 3.2 percent. That's a pretty big upside surprise. Previously, our narrative—or my narrative, anyway—was that Q1 would be a weak quarter, but don't worry, the remainder of the year would be stronger in the context of the situation in which it's well understood that 2019 would be a slower-growth year than 2018.

The new narrative is that Q1 came in stronger than expected, and year-over-year GDP growth is still above 3 percent. It's possible now that 2019 growth will be somewhat faster than currently expected, and we'll continue to have an upside surprise as we go forward. However, I do not think that the new narrative will have an effect on my projected rate path because the feedback from growth to inflation is quite weak, which is reflected in the lower coefficient in this new Tealbook Taylor-type rule.

Recent inflation readings are low, as many have mentioned around the table. Core PCE year-over-year—only 1.6 percent. Inflation expectations are still soft, in my view, as Governor Clarida has emphasized. This is mildly concerning to me. I think it could be used to justify a

rate cut or plan for a rate cut. One question I would have put to the Committee is, we've had two years of upside surprise to the economy, outperformance in labor markets, and outperformance on real GDP growth, and we still aren't up to our inflation target. Not only that, but we're going in the wrong direction. I think the idea of opportunistic inflation is an intriguing phrase put forward by President Mester.

I think a rate cut would still be premature at this point but should be something we prepare for. One counter, which I think is an important one, is that the Dallas Fed trimmed mean is still 2 percent, and I do think it has generally done a better job in measuring underlying inflation for the United States. But if it were up to me, I'd put more weight on inflation expectations and less weight on the core year-over-year reading.

My last comment is that the framework discussion that's ongoing and, I guess, is about to heat up in the lead-up to the Chicago conference in June has increased speculation about price-level targeting and its many variants. That could influence inflation expectations and could be mildly "dovish" for the near term. Longer term, however, it would depend on what we actually do with respect to that issue. So thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Kaplan.

MR. KAPLAN. Thank you, Mr. Chairman. Everything we are seeing in the 11th District is consistent with solid growth, although at a somewhat slower pace than last year. We currently expect Texas job growth of between 1½ and 2 percent during 2019. That compares with 2.3 percent growth last year. But I would say, our manufacturing- and service-sector surveys and our discussion with contacts suggest business seems to be stabilizing after weakness in the fourth quarter of 2018.

As with others, wage pressures remain elevated, and there have been continued reports of widespread labor shortages. Although, I would note, wage pressures are particularly evident at the low end of the wage scale where—based on discussion with our contacts—wages are \$12 to \$15 per hour, and for skilled workers.

One potentially underreported situation, from a commercial point of view, is the situation down at the southern border. U.S. border conditions have emerged as a source of business uncertainty in our District. As has been widely reported, we've got a surge—and this is a real surge—of immigrants and migrants coming from Central America. Not from Mexico, but from Central America. And I just visited El Paso last week and met with the mayor, with customs and law enforcement leadership, and with business leaders. What they told us is, they have now diverted personnel away from major commercial crossing points, literally shut lanes at a very critical port. Contacts that we talked to report 12- to 18-hour wait times for their trucks versus 4 to 5 hours, and there are reports of much longer delays. At just the port of El Paso, 3,000 trucks per day was typical up until a few weeks ago. It is now down to 1,500 trucks a day.

We're getting widespread calls—in our District, at least—about the implications of this. And what we're hearing is, this situation is putting logistic and integrated supply chain systems of manufacturers under severe strain, particularly probably in the Southwest United States and in the Midwest United States. We may not be hearing about it yet, but I'll just describe the dynamic. U.S. manufacturing facilities depend on these supply chains and typically use just-in-time inventory methods. That means they operate with not a lot of slack. So if this type of border situation persists—it's going on in El Paso, it's going on in McAllen, and all across at least the border of Texas—ultimately, these plants will run out of final goods inventory.

We're going to continue to monitor this very carefully. It sounds like, just around the table, your manufacturing contacts are not yet hearing about it, but our folks that handle logistics along the border suggest that, if this goes on, we will be hearing about it more from manufacturing contacts not just, again, in the Southwest, but probably also in the Midwest.

Let me just comment on oil. As some of you mentioned, oil prices have increased materially since January. Our own view at the Dallas Fed is that the bulk of that increase, at least up until the third week in April, was due to greater confidence in global demand—that is, less concern that we were going to head into a global downturn, along with some of the effect from sustained OPEC production cuts, as well as geopolitical uncertainties in Venezuela, Libya, and, of course, Iran.

Then, on April 21, the United States announced that we would no longer grant waivers on Iranian oil exports. Our estimate, based on discussion with our contacts, is, this should affect about a million barrels of oil per day. The reason we didn't see a greater market reaction—it's our sense that OPEC, led by Saudi Arabia, has already agreed to reverse some of their production cuts, as much as 800,000 barrels per day, to offset the bulk of this loss. And so, apparently, Saudi Arabia—we're at the point now where the United States, by the end of this year, produces about 13 million barrels of crude a day. Russia produces a little over 11 million. Saudi Arabia produces about 10 million, but it's our judgment they've got about 2 million in reserve. So they can flex and increase production to buffer some of these geopolitical issues.

The issue is, this year, we still expect global consumption to grow about 1.5 million barrels a day. The United States is going to grow production by about a million barrels a day. And, by the way, last year the United States grew production at 1.9 million barrels a day. And you may ask, what's the reason for less production this year? And what we hear all throughout

our District is—just a reminder—in shale, the first-year decline curve is 70 percent. And so if you want to just keep production level, you’ve got to drill dramatically more to grow production at a million barrels a day. In this case, going from 12 million to 13 million barrels is a pretty Herculean task, and they are struggling to keep up. That tells us that the dynamic we’re in now is, the United States will continue to grow production, but not as fast as global demand growth. Saudi Arabia and OPEC will play the role of price stabilizer, in that they’ve got some excess reserves to do that, but at elevated price levels.

The other thing we’re hearing widely from exploration and production (E&P) companies is, they are under substantial investor and shareholder pressure to improve operating efficiencies because E&P stocks have performed so poorly. And so these companies are investing a lot more in efficiencies, but what we expect predominantly to happen—and you’re already seeing it—is, because these techniques are so expensive, you’re going to see more scale. And in this industry, you’re either a buyer or a seller, and we’re going to expect to see a lot more consolidation. But I think for gas prices in the years ahead, you know, eventually we’re going to get to the point at which OPEC cannot continue to increase—they’re out of excess capacity, and we don’t think shale is going to keep up globally. We’ve been saying this for a while. It’s likely to keep some elevated pressure on oil prices.

Last couple of comments. We continue to see improvement in stabilization of the U.S. economy. Our own Dallas Fed economists now forecast that growth will be approximately 2¼ percent this year, close to the Tealbook. We would note that our business contacts, while they are more confident about the outlook, continue to be concerned about margin pressure, cost increases, input increases, and lack of pricing power. We think this is very consistent with S&P earnings growth. While better than expected—just a reminder, S&P earnings growth is going to

be flat, 2019 over 2018. What are companies doing about it? Substantial share repurchases, and earnings are going to be down even with massive share repurchases. You should expect to see more debt-financed merger activity, efforts to create scale, and investment in technology. The issue of corporate debt we've been talking about today is likely to get worse, because using low-cost debt is one way you can grow earnings per share. The one hope that we have in talking about this at the Dallas Fed—and Randy and I were talking about it—is, I'm hoping that a number of these companies who are heavily in bank debt will take the opportunity, with a good high-yield debt market, to term out and buy themselves some operating flexibility. And I think we, here at the Federal Reserve, jawboning this debt issue, may help encourage those who have a chance to term out to term out. I think that would be a healthy response to what we're seeing.

Last comment is on inflation. After holding steady at about 2 percent over the past six months of 2018, the 12-month Dallas trimmed mean PCE inflation rate, as President Bullard mentioned, dipped to 1.9 percent in January, but it's been holding around 1.9 to 2 percent for the first three months of 2019. It's our view at the Dallas Fed that the trimmed mean will firm during the remainder of this year, and it will end this year at or above 2 percent. We go through a monthly analysis of the factors that get cut out of the trimmed mean, and it's our judgment, just looking at this, that they appear to be transitory. I guess time will tell. We do prefer the Dallas trimmed mean because it cuts out the most extreme upward and downward moves, and we think this measure is a more reliable indicator than the ex-food and energy core PCE measure. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chairman. The outlook for the 10th District economy remains positive. Our most recent surveys of District manufacturers and service providers show

that activity continues to expand, but at a slower pace. Contacts report weather disruptions, continued trade uncertainty, and labor shortages as factors weighing on growth.

Recent flooding in the District was largely concentrated in the State of Nebraska. Preliminary estimates from state agencies put the cost of damages at around \$1.3 billion, slightly over 1 percent of state GDP. Most of this damage is expected to affect the agricultural sector, with potential for additional flooding this spring. This will add more stress to farm finances, especially in areas where infrastructure, cropland, and stored commodities have been damaged.

District energy activity is largely holding steady despite drilling activity easing a bit. However, the recent rebound in oil markets pushed the price of oil above the average profitable price reported in our energy survey. As we look ahead, higher prices and reports of easing of pipeline constraints should support increases in activity in the near term.

For the national economy, my outlook is largely unchanged since our March meeting. I continue to expect growth will slow to trend over the forecast horizon, with subdued inflation. Incoming data on consumer spending has improved. Both light vehicle sales and retail sales rebounded strongly in March, suggesting that the weakness we saw in earlier months was likely temporary. In general, consumer spending should continue to be supported by strong employment growth and rising wage growth. The recent strong buildup in inventories has added to near-term growth. Inventories rose strongly in the second half of last year, adding 0.4 percentage point to real GDP growth in 2018. Recent data show that this inventory accumulation continued in the first quarter. Given that inventories are quite volatile and timing of inventory unwinding is typically hard to predict, I'll be closely watching the current elevated inventory-to-sales ratio.

Regarding the labor market, the rebound in March payroll growth following the unexpected slowdown in February offers some reassurance that the labor market remains healthy. Smoothing through the volatility in recent months, I still anticipate some moderation in payroll growth from the strong growth of the economy experienced in 2018. In particular, the payrolls deceleration has been strongest in the case of the goods sector, whose employment growth has stepped down from an average of 53,000 per month in 2018 to 21,000 per month in the first quarter of 2019. Factors contributing to this deceleration likely include the waning of fiscal stimulus and the removal of monetary policy accommodation last year. Monetary accommodation historically has had a stronger effect on employment in interest-sensitive goods-producing industries than service-providing industries.

Employment growth in service industries experienced a more gradual moderation, from 163,000 per month last year to 148,000 in the first quarter. I expect employment growth to continue to slow over the next two years toward a rate more consistent with the net rate of entry into the labor force as overall economic growth decelerates toward its trend level.

Regarding inflation, recent readings suggest that 12-month core PCE inflation will likely remain below 2 percent throughout this year. Part of this weakness in the first quarter reflects softness in nonmarket components, such as PCE, health care, and financial services prices, which I expect to be temporary. In particular, health-care services inflation appears to be a bit out of line with fundamentals of wage growth in that sector and administered price increases for Medicare and Medicaid. Because of the methodological differences for these services and the core CPI and core PCE, this weakness in these nonmarket prices has caused a larger-than-usual divergence between core CPI and core PCE inflation, which obscures some of the signals about the underlying price pressures in the economy. I'll be monitoring inflation developments to

determine whether this recent weakness is, indeed, idiosyncratic and temporary in nature or whether it represents a more fundamental change in the inflation outlook. Thank you.

CHAIR POWELL. Thank you. Governor Quarles.

MR. QUARLES. Really?

CHAIR POWELL. Sorry. Governor Bowman.

MS. BOWMAN. Thank you, Mr. Chair. On Friday we learned that GDP growth in the first quarter was a strong 3.2 percent, comparable with the 3 percent pace recorded over 2018 as a whole. This was a better reading than many had expected. But, underneath the headline GDP number, the data on aggregate demand illustrated tentative signs of slowing growth. In particular, there was a step-down in growth in the categories of consumer spending and business investment. Consumption growth dropped to 1.2 percent in the first quarter after registering a 2½ percent pace in the fourth quarter of last year. I would note, however, that there were some temporary factors that can probably account for some of the slower domestic spending growth in the first quarter. Among those, I would include the government shutdown, slower-than-usual tax refund payments, and possibly some lingering caution after the financial market turbulence at the end of the last year. But, with household income still rising at a healthy pace and consumer sentiment improved, I remain confident that consumer-spending growth will strengthen again as we go forward.

The first-quarter data and various indicators suggest that activity in the business sector is also easing from last year's strong growth. Data show a softening in new orders for capital goods, and readings on business sentiment are below last year's higher levels. Information on expected earnings for capital goods producers that Board staff members use to forecast activity in the business sector tell a similar story of more moderate gains in business investment this year.

In agriculture, I would note that many producers seem optimistic despite the fact that conditions in the sector remain challenging. And, as President George mentioned, recent severe flooding in the Midwest has increased pressure in that region. The flooding resulted in significant losses of crops and livestock in Nebraska, Iowa, and Minnesota, and, although it's still too soon to fully assess the impact on national agricultural production, one early estimate put the value of losses in Nebraska alone at at least \$1 billion. Of note, in addition to crop and livestock losses, stored grain in flooded areas was also destroyed, much of which was stored in anticipation of commodity market price increases. Although the upward pressure these supply losses will put on domestic food prices will likely be modest, given the elevated inventories of corn and soybeans, I remain concerned that some farmers may be poorly positioned to withstand additional financial pressures.

Though there are some similarities between the current agricultural conditions and those that preceded the farm crisis in the 1980s, there are several key differences of note. Today's interest rate environment is substantially lower, and overall leverage is much less pronounced. Further, land values have declined only modestly in recent years. This combination of relatively low interest rates, increasing but modest debt levels, and strong collateral have resulted in more manageable debt service requirements for many borrowers. Most producers have continued to make loan payments despite the depressed commodity prices, and farm-sector bankruptcies, although slightly increasing, have remained well below the levels observed in the 1980s. Even so, developments in the agricultural sector bear continued close monitoring.

Regarding the broader economy, there have been several positive developments since our previous meeting. First, we've seen marked improvements in financial conditions since the end of last year, and financial markets appear to have bounced back. Residential mortgage rates are

now at the lowest levels in more than a year, and there are signs that the housing market is stabilizing after declining in 2018. Consumer confidence has strengthened once again after softening earlier this year.

Despite elevated debt levels in the business sector, borrowing conditions for businesses and households remain generally favorable, and, of course, the labor market continues to perform extremely well. Job gains have continued to be strong, with the unemployment rate very low, and measures of unfilled job openings are at high levels. I am encouraged by the improvement in labor force participation over the past year relative to its long-term downward trend. It appears that rising wages and a strong likelihood of finding employment may be encouraging more job seekers into the labor market than in previous years. I would note that I do have an ongoing concern that the current strength of the national labor market is masking the struggles that many lower-income families face, especially those in rural communities.

On the price-stability side of our mandate, the lower readings on PCE price inflation in recent months give me some pause. Despite the strong economy, we are still seeing inflation dip below our 2 percent target, and the recent readings are softer than I would hope to see. Trade tensions and global economic conditions also continue to be an area that warrant monitoring, particularly the unresolved trade negotiations and the continued effects of tariffs on particular industries, particularly agriculture.

Notwithstanding these risks, I remain optimistic that our domestic economy will continue to perform well in 2019, and that the expected transition to a more moderate pace of economic growth is proceeding more or less smoothly. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Chairman. Just a few remarks on the economy. I have been a consistent—some would say even annoyingly consistent—optimist in my economic outlook since joining the Committee. Given that position, a lesser man might have been tempted to dwell excessively [laughter] on last week's GDP number. But I am not that man. And as it has been pointed out, the strength of the headline number does hide some unappealing details.

In particular, I was disappointed by the weakness of investment. With spending on equipment about flat in the quarter—that's the worst showing in over two years—and given the importance for at least my hypothesis of investment and the effect on productivity and the productivity story for supporting that optimism, that's obviously a significant concern. Relatedly, PCE was held down by the sharpest decline in spending on durables since immediately after the crisis. Altogether, these are some worrying signs perhaps that consumers and businesses are becoming a bit more cautious in their spending. I expect the consumption will pick back up, supported by a labor market that's continuing to draw workers back in the labor force, accelerating wage gains. I expect investment to firm up, supported by favorable business and financial conditions. But if the weakness in investment were to persist further into the year, even I might be led to reassess the strength of my longer-term outlook.

The recent data on inflation have also been anemic—core PCE inflation in the 12 months to March running at only 1.6 percent. I understand that some idiosyncratic features, including a change in the methodology for measuring apparel prices—apparently, this year's equivalent to cell phone pricing—may have contributed to the weakness. Nonetheless, the data suggest that inflation pressures remain muted, even against the backdrop of increased tariffs and tight labor markets.

I characterize the tone of the discussion at the IMF and World Bank meetings earlier this month as cautious but not particularly distressed. I think there's a sense that the soft patch in global real GDP growth observed through late last year and early this year may be coming to an end. Certainly, at least financial markets seem to have regained their confidence. It's notable how strong of a reaction the market has had to the recent encouraging signs in Chinese activity. One interpretation might be that recent market volatility has—at least, in part—been driven by the market's changing assessment of the commitment of Chinese authorities to deleveraging relative to maintaining strong growth. At the end of last year, there could have been some concern that deleveraging would be prioritized at the expense of growth. And, more recently, moves by the authorities to relax credit conditions, along with the first-quarter GDP above 7 percent, has probably lessened those concerns. But this is a balancing act that's not going away, and the likelihood of continued shifts by the Chinese authorities between prioritizing deleveraging and growth could continue to move financial markets.

Finally, I welcome the change in the staff's policy rule and the new, perhaps more realistic, forecast of the policy rate path. Certainly, by closing the gap between the SEP rate path and the staff path, the new rule will allow us to focus on other fundamental differences between the FOMC's and the staff's outlooks without the distraction of the widely divergent rate path.

Thank you.

CHAIR POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you, Mr. Chair. Well, first, I just want to thank the staff for all of the new data series that they are putting on the table. I thought the use of the New York Fed's survey data to rank and show changes in rankings of risks is a very useful addition. I think that will be great to track over time. I thought the trade policy uncertainty index, developed by our IF

super team, is also going to pay dividends over time, and I also wanted to commend the staff for developing the distributional financial accounts by combining the Survey of Consumer Finances with the flow of funds data. I think this is going to provide a really rich ability to track how different groups are doing, in terms of their net assets over the cycle at a much higher frequency than we can do currently. And we saw a glimpse of that today, with the racial and ethnic groups.

Regarding the outlook, with one important exception, recently developments in the United States and abroad suggest a brighter modal path for our economy and a decline in downside risks. Moreover, financial conditions have rebounded, returning to the relatively accommodative conditions we saw before the fourth-quarter selloff. While these developments suggest some upside risk, the most recent readings on core PCE inflation are on the soft side. And although some measures suggest the softening may be transitory, I will be watching the full constellation of inflation data very carefully, given that underlying inflation has been running somewhat below target for some time. Let me talk about each in turn.

When we met in March, several pieces of data were concerning. By contrast, between the labor market report earlier in the month, last Friday's GDP report, yesterday's reassuring "print" on PCE, and today's upbeat confidence reading, those concerns have been largely laid to rest. The expansion looks likely to continue to be underpinned by confident consumers, robust hiring, and supportive financial conditions.

The BEA on Friday reported that real GDP increased at a $3\frac{1}{4}$ percent annual rate in the first quarter, well above what many forecasters were expecting. Although some components that were strong in the first quarter are likely to weaken in the second quarter, nonetheless, consumption growth looks likely to strengthen, leading to a solid first half in which real GDP growth is comfortably above the potential growth rate.

Retail sales posted a robust gain in March, and motor vehicle sales moved up sharply. Consumer sentiment has been at a high level following the January slump, and consumers are likely to be buoyed by recent solid gains in employment and the stock market. While residential construction continued to decline last quarter, it's likely to benefit later this year from the recent step-down in long-term interest rates. In contrast, the slowdown in gains in business fixed investment is likely to prove more persistent. Last year's exuberance appears to be waning. Surveys of businesses have generally moved lower over the past six months, reversing much of the run-up seen in 2016 and 2017.

Payroll employment increased about 180,000 per month on average over the first three months of the year. Although that's down a bit from the rapid gains of 2018, it's enough to keep the employment to population (EPOP) ratio moving up. The unemployment rate was 3.8 percent in March and has been about flat since this time last year. During that time, the participation rate and the EPOP ratio have both moved up about ¼ percentage point, suggesting that the strong job market is drawing in previously marginal workers. Unemployment insurance claims recently hit a new low for the cycle, suggesting those solid job gains are likely to continue. And although job openings ticked down in the latest survey, the current level is nonetheless higher than any reading prior to 2018.

And as we discussed earlier, financial conditions have continued to ease since our March meeting and, depending on the measure, have now either largely or entirely reversed the deterioration in the fourth quarter of this year.

Overall, recent data also suggest some brightening in the foreign outlook, a welcome shift from the downward momentum through much of last year. Most notably, according to official Chinese government figures, real GDP growth picked up significantly in the first quarter after

notable softness in the second half of last year. And today's purchasing managers index (PMI) and trade "prints," along with credit growth indicators, provide some reassurance that Chinese growth is stabilizing. While today's data from Europe remain soft, they nonetheless suggest some pickup over the weakness of late last year.

Taken together, recent surprises in the real activity data have generally been to the upside. Downside risks to activity appear considerably lower than they were earlier in the year—and it may even be time to start contemplating some upside risks. Policy uncertainty, which played a major role in financial market volatility at the end of last year, has diminished. There have been upbeat news reports about the ongoing U.S.–China trade discussions. Brexit has been delayed, providing welcome breathing room for businesses to prepare for a range of outcomes and for politicians to settle on an acceptable path. Against this, there may be some risks associated with the upcoming parliamentary elections in Europe and ongoing difficulties in Italy, but, for now, the picture is one of relative calm.

Against the constructive backdrop on growth, consumption, and financial conditions, the past few months of inflation data have been disappointing. Monday's official release of core PCE inflation indicated an increase of only 1.6 percent, down from 2 percent over the preceding 12 months. In contrast, the Dallas Fed's trimmed mean posted an increase of 2 percent right on target and up a bit from the year-earlier reading.

A careful look at why core inflation has been somewhat weaker than expected in the past three months may help explain why we're seeing divergent signals from those two measures. In particular, a trimmed mean measure will tend to exclude outliers, such as the declines in portfolio services and apparel. Because apparel and financial services prices tend to be volatile from month to month, it's not clear how much signal we should take from these downside

surprises. Additionally, as others have noted, the drop in apparel prices may reflect a methodology change. Consistent with the view that a substantial portion of the recent declines may be transitory, the staff expects some of the recent surprising weakness to unwind, with core inflation for the year at about 1.8 percent.

Although the price Phillips curve looks to continue to be as flat as a pancake, the recent data on wages should nonetheless reassure us that the tight labor market is, indeed, having some effect. Average hourly earnings rose 3.2 percent over the 12 months through March, up from 2.8 percent over the preceding 12 months, which were themselves up from the preceding year. The employment cost index (ECI) doesn't show quite as much acceleration, but, with today's release, that index is up about 2.8 percent over the past four quarters, similar to last year, and up about $\frac{1}{2}$ percentage point from the increase the year before that.

The broader economic context provides some reassurance. Nonetheless, I remain concerned about the soft underlying trend. As I have been saying for several years now, a variety of statistical filtering models suggest that underlying trend inflation has been running modestly below our target for several years. And this is consistent with a variety of other measures, such as the Michigan survey and five-year, five-year-ahead inflation compensation. Consistent with these developments, in this round, the staff threw in the towel on the prospects for further increases in underlying inflation and now assume that underlying inflation will remain flat at 1.8 percent instead of rising over the next few years. And, as I've noted previously, that underlying trend is a very important driver of inflation over the forecast horizon, given the very low rate of pass-through from resource utilization.

Overall, the incoming data on activity suggest that short-run r^* may be returning to its gradual upward trajectory of recent years, a development that would by itself suggest further

modest tightening. But this isn't the conclusion that we would reach on the basis of the softness in inflation and in inflation expectations. On balance, then, we should continue to be patient in coming months as we wait for inflation to again move up, consistent with our symmetric target.

In the “new normal” of low interest rates and the resulting compression of our conventional policy buffer, it's more important than ever to anchor inflation expectations at, and not below, 2 percent. The challenge that we face is how to move underlying trend inflation up to our target over a sustained period without also fueling the kind of financial imbalances that have ended the past few expansions, given the inert Phillips curve. For that reason, I too have been mulling the possibility that we should be looking for an opportunity to accommodate a positive inflation shock in a form of opportunistic reflation. I look forward to talking more about this tomorrow. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman. I thought about limiting my comments to just saying “There's still slack in the labor market” and calling it a day, but you can listen to the rest of it, since I've prepared it.

To start with the local economy, modest growth continues in the Ninth District. Most sectors are doing well, with the notable exception of agriculture. A broad range of business contacts note that current and near-term activities are positive. Of course, I'm going to come back to this.

Firms continue to report difficulty finding qualified workers, but, of course, wage growth also remains pretty stable at around 3 percent—my favorite two facts. Firms were reporting moderate pricing pressures, though quite a few offered unsolicited complaints about rising health-care costs. We have heard a lot more about that recently.

On the national economy, overall, the broad economic picture has been remarkably stable over the past several years: steady job gains with rising prime-age labor force participation, subdued inflation, and low long-term interest rates. Recent numbers have not changed this picture very much—job growth remains strong. I was happy that March bounced back after the weak February. Inflation remains subdued. Long-term interest rates remain low. Among developments worth noting since our previous meeting is that momentum in the real economy, as others have noted, looks a bit stronger. Friday’s strong GDP report alleviated concerns about a slow Q1. On the other hand, as others have noted, inflation has fallen, with core PCE now about 1.6 percent today, and survey measures of inflation expectations remain at or near historic lows. The Michigan survey is at or around 2.3 percent, which is its low.

To return back to the labor market: I don’t think I need a new theory of inflation. I just think there is still slack in the labor market, and I’ve come to the point as all of you do. I go out and meet with a lot of businesses. I’m concluding that feedback from businesses is almost useless in assessing the labor market. [Laughter] My favorite comment was from a couple of years ago. I had a roundtable of businesses complaining that they couldn’t find workers, and I said, “When was the last time there was a healthy labor market? When could you find workers?” And they said, “Oh, 2009 was a good year.”

Recently, I had a manufacturer tell me that we’ve had a diesel mechanic shortage for 30 years. I said, “No, it sounds like we have exactly the right number of diesel mechanics in the U.S. economy if it’s been 30 years.” Now, in contrast to that, Governor Clarida came out to our *Fed Listens* event in Minneapolis. It was mostly an academic-type conference, looking at distributional implications of different monetary policy frameworks. But in our final session, we had nonprofit leaders in from a wide range of service organizations that service low-income

communities around our region. And we did a little poll of them. We explained to them what maximum employment means, and we said, “Go down the line. Are we at maximum employment?” Unanimous. Not even close.

So what do we do when businesses are all saying, “Oh, my gosh, I can’t find workers,” and people in communities are saying, “Our constituents can’t find jobs”? To me, we look at the price. Like every other market, we’re trying to assess supply and demand in a market. Look at the price, and the price of labor is wages or compensation net of productivity. And until wage growth and compensation net of productivity implies inflation above 2 percent, we cannot be at maximum employment. And that does not even include the possibility that labor share of income could increase. Holding that static, nominal wage growth still needs to climb, net of productivity, to get inflation at about 2 percent. So, to me, that explains the inflation mystery. There’s still slack in the labor market. Thank you, Mr. Chairman.

CHAIR POWELL. Thank you. Vice Chair Williams.

VICE CHAIR WILLIAMS. Thank you, Mr. Chair. Last Friday’s GDP report indicated that economic growth remains strong through the first quarter, and that consumer spending was particularly strong in March. That’s really good news, especially in light of the weak economic data and market turmoil that we saw late last year or early this year. It is also consistent with my view that the underlying fundamentals support moderate growth in the period ahead.

As has already been stressed, much of that apparent strength in the Q1 number is unlikely to persist. Tepid growth and real final sales through domestic purchasers, perhaps a better gauge of the underlying pace of economic activity, point to a step-down of economic growth from last year to a more moderate pace closer to potential this year. According to various survey and industrial production data, domestic production has moved somewhat in sympathy with the

sustained weakness in manufacturing activity observed in other economies, most notably in Europe. And elevated inventory-to-sales ratios also signal that production could remain soft over the near term.

Information on other sectors in the economy also point to a slower pace of growth. Indicators for the housing sector, particularly permits for single-family units, point to continued softness in this sector despite a significant decline in mortgage rates. And although motor vehicle sales did pick up quite a bit in March, the recent pattern of sales suggests that it's unlikely that this sector will provide much impetus for growth this year.

If anything, previous concerns about negative spillovers from the global economy onto our shores have diminished somewhat in light of the more upbeat Chinese data, yet we're far from being out of the woods regarding the global growth slowdown, as signs of weakness in Japan, South Korea, and some regions in Europe continue. And, of course, policy space is quite limited in some of these areas. Now, even with the reported progress in the China trade talks, trade tensions and spillovers to financial markets still present downside risks. Although I expect some payback in growth in the second quarter, I have raised my first-half real GDP growth forecast to nearly 2½ percent at an annual rate, and that is a meaningful upgrade from my March forecast. And, like the Tealbook, I now see GDP growth for this year to be a tad above 2 percent. That said, the outlook does remain cloudy, and it's still too early to declare victory that we've gone through this period of financial market turmoil and global economic uncertainty completely unscathed.

Incoming news on inflation has surprised to the downside, culminating in yesterday's report of the 12-month core inflation at the most cited number of today, 1.6 percent. I think the transcript will show that that number was mentioned by almost everybody. But, of course, as

others have mentioned, we did see that some of this softness in inflation is probably due to temporary idiosyncratic factors, and the trimmed mean is close to 2 percent. I would point to the, I would say, somewhat soft reading on the ECI as indicating we're seeing good wage growth but no real sign of acceleration in wages.

Now, as we look ahead on inflation, we can tell a lot of stories about why apparel prices and prices of financial services are not properly measured. But the data are the data, and I expect core inflation will remain below our 2 percent target this year. I am increasingly concerned, as Governor Clarida mentioned, that inflation expectations are unlikely to stay anchored at 2 percent in the context of our repeated underrunning of our goal. Indeed, just as some of the risks of a sharper falloff in growth recede into the past, the risk of the inflation anchor slipping toward shore grows in prominence.

Let's step back from recent events and take a longer-term view. A topic that's garnered a great deal of attention among researchers is the pronounced secular decline in the rate of new business formation in the United States. Some commentators have worried that this development reflects an underlying trend—a fall in economic dynamism and potentially detrimental effects for innovation, productivity, and cyclical dynamics. It's an open question as to why this is happening and whether this trend will likely continue or reverse any time soon.

Recent work done by the New York Fed staff has found that demographics—in particular, slowing labor force growth—has been an important factor driving the slowdown in new business formation in the United States. In fact, they find that nearly half of the reduction in business formation since the 1980s can be attributed to the decline in labor force growth, and this has resulted in a shift in the distribution of firms in the economy toward older firms, which tend to exhibit relatively low productivity growth.

Now, to the extent that future demographic trends are already baked in the cake, the trend decline in new business formation is likely to continue for the foreseeable future. My point here is that the demographic trends both here and abroad—and these are some of the few economic factors that we can actually predict with a fair degree of precision—point to persistently low levels of both g^* and r^* in the future, which underscores the constraints and the nonlinearities associated with the zero lower bound that will shape monetary policy for quite some time. And for those who are interested, the latest unofficial estimates of r^* actually dipped a little bit in the first quarter. So I just want to remind everybody that r^* seems to be still quite low despite strong first-quarter growth. Thank you.

CHAIR POWELL. Thank you. And thanks, everyone, for your comments. The headline for me would be that, since the March meeting, the economy has performed broadly in line with our baseline expectations. Demand data have come in about as expected and appear to be turning up. Labor market data have been perhaps a bit stronger than expected, and inflation has been a bit weaker. The global risk picture has broadly, if not uniformly, evolved in a positive direction. Overall, it seems to me that the incoming data strongly support our current policy stance and our patient approach to any adjustments.

Despite the gaudy headline number, the first-quarter GDP report showed that private demand slowed overall in the first quarter compared with the fourth quarter, although, as John has pointed out, personal consumption expenditures, PCE, has risen steadily from December's low reading. The headline number was flattered by outsized increases in inventories and net exports, events that are unlikely to be repeated and that may, instead, reverse. Thus, to support the forecast of modest growth in the second quarter, we are looking for a healthy step-up in private domestic financial purchases (PDFP), particularly in PCE. And there is good reason to

expect that pickup. The remarkably weak December retail sales make interpreting underlying sales momentum difficult, but, like many of you, I am encouraged by the latest readings on retail and auto sales, which point to good momentum going into the second quarter.

In addition, solid underlying economic fundamentals support the view that we are likely to see a pickup in consumption growth and business investment. And I would point to more accommodative financial conditions and high levels of household and business confidence as well as strong job creation and rising wages. Overall, the risk of a deeper slide in the U.S. economy seems to have diminished, and the PDPF rebound story for the second quarter sounds credible to me.

In contrast to the growth in labor market data, first-quarter inflation readings have disappointed, slipping below our 2 percent target. This was expected for headline inflation because of past declines in oil prices, but the decline in core PCE was not expected. Some of this softening may well be attributable to sizable price declines that are likely to be reversed for some items, such as portfolio management services and airfares. Nonetheless, after a year with unemployment well below most current estimates of its natural rate, it is disappointing that we are once again explaining away an unanticipated softening in inflation on the basis of transient factors.

This pattern suggests the possibility of downside risk to longer-term inflation expectations and, therefore, to our ability to achieve our symmetric inflation goal on a sustained basis. Of course, we are not alone in this challenge, and weak inflation in the United States probably reflects the sustained disinflationary pressures that are causing many major central banks to fall short of their inflation objectives. With the labor market continuing to tighten, we can be patient in waiting for evidence that the drop in core inflation will be transitory. But in

light of the history, we need to be vigilant about this and strongly committed to our 2 percent objective.

The global risk picture has improved, on balance, although plenty of downside risk remains. The incoming data for the Chinese and European economies suggest a somewhat better outlook. The potential of a disruptive Brexit has been postponed until October 30, and there are reports of progress toward resolution of ongoing trade negotiations between the United States and China.

Our shift to patience earlier this year has contributed to more supportive financial conditions and has helped reverse earlier declines in business and household confidence. The result is an improved outlook for growth. Other central banks have also moved in an accommodative direction, in some cases with fiscal policy support, and that has helped improve the global picture.

My bottom line is that the incoming data strongly support our patient policy stance. Indeed, as some of the risks from around the world clarify but inflation unexpectedly weakens, the case for patience remains compelling. We must, of course, be prepared to respond appropriately if the outlook shifts materially, but, for now, I see no strong case for moving in either direction.

And, with that, why don't we move on to Thomas for his monetary policy briefing.

MR. LAUBACH.⁶ Thank you, Mr. Chair. I will be referring to the handout labeled "Material for the Briefing on Monetary Policy Alternatives."

As Simon noted, the median respondent to the Desk's surveys views as the most likely outcome no change in the target range for the federal funds rate between now and the end of 2021. When asked for the probability that they assign to outcomes for the target range by the end of 2019, survey respondents assigned, on average, about $\frac{2}{3}$ probability to no change. The average probability of a rate hike before the end of the year has fallen sharply since the March surveys, from about 50 percent to

⁶ The materials used by Mr. Laubach are appended to this transcript (appendix 6).

20 percent, and is now only slightly higher than the probability that the next move will be a cut.

As shown in the upper-left panel, market-based expectations regarding the path of the federal funds rate have also declined somewhat further, on net, over the intermeeting period. The probability distribution for the federal funds rate prevailing by year-end, derived from federal funds futures options quotes, shifted notably to the left and—in contrast to the probability distribution obtained from the Desk surveys—now assigns the highest odds to one 25 basis point reduction in the target range.

The diagram in the upper right shows the evolution since last fall of market-implied views on the direction of monetary policy over the next six months, as well as the level of conviction regarding those views. Conviction is highest at the corners of the triangle: The apex denotes the point at which the market-implied probability of the funds rate in six months' time being the same as today's is 100 percent. The lower-right and lower-left corners denote the points at which the probability of the funds rate being higher or lower, respectively, six months from now is 100 percent. As shown by the blue circles, on the eve of the September meeting, market pricing implied virtual certainty that the federal funds rate would be higher six months later than it was before the September meeting, and on the eve of the December meeting, there was still near certainty of a further increase. Since then, the probability distribution has become much more dispersed. By the time of the January meeting, when the blue circle moved close to the center of the triangle, market pricing implied almost even odds on the federal funds rate being higher, lower, or the same as the current target range. Although the odds of no change went up between the January and March meetings, as shown by the upward move in the circle, since then, they have shifted in the direction of a rate reduction. Of course, it is important to note that these are so-called risk-neutral probabilities—that is, they are “probabilities,” in the conventional sense of the word, only under the assumption that no risk premiums are embedded in futures and options prices. Still, the survey- and market-based probabilities point in the same direction: Over the intermeeting period, the odds of a rate cut before the end of the year have increased.

We don't know the economic outlook that underlies the options-implied probabilities. But it seems notable that the odds of a rate cut rose considerably when spending and labor market indicators received over the intermeeting period surprised, on balance, to the upside and, as Beth Anne mentioned, a number of risks to foreign economic activity eased. However, news on inflation has disappointed over the past couple of months. Indeed, immediately following Friday's GDP release, the two-year Treasury yield fell a few basis points, with a small downside miss on inflation from market participants' perspective apparently dominating the sizable upside surprise to headline real GDP growth.

In discussing possible reasons for increased expectations of a reduction in the federal funds rate, some market commentary has pointed back to the mid-1990s when, following the 1994–95 tightening episode, the FOMC made several small adjustments to the federal funds rate target. A box in the Tealbook B examines this

episode in greater detail and the middle panel depicts the main macroeconomic developments. Between February 1994 and February 1995, as the economic expansion gathered pace, the FOMC raised the target federal funds rate 300 basis points to forestall an increase in inflation, which was running near 3 percent. By the spring of 1995, the Committee had become reasonably confident that it had headed off upside pressures on inflation, but toward midyear, signs of a significant slowing in economic activity were accumulating. Even though the Committee regarded 3 percent inflation as inconsistent with its price-stability mandate, it decided to take out insurance against the risk of a sharper slowdown in economic activity by reducing the funds rate target 25 basis points in July, and it did so again at its December 1995 and January 1996 meetings. In the event, the unemployment rate, which had remained near 5½ percent during 1995, resumed its downward trend in 1996. At the same time, core inflation peaked near 3 percent in the fall of 1995 and then began to decline even as the expansion gathered momentum.

Of course, there are many differences between the situation in the mid-1990s and today. That period illustrates the point that, after monetary policy has been returned during an expansion to the vicinity of a neutral stance, some limited adjustments in either direction can become appropriate. Today, although confidence in the durability of the economic expansion in the United States has revived since the turn of the year, some risks to the outlook remain. In addition, recent low readings on inflation raise the question of whether, over time, resource utilization will be sufficiently high to return inflation sustainably to 2 percent. If low inflation were to persist, the Committee could confront at some point, as in 1995, the question of whether some modest adjustment to its policy stance would better balance the risks to attaining the Committee's objectives.

As noted in the lower-left panel, with alternative B, the Committee would acknowledge the recent softness in inflation readings, but it would signal that those readings have not altered its modal outlook that inflation will return to 2 percent in the context of a strong labor market and sustained economic expansion. This assessment might be supported by the observation that, although some measures of longer-term inflation expectations have remained low, they are little changed, on balance, over the past couple of years. Expectations in the Michigan survey of inflation over the next 5 to 10 years, the blue line to the right, have “printed” again at the lowest historical level for this series, but they have been little changed, on net, since late 2016, as has far-forward inflation compensation, the black line. In fact, inflation compensation has continued to increase while the market-based path of the federal funds rate declined. Of course, inflation compensation is a noisy measure of inflation expectations. But an estimate of far-forward inflation expectations derived from a staff term structure model that I discussed in January, the red line, has also been flat for the past year.

As Stacey discussed, the staff projects that 12-month core inflation will hold steady for the next few months and then gradually rise later this year. Should inflation instead continue to surprise to the downside, alternative A offers an option under which the Committee could signal greater concern about persistently low

inflation. Such communications would need to be crafted carefully, lest they convey a false sense of pessimism about the economic outlook or inadvertently foster a buildup in financial stability risks.

Thank you, Mr. Chairman. That completes my prepared remarks; the March statement and the draft alternatives and implementation note are shown on pages 2 to 7 of the handout. I will be happy to take any questions.

CHAIR POWELL. Thanks. Any questions for Thomas? Vice Chair.

VICE CHAIR WILLIAMS. I have a question about this episode. I mean, one thing that I'm curious about is, what did the funds rate get to?

MR. LAUBACH. It got to 6 percent.

VICE CHAIR WILLIAMS. Oh, 6 percent. So that was probably viewed at the time as being restrictive policy.

MR. LAUBACH. That's right.

VICE CHAIR WILLIAMS. So policy—I mean, they didn't have cutting-edge technology to do that assessment.

MR. LAUBACH. I'm happy to report that the July 1995 transcript does include a conversation about the equilibrium interest rate.

VICE CHAIR WILLIAMS. Which would be below this. Okay. So the FOMC at the time tightened to a contractionary state, saw the economy slow—perhaps more than they wanted to—and then brought monetary policy back, maybe more closely to a more neutral stance. Is that the right way that you would describe that episode?

MR. LAUBACH. My sense from reading the transcripts is that it had really a lot to do with the balancing of risks, right? I mean, the strength of the expansion, I think, in 1994 took them by surprise, and there was, of course, at that time, I think, a greater concern about inflation expectations and inflation becoming unanchored to the upside—in particular, since, again, inflation was running around 3 percent at the time, which many of them did not view as

consistent with price stability. So there was really a greater concern about dealing with that risk. And then, as 1995 unfolded, the outlook turned darker which I think was due in part to, for example, developments in Mexico, right?—and, against that backdrop, basically, they made this adjustment.

VICE CHAIR WILLIAMS. I mean, one interpretation would be that we've barely gotten to neutral now. And the difference between then and now is, we didn't do the last 50 basis points—you know, kind of getting into a more restrictive kind of zone.

MR. LAUBACH. That's right. I mean, it's not obvious from the transcript how far they viewed themselves being above neutral. Certainly, they viewed themselves, I think, closer to neutral at 6 percent than they had been at 3 percent, so that was clear.

CHAIR POWELL. President Barkin.

MR. BARKIN. You know, if you put the middle chart together with alternative A, you might make the case that what happened in '95 was an effort to support inflation by taking the rate down. The chart doesn't show it that way, at least not to me. The chart suggests that growth was slowing and they took the rate down. And, actually, during this period, core inflation, at least, continued to decrease. Did inflation expectations increase, or would you use this to describe a reflation story? Or is it really just a growth–balance of risks story?

MR. LAUBACH. I think, at the time, it was more a balancing act between not slowing economic activity too much and not letting inflation rise again. So they certainly wanted to lock in the inflation gains that they had achieved. The decline in inflation, I think—it came a little more as a surprise. So when you look at the transcript—certainly, for example, at the time of the December meeting—one thing that was important at the time was that they pointed to, actually, declines in inflation expectations over the second half of 1995.

MR. BARKIN. So there's no case in this story that, by taking the rates down 25 or 50 basis points, you support inflation. It actually, weirdly, went the other way.

MR. LAUBACH. That's right—which is why I tried to point out that the analogy here is actually not that close to the situation right now.

MR. BARKIN. Thank you.

CHAIR POWELL. President Daly.

MS. DALY. Thomas, is this the right way to think about it, too? Following on Vice Chair Williams—I'm lost. I'm in alphabet soup. If you look ex-post at this episode, my recollection about how we think about it is that we've moved down u^* *ex post* because we knew that it was lower than we thought it was at the time. And r^* —we overtightened a little bit on this, and we got slower growth. Then the explanation for why inflation came down precipitously, even though we didn't know it, was, we got a big positive productivity shock, and we also had global factors causing a deflation. Here we're reporting some deflation. So although I think it's illustrative of the tightening cycle, my lesson from this was always that we maybe overtightened, got slower growth, and then had a variety of other things that resulted in this picture we see. So is that how you would read it?

MR. LAUBACH. That's right, I think. And, in particular, I would say that it is, at least from the transcripts, not clear that, in some sense, there was a strong push toward actively further disinflating. In fact, at the December 1995 meeting Don Kohn gave a memorable briefing about opportunistic disinflation. And that, basically, set the stage and considered that as one of the possibilities that, maybe, they might see positive supply shocks, and that turned out, in the event, to be the story.

CHAIR POWELL. President Bullard.

MR. BULLARD. My recollection is that there were some real-time data issues in the first half of 1995. Is this true—so that it looks different today, if you look at the history, than it did at the time?

MR. LAUBACH. What I'm showing here on the chart is our data that I don't think are so much affected by real-time issues, because—

MR. BULLARD. But I think real GDP looked weaker than it subsequently turned out to be.

MR. LAUBACH. Yes, but—I mean, the unemployment rate, for example, did drift up a little bit in the spring of '95. Employment growth in real time—actually, payroll employment fell a little bit in the spring of '95. So there were, in real time, signs of clear weakness that they responded to.

CHAIR POWELL. President Evans.

MR. EVANS. Well, I mean, it's easily the case that you're right about real-time data. One thing that I remember—I actually had the high honor of attending that meeting for the first time, and I remember Chairman Greenspan was big on the risk management. And he kept talking about vendor-supplier deliveries and the PMI. Now, whether that gets revised, I'm not sure. But he looked at that as, inflation is coming. Then it didn't, and then it was coming down, so that helped. But I'm sure that it had real-time aspects.

MR. BULLARD. Yes. I would just give a little bit different interpretation from some of the others here. I think that the 300 basis points was very sharp. It was one of the toughest years for the bond market in the postwar era and went all the way to 6 percent. I think that kind of sent the signal, coming out of the '80s, that the Committee was extremely serious about getting

inflation lower, and I think it probably did set inflation expectations lower and set the tone for the rest of the '90s.

But there was this kind of reaction that we had maybe overdone it. I would say I agree with Vice Chair Williams that we had gone into restrictive territory. But the analogy to today, in my mind, is that we are mildly restrictive today in an environment with inflation lower and below target. So I think there is some analogy to draw here between the mid-'90s and today.

CHAIR POWELL. Governor Brainard.

MS. BRAINARD. I'm just wondering: We didn't have an SEP at that time, did we?

MR. LAUBACH. The projections that the Committee participants provided, to be summarized in the *MPR*, were pretty short-horizon. In February, it was for the current calendar year—1995—and in July, it was for the current and next calendar years—1995 and 1996. So they didn't go out very far. But those projections exist, and they were published in summary form.

MS. BRAINARD. I'm just wondering: We just got an enormous effect on the long end of the curve just coming from a change in the slope of the SEP forecasts. And what would be the analogy here? Would there have been a mechanism for doing that, absent this actual adjustment in the short rate?

MR. LAUBACH. The closest mechanism that I can think of was mainly the set of Delphic utterances by Greenspan—they could certainly move the long end of the yield curve—but nothing really more than that. In particular, the projections that were published in summary form in the *MPR* didn't, of course, include anything about interest rates.

MR. POTTER. I think what happened is, they started slowly increasing rates, and the bond market laughed. They started increasing rates a little bit more, and the bond market kept on

laughing. And then they did a 75-basis-point increase, felt they had to keep going, and looked at it and thought, “Boy, we almost collapsed the whole thing.” Think Orange County.

MR. KAPLAN. Remember the Mexico crisis. You remember that Colosio got assassinated in March? Remember tesobonos? Ring a bell? That all happened in 1994, and you had some tremendous stress. Our firm almost failed that year, you may remember.

CHAIR POWELL. Orange County and Bankers Trust.

MR. KAPLAN. Yes. So then I think the feeling was that the Fed overdid it and maybe took a breather. But a very different—we’ve got our problems right now, but this is a far more benign period than that one.

CHAIR POWELL. Governor Clarida.

MR. CLARIDA. Fascinating conversation. I will be brief, because we could all go on on this. But I think that one thing about this episode that is absolutely important for what we think about is, when we talk about well-anchored inflation expectations and credibility, I would argue and have argued that this episode was really crucial in monetary history, in the sense that this is the time when the FOMC essentially hiked rates very aggressively at a rate of inflation that, over the previous 15 years, would have been considered low.

Remember, it had been over 14 percent, and Volcker got it down to 4 percent. So this was the episode when—I wasn’t in this room, but I guess Charlie was, and I could read the transcripts—that the Committee said, “You know, we don’t want to go above 3 percent.” And it wasn’t pretty, and there was blood in the streets. But when we talk about well-anchored inflation expectations, a lot of it was really that episode. I think President Bullard alluded to that. I’ll be a little bit more blunt.

MR. BULLARD. Yes. I would just say one other thing about the yield curve, and I guess Simon was saying this. At first, when we raised rates, the long rates went up one-for-one. But then, as you got further through the year, the yield curve got flatter and flatter, and it almost inverted, but not quite, and then pulled back a little bit later. So the yield curve signal—it didn't quite invert in this situation.

CHAIR POWELL. Great. Maybe the last word. I happened to read this transcript in the intermeeting period as well, and I would say, there are so many ways to differentiate it. I would say, take a step back. The real point is, though, that if real GDP growth weakens and that sends you a signal that, in fact, monetary policy may be tight, there's evidence for being able to take a quick move—actually, 75 basis points—and things get going again. So it's a perfectly standard move. They did it again in 1998, of course, in a different situation—a 75-basis-point cut—and then, after that, raised 175 basis points. So there was a lot of zigging and zagging in this exactly 10-year-long expansion. That, for me, is the “takeaway.” I don't see it as applying to our current situation, but, nonetheless, I think the history is informative.

And, with that, we now adjourn to the elegant West Court Café. All FOMC participants and visiting staff members, as well as everyone here, are invited. And we reconvene tomorrow morning at 9:00 a.m. Thank you.

[Meeting recessed]

May 1 Session

CHAIR POWELL. Good morning, everyone. Let's go right into the policy go-round, beginning with Governor Clarida.

MR. CLARIDA. Thank you, Chair Powell. I support alternative B as written. It does make sense after the recent inflation data to acknowledge that measures of inflation have “declined and are running below 2 percent” and that “growth of household spending and business fixed investment slowed in the first quarter”—but acknowledging that economic activity continues to be solid. We continue in the statement to state that survey-based measures of inflation expectations are little changed. And while that's true, many of us pointed out yesterday they're little changed at very low levels historically.

In regard to the way forward for the economy and monetary policy, I'd like to make three points. First, the median SEP long-run u^* number as of March is now at 4.3 percent. And seven participants, including me, project a long-run u^* of 4.2 percent or lower. Over the past 12 months, the unemployment rate has averaged 3.8 percent and, as recently as January, stood at 4. So, with the most recent inflation data, we face an inflation gap that is modestly negative and an output gap that is modestly positive. And if I plug that in, along with my estimate of r^* , to a traditional Taylor rule, I get a policy rate very much in line with where we are now.

Second, as we all appreciate, monetary policy needs to be forward looking, and it can be subject to long and variable lags, as Milton Friedman taught us. An important judgment that the Committee will need to make in the months ahead is how best to strike the proper balance among three compelling realities. The first reality is an inclination to be preemptive because of those long and variable lags, but the second reality is that we need to consult models to inform the

basis for any preemptive move. And the third, of course, is that models can be wrong, and we need to take that into account as well as we're calibrating our response.

Now, in my previous life, in my theoretical academic research, I had been a strong proponent of consulting forward-looking policy rules in which the policy rate feeds back not on present, but expected future inflation and, potentially, also expected future output gaps. My research showed that if a central bank knows the true model of the economy, then a model-consistent forecast of inflation is the appropriate input into a policy feedback rule, and, of course, that directly deals with the long-and-variable-lags problem.

I've come to appreciate in my six months here, however, that I also need to take into account the fact that I don't know the true model of the economy. I wish I did. In particular, I don't know either the slope or the intercept of the Phillips curve, and, of course, the FOMC's views on the intercept of the Phillips curve have been shifting down over the years. Speaking for myself, I think this suggests that close attention should be paid to market- and survey-based measures of expected inflation and to the yield curve slope as reality checks against the predictions of various models.

And then, third, while I appreciate that the existing language in paragraph 2 that refers to global economic and financial developments may need to be reconsidered at some point, I do feel that the language "the Committee will be patient as it determines . . . future adjustments to the policy rate should be retained, at least until such time as we are really ready to signal an imminent change in policy. I think patience has served us well, and I don't detect that it has been misunderstood in any significant way. Thank you, Chair Powell.

CHAIR POWELL. Thank you. President Harker.

MR. HARKER. Thank you, Mr. Chair. I favor alternative B as written. The language continues to reflect that policy is on hold, and that the Committee can continue to remain patient regarding future rate hikes. With the softening in price pressures, there's no reason to change the stance of policy. But if inflation and inflation expectations decline further, that stance may need to be reconsidered. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. I support alternative B as written. With growth likely to be a bit above potential but inflation below target for now, I think the current level of the funds rate is appropriate.

I would note that many of the risks we perceived at the outset of this year have subsided. Stock markets, both here and abroad, have recovered nicely over the first quarter. Chinese real output growth seems to have responded positively to policy changes. The likelihood of destabilizing trade wars appears to be reduced, as public statements make a trade agreement seem imminent.

Despite this positive news, my biggest concern remains Europe. European banks are not showing great resilience, the politics seem more fragmented, and recent sluggish output has been discouraging. In addition, the willingness and ability of monetary or fiscal policy to respond to a significant downturn are beginning to be questioned. Assuming Europe is able to muddle through, I see little reason to alter monetary policy in the near term. While inflation is soft, I expect, like most forecasters, that the softness is temporary. In addition, I expect labor costs and diminished markups to gradually place more upward pressure on inflation.

Finally, I believe it is important that we not encourage expectations that we are likely to ease. Not only do I think it is premature to talk about easing, with the Tealbook forecast of the

unemployment rate expected to fall to near-historic lows, but I'm also concerned that such expectations will encourage more reach-for-yield behavior in financial markets. Several of our most recent expansions have ended when financial markets became too exuberant. I would like to avoid our own communications possibly contributing to this risk. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Daly.

MS. DALY. Thank you, Mr. Chair. I support alternative B as written. Since our previous meeting, many of the concerns about the economy's performance have eased. Incoming real-side data have surprised on the upside, and financial markets have continued their rebound. Despite these positive developments, the inflation data continue to disappoint, underscoring the need for ongoing policy patience.

As many noted yesterday, recent low inflation readings owe to declines in idiosyncratic sectors that well may be transitory. But this has been a feature of nearly all of the gains and losses in inflation over the past several years. Idiosyncratic sectors push inflation up toward 2 percent, and then they bring it down below 2 percent. In contrast, based on models by Stock and Watson, the San Francisco Fed, and the New York Fed, the contributions of inflation from more cyclically sensitive sectors have barely budged despite considerable changes in unemployment and output gaps.

This inflation puzzle that so many of us, including the staff, have been pondering—this is the puzzle. So how should we think about this? Well, if you think the slope of the Phillips curve is something other than zero, which I hold, too—the laws of supply and demand do still work—and you think that inflation expectations remain anchored at 2 percent, which I also believe, despite some softening of inflation expectations, then you're left with the unemployment gaps, which are larger than we think. In our model framework, this would mean that u^* is lower than

the broad consensus had penciled in. And you can look at the SEP, the Tealbook, or the Blue Chip.

As Stacey noted yesterday, we generally balk at moving our long-run variables around over the business cycle. We don't like to move the star variables. After all, these variables, in our minds, are largely determined by fundamental factors such as demographics and productivity, and models meant to directly or indirectly estimate them rarely include other factors that would move them up and down over the course of the business cycle. But it's also important to recognize that these are just estimated values, and that our models, by construction, are incomplete and cannot capture all of the factors that temporarily buffet these star variables.

Now, I'm going to turn to r^* , where we've experienced this very thing. I knew I'd get a look from Vice Chair Williams. [Laughter] Over the past several years, we've talked about headwinds and tailwinds that have made short-run r^* lower or higher than our long-run estimates. And while we struggle to exactly quantify these movements, we learn about them by watching other variables—for instance, the response of the economy to changes in our funds rate path. In fact, we talked about this yesterday, looking at the 1990s. The FOMC learned that r^* was probably different from what it thought when it raised the funds rate in the '90s and saw the economy slow more sharply than had been predicted.

I would argue that the same can be true for u^* . In the long run, it's also driven by fundamental factors related to average job matching rates across age cohorts and other long-run labor market dynamics. But in the short run, temporary factors can move it higher or lower than its steady-state value, and we saw this in the Great Recession when we moved u^* estimates up because we thought job matching was falling.

But as I described yesterday, there is growing micro evidence that this is happening right now—that, in fact, firms are lowering skill requirements or recruiting more intensively and that job-finding rates are increasing across the distribution of workers, particularly marginalized workers. This would effectively lower labor market frictions and put downward pressure on current estimates of u^* .

To me, this all says that short-run u^* is likely lower than the long-run natural rate we typically write down in our SEP. And, admittedly, estimates of short-run u^* are highly uncertain and hard to pin down ex ante. But with inflation, particularly cyclical inflation, so muted, it seemed clear to me that numbers like 4.6 or 4.3 percent are too high, and something more like 4 percent is likely.

So, to conclude, with the economy projected to grow at about trend, the funds rate currently near neutral, and inflation still below target, patience is appropriate. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Mester.

MS. MESTER. Thank you, Mr. Chair. I support alternative B and the statement as written. My modal outlook is little changed since our previous meeting. Over the forecast horizon, I expect the expansion will continue, with growth at or slightly above trend; strong labor markets, with payroll job growth slowing toward trend but sufficient to keep the unemployment rate below 4 percent; and inflation near 2 percent. The recent softer readings on core inflation are somewhat troubling but, at this point, look to reflect some temporary idiosyncratic factors rather than a more pernicious drop in aggregate demand that will destabilize inflation expectations.

As I discussed yesterday, it seems the prudent course of action, which is consistent with the Committee's balanced approach to achieving its dual-mandate goals, is to keep the funds rate at its current level, which is in the range of estimates of neutral, and to continue to assess economic conditions to ensure our policy is best calibrated to support sustained expansion and the achievement of our dual-mandate goals.

If inflation continues to undershoot the 2 percent target, the Committee is going to have to assess how comfortable it feels tolerating the undershoot and allowing inflation to drift back up, rather than taking bold action to raise inflation expectations to get inflation up sooner. Presumably, one's comfort level depends on what else is happening in the economy and whether the undershoot is expected to worsen or not. If real GDP growth begins to fall below trend, the unemployment rate rises, and inflation expectations start to fall, there could be a compelling case for easing, depending on the magnitude of the deterioration.

The more difficult case is continued soft inflation in the face of continued expansion, strong labor markets, and stable inflation expectations. In this case, a strategy of toleration may be the best from a balanced-approach perspective. Following such a strategy has gone fairly well for the Committee. From 2012 through 2018, headline PCE inflation averaged 1.4 percent, and core PCE inflation averaged 1.6 percent. At the same time, the unemployment rate fell from over 8 percent to under 4 percent, and the real output growth averaged over 2¼ percent.

The Committee began a gradual normalization of the federal funds rate starting in December 2015. Of course, one could argue that our policy reflected forecasts of inflation that had it moving back up to 2 percent, an outcome that was not fully realized. Nonetheless, in retrospect, even with the benefit of hindsight, I'm not convinced one can make a convincing case that the overall economy and our performance on our dual mandate would now be

demonstratively better had we been less tolerant of the inflation undershoot. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Barkin.

MR. BARKIN. Thank you, Mr. Chair. As I've said in the past couple of meetings, I support our patient path in alternative B but would much prefer to move to a no-forward-guidance version of the statement, with the final sentence of paragraph 2 omitted and its neutral positioning explained at the press conference. I'm hopeful that we'll do that in June, when I expect support to come from a dot plot demonstrating little shift in the expected policy rate trajectory.

Stepping back to today's statement, I suggest we acknowledge how close we are to our mandate. Growth is at or above trend. Unemployment is below the natural rate. Inflation, even with Monday's relatively weak reading, has rounded to our target for some time now. Yes, the staff's downgrade of underlying inflation to 1.8 percent highlights the fact that inflation, though very close to our target, has been persistently just below it. But I worry that we simply don't have the tools to achieve a finely calibrated overshoot, and an attempt to do so in pursuit of a modest benefit could put our broader performance at risk. I really hope we'll avoid the temptation to tinker, in the hopes of possibly getting a marginally better outcome.

In an economy that I view as being increasingly influenced, as I said yesterday, by business and consumer sentiment, I hope we can use this moment to provide some valuable stability through our actions and our communications. Thank you.

CHAIR POWELL. Thank you. President Evans.

MR. EVANS. Thank you, Mr. Chair. I support alternative B. In January, looming threats to the sustainability of the economic expansion caused us to put rate hikes on hold and

enter into a patient risk-management policy mode. Today the outlook for activity does not appear nearly as fragile as it did at our past couple of meetings.

I do think there's more to look at, however. Namely, the news on inflation has broken the wrong way—in an important way, I think—and it's done that this year. Core inflation currently is flirting with 1½ percent, and the Tealbook forecast doesn't have it reaching 2 percent until 2023, well beyond the medium-run forecast horizon. Such a projection just doesn't seem consistent with a symmetric 2 percent inflation objective, in my opinion.

I will agree that today, I think, it continues to be appropriate to leave the funds rate where it is and communicate patience about future policy moves. I think that, if I understand it correctly, the balanced approach that President Mester mentioned as one scenario has a lot of merit in the situation in which inflation is running a bit lower than we would like but the economy is doing better, so we kind of see how that helps with the inflation outlook.

But, having said that, I would like to mention that I'm an alumnus of the University of Virginia. And last year, I was just totally morose over the fact that they went out of the NCAA tournament in the first game as the number one seed. But I'm very pleased that they won the entire NCAA championship this year, and it really took a lot of effort, a little luck, and some officiating that broke their way. [Laughter] But in one particular instance, there was, with no time remaining, somebody who had the opportunity to make three free throws. He made them perfectly, right through, and then they won that game.

That reminds me. On my social media, I noticed somebody was talking about the Fed and inflation, and they had one of these GIFs—you know, one of these repeating little video vignettes. It was somebody at the free-throw line, sort of a weekend basketball person just by themselves, and they got it about three-fourths of the way to the hoop. And the whole point of

this was, this is what the FOMC has been doing with inflation for the past many years. It's not even getting to the rim. It's just, boom, not even close.

MR. KASHKARI. Let the record show that this was not me. [Laughter]

MR. EVANS. Now, you can say, "Well, that's not really very fair. There were a lot of factors, and a lot of things had happened." But, nevertheless, that is the type of outcome that sort of reinforces the wrong impression that 2 percent is a ceiling and that the Committee really has no intention of doing what it takes in order to get inflation above 2 and defending symmetry. And that does worry me quite a lot.

You know, we've seen recent low-inflation data that are troubling, and there are a couple of different ways that you might look at it. It could be temporary. It could be one of these potholes in inflation. It could be like the Verizon data. There's something with apparel. Maybe apparel prices have always been low, and we're just learning that—right?—and inflation has been worse than we thought. But at any rate, maybe it's temporary, and we'll get past that. We've seen this before, though, and it's sort of gotten us up to 2 percent. You know, if you redo that GIF, every now and then, the guy hits the rim, but it falls straight down. It just doesn't get there.

The other is, maybe it's going to be persistent, and we're going to be below that unless we take additional accommodative action—that, somehow, the setting of the neutral rate is not consistent with how we're doing this. Is it possible that we're going to get 2½ percent for inflation? That seems very difficult to imagine. Even though the unemployment rate is at 3¾, you would think that that ought to be enough to help out with inflationary pressures. But I'm worrying that that's not going to happen. If we don't talk about this and if we don't make sure that we get across the situation that this is worth paying attention to and we can't let it go

on, or else we will underrun our inflation objective, I worry about giving the appearance of inflation complacency.

Is this a big deal? Is this important? I mean, $1\frac{3}{4}$ percent inflation—it isn't so bad, is it? I mean, maybe we should have chosen $1\frac{1}{2}$ to $2\frac{1}{2}$ percent as our inflation range. We didn't, though. We said 2 percent, and every time we say 2 percent and don't live up to it, people have to think about, what does that really mean? We didn't sign up for that.

So I think it's going to be important to demonstrate that we do have that credibility. The reason why this is important is, at some point, the Chair—maybe in a few years, maybe after a long, successful term here, somebody is going to have to get up and say, “We need to take action that's going to provide accommodation.” And if we're at the lower bound and we have to do more, it's going to rely on people believing that we'll do that. So I think that's very important. I think every little bit that we help out with in light of these low-inflation data can help us in the future.

At any rate, that's how I see it. I think that today's current policy setting is fine, but I do think that we need to pay attention to this. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Bullard.

MR. BULLARD. Thank you, Mr. Chair. I'm a little worried I'm not going to be able to finish my coffee before this meeting is over. [Laughter] So I'm going to lengthen it a little bit. [Laughter]

I actually just have a few comments, but I thought I would make the case that the current policy setting is mildly restrictive and that, therefore, we might be out of position, given the current inflation readings. There are three parts to this argument. I've talked about them before. One is r^* . I think r^* is lower than you think it is, and I think I can make a good case for it. I

would interpret r^* as being the trend in short-term real safe rates since the 1980s. That trend has dropped nearly 600 basis points since the mid-'80s. I would see the trend as something that this Committee does not control. We have a lot of influence over short safe rates, but we don't control the trend in that rate.

I would urge you to take a global focus when you're thinking about this issue. So it's not just a U.S. safe rate—it's the global safe rate, especially counting Europe and Japan.

I would encourage you to use a model-free approach. A model is always going to give you this mean-reverting tendency, and I would just take that out. Just look at the trend based on the data alone. If you do that, it depends exactly on how you go about that, but you're going to get an r^* that's closer to zero. You could even argue it's negative, but, okay, let's go with zero globally. And I think you'd come to the conclusion that there's not really any evidence of mean reversion. You've had a long downward trend. There is really no indication that it's going back up. A lot of our models would naturally incorporate some mean-reversion idea—that you're at the bottom, and now you're going to go back to whatever the mean of the series was over the past 30 years. That's not happening. So I would just say, over the forecast horizon, set r^* to zero for purposes of policymaking here at the table.

The second part would be to downweight the output gap, and the new Tealbook policy rule has done that. It used to be an alpha of 1.0 on the output gap. Now it's an alpha of 0.2. That's a factor of 5. So this is going to put a lot less emphasis on the size of the output gap or where the u^* is or the y^* is, because whatever that gap is, it's going to be less important than it was. And I think this is totally appropriate. We've had, really, two years of above-trend growth and crazy low unemployment, and if there was ever a time when you thought the empirical effects of the Phillips curve were going to assert themselves, it would have been during this era.

And yet we're still sitting here today with core PCE inflation at 1.6 percent, well below our target.

So I think it's appropriate to downweight that. There's plenty of evidence over the past two decades that there's just less feedback from the real economy to inflation, which means that the slope of the empirical Phillips curve is close to zero. That doesn't mean there isn't a structural Phillips curve out there. That's true, but you can't just cite the fact that unemployment is low and say, "Well, based on that, inflation is going to be higher in the future." So I think this distinction between the slope of the empirical Phillips curve and the slope of the structural Phillips curve is an important one, but the empirical Phillips curve is the one that has the slope that has gone to zero. So we can't take a signal from low unemployment the way we would have been able to do in the past in order to be able to predict how inflation is going to evolve.

There are good reasons for that. It has everything to do with the credibility of this Committee, other central banks around the world, inflation targeting, and so on, which I've argued before. But the upshot of this is that you greatly downweight the real-economy gap term in your Taylor-type policy rule.

Finally, where is inflation? I've already cited it here several times—that core PCE inflation year over year is 1.6 percent. This has been a surprise to the downside. The staff has marked down their forecast. I agree with President Evans. It is disconcerting to have a forecast that says you're not going to hit the inflation target even over the medium term. I would interpret inflation expectations, as Governor Clarida mentioned, as being on the low side of where we'd like to see them.

If you put these features into a modernized Taylor-type policy rule, the recommendation will come to a neutral rate in the low 2 percent range, depending exactly on how you do this. So

I would say we're modestly restrictive today, which is concerning because we're in an environment with core PCE inflation less than 2 percent. You could mitigate this somewhat by saying core PCE inflation is maybe not the optimal measure. You might want to look at the Dallas Fed trimmed-mean rate, which is at 2 percent. But, even if you go in that direction, you'd be mildly restrictive with inflation at target, as opposed to inflation somewhat below target, and it's not clear you want to be restrictive in this environment.

So now may be a good time to think about a slightly lower setting for the policy rate. I agree with a lot of the comments of President Evans here. I think there would be clear benefits to this. I think we could try to re-center inflation expectations at our 2 percent target and build up credibility for our 2 percent target while the moment is a good one for doing that. I think we could steepen up the yield curve some and get away from the potentially inverted yield curve issue.

I love the 1995 example, which we looked at yesterday. We could drive a longer and more successful expansion. I think '95 was obviously different in some ways, but it was similar in the sense that you had this 300-basis-point normalization—we had a 225 basis point normalization in a much lower interest rate environment. And the Committee was flexible enough to make adjustments and stop soon enough to get the expansion to continue all of the way through the second half of the '90s, one of the most successful periods in postwar U.S. macroeconomic history.

Finally, I think a benefit would be that building up credibility for the inflation target will help us stay away from the effective lower bound, because it will show that the Committee is serious about the 2 percent inflation target. So I think that that's an important thing to keep in mind. In my view, the ECB is an example of a central bank that has let this slide over time and

lost their credibility. Now they're looking at their core inflation rate at 1 percent, not able to move it up toward 2 percent. We don't want to be in that situation, so I think it is important to defend the inflation target from the low side.

Having said all of this, I think it's premature at this meeting, but perhaps not for long. I think it might be, at future meetings, well worth thinking about. So I support alt-B for today, but I may want to shift to something like alternative A, especially if inflation and inflation expectations news continues to drag.

I think this particular statement may come off as slightly "dovish." We're highlighting the inflation numbers as pretty much the only change in the statement. I think that might be a good thing. It might gently suggest that we're paying attention to this, and we're going to be alert to this possibility.

Finally, I'm mildly concerned that we continue to cite global financial developments later in the statement. I think that was put in mainly in response to events in the December–January time frame, which have now dissipated. I'm happy to go with it for today, but I think we might want to find a graceful exit from that in the future. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Kaplan.

MR. KAPLAN. Thank you, Mr. Chair. I support alternative B as written, although I would echo what President Bullard said about dropping the reference to global financial developments, because I no longer believe that is applicable in the situation we face. So if we don't drop it today, I think we should be scrutinizing it for the future.

My own view is, if the economy continues to grow in the range of $2\frac{1}{4}$ percent in 2019 and the trimmed mean from our point of view is in the range of 2 percent, I believe that our

policy setting of $2\frac{1}{4}$ to $2\frac{1}{2}$ percent is roughly appropriate for the time being. But I would emphasize that the key words here are “for the time being.”

In the next several months, I’ll be particularly monitoring the following things: number one, trends in growth outside the United States. And I’ll continue to check and see how those might affect negatively U.S. growth prospects if outside growth continues to worsen. I will be closely watching the evolution of financial conditions, particularly credit spreads, the shape of the yield curve, and potential excesses and imbalances that could be building, specifically relating to debt buildup in the form of corporate debt, in particular given the sluggishness that we’re currently seeing in margin growth and earnings growth. By the way, I worry that this problem could worsen with a lower policy rate than the one we have now, but I think, even with our current policy rate, these excesses and imbalances will continue to build.

Regarding inflation, I do believe cyclical pressures will continue to build. But I continue to believe the structural forces of technology, technology-enabled disruption, and, to some lesser extent, globalization continue to mute the pricing power of businesses and are muting inflation trends.

During this period, I’ll be vigilant in watching carefully the development of these trends. Thank you, Mr. Chairman.

CHAIR POWELL. Thank you. Governor Bowman.

MS. BOWMAN. Thank you, Chairman Powell. I support alternative B as written. The available economic data now indicate that GDP rose at a strong pace again last quarter. The data also showed that household and business spending growth slowed. That said, I believe first-quarter numbers for these spending categories will improve as we go forward.

We continue to see signs that the labor market is very strong, with the unemployment rate well below what the staff notes as the natural rate of unemployment, as many have noted, and with labor force participation showing ongoing strength when viewed against its downward trend due to the aging population.

Financial markets have improved since the end of last year, overall borrowing conditions continue to be favorable, and residential mortgage rates have dropped to their lowest levels in more than a year.

Regarding price stability, we have yet to experience an extended period where inflation has been at our 2 percent target. Near-term inflation developments, therefore, as many others have noted this morning, warrant close and continued monitoring. But it remains my baseline expectation that the performance of the domestic economy in 2019 will continue to be strong and that inflation will soon move back up or close to our 2 percent target.

It's challenging to determine what the new normal and the new neutral rate of interest should be in the post-crisis environment, but the economic data suggest our current policy rate may be close to a neutral stance of monetary policy. That is, it does not appear that we are currently exerting significant headwinds or tailwinds on the economy, in my view.

Moreover, the information we've received since our March meeting suggests that a wait-and-see approach is still the appropriate course of action. Maintaining a patient stance while carefully monitoring economic conditions should allow us to continue to assess the effect of previous Committee actions and our ongoing adjustments to the balance sheet. Thank you, Mr. Chairman.

CHAIR POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chairman. I, too, support alternative B as written. I see the current setting of monetary policy as appropriate for promoting long-run sustainable growth consistent with our objectives. As we closely monitor the transition of the economy from the strong pace of growth in 2018 to a pace of growth expected to be closer to its trend level this year, the Committee should continue to be vigilant in updating its assessment of the economic outlook and the stance of monetary policy amid a range of economic and financial risks.

While it is true that headline PCE inflation has remained below our longer-run target of 2 percent for most of the past decade, it is also true that, for most of this period, the unemployment rate is well above its projected longer-run level. When both of these objectives were complementary, the policy prescription was clear in terms of providing an accommodative monetary policy stance. Now that the unemployment rate has moved below its longer-run level, our objectives are no longer complementary. For this situation, the Committee has expressed, in its Statement on Longer-Run Goals and Monetary Policy Strategy, that it will follow a balanced approach in promoting its objectives.

For now, I believe that our current policy setting appropriately balances those objectives, along with the risks to the economy—including risk to the financial system—that could impede the attainment of the Committee's goals. Thank you.

CHAIR POWELL. Thank you. President Bostic.

MR. BOSTIC. Thank you, Mr. Chair. I support the decision to maintain the current target range for the federal funds rate and the language in alternative B. The decision seems straightforward.

There are two points I would make. First, we must avoid giving any signs that policy is on autopilot. I am concerned that market participants believe the Committee is locked into no

further movements regardless of what may occur. And, given that, we must hammer home the point that we will remain vigilant to any risks that may emerge, either on the upside or on the downside, and respond as appropriate.

Second, it is my view that we should be very wary before declaring inflation beaten. I understand that inflation is below our target and, as I noted in one of my very first FOMC meetings, has been so for many years. I think President George just said “decade”—the decade has been a long time. And I also recognize that inflation has recently been trending away from target. These are all reasons for concern about looming economic weakness or an economy that’s not performing as strongly as it might.

But the tight labor market and the possible resolution of some uncertainties in trade and along other dimensions are signs of potential economic strength. And I must confess that I am leery about “this time is different” arguments regarding aggregate wage dynamics or price pressures.

I agree with President Daly that u^* estimates of 4.6 or 4.3 percent are too high. My estimate has long been at 4.1 percent, as I believe that technological changes have reduced job-search-and-match costs in a significant way. And this would suggest the employment gap is smaller than might otherwise be suggested, but it is growing, and pressure is building. So I will be continuing to push my contacts over coming weeks for signs that the wage pressure tide is changing and that the Phillips curve was simply resting. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Mr. Chair. I support alternative B as written. I’m comfortable signaling our continued patience and waiting for a clear signal from the data.

Just a couple of comments—I guess, principally for the minutes, as we’ve already given up any chance of setting a record. [Laughter] As the basis for our patience—as Presidents Kaplan and Bullard have mentioned—in the statement, we highlight global economic and financial developments, in addition to muted inflation pressures. Although I agree with them that global economic and financial developments have improved since March, I’m okay with retaining the reference at this time. That’s partly because I don’t think we’re out of the woods regarding the fragility of the global outlook. Even if Brexit risks have temporarily receded, the British will find a way to give us a reason to consider that again. But it’s also because I have a preference for attributing our patience to a broader set of indicators than inflation alone, given that I think firmly anchored expectations may have reduced the sensitivity of inflation as an indicator of slack in the economy.

Given my outlook for steady growth, tightening labor market conditions, and a firming of inflation, I continue to think it’s likely that we will want to hike rates a bit further at some point, but for the time being, I am comfortable watching the data and continuing to monitor the outlook. But, given that view, I do think it’s premature to discuss cutting rates, in view of the strong data on the labor market, GDP, and relatively easy financial conditions, including a stock market that’s hitting record highs.

Finally, I appreciated the staff’s update on reserve conditions as reserves continue to decline. Careful monitoring will allow us to get a better idea of when scarcity might arise and when it might be appropriate to resume growth of the balance sheet. While recent events certainly raise questions about it, I continue to hold the hypothesis that the true long-run comfortable level of reserves in the system will be much lower than the banks are currently indicating to us and that we are currently, therefore, positing, which would allow us to hold the

balance sheet steady for a longer period and thus shrink relative to GDP. So that's something that, again, I hope we continue to probe how to really get to that, an understanding of what the true long-run comfortable level of reserves is. Thank you.

CHAIR POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you, Mr. Chair. Over the past few months, incoming data have boosted the modal outlook for our economy, and downside risks associated with trade policy and the global outlook have diminished. Today's ADP "print" provides another upbeat read. Taken on their own, these developments would suggest some further tightening might be appropriate to sustain the expansion.

Balanced against this, however, are the past few inflation "prints," which moved down from target after a year when we finally saw inflation reaching our target on a sustained basis. Against the backdrop of underlying trend inflation running persistently on the weak side of our target at around 1.8 percent, we need to be vigilant in order to re-anchor inflation solidly at 2 percent. We can take some reassurance from the backdrop of rising wages and from a trimmed mean measure of inflation at target, which highlights that some of the underlying components that accounted for a material portion of the decline are likely transitory. But we will need to see more data before drawing any firm conclusions.

In many ways, we find ourselves today in a situation similar to 2017. Economic activity is rising somewhat above potential, risk appetite is elevated, and the labor market is strong, but inflation is weaker than we would have expected. If we focus on our inflation objective, monetary policy should be accommodative. Core inflation is running below target, and, crucially, underlying inflation also appears to be somewhat below target. On the other hand, asset valuations are already stretched, and business lending shows signs of "froth."

In my view, this set of conditions warrants some further patience as we observe whether inflation developments prove transitory or more persistent. With respect to today's decision, maintaining the current target range for the federal funds rate is appropriate. If, however, downside risks remain low, incoming data continue to lift my modal outlook, and core inflation looks to achieve our objective on a symmetric basis sustainably, there may be a case for modest further increases in the funds rate.

At this point, however, safeguarding the gains we've made on employment, while continuing to support upward movement in underlying trend inflation, argues for maintaining the funds rate where we are. I believe that posture is well captured in alternative B as written.

If, indeed, it turns out the downward movement of inflation proves to be persistent—if, for instance, inflation were to come in persistently closer to 1.5 percent—it will present a very difficult challenge to the Committee within our current long-run policy framework, which, as others have noted, commits us to a balanced approach. If, indeed, the Phillips curve is very flat, then it's not clear that modest further tightening of resource utilization will, on its own, be enough to move inflation expectations smoothly back up to our target on a symmetric basis, in the absence of a positive shock that might enable "opportunistic reflation." Indeed, in this case, I would see this as a central issue for our framework review, because it will require talking about this issue quite differently from how we've been talking about it for several years now.

Finally, I'll say in passing that I don't see the 1994–95 episode as relevant to today's circumstances, for the many reasons that we discussed yesterday. At least as I see it, we have taken out insurance against downside risks over the past few meetings. As I suggested yesterday, we have mechanisms that weren't available 25 years ago that have been very important over the past few months, including the SEP, which dates back to 2012. You'll recall

that the SEP median value at the end of 2020 has moved down about 75 basis points from September to March. And, over that period, financial conditions eased notably, and the 10-year yield moved down about 50 basis points. That's about the amount, at least in percentage terms, we saw the 10-year moving down in that 1994–95 episode. Our communications on the balance sheet are also an important difference. Finally, there was a lot going on in financial markets other than the kinds of things that we are looking at today, not least the Mexican tesobonos crisis.

But I think it is important to emphasize that the Committee has taken important action, and financial conditions have eased notably. And I think where we are today is appropriate. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman. I support alternative B. I'm generally comfortable with the current policy stance. As I said yesterday, I continue to believe that there's still slack in the labor market, and I see no need to raise rates, given the low inflation readings.

I expect that if growth continues and the labor market continues to tighten, we will see further improvement in wages and, eventually, some feed-through to prices. And at the same time, I'm closely watching, as others are, measures of inflation and inflation expectations.

I'm sitting here trying to process the comments, though, of Presidents Evans and Bullard and others about the risk that inflation expectations are too low—the staff brought down underlying inflation—and the idea that cutting rates would help. I don't think cutting rates 25 or 50 basis points would do anything to inflation expectations, because inflation expectations are set based on our behavior over the past 10 years. And the fact that we normalized rates when inflation was consistently below our symmetric target—I mean, this cake is already baked.

So, what would it actually take to boost inflation expectations right now? Maybe if we had some big upside surprise of inflation, inflation was above 2 percent, and then we didn't respond, that might work. Or, if that doesn't happen, it might not be until there's a future recession, and then the Committee actually behaves as though the target is symmetric. But I think 1.8 percent is a "baked cake" at this point, and I think it's going to be very difficult if we try to nudge that up from here, absent one of these external factors hitting us. Thank you, Mr. Chair.

CHAIR POWELL. Thank you. Vice Chair Williams.

MR. EVANS. I have a question. Do we get to respond?

MR. KASHKARI. You're welcome to respond. It was a statement.

CHAIR POWELL. President Evans.

MR. EVANS. Well, my view on that is that inflation is a monetary phenomenon. This is all about money—all of the factors that influence inflation and the setting of monetary policy. So when inflation goes up to 4 percent, it's a monetary phenomenon even if you think that there's a whole bunch of things that might have prevented you from dealing with that, like in the '70s. And when it's underrunning, it's a monetary phenomenon, too.

So your positioning against those factors, I think, is critical. Would any one setting of the funds rate for a period of time have a big effect? That, of course, is debatable—and probably not. But it's the longer attitude toward inflation that you demonstrate, that you care about, that I think is really critical to inflation expectations—at least that was the intention that I had with my comments.

MR. KASHKARI. Thank you.

MR. EVANS. Thank you.

CHAIR POWELL. Thank you. Vice Chair Williams.

VICE CHAIR WILLIAMS. Thank you, Mr. Chair. I support alternative B as written. Communicating patience and data dependency has served us well, and it makes sense to continue with this approach. I see a flat path of the funds rate as appropriate through year-end, given the outlook of a very strong labor market, above-trend growth, and inflation heading back toward our goal following the recent soft patch.

Although my view of the appropriate policy rate path has not changed, the reasons for it have evolved. The strength of recent data on economic activity, the rebounding growth in China, and the reversal in the tightening of financial markets imply that near-term risks to growth have receded somewhat and increase my confidence that we will see moderate to solid growth.

Stepping into this void are heightened risks of a sustained undershoot of our inflation target and an unmooring of inflation expectations. Given this evolution of the economic factors supporting our policy stance of patience, it will soon make sense to modify the wording of the sentence in paragraph 2 accordingly. For example, we could say, “In light of expectations of moderate economic growth and muted inflation, the Committee will be patient as it determines what future adjustments in the target range for the federal funds rate may be appropriate to support these outcomes.”

It’s not certain that we’re totally in the clear yet, in terms of global economic and financial turmoil, so we’re not jumping the gun to make this change today. But if things progress as expected over the intermeeting period, I could see us doing that—so, in the June meeting.

The final comment I’d like to make is, I think the discussions yesterday, today, and all of the way through 30 seconds ago have been really good across a range of issues and a range of

perspectives. I mean, I would argue that the fact that arguments on both sides of the policy stance today have been brought up shows that we're probably roughly in the right place, because you can make arguments on both sides that I think have a lot of legitimacy.

I do think, though, that we don't want to lose track of the connection between our rather theoretical discussion of the long-run composition of the balance sheet, including how to get there, and the discussion we're having right now about the appropriate stance of policy. I would worry that if we were to get out too early with some statement—I know the decisions haven't been made—about plans to shorten the duration of the balance sheet, especially to do that in a rather accelerated way, that is a tightening of financial conditions whether you think it's through flow effects, stock effects, signaling effects, or in any way you think about this. And I think, given where we are with inflation and with the economy, we want to keep, in my view, the stance of policy where it is today. So I just think, as we move ahead through this year and continue to think about some of these long-run issues, that we should do so in a way that does not end up communicating a change in our policy stance that will make it harder for us to achieve our dual-mandate goals.

CHAIR POWELL. Thank you. Let me just echo that I do agree with thoughts around the table, particularly what the Vice Chair just said, that the first phrase in the “patient” sentence could well evolve as soon as the June meeting to incorporate different factors. But I see the part that comes after the comma, about remaining patient, as something that, in the baseline case, would be durable. And it'll depend on the evolution of things, but things like moderate growth and muted inflation come to mind.

In any case, there's a good consensus centered on our policy. Let me now ask Matt to make clear what the FOMC will vote on and read the roll. Following the FOMC vote, the Board will vote on interest rates and discount rates. Matt.

MR. LUECKE. Thank you, Mr. Chair. The vote will be on monetary policy statement alternative B as it appears on page 4 of Thomas's briefing materials. And the vote will also encompass the directive to the Desk as it appears on pages 6 and 7 of Thomas's briefing materials. With that, I'll call the roll.

Chair Powell	Yes
Vice Chair Williams	Yes
Governor Bowman	Yes
Governor Brainard	Yes
President Bullard	Yes
Governor Clarida	Yes
President Evans	Yes
President George	Yes
President Rosengren	Yes
Governor Quarles	Yes

CHAIR POWELL. Now we have two sets of related matters under the Board's jurisdiction: corresponding interest rates on reserves and discount rates. As we've discussed, the proposal is to reduce by 5 basis points the rates paid on required and excess reserves. This should encourage trading in the federal funds market at rates well within the target range. May I have a motion from a Board member to take the proposed action with respect to the interest rates on reserves as set forth in the first paragraph on the last page of Thomas's briefing materials?

MR. CLARIDA. So moved.

CHAIR POWELL. May I have a second?

MS. BRAINARD. Second.

CHAIR POWELL. Without objection. Thank you. Now may I have a motion from a Board member to take the proposed actions with respect to the primary credit rate and the rates

for secondary and seasonal credit as set forth in the second paragraph on the last page of Thomas's briefing materials?

MR. CLARIDA. So moved.

CHAIR POWELL. May I have a second?

MS. BRAINARD. Second.

CHAIR POWELL. Without objection. Now, before we confirm the date of our next meeting, I'll turn the floor over to Governor Clarida, who has a few comments on the status of the work of the communications subcommittee.

MR. CLARIDA. Thank you, Chair Powell. Three quick points. As is our custom, the subcommittee met this week before the FOMC meeting. And, at this meeting, we went around the table and discussed and summarized the conversations that we've had with all of you about possible ways in which the SEP could be improved and refined. So that will continue.

I should say that, in terms of the framework review, we're in a very good place. We've had 2 *Fed Listens* events already, and another 10 are scheduled. So we're 12 for 12 on that, and that looks like they're not only successful events, but they, I think, are being covered in a good way as well.

Of course, in June, we'll be having the event in Chicago. President Evans and his team have done a fabulous job of pulling that all together. If you haven't registered, please do that. Hotel rooms are scarce in Chicago in June, so please do that.

The final thing is just to remind you that the framework review process has this public piece and listening piece. But then, beginning in the second half of the year, this will move into a traditional FOMC process, with staff briefings, agendas, and the like. So we're on course for all of that. Thank you.

CHAIR POWELL. Thank you, Rich. The final agenda item is just to confirm that the next meeting will be Tuesday and Wednesday, June 18 and 19. That concludes the meeting. Thank you for a particularly useful and insightful set of discussions. I really put this high on the list of meetings I've attended. There's a buffet lunch at 11:30. Thanks, everybody.

END OF MEETING