

**Meeting of the Federal Open Market Committee on
July 31–August 1, 2018**

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, July 31, 2018, at 10:00 a.m. and continued on Wednesday, August 1, 2018, at 9:00 a.m.

PRESENT:

Jerome H. Powell, Chairman
John C. Williams, Vice Chairman
Thomas I. Barkin
Raphael W. Bostic
Lael Brainard
Loretta J. Mester
Randal K. Quarles

James Bullard, Charles L. Evans, Esther L. George, Eric Rosengren, and Michael Strine,
Alternate Members of the Federal Open Market Committee

Patrick Harker, Robert S. Kaplan, and Neel Kashkari, Presidents of the Federal Reserve
Banks of Philadelphia, Dallas, and Minneapolis, respectively

Mark A. Gould, First Vice President, Federal Reserve Bank of San Francisco

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
David W. Wilcox, Economist

Kartik B. Athreya, Thomas A. Connors, Mary Daly, David E. Lebow, Trevor A. Reeve,
Ellis W. Tallman, William Wascher, 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

Rochelle M. Edge, Deputy Director, Division of Monetary Affairs, Board of Governors

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

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

Joseph W. Gruber 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

Christopher J. Erceg, Senior Associate Director, Division of International Finance, Board of Governors; Gretchen C. Weinbach, Senior Associate Director, Division of Monetary Affairs, Board of Governors

Ellen E. Meade, Edward Nelson, and Robert J. Tetlow, Senior Advisers, Division of Monetary Affairs, Board of Governors; Jeremy B. Rudd, Senior Adviser, Division of Research and Statistics, Board of Governors

John J. Stevens, Associate Director, Division of Research and Statistics, Board of Governors

Luca Guerrieri, Deputy Associate Director, Division of Financial Stability, Board of Governors

Glenn Follette and Shane M. Sherlund, Assistant Directors, Division of Research and Statistics, Board of Governors; Christopher J. Gust, Assistant Director, Division of Monetary Affairs, Board of Governors

Penelope A. Beattie,² Assistant to the Secretary, Office of the Secretary, Board of Governors

Etienne Gagnon,³ Section Chief, Division of Monetary Affairs, Board of Governors; Matthias Paustian,³ Section Chief, Division of Research and Statistics, Board of Governors

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

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

² Attended Tuesday session only.

Hess T. Chung,³ Group Manager, Division of Research and Statistics, Board of Governors

Andrea Ajello, Edward Herbst, and Bernd Schlusche,³ Principal Economists, Division of Monetary Affairs, Board of Governors

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

James M. Trevino,³ Technology Analyst, Division of Monetary Affairs, Board of Governors

Michael Dotsey, Beverly Hirtle, and Christopher J. Waller, Executive Vice Presidents, Federal Reserve Banks of Philadelphia, New York, and St. Louis, respectively

Anna Paulson, Senior Vice President, Federal Reserve Bank of Chicago

Joe Peek, Vice President, Federal Reserve Bank of Boston

Karel Mertens, Senior Economic Policy Advisor, Federal Reserve Bank of Dallas

A. Lee Smith, Senior Economist, Federal Reserve Bank of Kansas City

Brent Meyer, Policy Advisor and Economist, Federal Reserve Bank of Atlanta

Cristina Arellano, Monetary Advisor, Federal Reserve Bank of Minneapolis

³ Attended through the discussion of monetary policy options at the effective lower bound.

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July 31 Session

CHAIRMAN POWELL. Good morning, everyone. As usual, today's meeting will be conducted as a joint meeting of the FOMC and the Board. I will need a motion from a Board member to close the meeting.

MS. BRAINARD. So moved.

CHAIRMAN POWELL. And a second.

MR. QUARLES. Second.

CHAIRMAN POWELL. Without objection, so ordered. I'd like to begin by welcoming John Williams to his new seat over here as president of the Federal Reserve Bank of New York—John, welcome—and as Vice Chairman of the Committee. Sitting in John's old seat, representing San Francisco as acting president, is Mark Gould. Mark, you've been to many FOMC meetings, but welcome now to the table.

MR. GOULD. Thank you.

CHAIRMAN POWELL. Let's go to our first agenda item, which is the special topic. This will be a discussion of our current monetary policy toolkit and how well equipped we are to provide sufficient policy accommodation in future economic downturns.

I want to begin by framing this discussion clearly. In defining our current toolkit, the intent is to include only the tools that we actually used during the Global Financial Crisis and the subsequent recovery and expansion and that are within the context of our monetary policy strategy, as specified in the consensus statement. Specifically, these tools are interest rates, forward guidance, and asset purchases, or LSAPs. As I will describe in a few minutes, in

subsequent discussions we'll broaden the lens to consider other approaches that might enhance the effectiveness of our policies.

As for today's discussion, in the years ahead this Committee may again face the challenge of achieving our statutory objectives in an environment in which the federal funds rate is constrained by the effective lower bound. We need to develop the best possible understanding of the risks we face and the capacity of our current toolkit, as I have just defined it, to deal with those risks. That's the subject of today's discussion.

But, before we begin, let me also take a second and lay out the plan for a series of discussions at upcoming meetings. This fall we will return to a discussion of our longer-run operating framework, a topic that we spent a good deal of time on in recent years without really trying to reach resolution. As Simon and Lorie will discuss in their briefing, recent events in money markets have fueled debate among market participants about how much longer balance sheet reduction will continue. And, although we are learning as we go, in my view, the balance sheet normalization process probably has a ways to go.

To make their own assessments of the timing, market participants are understandably looking for guidance about our longer-term operating framework and, in particular, how we see the relative merits of the current floor system relative to those of the corridor system we used before the crisis. I expect us to begin that discussion at the November meeting, and the Board staff and New York staff will provide background materials before that meeting.

I also then expect that sometime during the first half of next year, we will follow up on today's toolkit discussion and examine features of alternative policy strategies that could help us deal with future effective lower bound episodes—making them less frequent, less damaging, or both—and will include history-dependent strategies like price-level targeting. In principle, I'm

open to considering any approach that is of reasonably broad interest to participants. Adoption of relatively novel changes to our approach would be a complex undertaking, likely requiring changes to the consensus statement.

So that's a view of the plan.

Now, there are going to be overlaps and points of contact across these serial topics. For example, there's a connection between the use of LSAPs, potentially, and the choice of an operating framework. Nonetheless, I suggest that we focus today on the subjects broadly laid out in today's staff memo: the likelihood of returning to the effective lower bound; and the efficacy of the tools we used in the crisis and the subsequent recovery.

I see all of these discussions as a matter of prudent planning. The economy is very strong and close to our objectives, and our current policy strategy and implementation framework are working very well. But now is a good time to consider options that could enhance the effectiveness of our policies. So I'll look forward to your comments and will offer some of my own as well.

Before turning to the staff presentations, let me applaud the staff for their effort on the memo we received and also for all of the related work in model development that went on behind the scenes. And with that, we will turn it over to you.

MR. CHUNG.¹ Thank you, Mr. Chairman. We will provide a brief summary of the memo sent to the FOMC on the efficacy of the Committee's current policy tools to address ELB episodes. We will be referring to the materials titled "Material for Briefing on Monetary Policy Options at the Effective Lower Bound: Assessing the Current Policy Toolkit."

Our memo reports estimates of the probability that the nominal policy rate will be constrained by the effective lower bound, or ELB, over several time horizons and in the long run. Those probabilities are estimated to be sizable. Against that background, we use simulations of the FRB/US model to determine how much additional policy accommodation could be delivered by unconventional measures of

¹ The materials used by Messrs. Chung and Schlusche are appended to this transcript (appendix 1).

the sort previously deployed by the Committee. In particular, we assess the efficacy of threshold-based forward guidance on the federal funds rate and balance sheet policies.

In the top panel of your first exhibit, we report the probabilities of episodes when the ELB binds in simulations with the FRB/US model centered on a baseline consistent with the June 2018 Summary of Economic Projections. Our current analysis features several important methodological improvements over that in previous memos sent to the Committee. In particular, the frequency and severity of recessions in our stochastic simulations are now more in line with historical experience, while the use of an asymmetric policy rule better matches the past behavior of the Committee. Specifically, in these simulations, the federal funds rate is governed by a version of the inertial Taylor (1999) rule that prescribes sharp reductions of the funds rate when the unemployment rate shows sustained increases. Under that policy rule, we find a roughly 40 percent chance that the ELB will bind at least once in the next 10 years. In long-run simulations, we find that the ELB binds around 15 percent of the time. Under alternative assumptions, as reported by some other studies also using the FRB/US model, this probability could be as high as 35 percent of the time in the long run.

We next assess the scope of forward guidance and asset purchases to provide accommodation when the ELB binds. We first describe the effects of these additional tools in an illustrative scenario depicting a severe recession starting in 2018:Q3. As shown by the solid red line in the upper left of the three figures at the bottom of the page, in the absence of unconventional policy measures, the unemployment rate peaks at 10 percent in 2020, while inflation, shown to the right, moves down to around 1 percent by the end of 2021. As shown in the bottom figure, the federal funds rate falls rapidly to the lower bound, at which it remains for five years, until 2023, when the asymmetric rule prescribes departure from the ELB.

We now describe the effects of explicit forward guidance about the circumstances under which the federal funds rate would depart from the ELB. Specifically, once the federal funds rate hits the ELB, it remains there until certain threshold conditions are attained at which point it follows again the prescriptions of the asymmetric rule. The bottom figure displays the results for two alternatives: one, the black dashed line, in which the federal funds rate stays at the ELB until the unemployment rate drops below 3½ percent (1 percentage point below the long-run natural rate of unemployment for these scenarios), and another, the blue dotted line, in which the ELB binds until the inflation rate rises above 2 percent.

In the FRB/US model, these threshold conditions lower the path of the federal funds rate expected by financial market participants and hence also yields on the longer-term interest rates relevant for household and business spending. However, in this model, economic activity is not very sensitive to the path of real interest rates and responds with a considerable lag. Accordingly, the sharp increase in the unemployment rate in this scenario is largely unaffected by the thresholds. However, thresholds that sufficiently delay exit from the ELB can speed up the recovery and

restrain the decline in inflation. In particular, as shown in the top figures, under either an unemployment rate threshold of 3½ percent, the black dashed lines, or an inflation threshold of 2 percent, the blue dotted lines, the unemployment rate converges back to the natural rate by 2023, while inflation bottoms out at 1½ percent, around 40 basis points above its trajectory absent threshold-based guidance.

In long-run stochastic simulations, we find similar results. Under the asymmetric rule, the median unemployment rate for a quarter in which the ELB is binding is 6½ percent. If we resimulate those draws under one of the two thresholds just described, however, the median unemployment rate would decrease by around ¼ percentage point. Likewise, the median inflation rate would improve by as much as 40 basis points.

I will now hand over the discussion to my colleague Bernd Schlusche, who will present our second exhibit in which we assess the efficacy of balance sheet policies.

MR. SCHLUSCHE. We compared the macroeconomic outcomes that we obtain in the recession scenario when the balance sheet is assumed to remain passive with the outcomes that occur under two alternative balance sheet policies—a maturity extension program, or MEP, and large-scale asset purchases, or LSAPs—both of which are initiated as soon as the ELB binds. Under the MEP policy, the FOMC extends the average duration of its SOMA security holdings while keeping the aggregate size of the portfolio unchanged. Under the LSAP policy, the FOMC increases the size and duration of the SOMA holdings through purchases of longer-term Treasury securities. Under both policies, the reduction in duration risk faced by private investors depresses term premiums and longer-term borrowing rates, supporting economic activity. We simulate the effects of these policies using a recently developed toolkit integrating the FRB/US model and the staff’s balance sheet model that enables us to perform a large number of simulations for a broad range of endogenous balance sheet policies.

As before, the figures in the middle of the exhibit illustrate the macroeconomic outcomes under the two balance sheet policies in a severe recession. The top-left figure shows the evolution of total assets held by the Federal Reserve for each balance sheet policy in the recession scenario. The balance sheet under the passive policy, the solid red line, evolves as in the baseline. Under the MEP policy, the black dashed line, the size of the balance sheet remains constant at around \$4 trillion, or initially roughly 20 percent of GDP, starting in early 2019, when the federal funds rate reaches the ELB. Compared with the passive policy, the MEP reduces private-sector duration risk, lowering term premiums somewhat, shown to the right, but only slightly improving macroeconomic outcomes, the black dashed lines in the two bottom figures.

Returning to the top-left figure: Under the LSAP policy, policymakers increase the size of the balance sheet, the blue dotted line, to nearly \$8 trillion in 2023, which amounts to 33 percent of GDP. That expansion of the balance sheet exerts much greater downward pressure on term premiums. The 10-year term premium effect is

over 100 basis points more negative, on average, over the next several years under the LSAP policy than under the MEP policy. As a result, the unemployment rate, the blue dotted line in the bottom-left figure, declines faster over the medium term, reaching its natural rate four quarters earlier than under the passive policy. The inflation path is about $\frac{1}{2}$ percentage point higher than under the passive policy at the trough, as shown in the bottom-right figure. Because of the more rapid economic recovery, the federal funds rate—not shown—departs from the ELB three quarters sooner than under the passive policy. Regarding the macroeconomic effects, we note that our estimates are based on the assumption that balance sheet policy affects the economy through conventional yield curve channels. Other studies propose alternative transmission channels, and these could have different implications for the effectiveness of the balance sheet measures.

We also analyze the relative performances of the LSAP policy and the passive policy in stochastic simulations. In those simulations, we find that by 2020 the LSAP policy reduces the median unemployment rate when the ELB binds by about $\frac{1}{4}$ percentage point compared with the outcome under the passive policy. The median inflation rate rises about 20 basis points.

The bottom panel summarizes the main messages of our memo. The results suggest that there is a material risk that the ELB will bind in the future. We find that the current monetary policy toolkit can offset only some of the effects of a significant recession and, even then, only by undertaking commitments that may extend a number of years into the recovery. Specifically, although lags in the transmission of monetary policy limit the ability to offset the initial deterioration during a recession, the unconventional policy tools we consider can strengthen somewhat the labor market recovery and help raise inflation over time. Furthermore, these long lags imply that, like conventional interest rate policy, unconventional policies should be deployed rapidly in the event of an incipient recession. Finally, we note that our simulation results are, like any estimates of the macroeconomic effects in related studies, subject to considerable uncertainty, and alternative models and analytical approaches can produce different results.

This concludes our prepared remarks. We are happy to take any questions and look forward to your comments on these topics. It would be helpful if your comments could address the three questions on the last page of your handout, which are reproduced from the memo that you received earlier.

CHAIRMAN POWELL. Thanks very much. Questions for Hess and Bernd? President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman. Just looking at, in exhibit 2, the term premium effect. In preparation for this meeting, I was looking at the historical term premium with my staff. And I'm just trying to reconcile the shape of this chart with the data.

Maybe this isn't a fair question, so forgive me, but right after the Great Recession, my recollection is that the term premium was very elevated, and then basically it gradually has declined to where it's slightly negative today. It seems like it's the opposite shape in this chart. I'm not suggesting causation, I'm just curious how you think about this. As the QEs were launched, the term premium was very elevated, and now they've gradually been coming down. Your chart shows the opposite effect. Now, granted, I don't know the counterfactual. Maybe the term premium would have been even higher, absent QE. I'm just curious how you think about the actual data over the past 10 years against this chart.

MR. SCHLUSCHE. Maybe I will start talking about the term premium effects, and somebody else could weigh in then on the term premiums themselves. I'm talking about the effect stemming from the program.

What you see in the top-right panel there is the term premium effect from the particular policy that we are considering. The shape or the contour of the lines that you are seeing is the typical shape that we are reporting in the Tealbook, and it stems from the fact that, over time, you have some roll-off of the portfolio and, in addition, you have an aging of the portfolio. So the maturity or the duration of the securities in the portfolio becomes shorter. And because this model basically works off 10-year equivalents, you see this decay in the term premium effects as is shown here under the different policies.

In the case of the term premiums, over time I would refer to—

MR. POTTER. I think there were two things going on in 2008 and 2009. Treasury yields definitely went down. Private-sector yields went up a lot. Yields on mortgages went up a lot relative to those on Treasury securities. So you did see this pattern that there was credit risk, which was really large. Some of the LSAPs, particularly purchases of mortgage-backed

securities, helped with that. And then as the LSAPs got bigger in the U.S. Treasury securities market, that did have the effect of keeping the rates low for quite some time. The other thing that's really important is, in 2011—seven years ago—the forward guidance on rates had a really big effect on term premiums separate from the LSAPs.

MR. CHUNG. One other thing that I would add to what Bernd said is that it's important to understand that, in our scenario, all agents know that the LSAP program will be undertaken once the ELB is reached. I'm not sure that was the case immediately once the Great Recession started.

MR. LAUBACH. Perhaps if I could chime in. The point that Simon made earlier about the importance of how long the assets are expected to be held—I think that there was some uncertainty in the early stages, right? The Committee wasn't very specific at the time when it started the asset purchases, but it then later clarified matters via its articulation of a reinvestment policy. And, in fact, by that logic here, we estimate that the announcement of reinvestments in 2010 also had a sizable effect, even though it didn't change immediate expectations of the size of the balance sheet. But, simply as a logical matter, if you went out and purchased some assets and said, "In a month from now, we will roll them off," obviously the effect would be basically nil no matter what the size.

MR. KASHKARI. You had a different explanation than the one I had when I tried to explain it to myself, which was that maybe there was a lot of uncertainty about QE—maybe it would lead to high inflation, and that could have kept the term premium up early on. And maybe the experience would be different now because people have confidence that it's not going to lead to runaway inflation—the Committee will control inflation expectations. But in any case, as we

go forward, I'd welcome any additional explanation for how we reconcile this type of analysis with what we've experienced over the past 10 years. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thanks. Further questions? President Bullard.

MR. BULLARD. Thank you, Mr. Chairman. Looking at these charts here, I see they don't have confidence bounds around the estimates, and the staff does note that there's considerable uncertainty. But if I tried to put confidence bounds around especially the term premium effect, what would it look like? And would the bound include zero?

MR. SCHLUSCHE. You are entirely right. There are huge confidence bands around it. I don't have the precise numbers. Does it include zero? I would say it does not. But I think there is previous work that has been conducted by the staff in the forms of working papers and FEDS Notes that reports the confidence bands—which are, as you just pointed out, quite wide on the term premium effects.

I think what also sheds light on that is that, if you compare the term premium effects coming out of our model with the effects reported in other economic literature, including event studies and time-series studies, these estimates are quite comparable with what we see in these studies. In fact, I think for the large-scale asset purchase programs, we are actually on the lower end of that range, whereas for the MEP, we are a little bit above estimates in the related literature.

MR. BULLARD. So a related comment would be, if you really think you can lower longer-term interest rates by 200 basis points, maybe that should be the primary tool for monetary policy instead of using short-term rates.

CHAIRMAN POWELL. Any further questions? President Rosengren.

MR. ROSENGREN. During the crisis, when we were estimating the effects, about half the effects were coming from the exchange rate. What kind of assumptions are you making about the rest of the world and whether they're at the effective lower bound? Right now, Japan and Europe are still at the effective lower bound. When you do these simulations and we think about how you're calibrating what's happening, is this a domestic U.S. shock and the rest of the world is not involved? Or is this a global shock that is the same for the whole world?

MR. CHUNG. In this scenario, it's a U.S.-only shock. There will be some spillover to foreign economies, but it's not the case that we calibrated the shocks so that the foreign economies were also in recession. In stochastic simulations, it's less clear what's happening. This should track historical outcomes, but that would suggest that there is not a great deal of synchronization in stochastic simulations.

MR. ROSENGREN. So if the rest of the world were actually at the effective lower bound when you were doing your simulation, how much further out would it extend the time before we actually start seeing the kind of progress that you're showing in these simulations? Would it be double? Just the rough magnitude.

MR. CHUNG. I think with our current calibration, the exchange rate accounts for slightly less than one-third of the total effect. We would still get some effect due to stronger foreign activity as a result of the stronger demand generally—there would be some spillovers. But the direct effect to the exchange rate would be suppressed.

CHAIRMAN POWELL. President Evans.

MR. EVANS. Thank you, Mr. Chairman. I think this is really an outstanding analysis, which addresses the question that's posed, which is, to the best of our ability with the models

that we're looking at, what type of policies could improve the economic outcomes? What policies are most effective—thresholds and things like that.

The structure of the model, of course, is very important, and it probably limits how much we really learn about the circumstances we might actually face when we get to this. So a question that I have that you didn't really touch on in the presentation is expectations formation. In the model, you've got very well-defined expectations formation: forward-looking behavior on the parts of financial investors and some backward-looking expectations for households and businesses. At the moment, just looking at the problems that the Bank of Japan and the ECB had before 2014, credibility seemed to be really important. Are there any insights on attaining that credibility that you see within the model or other work that you might be doing—or any guidance on how we might think about that a little more broadly?

MR. CHUNG. In our appendix, we actually have a fairly extended discussion of some credibility issues arising from the threshold. Maybe I'll defer to one of my colleagues who's an expert on the subject.

MR. LAUBACH. Before somebody feels obliged to get up, I can chime in. Because we now have the ability to imbed, in particular, balance sheet policies systematically into the model, this has allowed the authors to treat these policies as if they are perfectly anticipated. I mean by that that agents in the model know. So in some sense, in particular when it comes to the balance sheet policies, previously our analysis was basically always conditioned on “this comes as a surprise.” Now, in contrast, these policies are actually anticipated. So you might say, “Well, maybe we moved from one end of the spectrum to the other—and reality may be somewhere in the middle.”

One piece of evidence that I find encouraging in terms of the direction in which we move is actually from the Desk surveys, because when you look at the results of the questions about the expected balance sheet size, which are broken out between the case in which the economy is not expected to go back to the lower bound and *vice versa*, when the economy is expected to hit the lower bound again, the balance sheet expectations are substantially higher for the latter case than for the former. That indicates that there is some learning going on. That indicates that if the economy were to hit a recession, arguably, at least financial market participants would expect these tools to be deployed again.

CHAIRMAN POWELL. Further questions? [No response] Okay. If not, let's go to our round of comments, beginning with Vice Chairman Williams.

VICE CHAIRMAN WILLIAMS. Thank you, Mr. Chairman. First, I'd like to start by thanking the staff for the excellent memo. It summarizes a number of important lessons regarding the implications of the effective lower bound.

The first is, past is prologue. We should not view the recent episode with several major advanced economies at the ELB for many years as an aberration. The model simulations demonstrate that the ELB is likely to be a major risk for the United States and, indeed, the world economy for the foreseeable future.

As indicated in the memo and the extensive research on this topic, this conclusion is robust across a variety of models and assumptions. In fact, I view the risks associated with the ELB to be potentially even greater than implied by the memo. One is the point that President Rosengren just made, and that's the global nature of this risk. Members of the staff at the New York and Dallas Feds have examined trends in real interest rates using data from seven advanced economies going back nearly 150 years. They find that since the late 1970s, trends in real rates

in these countries have converged toward a common trend, and this can be thought of as a world r^* .

This common trend has declined nearly 2 percentage points over this period, with the most recent estimate being around $\frac{1}{4}$ percentage point. And this finding is in line with the GDP-weighted estimates of r^* in my work with Kathryn Holston and Thomas Laubach. The decline in r^* is a widespread phenomenon that began well before the Great Recession, and it's primarily driven by global developments related to demographics, productivity, and the demand for safe assets rather than idiosyncratic, country-specific factors related to government policies. And these global trends do not look likely to abate any time soon.

An important implication of the global nature of this decline in r^* is that we may again find ourselves in situations in which many countries are at the ELB simultaneously. And that's a far more challenging situation than if only one country is at the ELB.

Now, a second source of my concern is that uncertainty about r^* is greater than may be gleaned from reading the memo. In particular, the memo explores three values of r^* , corresponding to the range of estimates in the June SEP. But this conflates disagreement over modal forecasts—which is typically pretty small—with true uncertainty—which is very wide, especially with regard to r^* .

Let me give a real-world example that makes this point. If one had conducted the same exercise back in January 2012, the range of r^* estimates in the SEP was $1\frac{3}{4}$ to $2\frac{1}{2}$ percent. In other words, the most pessimistic view in the Committee back in 2012 about r^* was that it was $1\frac{3}{4}$ percent. And this compares with the current range of $1\frac{1}{4}$ to $1\frac{1}{2}$ percent, which lies entirely outside the range that we wrote down less than seven years ago. So, from a risk-management perspective, in which a low r^* is far more damaging than a high r^* , analysis of the implications

of values of r^* below zero, I think, would be highly informative as we think about the policy strategy questions that we will discuss later.

Now, the second lesson from the memo is that we have proven tools that we can again deploy to at least partially mitigate the effects of the ELB on the economy. But to have their maximum effectiveness, they must be used early and with vigor, because of the lags in monetary policy's effects on the economy. This principle applies to conventional monetary policy, which should, of course, be used aggressively in case of a severe negative shock, and this is illustrated nicely by the asymmetric policy rule in the memo.

In other words, there is no reason to keep our powder dry. It's quite the opposite. Theory and history tell us that it's best to move to the ELB with dispatch. This principle applies equally to newer policy tools, such as forward guidance and asset purchases. And I view explicit forward guidance as a natural next step in situations in which the ELB is salient and additional accommodation is needed.

A key "takeaway" that I inferred from the memo and from experience is that, in order for forward guidance to be most effective, it must be bold—and, therefore, likely to be uncomfortable for us policymakers at the time. Vague statements or weak conditionality are simply ineffective. The success of the introduction of the strong, explicit forward guidance back in August 2011, after years of weaker verbal commitments to keep rates low, is an instructive case study on this point.

I also view asset purchases as one of our proven tools to address severe downturns when at the ELB. Now, it's hard to predict exactly when and how we'll use unconventional policies in the future. For example, I don't imagine us coming up with a Taylor rule applying to asset purchases. But the important point is that we are ready and able to deploy these tools when and

as needed. This fact by itself should be reassuring to the public in an episode of severe economic uncertainty or recession. Expectations will once again do what is needed to achieve our goals and should act as an automatic stabilizer in the sense of the anticipation of additional stimulus helps boost confidence and ease financial conditions, even before the ELB is reached.

Now, despite the experience we have with conventional and unconventional policies, or perhaps because of it, it is more than prudent—I would say it is essential—that we open a discussion on possible policy strategies that can mitigate the constraint imposed by the ELB. This debate should be framed in terms of discussing the pros and cons of modifying the current flexible inflation-targeting framework with some alternative that can help us better achieve our dual-mandate goals in a low- r^* environment.

The potential alternatives are well known and include moving to price-level or nominal GDP targeting or to reformulating our price-stability objective in terms of an average inflation rate over a longer period than is currently understood. Because forward guidance can be effective only insofar as the public understands our objectives and strategy and forms their expectations accordingly, a reformulation of the price-stability objective could help both on the front of better aligning public objectives and private expectations and in terms of enhancing the credibility and effectiveness of monetary policy. Thank you.

CHAIRMAN POWELL. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. I'm very concerned that we are likely to hit the effective lower bound in future economic downturns. In fact, the staff memo highlights the elevated probability that we hit the ELB, and I agree with Vice Chairman Williams that, if anything, I would have expected the probability to be higher, not lower.

With productivity growth low, slow trend growth in the labor force, and inflation at 2 percent, it is a reasonable assumption that the equilibrium interest rate will remain depressed. The current median SEP estimate of the equilibrium interest rate at 2.9 percent provides inadequate room for monetary policy responses that depend only on reductions in short-term interest rates, because, as the excellent supporting memo points out, the past three recessions have produced reductions of 5 percentage points, with one of those responses constrained by the ELB.

In addition to our limited monetary policy buffer, I worry that the countercyclical buffers associated with our other policy tools have been depleted, leaving few alternatives to countercyclical monetary policy. For example, the rapidly growing debt-to-GDP ratio will be a growing constraint on future countercyclical federal fiscal policy. At the state level, most states have relatively small rainy day funds and have significant unfunded pension liabilities, providing little cushion for the next recession.

Finally, the rest of the developed world is arguably even more poorly prepared to provide countercyclical policy support in the next recession. They have worse demographics than the United States, slower productivity growth, below-target inflation, and even lower interest rates. The reality is that a fixed 2 percent inflation target with a balanced approach to our dual mandate might be appropriate if the equilibrium interest rate were high enough to provide room for strong monetary policy reaction to a recession or if other countercyclical tools were effective and could be deployed to complement monetary policy. Unfortunately, that is not the case.

One option to consider is the adoption of an inflation range rather than a fixed target value and using the upper end of such a range when real interest rates are low to provide us with

a larger policy cushion. But I think we should consider a wide variety of alternative proposals, and we should do so through a much more structured process.

On question 2, I view forward guidance and balance sheet actions as useful when more traditional policy tools are not available. However, I would note that many research studies of their effects during the Global Financial Crisis and afterward find mixed evidence of their efficacy. And these extraordinary tools remain politically quite unpopular. Thus, these are appropriate tools when short-term interest rates cannot be lowered rather than a perfect substitute for lowering short-term interest rates.

I would also note that Japan has used much more radical tools, as has Europe, including more aggressive use of forward guidance and balance sheet tools, and still remains stuck at the effective lower bound. But we should not take our forward guidance and balance sheet tools off the table. We should have tempered confidence in their ability to substitute for the conventional policy of interest rate adjustment.

For question 3, yes, the Committee should evaluate alternative monetary strategies to address the effective-lower-bound concern. As I mentioned earlier, the Committee should consider many alternatives, not just the forward guidance and LSAPs considered in the memo. For example, a more flexible inflation target in a reasonable range should be considered. Any such evaluation should be broader, involving something more than the occasional internal staff memo or the relatively *pro forma* discussion we have each January.

I would prefer an open and transparent process that encourages input from a variety of stakeholders on possible ways in which to address the limitations imposed by the effective lower bound in a low real rate environment. Such a discussion might also provide a systematic assessment of the strengths and weaknesses of our current framework, including the extent to

which we will adhere to it. Not only may we get some good suggestions, but it will also help with the communication with the Congress and the public should we decide eventually to make more fundamental changes in the framework. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Harker.

MR. HARKER. Thank you, Mr. Chair. I'd also like to thank the staff members who produced this thoughtful and, I think, very timely memo. I believe it starts the Committee on the important path of deciding if and how monetary policy should confront the increasing likelihood of ELB events. As President Rosengren has said, funds rate cuts in the neighborhood of 500 basis points are typical during recessionary shocks, so the probabilities of hitting the ELB calculated in the memo actually seem reasonable to me and, of course, are of quite considerable concern.

With repeated ELB events and the resulting likely shortfall of inflation from target, as I've stated in previous meetings, we risk the possibility that inflation expectations will fall below our 2 percent target. Individuals and firms may gradually come to realize that the stochastic mean of inflation could lie somewhat below our stated 2 percent target and factor that reality into their expectations. In that event, the Committee would face the added difficulty in achieving its dual mandate. That possibility requires us to think seriously about a change in the way in which policy is conducted. But doing so involves risks as well.

In thinking about whether it would be advisable to evaluate alternative monetary policy strategies, the central issue is discovering the likely economic benefits of avoiding frequent ELB events versus the cost of changing our strategy. If the benefits are large, then, of course, we should adopt an alternative strategy that reduces the chances of hitting the ELB. But we must bear in mind that a change in strategy will also present challenges—challenges to our credibility

if we change the inflation target and challenges to communications if any new strategy is to be credible and easily incorporated into the decisions made by firms and households.

The staff memo helped me a lot in thinking about the relative cost of the ELB and whether unconventional policies will likely prove adequate. It appears that the conclusion that comes out of the experiments that are run is that forward guidance and LSAPs are, at best, modestly useful. The effectiveness of these policies may even be overstated.

Regarding forward guidance, it appears that FRB/US is less subject to a forward-guidance puzzle than the standard DSGE models. But some confirmation of that conjecture, I believe, is warranted. Insofar as a forward-guidance puzzle is present, the effects of forward guidance will be overstated, and the overstatement will increase with the number of periods in which forward guidance is employed.

Regarding LSAPs, especially QE2 and QE3, I also question whether they are as effective as presented in the model. The econometric literature on the matter has yet to reach a consensus on their efficacy. Although the exercises are a very useful first step, I would benefit from looking at results from a wider range of models. Now, I realize we will not uncover fully believable results on the basis of any one model. But I think some robustness experiments could help guide my opinion on the extent to which we can count on alternative monetary policies.

Along those lines, an inflation target that gets revisited periodically may be a useful option, especially if other models confirm that interest rate policy is our most effective tool and, we hope, more effective than it appears to be in the FRB/US model. The change would be relatively easy to communicate. But it may pay to wait until an ELB event reoccurs. The model is predicting fairly high probabilities. But the models have been wrong in the past—and it would

be useful to have some confidence intervals associated with the probabilities reported in table 1 specifically.

Alternatively, we could resort to negative interest rates, which would have a similar effect to raising the inflation target but may not be feasible. But if we deem it somewhat feasible, it may be worth discussing. And if we change our strategy, we should communicate the change well in advance.

Regarding unconventional policies, I prefer forward guidance and perhaps even forward guidance that is threshold-based through the use of asset purchases. In using a threshold, we must be reasonably confident that the threshold is attainable, or we could stay at the ELB forever or, worse, end up with an infinitely large balance sheet. And judging attainability is likely to be difficult, as our models may not be capturing the economic channels that will be responsible for driving interest rates back to the ELB. That was certainly true of the financial crisis.

Further, in view of how slowly our balance sheet normalization has proceeded, if ELB events occur with the frequency reported in the memo, we run the risk of an inordinately large balance sheet and the political-economy problems that would likely ensue. Thus, the limited benefits of an extensive use of LSAPs do not seem to me to outweigh the potential costs.

In summary, the memo lays the groundwork for the start, I think, of a very important policy discussion. On the basis of the staff's analysis, I believe we will be best served by strategies that facilitate the use of normal interest rate policies augmented by forward guidance. Facilitating the use of interest rate policies may eventually require the adoption of a higher inflation target or, again, potentially employing negative interest rates.

Forward guidance is another useful policy tool that may be even more effective in the future now that the public has significant experience with it. They understand how we used it,

and they have some confidence, after what they learned through the crisis. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Bullard.

MR. BULLARD. Thank you, Mr. Chairman. And thanks to the staff for putting together this excellent memo that summarizes the state of affairs on the effectiveness of various unconventional policy tools. I'm going to organize my comments into four areas. First, a little bit about the probabilities of returning to the ELB. Second, quite a bit on the effectiveness of tools. Third, a brief comment on additional tools that were not discussed. And then, finally, should the Committee evaluate alternative monetary policy strategies?

On the question of the probabilities of returning to the ELB, I think these are interesting calculations but only as a very rough guide. We cannot expect that we can pin down a reasonably sharp estimate of a probability like this. Any estimate is going to be model dependent, and even within a model class, estimates will be highly uncertain. At best, I regard these probabilities as a rough guess of what we may face in the future. But a question from my point of view is, does it really matter what the probability is? A risk-management perspective might suggest that all that really matters is that the probability is not zero. And it is clearly not zero.

The Committee faces a decision tree with two branches, and one of the branches involves policy rates back at the ELB levels. The Committee can and should have a plan in place preparing for a period at the ELB in the future, regardless of the perceived probability of getting to that state.

Does the Committee have such a plan in place? I think we do. Current private-sector expectations of what we would do during a future ELB episode would likely be informed by

former Chair Janet Yellen’s Jackson Hole speech of several years ago, which I interpreted as laying out how the Committee would likely react if a sufficiently negative shock occurred that caused the policy rate to return to the ELB. The speech argued that the Committee had enough tools through forward guidance and quantitative easing to handle an ordinary recessionary shock.

Are private-sector expectations of such a plan important? And here I agree with Thomas Laubach and Vice Chairman Williams. I think that private-sector expectations are quite important. The private-sector expectation of FOMC action would mitigate the bad shock even before any action is taken by this Committee in response to the shock. This effect may even be large enough to keep us away from ELB—although any estimate of this type of effect is, of course, very uncertain.

In my view, an update of the former Chair Yellen’s speech might reinforce currently existing expectations of what the Committee would do in the event of a recessionary shock and have the added benefit of mitigating the effects of such a shock on the economy.

Let me turn now to the effectiveness of tools. There’s a long-running academic debate on the effectiveness of both QE and forward guidance. This debate is unlikely to be resolved any time soon. The Committee will simply have to track developments in this ongoing debate and revisit on occasion.

The forward-guidance debate has been dominated by ideas about the forward-guidance puzzle. Many top authors in the field have discussed this issue and published papers. There is no clear resolution, in my reading of the literature. I think that the forward-guidance puzzle reveals fundamental weaknesses in New Keynesian theory. Basically, the forward-guidance puzzle is that forward guidance works phenomenally well inside a model—implausibly well. The expectations effects are too large for events promised in the distant future. Paradoxes like

this often suggest fundamental rethinking of theories. So I think we just have to wait and see how this proceeds over the next few years.

I think it's clear we can't resolve such issues here. The best we can do is be aware that these debates are proceeding and that we should not be fooled into overstating what forward guidance can do. I think I'm echoing some of the comments just made by President Harker.

On quantitative easing, what about the effectiveness of QE? Here, again, there's a long research debate—one that is unlikely to reach a clear resolution any time soon. But here's my own take: First of all, we don't have an accepted theory of quantitative easing. What we do have is a set of stylized facts based on the general experience of the ECB, the Bank of Japan, and the Federal Reserve.

The stylized facts are as follows. Major effects do occur, centered in financial markets, especially equity prices and foreign exchange markets. Very large effects are observed during the run-up to key decisions, especially when the probability of action was initially thought to be zero but then eventually moves toward 100 percent. I have three examples in mind. The first is the United States in the run-up to the QE2 decision during the fall of 2010. During the summer of 2010, it was thought that the Committee would not move in this direction, but by the time it got to November, that probability had moved to 100 percent.

The second is the BOJ in the run-up to the appointment of Haruhiko Kuroda during the winter–spring of 2012–13. Again, during the fall of that year, it was thought that the BOJ would take no action at all on this kind of dimension, but by the time Governor Kuroda was appointed, the probability was considered to be 100 percent.

And the third is the ECB in the run-up to the generalized asset purchase program in the spring of 2014 up to January 2015. Again, for the ECB's case, the ECB was viewed as not

having any probability at all of taking unconventional policy actions during the early part of 2014, but by the time you got to the actual decision in January 2015, that probability had moved to 100 percent.

During these run-up periods, the key effects are clear. There's a large depreciation of the domestic currency—on the order of 20 percent, depending on which episode you're looking at. There are important equity price increases in all three cases. There is some effect on longer-term bond yields, but it is much more muted. There's even less effect on inflation and inflation expectations—plausibly, you could argue there's no effect at all on inflation. And then the effects on the real economy are very hard to disentangle, without having a good theory of how QE works.

So I would summarize the state of affairs for QE as, something happens but not in a way that is easily reconciled with standard macroeconomic theories that we like to work with. And I would stress that the large equity price effects and foreign exchange effects sound like standard monetary policy easing, only much larger than what we're used to from most policy rate moves that we would consider.

To academics and others who say there are no effects from quantitative easing, I would say, "You're not paying attention." These are the "QE facts" that a satisfactory theory has to confront. We don't have such a theory, but I think we need to keep these facts in mind and ask ourselves, for those who are arguing either one side of the debate or the other, whether their theories are addressing these facts.

Where does this leave the Committee? I would say forward guidance is in a bit of disrepute because of the forward-guidance puzzle. If we're forced back to the ELB, we will likely have to turn to quantitative easing, as imperfect as it is, and I think we should probably be

more assertive than we have been in creating policy space on the balance sheet in order to prepare for this possibility. This augurs against our current policy, which only slowly reduces the size of the balance sheet. I think we should think more strategically about this issue.

Let me just turn to a few policy tools that are not mentioned. President Harker did mention negative policy rates. I personally do not see this as very effective, but many countries have now done this with some effect, and I think if we return to the ELB, we'll be pushed very hard on this issue. So I think we should have that as part of the analysis. If we want to say no to negative policy rates, we should have good reasons why we're going to say no, whereas other countries have said yes.

There is also the sticky question of other types of purchases other than U.S. Treasury securities or mortgage-backed securities. In Japan, they regularly buy ETFs that concentrate on equities. I think there could be political pressure to go toward other types of assets. Certainly, Europe has gone toward other types of assets. So, again, I think it's unpopular here in the United States—but if we don't want to go to other types of assets, then we should be prepared to answer this question and give a good analysis about why we don't want to go in that direction.

Finally, should the Committee evaluate alternative monetary policy strategies? Yes, and, like others, I think a regular review is a good idea. I like the Bank of Canada's standard on this question. Their policy framework is evaluated every five years or so and preferably outside the hubbub of day-to-day policymaking—perhaps at a special meeting of several days in which the Committee would give careful thought to this question.

I have several brief comments on this. A lot of times, this is framed as whether we want to change the inflation target or not. I think any change in the inflation target is unlikely to work. A change in the inflation target would undermine the credibility of the inflation target, so it

would disturb the primary benefit of having an inflation target in the first place. It would upset a global standard that has been established over the past 25 years, and I think it would likely set off a global free-for-all with lots of inflation target changes globally. We've seen that kind of situation occur in the 1930s and possibly again in the 1970s. So I think you probably don't want to break this international standard.

I think a better way to frame the debate is via the price-level targeting or nominal GDP targeting debate. What I like about those kinds of frameworks is that they are optimal in a wide variety of macroeconomic models. That gives me some confidence that we're not getting something that's model-specific. If you don't want to read those papers, I think the simple answer about why they're good is that they pin down expectations better than other types of policies.

Also, I would note that we are not behaving like price-level targeters today. And, in my mind, that suggests that a review is warranted. Some of you have heard me make this point before. Between 1995 and 2012, we arguably followed a *de facto* price-level targeting policy in which inflation was sometimes above target and inflation was sometimes below target, but, on average, we stayed on a 2 percent price-level path.

Since 2012, we've moved off that path and by a substantial margin—about 4½ percent off the price-level path. And this makes me think that we're no longer behaving as *de facto* price-level targeters. And, possibly, we have moved away from what would otherwise be more closely aligned with the optimal policies that come out of our models.

So I do think it's very much warranted that we would have a broad discussion on these issues, but that discussion should take place in a setting that would be divorced from the day-to-day policymaking. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Evans.

MR. EVANS. Thank you, Mr. Chair. Thank you for scheduling this important discussion, and thanks to the staff for an excellent analysis of the policy environment at the effective lower bound. I found the staff paper an outstanding refresher for thinking about the policy options that will best help the Committee achieve our dual-mandate goals, taking into account the prospective constraints posed by the ELB. The model analyses are state of the art. I don't mean they are the last word on any of these issues, but this is the kind of work that should inform our best policy thinking.

Now, in response to the first question, yes, I am concerned about how the effective lower bound may limit our ability to achieve our dual-mandate objectives. Our challenge is that equilibrium real interest rates have fallen over the past 10 to 15 years. Vice Chair Williams and President Rosengren mentioned this. This has been a global phenomenon for interest rates.

It's also due to the substantial decline in potential output growth. Standard growth theory is going to have a relationship between the decline in growth and r^* . The outlook is for r^* to remain lower than we expected when we agreed on our 2 percent symmetric inflation target. So I think this is a big change and challenge for us from 2012.

Under our median assessment for the neutral nominal federal funds rate of 2¾ percent, we could quite often run out of room to deliver the typical 500 basis point reduction in short-term policy rates that we have used in the past to mitigate economic downturns. This was also mentioned earlier. We'd then be forced to turn to alternative instruments to provide monetary accommodation. While I believe these alternatives are effective, they are not close to being perfect substitutes for our usual policy instrument, and they are more controversial outside economic circles. The results in the paper regarding the frequency and severity of ELB episodes

and the efficacy of alternative tools reinforce this assessment. It's a reality that we have to come to grips with.

At a minimum, the first conclusion I draw is that it's critical that we get everything we can out of our symmetric 2 percent inflation objective. We must always act to reinforce the public's understanding that 2 percent is not a ceiling. If we don't, our perceived inflation target will be lower than 2 percent, making ELB episodes even more frequent and more difficult to exit from.

The staff analysis provides a good deal of food for thought about the second question posed to the Committee regarding the effectiveness of alternative policy tools. My reading of the results is that, while not as powerful as moving the federal funds rate, both forward guidance and large-scale asset purchases can provide sizable monetary accommodation.

To be sure, in the simulations it appears that the effects on unemployment may be relatively muted, while the effects on inflation are more apparent. But I can see alternative simulations in which all of these effects would be stronger. Notably, the simulations all assume households have backward-looking expectations while price and wage setters are forward-looking.

As we know from a large body of New Keynesian research, putting more weight on forward-looking expectations will amplify the effect of future policy on the real economy today. Indeed, the forward-looking behavior of price setters in the memo simulations likely is a factor making the inflation result more powerful.

There are a whole host of technical factors that weave in and out of this analysis related to the forward-guidance puzzle and things like that that are linked to long-term expectations and longer-horizon aspects of the models, which we have to grapple with in the analysis. But in

terms of how descriptive they really are of what we're experiencing in the economy, I think we have to take some of this with a grain of salt and use judgment there. I think that that is important for us to grapple with.

This observation highlights the benefits of the public believing our commitment to do whatever it takes to fight the disinflationary consequences of the effective lower bound. Indeed, I think the Committee's adoption of threshold-based forward guidance in 2012 was an important ingredient in firming the public's beliefs that the FOMC would pursue sufficiently accommodative policies. In combination with our open-ended QE3 purchases, threshold-based guidance was a powerful declaration that distinguished our efforts from the less forceful commitments made by the Bank of Japan in the 2000s and the pre-2014 ECB efforts.

Credible communications in combination with observable actions are important for reinforcing the public's understanding of our commitment to achieving our dual-mandate objectives. The combination can have a powerful effect on consumer confidence and business confidence, which are something of a proxy for forward-looking influences on behavior and, with it, the spending decisions of these agents.

The important role of expectations should serve as a warning as well. Monetary policy can be a powerful tool at the ELB when inflation expectations are anchored in the right place. But if inflation expectations fall and are no longer consistent with our inflation objective, our future challenges will be much harder. This is one reason I feel we need to keep emphasizing the symmetry of our 2 percent target.

Finally, should we consider alternative future monetary policy frameworks in light of these results concerning the ELB? I think it is natural and appropriate for us to have periodic strategic discussions on this topic even if, in the end, they simply reinforce that our current

approach is the best we can do. I think that it is the case that the Bank of Canada has had a number of these reviews, but they haven't really changed anything—though I haven't studied that.

I would note, though, that none of the alternatives that are on the table, such as price-level targeting or raising the inflation target, necessarily free us from the use of forward guidance or large-scale asset purchases. Alternative frameworks might lessen the odds of hitting the ELB, but they cannot drive the risk to zero. And whenever we are at the ELB, the question of alternative policy tools becomes relevant again.

I also think it's appropriate to communicate the outcomes of these discussions in the minutes, speeches, and testimony. Transparency is important here. But unless we make a change in our inflation target, I'm less inclined toward amending the Committee's longer-run goals and strategy statement. I'm skeptical that simple changes in language could provide additional meaningful clarity to the public or improve their confidence in our approach beyond their current assessment.

Now, let me speculate on the central outcome of such monetary policy strategy discussions. I think that the Committee will find that it should select a strategy that locks in a commitment to achieving our dual-mandate objectives without blinking an eye in the face of difficult circumstances. That's a tall order. Adding a few words to our strategy statement is key. It's taking difficult and controversial actions in the moment that truly proves a central bank's commitment.

Whatever the precise instruments may be, such an outcome-based approach to policy is key. And in this regard, I believe strongly that credibly reinforcing the symmetry of our 2 percent inflation objective is extremely important. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Mester.

MS. MESTER. Thank you, Mr. Chair. I also thank the Board staff for providing a solid memo to kick-start our discussions about policy tools at the effective lower bound. Although we can't estimate the probability of hitting the effective lower bound with precision, if the equilibrium interest rate is going to be lower, then this risk is higher than it has been in the past.

My thinking is similar to President Bullard's. Even if the risks were smaller than estimated in the memo, recent experience shows the costs of being at the lower bound can be very high. So it's not too early to start these discussions to determine the consensus view on the tools we'll use when we confront the situation in the future.

I agree with the Chair. I view this discussion of tools as a piece of a larger discussion the Committee needs to have about its operating framework—here, I am referring to floor versus corridor—and its monetary policy framework—here I'm referring to our current flexible inflation-targeting framework versus alternative strategies such as price-level targeting. The efficacy, and even the feasibility, of tools available at the effective lower bound are tied to how we decide to operate, and our choice of monetary policy frameworks should reflect our assessment of the efficacy of the tools at the effective lower bound and the likelihood of finding ourselves there again, which are in turn dependent on our framework.

Indeed, while assessing the efficacy of tools to use when policy is constrained by the lower bound is important, equally important is considering whether there are changes to our monetary policy framework that would reduce the chances of encountering the effective lower bound or, even within our current framework, asking whether there are better ways of conducting policy. For example, rather than a Taylor-type rule, can policy be guided by a rule that

approximates the optimal rule in a low equilibrium interest rate world that lowers the probability of hitting the lower bound and is robust across alternative models?

Regarding the tools, I think there was a considerable amount of learning by doing in addressing the Great Recession. And in the end, both asset purchases and forward guidance were reasonably effective at providing policy accommodation. But I don't think we should overestimate their effectiveness in the future.

The memo's estimates of their effects on unemployment and inflation are relatively modest. And, as the memo indicates, there is considerable uncertainty associated with such estimates. Additionally, the use of asset purchases may face some limits in the future. Our choice of operating procedure will determine the normal size of our balance sheet. If the balance sheet grows too large, we may run into constraints, both political and operational, in using this tool.

We've already seen some public "pushback" against IOER. It's not difficult to imagine similar types of "pushback" against large-scale asset purchases. On the other hand, with no limit on the size of the balance sheet, we open ourselves up to requests to aid other industries or use the balance sheet to fund government initiatives, as occurred during and since the crisis.

Operationally, while the staff memo suggests limits won't be binding, I think it's reasonable to ask whether, in a world of rising federal deficits, increasing the stock of Treasury securities held by the public and perhaps pushing up term premiums, the Fed would need to buy a greater amount or share of Treasury securities and perhaps MBS to get the same effects as during the Great Recession episode. Or would our purchases need to be scaled up according to the size of the outstanding stock of securities?

Regarding forward guidance, I find it helpful to think of two types of guidance. Away from the lower bound are guidances that are intended to convey information about our reaction function and the rationale for our policy decisions. This type of forward guidance is in the realm of transparency and policy communications.

The other type of forward guidance is meant to be used as a policy tool to provide accommodation once our interest rate tool is constrained. To be fully effective, the public must understand that the central bank is setting policy differently than it would if interest rates were not constrained. And they need to believe that the Federal Reserve is committed to implementing this different policy over what could be an extended period, even after the economy has improved.

Now, the forward guidance the Committee used following the onset of the Great Recession evolved over time from qualitative guidance to calendar-date guidance to economic thresholds and to a blend of state-contingent and date-based guidance. The one constant was that the Committee stopped short of making the kinds of commitments that make forward guidance work most effectively in our economic models.

Because of the uncertainty that policymakers face, maintaining some flexibility to depart from guidance is likely to characterize monetary policy during these episodes. Implementing a credible commitment is going to be hard for the Committee to achieve. Time-inconsistency problems will be hard to overcome.

If the effectiveness of forward guidance comes from the public understanding that we're setting policy differently than we usually do away from the lower bound and that we're making a commitment to do so, then it seems worthwhile to continue to work on our policy

communications and toward more systematic policymaking in order to increase the public's understanding of our usual reaction function away from the lower bound.

How to increase the credibility of commitments continues to be a subject of economic research. And this is the point at which this topic touches the selection of the policy framework—as mechanisms like price-level targeting or nominal GDP targeting increase the degree of commitment.

With regard to other tools, although there was some early consideration of using negative interest rates and targeting longer-term interest rates, the Committee judged these were not the preferred tools. That may still be true, but we now have examples of other central banks using these tools with some positive effect, and I think it would be useful to reassess whether the Committee's earlier conclusions stand.

Finally, I support the Committee's evaluating alternative monetary policy strategies. As a matter of good governance, a central bank should periodically review its assumptions, methods, and models. The economy is doing well, so now seems like an appropriate time to begin the discussions.

Changing frameworks should not be decided on cavalierly, so the evaluation will need to be a deep one and will take some time. But I think it would prove valuable. Even if we stick with our current strategy, we may learn how to implement it more effectively to promote our goals of price stability and maximum employment. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Barkin.

MR. BARKIN. Thank you, Mr. Chair. I agree with everyone else that we are more likely to be constrained by the effective lower bound in the future, because neutral rates in this environment will only go so high. How much it will constrain us is a different and interesting

question. I read the staff memo to suggest that for the median event, the policy was actually not all that constrained. There was more constraint in the tail events, but then tail events, almost by definition, seem to push us to our limits.

I do think forward guidance, with flexibility to change that guidance in response to events, is a core part of our toolkit and has served us well, and I support it. I'm not as confident that we should count on our balance sheet being a normal part of our toolkit. Its potential effect is still not fully clear to me, and our use of the balance sheet does put our political capital significantly at risk. So I would restrict its use to more extreme scenarios in which we believe that it's critical for us to be seen to do more. I'm okay with communicating in advance but would urge us to be humble and to emphasize that humility in our communications. We can only do our part with the tools we have.

Most of the staff scenarios suggest even our most aggressive actions only move unemployment about 1 percent. And we might now want to be communicating, as I think President Rosengren said, that there are limits to the effect we can have and the importance of building fiscal policy capacity that creates some additional potential for stimulus should it be needed.

On the topic of alternative policy strategies, I still feel very new to this debate, and I'm open to learning. I will say I'm nervous about policies that have us precommitting to future excess inflation, and I do wonder if they'll be credible and feasible or if we'd actually live up to those commitments in fact.

CHAIRMAN POWELL. Thank you. President Kaplan.

MR. KAPLAN. Thank you, Mr. Chairman. And thank you to the staff for this excellent memo. I, like everyone else, believe the probability of reaching the effective lower bound is

much higher than it was in the past. We've talked about some of the reasons why: aging demographics, sluggish productivity—and I would add a third, fiscal policy tailwinds, which I think may well turn into headwinds in the years ahead, and which, at a minimum, will reduce the availability of fiscal policy in the next downturn. I think those are all issues on my mind, and they're all issues that factor into my current thinking regarding our current case of removing accommodation.

I do believe that forward guidance is a key tool that could help us in the future. I am also supportive and open minded that it needs to be explicit and deliberate and also that it may have to be different and adapt to tools that are somewhat different than the tools we used in the past. And that may include different ways to use our balance sheet, including buying different types of assets than we did in the past.

I do believe that we should be fleshing out alternative frameworks—price-level targeting or nominal GDP targeting. I am supportive of doing a strategic review, maybe taking several days to do it, and getting outside advice. I think it's good practice and good governance. It pays to be prepared.

I'm also supportive, if we were to consider some of these alternative frameworks, of having sort of a shadow tracking of nominal GDP targeting and price-level targeting—which I think we're starting to do, but like we do with the Taylor rule—so we can start to learn how they might affect our decisionmaking and get some practice with that. I think that would be a good action.

I'm very mindful of the fact that the next downturn is, for better or worse, going to likely be different than the one we just went through. The causes may be different, the facts will be

different, and certainly the fiscal and structural policies that are in force will be different—which means we’re going to have to be flexible.

Several people talked about the fact that, in the previous downturn, there was a good bit of experimentation and getting feedback and trying new things, and our processes and what we did evolved. Preparation, I think, is critical. I do believe, in the next downturn, it’s going to be essential to get inputs from the financial sector and the business community—we already do that through individual banks—to make sure we have in place mechanisms by which, if we need to, we can have brainstorming sessions with the financial sector and the business community, and learn about what’s going on, and have forums in which we can brainstorm among ourselves. I do think, again, the range of tools that we’re going to use in the next downturn—we’re going to have to accept that it may just be different than we used the previous time, and we’re going to have to be willing to adapt and experiment.

The last comment is—and this was alluded to—Federal Reserve independence is critical, but there’s no doubt that we’re going to need political support for our actions in the next downturn, particularly if it involves using the balance sheet. So I think the work that’s being done by presidents, Governors, and the Chair to build our relationships on the Hill now, well in advance of a crisis—those efforts are essential. And I think the more work we do on that pre-crisis, the more effective we will be in our efforts during the crisis. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Mr. Chairman, and thanks to the staff for what is a very clear and accessible memo. And it’s set up, what I am finding at least to be, a fascinating and useful discussion. Inevitably, the financial crisis is, as much as we want to say we won’t let it, receding into the rearview mirror. So projects like this are really important in order to make sure

that we don't lose our institutional knowledge, and that we are keeping our analytical toolkit fresh.

The importance of this discussion is buttressed by the memo's assessment that the probability of hitting the effective lower bound in the future is quite high. I am concerned about that possibility, but probably less so than other members of the Committee. The memo makes clear that the probability of hitting the effective lower bound falls off pretty rapidly with higher levels of the longer-run neutral rate of interest. And as I have mentioned previously, I am an optimist when it comes to the potential growth rate of the U.S. economy, particularly over the course of the next decade. As such, I have a relatively high estimate of the longer-run rate potential growth rate, compared with, I think, some other members of the Committee.

My "takeaway" from the staff's analysis and a reflection on history is that, if faced with another recession on a par with the financial crisis, we could expect our former toolkit to be moderately effective provided we acted quickly and kept our expectations within reason. Forward guidance and LSAPs could play a measurable role in mitigating the macroeconomic effects, although, not surprisingly, the recession would still be substantial. Long-lasting effects on unemployment and inflation would be similarly durable. But in conducting this thought experiment, it's important to consider changes in the post-crisis economic environment that would alter how a crisis would play out relative to 2008.

As both President Rosengren and President Kaplan and, I think, others have noted, on the negative side, the capacity for fiscal policy to respond to a deep recession is much more constrained now than it was then. But, on the positive side, the financial system is in a much better place, in terms of its capital and liquidity, to absorb such a shock without amplifying it, making it unlikely that the next recession will play out quite like the previous one.

For a transparency and limited discretion—I was going to say “nut,” but someone is writing all of this down, so let me say “advocate”—like myself, the most immediate issue that was broached by the memo is whether we should communicate in advance our policy framework in conditions of the effective lower bound and how clearly and concretely we should do it. And the potential benefits of such an approach are obvious and inherently appealing. Increased transparency and predictability regarding a sensible and clearly articulated framework can increase the legitimacy of our actions and decrease uncertainty among market participants, improving macroeconomic outcomes.

The alternative to communicating our framework now is waiting until the next crisis and then acting in what might appear to be a reactive and *ad hoc* basis, even if it’s quite in line with what we all kind of expect we are likely to do and, indeed—as Thomas Laubach and others have noted—with the likely market expectations, shaped on the basis of past practice, of what we’d be likely to do.

And yet even taking all of that into account, in this instance I think we should be cautious about tying ourselves, Odysseus-like, so firmly and publicly to the mast. Precisely because of the changes that several have discussed in both the fiscal and regulatory environments, we have good reason to expect that both the origin and the evolution of the next crisis will be at least somewhat different from the previous one—and perhaps materially different from the previous one—and that may require a different response. And at least currently, we understand too little about exactly how the tools we’re discussing affect the larger economy—as Vice Chairman Williams said, we don’t have a Taylor rule for the balance sheet—to be too categorical about exactly when and how we will deploy them in the future. So excess specificity in these circumstances could easily be confusing rather than clarifying and close off options to boot. In

addition, on the decision to communicate a framework in advance or not, my reading is that the staff's analysis is inconclusive and probably necessarily so.

In all of the simulations—again, as Thomas Laubach noted—it was assumed that the public and markets fully understand and believe the FOMC's commitment to various rules. Would the results have been much different if, in the simulations, the Committee had waited until the crisis struck to announce its policy framework? How much of an advantage does announcing the policy framework in advance provide? And, certainly, on the question of what approach to transparency on this issue is appropriate for an independent but democratically accountable institution, that would necessarily be outside the scope of the staff's analysis and ultimately left to our honest judgment. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chairman. Like others, I think we'd be well served to consider the likelihood that the effective lower bound could pose limits to the FOMC's ability to achieve its objectives in future economic downturns. However imperfect our understanding of the drivers, the prospect of lower equilibrium interest rates should lead us to evaluate options for deploying an effective instrument of monetary policy.

In terms of the options specifically covered in the staff memo, both forward guidance and balance sheet policy should be on the table, I think. I have more questions about the efficacy of large-scale asset purchases in the short run and consider our understanding of the long-run costs to be limited. We also will need to be mindful of the role of communication, considering the public's greater uncertainty about such policies and the related implications for monetary policy effectiveness and credibility. On the other hand, the use of forward guidance seems more

promising. Recent research by my own staff shows that forward-guidance announcements generally increase economic activity and inflation as well as lower term premiums.

Beyond these specific policy instruments, I think we should take into account the full range of policies available to achieve macroeconomic stability, especially if we face limitations. Fiscal authorities certainly play a role here, notwithstanding apparent current constraints, and we should avoid being viewed as the only game in town. Additionally, we cannot afford to disregard the role of financial stability tools—historically, the most fundamental mission of central banks. As we’ve come to appreciate, these tools are understandably harder to measure and monitor and involve multiple instruments, require cooperation between relevant authorities, and generally require longer time horizons relative to monetary policy. But in a world in which the failure of one of our largest financial institutions continues to threaten macroeconomic stability, macroprudential and other regulatory rigor will surely be needed.

Finally, I’m open to the Committee evaluating alternative monetary policy strategies, recognizing that the threshold should be a high one for changing meaningfully the Committee’s Statement on Longer-Run Goals and Monetary Policy Strategy.

CHAIRMAN POWELL. Thank you. President Bostic.

MR. BOSTIC. Thank you, Mr. Chair. I, too, would like to thank the staff for its work, and I find its analysis in part 1 of the memo convincing. I agree that it is prudent to take seriously the possibility that the effective lower bound could limit attainment of our goals. And we are more likely to be successful if we have discussed and communicated our intentions well in advance of confronting an ELB situation. So I welcome this discussion and look forward to follow-up deliberations in the near future.

I am convinced that both forward guidance and the use of the balance sheet were effective tools during the last ELB episode and have confidence that they would continue to be so should the need arise. Now, I recognize that some argue that the effects may be modest, but tools are there to be used. We should be ready and willing to use them and be thoughtful on maximizing their effectiveness. On this point, I agree with Vice Chairman Williams—we will need to be bold, especially because the public’s expectations about our policies are different than before the Great Recession.

As a consequence, I support President Bullard’s suggestion that we consider current balance sheet policy in light of the effective-lower-bound responses, and I echo calls for more transparent communication about what we do and how our policy differs in normal times from when we are at the effective lower bound.

Regarding the balance sheet, I believe the approach will have to rely heavily on prevailing circumstances, and this is a general truth. How and why we get to the effective lower bound will matter for our response. The choice to purchase MBS as part of the first LSAP was not random but, rather, was closely linked to the lack of liquidity in housing markets. We should be open to a wide range of design options in developing a response and think hard about how to communicate this. This will not be easy. And I lean toward Governor Quarles’s view about avoiding specificity, where possible.

More broadly, I would find value in a conversation about our strategy for easing monetary policy, even before the effective lower bound comes into operation. Should we proactively try to avoid reaching the effective lower bound? In that vein, we may want to decide up front whether balance sheet policy or forward guidance will be implemented along with

interest rate cuts as part of a general strategy for dealing with downturns in economic activity, independent of whether we actually hit the effective lower bound.

It seems inevitable that consideration of the balance sheet as an active policy tool will raise questions about the efficacy and feasibility of corridor versus floor systems in the range of economic conditions we are likely to confront. Even if we would prefer to run a corridor system in normal times, choosing to use the balance sheet as an active policy tool will generally mean suspending the corridor system in particular circumstances. Like others, I think it would be a good idea to come to a resolution on the floor-versus-corridor question and communicate our intentions with respect to the operating framework sooner rather than later.

With respect to the Statement on Longer-Run Goals and Monetary Policy Strategy, I'm not a big fan of increasing the long-run inflation target. But I am open to other alternatives that would provide some scope for communicating state-contingent, short-term inflation targets that deviate from the long-run target. Examples of such alternatives are price-level targeting with bands, as I discussed in a macro blog series earlier this year, or temporary price-level targeting schemes at the effective lower bound, as President Evans and others have discussed. I think such strategies could be a strong enhancement to forward guidance, and I would like them to be actively considered. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman. Like others, I am concerned that in a low- r^* environment, we are likely going to be bumping into the effective lower bound, and we should be prepared for it in advance, with additional tools.

I do think that forward-guidance and balance sheet policies should be part of our toolkit. I think there's a lot we don't understand, as evidenced by the discussion today. That doesn't

mean we shouldn't consider these in our toolkit. I think we should continue to study them, but keep them ready if we need them.

One issue that I thought about is—and Vice Chairman Williams touched on this—I think forward guidance is most powerful when it's used sparingly and used powerfully and very credibly and we're really committed to it. I have concerns, and I would encourage the staff to contemplate how the SEP dot plot is interpreted. Even though we don't mean it as forward guidance, I think it's interpreted as forward guidance, and it's basically been forward misguidance for much of the past six years. And I actually think it's undermining us so that if we actually do want to send a signal to markets that this is what we're going to do and we're going to stick to it, our credibility is a little bit less than it would be if we had not been providing this misguidance. So I would encourage us to think about the SEP in this context.

Generally speaking, I think communicating in advance about these alternative policy tools, without binding ourselves necessarily, will be beneficial. I think it can add to our credibility when we actually turn to it, and it may build some political support if we've conditioned the public to these tools in advance.

I'm supportive of having a broader discussion of alternative strategies and frameworks, but I am cognizant of the political reality. At the end of the day, the public has to support us in whatever we choose to do. And if we haven't built that support in advance, we're not going to end up being effective.

I've said this previously—I don't think the public will support us raising the inflation target. I've heard so many people “push back” on our existing 2 percent target. I don't think raising the target is a credible alternative. That doesn't mean we shouldn't discuss it as a Committee, but that's a consideration that I'm going to have as we talk about it. Similarly,

something like a price-level target—I don't find it to be credible because I don't think we would actually live with the higher inflation that the price-level target might call for. We're going to be worried about nonlinearities and high asset prices, just as we are today, and I think we'll be more so if inflation were substantially higher. So I think it's worth talking about. But I don't find it credible, in view of our current concerns.

Something I do think would be interesting to analyze would be the Bank of Japan's policy, under which it's actively controlling the term premium. I think that could actually be very powerful, by controlling both the short end and the long end of the curve directly—again, not without political risk, but I think it should be on the table for consideration. But I'm supportive of having the discussion in a systematic way. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you, Mr. Chairman. Thank you to the staff for a really very helpful set of analyses.

The likelihood that we will see more frequent and prolonged episodes with the federal funds rate pinned at the lower bound has been a key consideration animating my policy views since shortly after I got here, as it appeared increasingly likely that the equilibrium interest rate would remain much lower than it was in the decades before the crisis. And, in fact, you can see that evolution of thinking, as distilled in the SEP. The median participant in the most recent SEP expected a longer-run federal funds rate of $2\frac{3}{4}$ percentage points, which is down sharply from the value that we saw just a few years ago, in 2012—the first time that these projections started to be collected—when that estimate was at $4\frac{1}{4}$ percent, which was close to the average value of $4\frac{1}{2}$ percent that we saw in the decades before the crisis. That is a large loss of policy space.

The low neutral rate limits the amount of space available for cutting the federal funds rate to buffer the economy and could be expected to increase the frequency or length of periods when the policy rate is pinned at the lower bound, unemployment is elevated, and inflation is below target. And in turn, those frequent or extended periods of low inflation run the risk of pulling down private-sector inflation expectations and further compressing policy space. That's a concern that was articulated also by Presidents Harker and Evans. That self-reinforcing downward spiral is extremely dangerous, as we have seen most vividly in Japan. Of course, in that specific case, there are some special factors at work, too.

In the U.S. context, the FOMC has cut the federal funds rate, on average, by about 450 basis points in response to recessions over the past several decades. Current estimates suggest that we now are likely to have a buffer of only 275 to, perhaps optimistically, 325 basis points in available conventional policy space—that is, assuming we get inflation expectations re-anchored at 2 percent.

If the frequency and severity of shocks are roughly in line with historical experience, this suggests more frequent and protracted episodes with the federal funds rate at the effective lower bound. And in the event of any erosion in inflation expectations associated with those episodes, that would further compromise our ability to use conventional tools alone. This conclusion is reinforced by the observation that fiscal policy has been playing a pro-cyclical role in recent years, placing a greater burden on monetary policy, and I think both Presidents Barkin and Rosengren observed also the likelihood of diminished fiscal policy space in the future.

The analysis presented by the staff demonstrates that threshold-based asset purchases can help improve the effectiveness of policy if the public anticipates quantitative easing or asset purchases will be triggered as soon as the lower bound is hit and maintained as an open

commitment until the thresholds are achieved. To me, this point bears highlighting. If, instead, as has been the case in every advanced economy that has employed some form of asset purchases, there is uncertainty in the mind of the public about what conditions might trigger asset purchases and how long the purchases would be sustained, this undercuts, I believe, the efficacy of the policy. And long delays in the deployment of such asset purchases, perhaps because of perceived political risks associated with expansion of the balance sheet, add further to the public's uncertainty.

All told, an inflation-thresholds-based combination policy along the lines suggested by the staff seems like a worthwhile approach to consider. But even under the very strong set of assumptions about the predictability and credibility of the threshold-based policy combining asset purchases with forward guidance, it's worth noting that the combined effects of these policies are relatively modest, as we were just shown.

For this reason, I believe it's prudent to cast our net more broadly as we consider the range of options for dealing with the possible loss of conventional policy space, including by looking carefully at lessons from other jurisdictions. In particular, I would recommend that the Committee undertake an analysis of temporary price-level targeting and related makeup policies that seek to make up for a protracted shortfall from our objectives during a lower-bound episode. The economic literature suggests that such policies can be particularly effective in addressing the lower-bound constraint, although these policies need to be credible and well anticipated in advance and implemented *ex post*.

In addition, I'd be interested in seeing some analysis of options that focus on targeting interest rates out the yield curve once the federal funds rate is pinned at the effective lower bound—perhaps along the lines that were suggested by Presidents Kashkari and maybe Bullard.

In contrast to quantitative approaches that are lumpy and target pre-specified quantities of purchases, progressive yield curve control policies would keep the focus on interest rates, our traditional policy instruments, and perhaps could be transitioned and ramped up and down in a more continuous manner. I would be very interested in analysis of how such a policy might be implemented, how it could be used in conjunction with forward guidance, and whether there would be differential implications for the size of the balance sheet as a result.

Finally, if indeed there is likely to be an enduring compression in the average size of our monetary policy buffer driven by an enduringly lower neutral rate, it would seem irresponsible not to at least consider the pros and cons of raising the inflation target to compensate by a modest amount. While I'd be disinclined to consider a move to a 4 percent target, I think it would be valuable to discuss the risks and advantages of considering a move to a more modest and perhaps more achievable range, perhaps around 3 percent.

Finally, I'd note that we were asked whether the Committee should evaluate alternative policy strategies, including ones that require changing the statement of longer-run goals. The answer to this seems relatively straightforward. By law, we're directed to achieve maximum employment and price stability. We should be prepared to evaluate whatever it takes within the range of permissible options to faithfully discharge our statutory responsibilities. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. Thank you very much. And thank you for a really—I'll go with Governor Quarles here—fascinating, I think is the word you used, round of comments. Really very interesting. And also thanks to the staff for a nicely done analysis, which suggests that we face a material risk of hitting the effective lower bound in a future downturn, with the probability as high as 50 percent over the next 10 years. This assessment

seems highly plausible to me, as it is corroborated by other research. Indeed, as long as nominal interest rates remain materially lower than pre-crisis levels, that result is quite intuitive. So it is wise to assume, for the purpose of this exercise, that nominal rates will remain low, that the ELB will be nearer, and that the possibility of returning to the ELB will be greater than in the past.

Indeed, the need to think ahead about our policy options when facing the ELB is self-evident. And, as I mentioned earlier, right now is the right time to do that, with the economy and labor market strong, inflation near our goal, and the risks roughly in balance.

I want to start by looking back at the Addendum to the Policy Normalization Principles and Plans that the Committee adopted at our June 2017 meeting, and I'll quote, "The Committee would be prepared to use its full range of tools, including altering the size and composition of its balance sheet, if future economic conditions were to warrant a more accommodative monetary policy than can be achieved solely by reducing the federal funds rate." In other words, we're prepared to use QE again, but only if rate policy isn't sufficient—that is, if we reach the ELB.

Let me now turn to some of the results reported in the staff memo. The simulations suggest that forward guidance and asset purchases can help speed up the recovery of the labor market and the return to 2 percent inflation if a serious recession does leave interest rate policy constrained by the effective lower bound, and that result is in keeping with the view that forward guidance and asset purchases were effective in supporting the economy as it struggled to recover.

Forward guidance reduced uncertainty and lowered the market's expectation of the likely path of our rates. Asset purchases depressed term premiums, perhaps working in practice if not quite in theory. Together, those two tools lowered rates and improved financial conditions, which supported economic activity, lowered the unemployment rate, and pushed inflation gradually higher. It's hard to say with any confidence the size of these effects, but I suspect that,

over time, they were meaningful. And there's good reason to think that forward guidance and LSAPs will be helpful again if the ELB becomes binding and we need them in the future.

During the recovery, we learned a great deal about how to use forward guidance and the balance sheet, and so did market participants. We are, of course, better positioned to deploy these tools expeditiously in a future downturn than we were in 2009 when they first needed to be created and then explained to the public. As Thomas said and others echoed around the table, a better understanding of our intentions to deploy these tools when we face the effective lower bound should enhance their effectiveness. In particular, the public now expects that we will deploy these tools again during ELB episodes, which is illustrated by results from the Desk surveys regarding the expected balance sheet size. Respondents now expect a markedly larger balance sheet in scenarios in which the ELB is binding. The resulting anticipation effects should provide further accommodation when the economy weakens. So the integration of the balance sheet into the macroeconomic model means that the staff analysis is now able to account for these effects, just as it has long done in the case of short-term interest rate policy.

The staff memo also shows, however, that forward guidance and asset purchases are not a panacea, as former Chairman Bernanke was fond of saying—and a sentiment that was also echoed very broadly around the table. During the long recovery, the combination of near-zero rates, forward guidance, and LSAPs supported a faster return to a healthy economy but, in the end, were not sufficient to offset all of the effects of the ELB. In view of the historically large size of the Global Financial Crisis, it was probably not reasonable to expect that they could have done so.

As with the crisis and its aftermath, the simulations illustrate that, even with rather aggressive reliance on forward guidance and asset purchases, we may not be able to make up

fully for the constraints imposed by the ELB. In addition, the most effective asset purchase program discussed in the memo’s recession scenario would bring the balance sheet to a size that is well outside our historical experience.

Finally, and as many of you noted, the effectiveness of both forward guidance and asset purchases would depend heavily on the Committee’s ability to make credible, multiyear commitments that would effectively constrain future Committees’ choices—a challenging assumption, for example, in the case in which the Committee undertakes to hold rates low even after unemployment moves below its long-run sustainable rate and inflation looks set to move above target.

To me, then, the main “takeaway” from the staff’s memo and presentation—and one that appears to be very generally shared around the table—is that, while our current toolkit remains a powerful one, it is prudent to explore ways in which to improve on it in order to enhance our ability to deal with severe downturns that threaten an extended stay at the ELB. And I look forward to our forthcoming discussions.

I do think there’s broad agreement to return to this discussion and to do so in a thoughtful, very carefully planned way that will allow essentially all other important “stakeholders” to have a chance to provide input. We need to be patient. We need to take our time in planning and in executing this because it really does go to the fundamentals of what we do, and I think we need to be mindful of the broader environment that we operate in.

Thank you. Let’s move to item 2, “Financial Developments and Open Market Operations,” and we’ll turn to Simon and Lorie for the Desk report.

MR. POTTER.² Thank you, Mr. Chairman. Trade tensions and foreign monetary policy developments, as well as continued strong growth momentum in the United States, were the major drivers of market developments over the intermeeting period.

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

In particular, developments related to perceived escalation in U.S. and China trade tensions stood out.

In the top-left panel of your first exhibit, you can see that on days over the intermeeting period on which market attention was focused on negative U.S. and China trade headlines, U.S. and Asian equity price indexes declined, with sectors most sensitive to trade, such as industrials, underperforming. These so-called trade-tension days have also generally coincided with declines in U.S. yields, measures of inflation compensation, and commodity prices and with relative dollar strength. However, over the intermeeting period as a whole, asset price moves have also been influenced by other factors, including strong U.S. earnings and divergent growth trajectories in the United States and abroad. These factors have contributed to the increases in the S&P 500 index and net increases in U.S. Treasury yields.

Market contacts generally note that a large degree of uncertainty remains about the future of U.S.–China trade relations, as well as U.S. trade agreements with its other major trading partners. Last week’s announcement by President Trump and European Commission President Juncker of agreement on a framework for resolving trade issues between the United States and the EU was cited as supporting modest equity and yield increases in the United States and Europe. However, a number of contacts focused on wording in the U.S.–EC statement that they viewed as increasing the likelihood of a more confrontational approach with China. Despite the focus on potential escalation with China, at this point in time, neither measures of option-implied skew nor overall implied volatility levels in the case of U.S. equities point to higher costs of protecting against adverse effects stemming from trade risks. In explaining this, some contacts have cited a reluctance to enter positions when so much uncertainty remains and there is such difficulty in accurately assessing political tail risks, as was demonstrated in the cases of the Brexit vote and the 2016 U.S. presidential election.

Analysis of the Desk’s policy survey results has been helpful in underscoring the uncertainty surrounding trade policy. The top-right panel shows the results of a natural language processing program run over the responses provided in comment boxes in the July surveys. Conditional on any two-word phrase appearing more than 10 times in the surveys, the panel shows the proportion of times with which that two-word combination appears in the same sentence as wording expressing uncertainty. As you can see in the results, references to “trade policy” had far and away the highest linkage to expressions of uncertainty, with “balance sheet” the second highest, a topic that will be discussed in further detail by Lorie.

Evolving developments in trade policy were the major focus of foreign exchange markets over the period, with the trade-weighted dollar rising roughly 1 percent. As indicated in the middle-left panel, the dollar appreciated against almost every currency in the index with the exception of the Mexican peso. The peso strengthened roughly 10 percent, reversing much of its weakness over the past two months, as contacts perceived a more moderate stance from the new Mexican administration on fiscal issues and NAFTA, and U.S. officials suggested an agreement on the latter

might soon be reached. Further, Banxico's June rate increase and heightened expectations of further policy firming have also been cited as contributing to the strength of the currency.

The other currency move that stands out is that of the Chinese RMB, which was by far the largest contributor to trade-weighted U.S. dollar appreciation over the intermeeting period, as shown in the dark blue bars. The RMB depreciated over 6 percent against the U.S. dollar and roughly 5 percent against the CFETS basket as trade tensions escalated, as shown in the middle-right panel. For context, the depreciation of the RMB was the largest absolute move over a seven-week period since the currency's de-pegging in 2005. While contacts viewed trade concerns as the primary driver, the announcement of monetary policy easing measures in China in the context of slowing credit growth and initial signs of weaker economic data were also cited as playing an important role.

With regard to the magnitude of the depreciation, contacts speculated that authorities were content to allow the market to direct the course of the RMB and that outright FX intervention by the PBOC was limited and not necessary to prevent even larger declines, unlike in 2015 and 2016, when \$1 trillion of reserves and enhanced capital controls were used to stabilize the exchange rate. Contacts do seem to have taken comfort, however, from the belief that the PBOC undertook signaling efforts to moderate the pace of recent depreciation, including reassurances by the PBOC governor in early July that the authorities were not targeting a weaker currency. In another example of such signaling, a number of contacts also noted that the PBOC set the daily fixing rate at slightly stronger levels than certain model estimates would suggest, in contrast with a pattern of weaker fixes earlier in the year.

Levels of implied volatility on the dollar–RMB currency pair have risen to levels only notably surpassed in the period immediately following the August 2015 devaluation. And dollar–RMB risk reversals have risen markedly since mid-June, indicating the cost of protection against further RMB depreciation has increased relative to the cost of protection against appreciation. However, these latter measures remain well below levels seen in 2015 and 2016. Indeed, most market participants do not seem overly concerned that the recent RMB depreciation might indicate much more to come, in contrast to the situation after August 2015 and January 2016. Reasons cited for this confidence include a more clearly communicated and better understood PBOC FX framework, a somewhat less fragile financial system following the government's deleveraging campaign, and a more robust global economic backdrop.

That said, some market participants have noted a growing tail risk of rapid escalation of trade tensions between the United States and China that could result in a much more meaningful move in prices. A number of market participants have pointed to the inability of China to match the United States in the amount of goods on which to levy tariffs and noted that nontariff retaliatory measures could affect U.S. firms operating in China. Other potential retaliatory measures could involve exchange rate policy or China's portfolio of foreign assets. Though market contacts

view this scenario as highly unlikely, considering that it could impose high costs on China itself, including sharply increased capital outflow pressures, it is one that would affect global markets very significantly. The combination of negative growth effects of escalating trade tensions, alongside a return to increasing leverage that could stem from policy easing, also increases the chance of a hard landing in China, which would have global consequences. Steve will discuss these issues further in his briefing.

Turning away from China, developments with regard to major advanced-economy central banks were cited as driving moves in sovereign yield curves. Net moves in German, Japanese, and U.S. sovereign yields over the intermeeting period are displayed in the bottom-left panel. Specifically, the ECB's introduction at its June policy meeting of new forward guidance on its asset purchase program and policy rate path drove declines in German and other European yields. Separately, the Japanese sovereign yield curve steepened following reports that the Bank of Japan may adjust its operating framework to facilitate an increase in longer-term interest rates. Today the Bank of Japan announced some tweaks to its operating framework along with new forward guidance on its policy rates.

These developments affected U.S. Treasuries as well, with yields declining modestly on the day of the ECB announcement and increasing, particularly in longer-dated tenors, following the initial reports about changes to the Bank of Japan's framework. The steepening in U.S. yields that was observed following the speculative reports on the Bank of Japan was in contrast to the flattening in the U.S. yield curve that continued over the intermeeting period. In explaining the moves higher in shorter-dated yields over the period, contacts pointed to expectations for continued policy rate normalization in the United States. Contacts cited escalating trade tensions as keeping longer-dated yields lower, though structural factors such as increased demand from liability-driven investors also reportedly continued to put downward pressure on yields further out the curve. TIPS-implied breakevens were little changed in longer-dated tenors, although they narrowed more significantly in shorter-dated tenors, despite rising trade tensions. Contacts attributed the narrowing in shorter-dated breakevens to lower oil prices, a view that the inflationary pass-through of higher tariffs may be limited, and a decline in risk sentiment on trade-tension days.

As shown in the bottom-right panel, near-term U.S. monetary policy expectations were little changed over the intermeeting period. No rate hike is expected at this meeting, though roughly 95 percent of a 25 basis point rate hike is priced in at the September meeting, with 40 basis points of tightening priced in by the end of the year. Despite the focus on intensifying trade frictions, responses to the Desk's July surveys did not indicate that the escalation had a material effect on respondents' expectations for monetary policy, nor did they indicate that recent comments by President Trump on interest rate policy had affected their views on the likely path of policy. And broader market commentary was consistent with the view that the comments would have no material effect on the Committee's reaction function.

Market participants were attentive to the announcement by the Chairman in the June press conference that, starting in January of next year, press conferences would be held following every meeting. Including the earlier press reports of such a change, the implied federal funds rate path in 2019 became a little smoother in response. Lorie will continue the briefing.

MS. LOGAN. Thank you, Simon. I'll begin on exhibit 2 and review recent developments in the federal funds market and our assessment of those developments, and then conclude with a few operational updates.

As discussed in the staff memo, the technical adjustment to interest on reserves was effective in moving the effective federal funds rate lower in the target range. As shown in the top-left panel, the effective federal funds rate increased 20 basis points to 1.9 percent, in line with the 20 basis point increase in IOR. Other overnight rates also rose about 20 basis points, and, as I'll discuss in more detail, market participants appear to have adjusted their expectations of both unsecured and secured rates relative to the target range in response to the technical adjustment. All of these developments suggest that the current operating regime and tools remain highly effective at controlling short-term interest rates.

In the days following the technical adjustment, as shown in the same panel, the effective federal funds rate unexpectedly rose 2 basis points to 1.92 percent, narrowing the spread to IOR to just 3 basis points. It stayed at this level for a week before declining to 1.91 percent, where it remains now.

The rising effective federal funds rate received significant attention, likely because some market commentators suggested that it may have been a result of declining reserve balances—in other words, early evidence of reserve scarcity. However, the staff's assessment, formed with the benefit of some hindsight, is that the firmness was driven by temporary factors specific to the federal funds market.

In particular, we saw greater demand to borrow federal funds from a few banks that were temporarily willing to pay up to borrow from the FHLBs because this source of funding has favorable treatment under the LCR. At the same time, we observed a lower supply of lending in the funds market from FHLBs. Taken together, we saw a decline in federal funds volumes, as shown by the height of the bars declining on the left-hand side of the top-right panel, and a shift upward in the distribution of traded rates, shown by the red portions shrinking and the gray portions growing. Notably, you can see that a very small change in trading activity could have resulted in the effective federal funds rate coming in at a higher level, on account of the thin volumes at and above the median rate.

Meanwhile, as illustrated in the right-hand side of the panel, the distribution of Eurodollar volumes by rate was much more stable over this period, reinforcing our view that the developments in federal funds were related to factors specific to that market. Recall that FHLBs are the dominant lenders in the federal funds market, in

contrast to the Eurodollar market, in which the majority of lending is by firms whose loans do not provide borrowers favorable LCR treatment.

The factors driving these developments in June were difficult to assess quickly but became clearer in the subsequent days. The experience underscores the challenge that we face in understanding and interpreting market developments during this period of declining reserves. In particular, distinguishing in real time between market developments that are transitory or specific to particular market segments versus those that reflect a growing scarcity of reserve balances will be difficult.

Looking forward, to understand how market participants expect key overnight rates to evolve, we asked respondents to the Desk's surveys to provide their forecasts through the end of 2019 for the spread between the effective federal funds rate and IOER, between IOER and the top of the target range, and between the triparty repo rate and the overnight RRP offering rate. The middle-left panel summarizes some of the key findings.

Respondents expect the effective federal funds rate to continue to narrow to IOER, as demonstrated by the gray line approaching the dark blue line. Relative to May, when we last asked about the spread between the effective federal funds rate and IOER, respondents now expect it to narrow a little further over the forecast horizon. Nonetheless, they expect the effective federal funds rate to remain within the target range throughout the period. This is due in part to the fact that most respondents anticipate at least one further technical adjustment by the middle of next year. As shown by the dark blue line, the median indicates an expectation regarding the IOER rate to be 10 basis points below the top of the target range in June of next year.

Respondents also marked down the expected spread of market repo rates over the overnight RRP rate by about 5 basis points since May, but, as shown by the green dashes, the median expectation is that the repo spread will not change further between now and the end of 2019. This appears consistent with a view that further technical adjustments to IOR will also pass through to the repo market and offset any upward pressure that might be expected.

In the surveys, we also asked respondents to rate the importance of factors influencing the spread between the effective federal funds rate and IOER through the remainder of this year and in 2019. The median responses are shown in the middle-right panel. Similar to May, respondents rated Treasury security supply dynamics, the light blue bars, and changes in reserve balances, the dark blue bars, as the most important factors. However, looking ahead, market participants expect reserve balances to become a more important factor in 2019, with the median survey respondent assigning this factor the highest rating.

Survey respondents were also asked to forecast the spread between the effective federal funds rate and IOER conditional on various reserve balance levels. Since May, nearly all respondents raised their expected level of the effective federal funds

rate relative to IOER in each reserve balance scenario. As shown by the diamonds in the bottom-left panel, the median expectations for the spread in lower reserve balance scenarios rose considerably. Furthermore, although the median respondent expected the effective federal funds rate to equal IOER at a level of \$500 billion in reserves in May, the median expectation is now that these rates will converge when reserves total between \$1 trillion and \$1.25 trillion. In order to provide context, in the bottom-right panel, we project reserve balances to reach these levels in the second half of next year. These levels, along with the associated survey median spread between the effective federal funds rate and IOER, are highlighted by the dashed lines.

Broadly, I'd say the results from the Desk surveys are consistent with the staff's assessment that a variety of factors will likely exert further upward pressure on the effective federal funds rate toward the IOR rate in the coming quarters.

Like the survey respondents, the staff expects that reserve levels should become an increasingly important factor in firming rates. As can be seen in the staff projections of reserve balances, the decline in reserves accelerates once the redemption caps reach their maximum levels, with reserves falling at a pace of roughly \$50 billion per month, owing both to ongoing portfolio runoff and the expected growth of nonreserve liability items.

Similarly, the staff also expects the supply of Treasury securities to exert some upward pressure on bill and repo rates, and thus the effective federal funds rate, over the rest of 2018, though perhaps not to the extent observed earlier in the year when net Treasury bill issuance exceeded \$300 billion. As shown in the top-left panel of your third exhibit, the amount of Treasury bills outstanding is projected to fluctuate over the remainder of this year, with supply increasing about \$75 billion, on net, in the fourth quarter.

One factor that the staff discussed in the memo that was not reflected by respondents in the Desk survey relates to expected changes to the FHLBs' liquidity portfolios. First, the FHFA, which regulates the FHLBs, has informed us confidentially of its plans to increase the amount of liquidity that FHLBs are required to maintain and to allow them to make a broader range of investments. This change could have countervailing effects on federal funds volumes and the effective federal funds rate. Second, prompted by higher repo rates, the FHLBs recently began investigating options for further increasing their capacity to lend in repo, including arrangements that would meet their early-day liquidity needs, similar to federal funds. While it is difficult to anticipate the full effects of these two changes, on the margin, they introduce a greater risk of structural shifts in the federal funds market that could lead to lower volumes and put upward pressure on the effective federal funds rate.

The staff will continue closely monitoring money market developments for any signs of changes that could have implications for policy implementation. At some point, an additional technical adjustment to IOR within the target range may be needed. But the staff does not anticipate that this will be the case soon. While new risks may emerge, those related to lower volumes in the federal funds market

stemming from a significant shift in FHLB liquidity management have been presented previously. Indeed, the OBFR, which is the broad measure of overnight unsecured activity that captures both federal funds and Eurodollar transactions, has been identified in past work as a potential backup rate to the effective federal funds rate. The OBFR has, to date, been highly correlated with the effective federal funds rate and, as shown in the top-right panel, is based on sizable volumes from a more diverse set of participants, suggesting that it could be a good alternative policy rate. However, there are various legal, operational, and communications matters that would need to be fully understood in order to assess accurately the implications of a change like this should it be needed.

That said, we have been working on further enhancing the data collection for the production of the OBFR. Recall that in 2016, we highlighted the fact that a few large Eurodollar borrowers changed the way some of their overnight wholesale borrowing activity is booked, from offshore to onshore branches. Earlier this year, another Eurodollar borrower reported onshoring such activity. As you can see in the dark blue area, the Eurodollar volumes underlying the OBFR have fallen, in some part related to these changes. A *Federal Register* notice was issued in mid-May to provide revised reporting instructions to capture this activity. We expect that a final notice will be published during the upcoming intermeeting period, with the reporting change to be implemented in October and the expanded data set added to the OBFR in mid-to-late 2019.

I'll conclude with a few operational updates. As shown in the middle-left panel, overnight RRP take-up remained low. Market participants continue to cite the availability of alternative investments at more attractive rates as the principal driver of low take-up.

Regarding the middle-right panel, staff projections continue to indicate that principal payments received from agency MBS holdings will fall below the redemption cap and that reinvestment purchases will cease in October. As discussed at the June meeting, after SOMA MBS principal receipts fall below the cap, the Desk will conduct monthly small-value purchases of up to \$300 million. In order to communicate these plans, we intend to publish a Desk statement and FAQs in mid-September.

Around this time, the Desk also intends to communicate plans with respect to the FHFA's Single Security Initiative, which is expected to be implemented in June 2019 and result in new trading conventions in the agency MBS TBA market. Most agency MBS are traded in the TBA market, in which the seller decides which securities to deliver to the buyer just before settlement, rather than at the time of the trade. This market currently features separate contracts for MBS issued by Fannie Mae and Freddie Mac. The Single Security Initiative will allow Fannie and Freddie MBS to be deliverable into a new common TBA contract called Uniform MBS, which the FHFA expects will save taxpayer money by eliminating inefficient origination costs and enhance overall market liquidity. Absent any objections from the Committee, the Desk would communicate its plans to be operationally ready to transact in UMBS and

would indicate that it may convert some of the SOMA's existing holdings—specifically, Freddie Mac securities—where appropriate, to align with UMBS for operational efficiency. In advance of any announcement, we will circulate a memo describing these details.

Lastly, the Desk plans to test Treasury bill operations in the coming weeks. The purchase operation is anticipated for August 16. The Desk will then conduct tests of rollovers and sales of bills and allow some of the purchased securities to mature. The timing of these subsequent tests will depend on the maturity of the securities purchased. While the exercises are consistent with standard practices, they may generate attention, as the Desk has not purchased bills since 2006 as well as the increased focus on declining reserve balances.

As usual, the appendix contains a list of all of the small-value exercises conducted over the intermeeting period, along with a list of upcoming exercises. Thank you, Mr. Chairman. We would be happy to take any questions.

CHAIRMAN POWELL. Thank you. Questions for Simon and Lorie? President George.

MS. GEORGE. Lorie, you mentioned the FHLB liquidity requirements. What is the expected implementation time frame for that?

MS. LOGAN. I think the information that we've received is that they would need to be compliant by the end of 2019. I think they may start making adjustments either in advance or in the early part of 2019, so we might start to see some of those developments. But I think the expectation is to be finished by the end of 2019.

MS. GEORGE. Thank you.

CHAIRMAN POWELL. Other questions for Simon and Lorie? If not, I suggest that we break—oh, sorry.

VICE CHAIRMAN WILLIAMS. This is my big role.

CHAIRMAN POWELL. Your big role. Okay. Before we break for lunch, we need a vote to ratify the domestic open market operations conducted since the June meeting. Do I have a motion to approve?

VICE CHAIRMAN WILLIAMS. So moved.

CHAIRMAN POWELL. All in favor? [Chorus of ayes] Thank you. And now we break for lunch. And why don't we come back at 10 minutes of 1:00, if we could. Thanks very much.

[Lunch break]

CHAIRMAN POWELL. Okay. Let's now turn to the review of economic and financial developments, including financial stability. David Wilcox, over to you.

MR. WILCOX.³ Thank you, Mr. Chair. I'll be referring to the materials titled "Material for Briefing on the U.S. Outlook." In order to deal with the incipient risk that "Miller Time" might otherwise come at about 10 minutes to 3:00, I've quadrupled the length of my prepared remarks. [Laughter]

We continue to assess that the economy is operating somewhat beyond its sustainable level and is likely to move further beyond it during the next couple of years. As a whole, the data that have become available since the June Tealbook have been a little stronger in this regard than we expected. The latest real GDP data have far exceeded our expectation. The BEA currently estimates that real GDP increased about 4 percent at an annual rate in the second quarter—the blue dot in panel 1 of your first exhibit— $\frac{3}{4}$ percentage point above our June forecast. However, a large portion of the upward surprise was in net exports, and we expect much of the bump from that source to be unwound over the second half of the year. For 2018 as a whole, our forecast of real GDP growth is 3 percent, 0.2 percentage point higher than in June. I should note that Friday's historical revisions to real GDP growth, which are not folded into this exhibit, were relatively small and likely will have only minor implications for our projection.

The June employment report pointed to a continued strengthening in labor market conditions that also was broadly in line with our expectations. The June data on payroll employment came in a little stronger than we had expected. Panel 2 plots the BLS's estimate of private payroll gains, the red line, along with an estimate that we construct using ADP's payroll processing data, the black line. A statistical exercise that combines both of these pieces of information yields an estimate of June private payroll gains of 220,000, the blue line, that is well in excess of the pace that we judge to be consistent with no change in resource utilization. I am inordinately proud, by the way, of the ADP franchise, so if any of you have questions on that, I would especially welcome those. [Laughter]

We receive the July employment report this coming Friday. The ADP data that are available thus far—through the first three weeks of the month—suggest that private-sector hiring remained solid, with a point estimate for an increase of another

³ The materials used by Mr. Wilcox are appended to this transcript (appendix 3).

200,000 in July. In the survey of households, the unemployment rate increased two-tenths in June to 4 percent, rather than edging down as we had expected. However, the June increase reflected a jump in the number of people entering the labor force that also resulted in an unexpected rise in the participation rate. Together, the unemployment and LFPR surprises added up to an employment-to-population ratio that was in line with our June Tealbook projection.

Putting all this information together, and as shown in panel 3, we estimated in the July Tealbook that the output gap, the black line, had increased to 2 percent in the second quarter. We derived this estimate of the output gap by judgmentally synthesizing a wide range of information bearing on resource utilization, including data on spending and production, labor market conditions, and inflation. Our judgmental estimate is also informed by results from a set of models that estimate the output gap using similar sorts of data. The output gap estimate from our currently preferred model of this type is given by the blue line in panel 3. Broadly, the model concurs that economic activity is running modestly above its sustainable level at present. Although the model currently estimates the output gap to be slightly narrower than does the staff, the staff's judgmental estimate lies well within the model's 70 percent confidence interval. Like our judgmental estimate, the model's view of the current level of the output gap has changed little in response to the data that became available between the June and July Tealbooks.

Panel 4 provides a different perspective on resource utilization—and over a longer period—by plotting the actual unemployment rate, the black line, together with our judgmental estimate of its natural rate, the green line, and the natural rate estimate from the same statistical model used in the preceding panel, the blue line. The contour and current level of the two natural rate estimates are similar, with both implying that the natural rate has drifted lower as the labor market has continued to improve. Currently, the actual unemployment rate is close to the lower end of the model's 70 percent confidence interval for the natural rate, the blue shaded region. I would note, by the way, that the model does incorporate a Phillips curve, so along with all of the other information that it's factoring in, it does attempt to make sense of the incoming data on price inflation.

We continue to anticipate that real output will rise faster than potential through 2019; in 2020, we expect output growth to slow to a pace about in line with its potential, partly because our baseline forecast continues to assume that the stance of policy will shift from accommodative to somewhat restrictive, and partly because some supply constraints emerge. The unemployment rate—the black line in panel 5—is expected to reach 3½ percent by the middle of next year and then to remain at that level, which is 1¼ percentage points below our estimate of its natural rate, over the remainder of the medium term.

As shown in panel 6, the continued improvement in labor market conditions has been broadly shared across racial and ethnic groups. At present, the three-month moving-average unemployment rate for each group lies at or below the lows that were achieved during the previous expansion. In the case of African Americans, the

comparison to their experience just before the Great Recession is quite striking. The quarterly average unemployment rate for African Americans in the second quarter of this year was 6.3 percent. On the eve of the financial crisis, the lowest quarterly average rate attained by that group was 7.9 percent. This result reflects a continuation of the high-beta phenomenon that I have described previously to this Committee. Over the most recent four quarters, the unemployment rate for Asians declined 0.4 percentage point relative to the comparable period four quarters earlier, the rate for whites declined 0.5 percentage point, the rate for Hispanics declined 0.6 percentage point, and the rate for blacks declined 1 full percentage point. Nonetheless, as is all too evident from the chart, the relative positioning of the unemployment rates remains stubbornly entrenched, with the unemployment rate for blacks averaging $2\frac{3}{4}$ percentage points more than the rate for whites in the second quarter of this year. In addition, it seems that there is every reason to believe that when the next recession hits, the differential between unemployment rates will widen back out again.

On the next page of exhibits, panel 7 shows three measures of labor compensation growth that we follow. I've omitted the measure of comp per hour that is published in the Productivity and Costs release because we don't yet have updated data reflecting last week's comprehensive revision of the national income and product accounts. We tend to put the most weight on the ECI, the black line, in part because it's less noisy than the other measures. This morning, the ECI for June was published, and it implied a 12-month change of 2.9 percent, right on our forecast. We continue to see the recent behavior of the ECI as broadly consistent with an increasingly tight labor market, relatively well-anchored inflation expectations, and the lackluster productivity gains seen in recent years. Because compensation growth has continued to attract a lot of attention, I've updated in panel 8 a decomposition of compensation growth that we've shown several times in the past. This decomposition is based on a relatively standard wage Phillips curve model in which nominal ECI growth is related to long-run expected price inflation, trend productivity growth, and labor market slack. The twist this time around is that we estimated the coefficients of the model using only data through 2009, so I haven't "stacked the deck" as much as usual by letting the model know about how compensation would evolve during the current expansion period. According to the model, the downward pressure on nominal wage growth that has resulted from slack conditions in the labor market—the gray bars—has steadily diminished as the labor market has tightened. However, that boost to wage growth has been largely offset by a deceleration in trend productivity, the red bars, that has yielded only a small net increase in hourly compensation growth over this period. These results underscore all over again the urgency of reviving U.S. productivity growth.

This morning we also received the BEA's estimate of PCE prices through June. Over the 12 months ending in June, top-line PCE prices increased 2.2 percent, and core prices rose 1.9 percent. The estimate for core inflation was in line with our July Tealbook estimate, which is shown in panel 9; the data shown in the exhibit again do not reflect this morning's release or last week's historical revisions. The estimate for top-line inflation rounded to one-tenth below our forecast; however, on an unrounded basis, the shortfall was only 3 basis points.

We are still very much in the process of reviewing the implications of the annual revisions for the inflation outlook. On the whole, those implications look likely to be small, with the most notable exception being some hints that the BEA may have succeeded in reducing the residual seasonality that had caused inflation rates early in the year to run a little higher than average. Looking ahead, we expect the 12-month change in the core index, the red line, to remain at or slightly under 2 percent through the end of this year; by that time, total PCE inflation, the black line, is projected to be running at about the same rate as the core after having been temporarily boosted by gains in consumer energy prices.

Finally, our medium-term inflation outlook—summarized in panels 10 and 11—is essentially unrevised relative to June. In particular, by 2020, core inflation is projected to reach 2.1 percent as resource utilization tightens further and trend inflation drifts slightly higher. Total PCE price inflation is expected to run one-tenth below core inflation in 2019 and 2020 as a modest projected decline in oil prices over the medium term feeds through to consumer energy prices. Steve will continue our presentation.

MR. KAMIN.⁴ Thank you, David. I'll be referring to the materials titled "Material for Briefing on the International Outlook." Like thousands of other Washingtonians, I spent a week at the beach earlier this month. While sitting on the sand and watching the people go by, my pallid skin slathered in number 70 sunblock, I mused about how one might identify the Federal Reserve economist in the crowd. Certainly, one giveaway might be reading this five-pound, 800-page tome, *Clashing over Commerce: A History of U.S. Trade Policy*. [Holds up book] But, in my defense, the book was written by a former member of the Division of International Finance, Doug Irwin, who left here in 1991, I suspect, because there wasn't enough going on to keep a trade economist occupied. [Laughter] Those times have changed. And I found the book, especially the chapter on the 1930 Smoot-Hawley tariff, to be a great way to put the current trade issues in perspective.

Regarding slide 1 of the exhibits, most people's recollection from their high school U.S. history class is that the Smoot-Hawley bill resulted in a massive hike in import tariffs that helped deepen the Great Depression. But it turns out the bill boosted average U.S. tariff rates by only about 2 percentage points. Most of the upswing in tariffs between 1929 and 1933 reflected the general price deflation of this period. Because many of the tariffs were expressed in dollars and cents rather than as a share of the value of imports, declines in import prices ended up boosting the ratio of tariffs to import values. In fact, the consensus among researchers now seems to downplay considerably the role of the Smoot-Hawley bill in causing the Great Depression in comparison with other factors, including the monetary policy decisions made by your predecessors nearly 90 years ago.

By comparison with Smoot-Hawley, the tariff hikes being contemplated today are both larger and, with the greater openness of our economy, potentially more

⁴ The materials used by Mr. Kamin are appended to this transcript (appendix 4).

consequential. As shown in the upper-left panel of slide 2, since the Great Depression, average U.S. tariff levels have fallen to nearly rock-bottom levels. The indiscernible rise in the tariff rate for 2018, shown by the blue dot, represents the tariff hikes implemented so far this year. As shown by the blue wedges in the pie chart on the right, they apply to only \$83 billion in imports, or less than 4 percent of total merchandise imports. But were all the tariffs both implemented and proposed by the Administration to go into effect—both the blue and red wedges in the pie chart—this would boost average tariffs about 5 percentage points, as indicated by the red dashed line on the left. This would eclipse the 2 percentage point hike in the Smoot-Hawley bill, although the level of tariff rates would still fall well short of its peak in the 1930s. Finally, the Tealbook describes an alternative scenario in which tariff rates on all merchandise imports are boosted 15 percentage points, the green dotted line on that chart. In this instance, the average tariff rate rises back to its level in the 1930s.

Your next slide examines the prospective effect of these tariff hikes on U.S. economic activity as measured by GEMUS, one of our DSGE models, assuming that our trading partners retaliate by imposing proportionate tariffs on U.S. exports. The aggregate effect of the tariff hikes implemented thus far is minimal. Were all of the tariff hikes being contemplated to go into effect, the effect would be material, at nearly 1 percent on the level of GDP, but hardly catastrophic. One reason that recent tariff announcements have engendered so much angst is that they highlight the risk of more expansive actions, such as the 15 percent hike on all merchandise imports described in the Tealbook—indeed, this lowers real GDP by a much more consequential 4 percent after two years.

Another reason for the anxiety about tariff hikes is that their effect is so uncertain. The 4 percent decline in GDP shown here reflects various factors, including the effect of higher costs and lower profits on corporate investment, reduced household spending as real disposable income declines, monetary tightening in response to higher inflation, and losses in productive efficiency as the economy increases output of goods in which we have less comparative advantage. But because we have such limited experience of such large hikes in tariffs and the structural transformations they might trigger, there's no good way to check the model results against historical experience. Finally, a critical factor is not modeled at all: disruptions to global supply chains. All told, our guess is that the Tealbook simulation may understate the effects of such a large tariff hike, but we can hardly be sure of that.

Now, before we get too carried away, I stress that this is all very speculative. Most recently, the Administration and the European Union have agreed to hold off on any additional tariff hikes pending further negotiations, and there is also greater optimism that a deal on NAFTA may soon be struck. Thus, trade policies might well end up in a better place than many have feared. But the uncertainties remain profound, especially because there are no signs of any easing of trade tensions with China.

Because of these uncertainties, in the baseline Tealbook forecast, we are building in only those trade actions that have already been implemented. Accordingly, our foreign economic outlook, as shown on your next slide, is quite benign. We estimate that real GDP growth in the advanced foreign economies, or AFEs, bounced back in the second quarter from the transitory weakness in the first, while the EMEs slowed following unsustainably brisk expansion earlier. In the period ahead, aggregate foreign growth holds up around its trend pace.

Your next slide focuses more closely on the AFEs. Much has been made of the weakening tone of the data we've been receiving in recent months, and, as shown on the left, the black line indicates that we've indeed been revising down our forecast for growth in 2018. However, the markdowns have been quite small, totaling only about $\frac{1}{4}$ percentage point, and the PMIs and monthly activity indicators for the region are still pretty solid. Accordingly, the forecasts for GDP growth in 2019 and 2020, the red and blue lines, have been little changed. On the right, our forecast model of recession probabilities in the AFEs, obtained using economic activity data and financial stress measures, is not showing much indication of imminent slowdown.

Your next slide focuses on an alternative signal of oncoming recession that you've discussed extensively in recent meetings—the slope of the yield curve. A standard measure of the long-term spread—10-year minus 2-year yields—has often inverted in the AFEs before recession, as in the United States. But also as in the United States, most of these spreads are close to inverting again. But we doubt that this is a strong indication that an economic slowdown abroad is becoming more likely. First, as Viktors Stebunovs described in his pre-FOMC briefing last week, the term spread is a less reliable predictor of recessions in foreign economies than it is in the United States. Second, recent spreads are likely being depressed by QE and heightened demand for safe assets. These developments have probably reduced the term premium and thus affected the ability of yield curves to predict recessions, although we acknowledge that the jury is still out on this point.

To abstract from issues associated with the term premium, your next slide presents a near-term slope calculation—measured over the next six quarters or so—that is similar to the one described for the United States in a box in the June Tealbook. These spreads are lower for the AFEs than for the United States, because the Committee is expected to continue raising rates for some time, whereas the pace of tightening abroad is expected to be considerably slower. Does this mean that a recession is more likely abroad than in the United States? That's not clear. On the one hand, to the extent that slower tightening abroad reflects weaker economic momentum, it could indeed be the case that the foreign expansion is more fragile. On the other hand, the delay in, or slow pace of, tightening by some foreign central banks, especially those of Japan and the euro area, may be a response to low inflation rather than weak economic activity—in which case the low term spread may not be all that predictive of future downturns.

For now, we are putting our money on the second interpretation, but we're hardly sanguine about the outlook for the AFEs. There is still a good chance that the Italian

government could shake things up in the euro area, and Brexit will continue to churn long after the sun has cooled and humanity has migrated in spaceships to another galaxy. [Laughter] But the headline risks seem, indeed, more prominent for the emerging market economies. One of these, discussed in your next slide, is that rising U.S. interest rates will interact with high debt levels and structural vulnerabilities to trigger a widespread EME financial crisis. As shown on the left, there are some signs that the most recent bout of emerging market stresses is easing—capital outflows have slowed, and EMBI spreads have moved down. But if the staff forecast materializes, both interest rates and the dollar have further to rise, and this could lead to renewed pressures down the road.

The other big risk for EMEs, addressed in your next slide, was discussed in a chapter of the latest QS report on financial stability: a financial crisis in China. By tightening monetary policy and cracking down on shadow banking over the past year and a half, the authorities have managed to curtail the explosive growth of corporate credit. However, although the government now seems to be easing up a bit in the face of weakening demand, the risk remains that economic growth could slow too quickly and trigger the very crisis the authorities sought to forestall. In early 2016, worries about a Chinese hard landing were enough to roil global financial markets, helping to tighten U.S. financial conditions enough to delay an expected increase in the federal funds rate. Were an actual crisis to emerge in China, the effect on U.S. markets and economic activity would almost certainly be quite substantial, although we judge the U.S. financial system as sufficiently resilient to be able to weather the storm. Rochelle will now continue our presentation.

MS. EDGE.⁵ Thank you. I will be referring to the materials titled “Material for Briefing on Financial Stability Developments.” We continue to judge that adverse shocks to the U.S. economy would likely be intensified by the financial system by an amount about in line with normal experience. This assessment reflects current elevated asset valuations, moderate household and business debt loads, strongly capitalized financial institutions, and low levels of vulnerabilities stemming from maturity and liquidity transformation.

The upper-left panel of your first exhibit plots a composite index that summarizes asset valuation pressures and risk appetite for a number of markets, including equities, corporate debt, and residential and commercial real estate. We estimate that in the second quarter, this index exceeded the 90th percentile of its historical distribution, with no component below its median.

Regarding specific markets, house prices have accelerated over the past year and, as shown in the upper-right panel by the black line, the aggregate house price-to-rent ratio has similarly increased. A measure of overvaluation—which controls for the long-run trend in this ratio and would therefore be the difference between the black

⁵ The materials used by Ms. Edge are appended to this transcript (appendix 5).

and red lines—lies well below its level before the crisis but is approaching levels reached in the housing cycle peaks of the late 1970s and 1980s.

The middle-left panel reports capitalization rates—that is, the ratio of a property’s annual net operating income to its price—on recently transacted commercial real estate properties. Most of these rates have continued to trend down—indicating increased valuation pressures—as property prices have risen further while rent growth has remained slow.

In equity and corporate bond markets—not shown—valuations remain high, but they have not stretched further since our last assessment. In leveraged loan markets, valuation pressures have continued to increase, mainly as a result of easier nonprice terms. That is, although spreads on new issues of leveraged loans have largely been little changed, borrowers have become riskier and underwriting standards weaker.

As shown in the middle-right panel—and by the sum of the blue areas in each column—relative to last year, a slightly higher percentage of respondents to the July Senior Loan Officer Opinion Survey on Bank Lending Practices reported that their bank’s standards were currently easier than the midpoint of their range since 2005. Additionally, the percentage that saw standards as currently being at their easiest—the dark blue area of the rightmost bar—was notably higher than last year and rivaled levels reached in 2014, when excesses in this sector last appeared to peak.

The lower panels consider leverage in the nonfinancial sector, starting with the business sector, in which leverage—not shown—has been high, particularly in the case of risky firms. Net debt issuance by these firms, shown by the black line in the lower-left panel, moved sideways in the second quarter after increasing steadily before. Leveraged loan issuance, the blue portions of these bars, has continued to account for all of the net issuance, while risky bond net issuance, the green portions, has remained negative. This divergence in risky loan and bond issuance reportedly reflects the floating-rate nature of loans and investors’ demand for such instruments in the rising rate environment.

The lower-right panel reports real household debt balances for borrowers grouped by credit score. Balances for borrowers with prime credit scores, the blue line, continued to increase in the first quarter, with balances reaching previous peak levels. In contrast, balances for borrowers with near-prime and subprime credit scores remained at low levels, comparable with those in the early 2000s. Because borrowers with prime credit scores, and historically high repayment rates, have been accounting for an increasing share of household debt, we view the credit quality of household debt as being solid. In the stress-test analyses reported in the special topic memo on household leverage, this compositional shift is the main reason why household debt default rates—under adverse economic conditions—rise to lower levels than in previous years. That said, under such adverse conditions, defaults are still expected to increase substantially, which leads to our overall “low to moderate” assessment of the vulnerabilities associated with household leverage.

Your next exhibit considers vulnerabilities in the financial sector, starting with insights on banking-sector leverage gathered from the Federal Reserve Board's annual supervisory stress tests. Considering first the scenarios, the upper-left panel reports the maximum changes for the unemployment rate, the black line, and commercial real estate prices, the red line, in the severely adverse scenario for each stress-test round, starting with the 2014 exercise. Reflecting the scenario design framework in which stresses increase as the economy improves, this year's scenario featured a more sizable increase in the unemployment rate. Additionally, reflecting the assumption of a major unwind of current stretched valuations—like those I discussed in exhibit 1—this year's scenario featured more sizable declines in asset prices. The scenario also featured a steepening of the yield curve resulting from a decline in short-term interest rates.

The upper-right panel shows selected results from the 2018 and recent years' stress tests, broken out for large internationally active banks and other CCAR banks. This year's scenario led to larger projected losses—the orange bars—reversing the trend of decreasing losses seen in previous years. The scenario's steeper yield curve boosted net interest margins and, thereby, pre-provision net revenue, the green bars, which offset some of the scenario's effect on banks' pretax net income, the purple line. However, because long-term Treasury yields did not fall in the scenario, large banks saw larger mark-to-market losses on securities, which flowed through to capital via the accounting concept known as “accumulated other comprehensive income,” or AOCI—the red bars. The 2018 stress tests implied sizable declines in bank capital. However, reflecting banks' current high levels of capital, banks—even after enduring the stress tests' severe scenario—appeared to remain strong enough to continue lending.

Regarding other entities, leverage appears moderate for insurers and broker-dealers but somewhat elevated for the hedge fund sector. The black line in the middle-left panel plots average gross notional leverage across hedge funds as derived from the SEC's Form PF data. This measure, which captures the many ways through which hedge funds employ leverage across markets but is stale, indicates that average leverage stepped up in the first three quarters of last year. In terms of more timely but less comprehensive measures, the red line—which captures leverage provided by prime brokers typically to finance equities—suggests that gross leverage continued to increase through May, though conversations with market participants suggest that, more recently, this form of leverage has not been increasing. Dealers responding to the Senior Credit Officer Opinion Survey on Dealer Financing Terms reported that they have been continuing to ease the terms that they offer to hedge funds—the blue and red lines in the middle-right panel—consistent with another theme that we've been hearing from market participants, which is that dealers are currently very willing to provide leverage.

The lower two panels examine maturity and liquidity transformation. This potential vulnerability remains low for banks, reflecting their substantial liquid asset holdings and high core deposit funding levels. In addition, as can be seen in the lower-left panel, which shows cumulative changes in 12-month CD interest rates,

banks have been able to retain core deposits via relatively moderate increases in deposit rates, although steeper deposit increases are more evident in the case of smaller banks.

Vulnerabilities associated with institutional investing in money markets also remain low. As shown in the panel to the right, there has been little appreciable growth in MMF substitute vehicles that have similar fragilities to prime funds but could attract assets that used to be in prime funds.

Finally, the table in exhibit 3 provides a time series of our judgmental heat map, which we began including in the QS assessment exactly four years ago, and the table in exhibit 4 reproduces the detailed heat map given in the July assessment. Thank you. That concludes our prepared remarks. We would be pleased to respond to your questions.

CHAIRMAN POWELL. Questions regarding any of those presentations? President Harker.

MR. HARKER. I wanted to ask a question on the trade issue and inflation. First, I agree that I think the scenario could be a lower bound on how bad it could be, in view of the interconnectivity of the global supply chain. My question is a little different, though. In this scenario, monetary policy responds to tariff-induced inflation in the same way as inflation induced by excess demand, right? So it's acting in the same exact way.

MR. KAMIN. Right.

MR. HARKER. But I'm not sure that's quite right. At least I've been thinking about this. In practice, central banks—for example, if there's an increase in VAT or other consumption taxes, you try to look through that—right?—to look for the underlying signals in the economy. Now, granted, that's much harder in this case, because, unlike a one-time event, these are going to be dribbling out. But how do you think about that? Because what I'm worried about is that we see inflation spike. Some of that, if we get into this scenario, is due to the tariffs, but that's a one-time event. So how are you modeling that and thinking about that?

MR. KAMIN. Well, thank you for that. We've definitely given that issue a fair amount of thought. First of all, we recognize that one possibility is certainly that our monetary policy would indeed "look through" a one-time increase in tariffs and its recorded effect on inflation. And in that event, of course, the federal funds rate wouldn't rise. It would probably fall a little bit to accommodate the weaker demand that comes from the other parts of the simulation. In that instance, the negative effect on real GDP is moderated, but it doesn't go away entirely. In other words, only one part of the total negative effect of the scenario is taken away. So you still have negative effects on real GDP that are pretty substantial.

But we also considered the possibility that, for a number of reasons, the Federal Reserve might not fully look through that price increase. One of them, of course, is that the evolution of tariffs would be uncertain, so you wouldn't know whether there might be more of those in the offing. A second one is that the time pattern of pass-through from the tariffs to our prices would be uncertain. And then, finally—and this was pretty prominent in our thinking—it could be that these tariff hikes take place in an environment of pretty heavy, rapid aggregate demand growth and very little slack in the economy. And in those situations, the shock might be more likely to pass through into inflation expectations than in an environment in which there was lots of slack. So the "look-through" scenario is definitely plausible. It doesn't fully take away the negative effects of the shock.

CHAIRMAN POWELL. Governor Quarles.

MR. QUARLES. I just have kind of a simple-minded question on the panel that has the house price-to-rent ratio and the long-run trend—and sort of evaluating our comfort on the basis of the ratio's relation to the long-run trend. Is that a friendly trend?

MS. EDGE. Yes.

MR. QUARLES. As I like to say, if my temperature rises by one degree a month starting in January, it will be below trend in December but only because I died in November. [Laughter]

MS. EDGE. There is a lot of uncertainty regarding this trend. There are possible reasons one could use to understand why there might be a trend here, though. For example, it could be that quality improvements aren't well captured in rents and prices, and there's a difference between how the quality is being captured. That could lead to differences emerging over time. It could be that prices increased more in areas in which there are more owner-occupied properties. So there are possible reasons for the trend, and other sorts of considerations go into this line as well, actually. There are things like costs of owning property as opposed to renting it. So there are reasons for the trend, but there is a lot of uncertainty associated with it. We don't want to put too much weight on this trend, but there are reasons for it being upward sloped.

MR. QUARLES. I guess if houses that you own are getting nicer and rental properties aren't, and that's accounting for the upward trend, then that would be, I guess, a reason for comparing the current situation with the trend and thinking that that's the right comparison. I could see that.

MS. EDGE. I still would be cautious about it. The usual chart that we actually show has the bands around it, and they are sizable. The lowest one is not completely flat, but it is flat.

MR. LEHNERT. We'd consider it a victory if you view trends with suspicion in the financial stability world, because they have an unfortunate history. In this instance, in addition to everything that Rochelle said, there are a variety of different sources of information on rental properties versus owner-occupied properties, and one can try to correct for the differences between those properties.

All of these different measures and all of these different kinds of perspectives on this question are telling the same story, which is that prices are now not really any longer within the kind of historical range that can be explained by rent. They are somewhat above it. They're not a lot above it, but they are—it's sort of where you might expect to see them, actually, at this point in this cycle.

MR. WILCOX. By fortuitous circumstance, we actually happen to have a *bona fide* measurement expert in the audience. Shane Sherlund, do you want to elaborate at all on any of the measurement challenges that are associated with this? And, for purposes of history, you should come up to the table, so you can be heard by the microphone.

MR. SHERLUND. I was actually afraid you might remember I was back here.

[Laughter]

MR. WILCOX. My memory isn't that bad.

MR. SHERLUND. It's good. We suspect that there is a trend in the price-to-rent ratio model for a lot of reasons. As Rochelle alluded to, there are measurement differences between prices and rents of the houses you buy versus the houses and other types of properties that you would rent.

One of the things that is driving prices higher right now is tightness in the housing market. You might suspect that would be driving prices up and maybe not affecting rents as much.

From a statistical point of view, we have this expectation that prices and rents move together. If you just plug that into the data and you don't impose any trends or anything at all, that relationship just breaks down. That's one of the primary reasons we have that trend in there as well.

MR. WILCOX. So why don't you and I have a little dialogue for just a second. The numerator comes from—are we using CoreLogic in the numerator?

MR. SHERLUND. Yes. So that's the repeat transactions.

MR. WILCOX. Right. And the denominator comes from the Bureau of Labor Statistics.

MR. SHERLUND. Exactly.

MR. WILCOX. Institutionally, they come from different organizations. There's no reason why the methodology that goes into the numerator should be the same as the methodology that goes into constructing the denominator. As you know, there's a huge literature associated with measuring quality change for purposes of bias-adjusting the consumer price index. Rents is one area in which they try mightily at the Bureau of Labor Statistics, but it's not a simple challenge to try to measure a constant-quality residence over periods of time in a consistent manner, and exactly the same challenges arise. This issue of getting the quality adjustment just right in both numerator and denominator could be one of the sources of the trend. I think the burden of the comments made by Rochelle and Andreas is, we don't want to give you too much comfort in that regard.

MR. QUARLES. Thank you.

CHAIRMAN POWELL. President Kashkari.

MR. KASHKARI. Just a quick follow-up. But have P/Es across asset classes gone up like this? I mean, is this unique to prices to rents and housing? Or if we look at other asset classes, would we not also see this P/E expansion over this time?

MR. WILCOX. My recollection, Shane, is that you've done quite a lot of work looking at this. One reason why P/Es might have trended up is that discount rates might have come

down. My recollection is that there is, at best, a very limited role in your preferred model for interest rates. But my recollection of the details of that is hazy.

MR. SHERLUND. That's absolutely right. Raven Molloy gave a presentation to the Board about a year ago, I think, that basically showed that the effect of mortgage rates and interest rates on house prices was pretty small. If you think about what has happened to interest rates over the past 20 to 30 years, there has been quite a dip. So even though it's small per percentage point, you take 10 or 15 percentage points—now it's something that might actually be relevant. So that's right.

MR. WILCOX. I don't know broadly what the trend in P/Es is, but, again—

MR. KAPLAN. They moderated a little bit.

MR. WILCOX. I wouldn't want to offer too much comfort that the trend increase in P/Es here in the price-to-rent ratio could be laid off as a consequence of low mortgage rates, because we don't have a lot of strong empirical evidence to back that up.

CHAIRMAN POWELL. I'm sorry. President Bullard, were you done? You had your hand—

MR. BULLARD. I'm not commenting on this question, so if there's more on this question—

CHAIRMAN POWELL. Is there more on this question?

MR. BOSTIC. Yes. So, just in connection with Neel's point, do we know what's happening in cap rates across asset classes?

MR. LEHNERT. It's hard. Do you mean cap rates, like in property classes, or—

MR. BOSTIC. Yes, property classes.

MR. LEHNERT. Just in property markets? Yes, we did this work Rochelle showed you, I think, right?

MS. EDGE. Yes. What I was showing here was cap rates for CRE prices. Sometimes we do show it relative to Treasury yields, but this one is just—

MR. BOSTIC. So I think that would suggest that this is a more general phenomenon than just in housing.

MR. KASHKARI. But their cap rate chart has a narrower time frame. We'd have to look back over 30 years to see the same—

MR. BOSTIC. Oh, for the long historical one?

MR. KASHKARI. Yes—to see the trend line in the house price to rent.

MR. LEHNERT. Shane, do you want to say something about commercial real estate?

MR. SHERLUND. Sure. I think the inclinations at the table are correct. I think if we looked at a longer time series of cap rates, especially in CRE, they would follow what has happened with the 10-year Treasury yields fairly closely, plus or minus a spread. I think if you went back to the early '80s, you would see a very large downward trend in cap rates. I think that's absolutely right.

CHAIRMAN POWELL. More on this, or—we're moving on now. President Bullard.

MR. BULLARD. I do have just one suggestion on the house price issue, which is, you can look at house price to nominal GDP—and I think that's not as popular a chart here—but you could view the price of the U.S. housing stock as being a price of capital, which is a substantial fraction of the U.S. capital stock. According to balanced growth, that should be growing at the same rate as the nominal value of the capital stock itself or as nominal GDP itself, and, therefore, you should expect that to be a flat line. It's not a flat line when you draw it. And then you could

say something about whether those prices are getting out of bounds or not based on that, as opposed to having to compare with the rental market.

One thing I've been concerned about on the rental comparison is that, when you think about single-family homes, it's not really possible to rent out the homes the way it's conceptualized in the calculation. That market is extremely thin in many neighborhoods in the United States, possibly because of subsidies to housing and so on. So there isn't really a rental market in which people are indifferent between buying the house and renting the house, the way it's conceptualized in the calculation. But this is just my view on it.

On the Smoot-Hawley tariff, I wanted to get back to this. This says that it's overrated because the deflation from 1929 to 1933, in effect, raised the tariffs. Does it matter that that's the reason the tariffs went up, or isn't that a stealth increase in tariffs, so we would still look for major effects to come from that? And also, what was happening to foreign price levels at this point? Weren't they also declining?

MR. KAMIN. Well, I think your point is well made that there was a large increase in effective tariff rates for whatever reason, so that's something worth keeping in mind. I just wanted to be able to put our current policy debate in perspective by looking at a particular policy action in the past, and the policy action in the past was the Smoot-Hawley. Now, as you point out, certainly the tariff rates did go up a lot. The fact that they were pushed up, those average tariff rates, by declining import prices reflects the general global level of deflation. So, indeed, those declines in import prices were reflective of both collapses in global commodity prices and also the same deflation in our trading partners abroad that we were experiencing as well. So those factors were indeed operative.

Just to bring up one additional point on this: One issue that has been raised is that even if the Smoot-Hawley tariff was not very consequential in its own right because the increase in tariff rates was small, it may have played a more pernicious role by sending the green light to other countries to raise their tariff barriers. Now, there were lots of other reasons why those countries might have done it other than the U.S. example, but that was probably a factor, and that probably did help deepen the Depression, although, as I say, most scholars don't think it was the major factor.

MR. BULLARD. Just to make sure I'm on the same page about my history here, I thought the volume of trade did go down substantially internationally.

MR. KAMIN. Yes, very much so.

MR. BULLARD. Yes, and that has usually been traced back to Smoot-Hawley and its ramifications.

MR. KAMIN. Right. In fact, those trading volumes were declining substantially before the Smoot-Hawley tariff as well as afterward.

MR. BULLARD. But we are talking about a 90 percent decline or something like that.

MR. KAMIN. I don't recall the exact number, but—

MR. BULLARD. I thought it was quite large.

MR. KAMIN. Yes, it was extremely substantial. And then if you look at some of the graphs in my main reference, it shows its downward trend in U.S. imports in volume terms, with a little jog downward—small, but you can see it—in imports right after the Smoot-Hawley. So it definitely had a marginal contribution to the decline in imports.

MR. BULLARD. Okay. So the research question is whether the Great Depression itself caused the collapse in trade or whether the collapse in trade contributed to the Great Depression.

MR. KAMIN. Right. Chicken-and-egg-like.

MR. BULLARD. Yes. And then on the—

MR. EVANS. Sorry—I thought you were expecting an answer. [Laughter]

MR. BULLARD. He said, “Chicken and egg.”

MR. KAMIN. I wasn’t sure about that.

MR. BULLARD. And then on the broad-based reciprocated tariffs, “reciprocated” means the entire rest of the world does exactly what the United States does and moves tariffs to, let’s say, the green dot here on page 2?

MR. KAMIN. Not exactly. What the entire rest of the world does is, it raises tariffs on imports from the United States to the same extent that we increase tariffs on their imports. So, what that means in practice is, if we impose a 15 percent tariff hike on imports from all countries, then every one of our trading partners imposes a 15 percent tariff hike only on imports from the United States, not on imports from their other trading partners. So, as a result of that, the reduction in trade is larger for the United States in terms of two-way trade than it is for other countries, whose trade with the United States falls but not with everybody else that they trade with.

MR. BULLARD. What seems to be going on is that possibly the United States and China would have this kind of reciprocal trade war, but that it would not spread, necessarily, to all other trading partners because of bilateral deals. And would that mitigate most of these effects, or would you still get a 4 percent decline in GDP?

MR. KAMIN. No, that would mitigate a lot of these effects. We have been very hesitant to basically make predictions of how this will go, because doing so has proven near impossible. But, certainly, the signal that we took from last week’s agreement between the United States and

the European Union—which certainly promises, at a minimum, to push any tariffs on autos toward the end of the year, maybe beyond the elections—is that it makes it much more likely that the trade tensions and actions will be concentrated in the United States–China bilateral relationship. But that’s not a bet we want to put too much of our money on.

MR. BULLARD. Thank you.

CHAIRMAN POWELL. Other questions? [No response] If not, we now have an opportunity to comment on the financial stability issues, beginning with President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. Two quick comments. My first comment is on pending money market reform legislation, which the Chair was asked about during his testimony. The proposal would repeal the requirement for prime funds to have floating NAVs rather than the stable NAV funds that apply to government-only money market funds. A major source of instability during the crisis was the run on prime money market funds. The fact that most money market funds are now holding only government securities has significantly reduced fund risk in short-term credit markets. A return to a fixed NAV for prime funds would be a dangerous rollback and should be resisted. Just as floating NAVs may have induced some money market funds to move primarily into Treasuries, fixed NAVs might motivate a return to investing in more risky assets. While the legislation seems unlikely to be taken up by the Senate this session, we should be vocal about our opposition to restoring a practice that was a major source of instability during the crisis.

My second comment concerns the risk discussion. The worst outcome in the stress scenarios provided in the Tealbook shows us only returning to the Committee’s SEP estimate of the full-employment unemployment rate. Although I realize that, in large macroeconomic models, it’s difficult to generate recessions, the economy itself is fully capable of doing so.

[Laughter] I am concerned that we expect banks to prepare for much more stressful scenarios than we model ourselves when considering monetary policy. Perhaps we should fold some of the counterparty risk and financial acceleration that we use in our stress scenarios with regard to the banks into our monetary policy simulations. I would find it useful to see more integrated simulations that more clearly connect adverse economic outcomes with the financial acceleration that likely would attend such stresses and that is implicit in our financial stability work and that also reflects the somewhat constrained monetary and fiscal policy responses that will be available to us in the near future. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Mester.

MS. MESTER. Thank you, Mr. Chair. I thank the staff for continuing to provide useful insights into sources of financial stability risk. In the staff's assessment, vulnerabilities of the U.S. financial system remain moderate. However, we are at a point in the business cycle at which increased attention to financial stability risk is warranted. Asset valuations in equity, corporate bond, and Treasury securities markets are elevated above historical norms. Though they are below the levels seen before the housing crash, price-to-rent ratios in residential real estate markets are rising and near their peak from the '80s and early '90s.

Commercial real estate valuations remain elevated, and issuance of commercial real estate loan obligations is rising. Now, research indicates that it's when high valuations are coupled with high debt levels and credit growth that financial stability is most at risk. So far, nonfinancial business leverage remains at moderate levels overall, but it's elevated in the speculative-grade and unrated firm segments, and banks are beginning to lower lending standards. While it has improved since the financial crisis, our insight into the nonbank financial system remains more limited. We should recognize this and continue to develop better ways to

monitor this sector. The staff's stress analysis suggests that household balance sheets are currently sound, but while the household sector may not be the source of financial system shock, should a macroeconomic downturn take hold, the household sector is vulnerable, and default rates could rise significantly.

How to incorporate financial stability risks into our monetary policymaking is still an open question. Ideally, one would like to use macroprudential tools to address financial stability risks and monetary policy to address macroeconomic risks. I continue to think that the macroprudential and microprudential tools are the first line of defense against financial imbalances. However, whether monetary policy would need to be used as well would depend on the efficacy and/or willingness to use the prudential tools. Our main countercyclical tools are the countercyclical capital buffer and the stress tests. The lead times needed to use the countercyclical capital buffer make it less effective at addressing vulnerabilities that may rapidly develop or may be detected only after they have had time to develop. This suggests the need to raise the buffer in good times before we see the vulnerabilities, yet the countercyclical capital buffer remains at zero in the United States. The stress-test scenarios were tougher this year, but I'm not convinced that we've done enough to communicate the notion that, in future, we plan to use such stress tests as a countercyclical measure. In my mind, it appears we're backing off from that.

With some constraints on our ability to use the countercyclical tools, I'm led to two conclusions. First, it's important to promote the structural resilience of the financial system across the business and financial cycles using our tools of capital and liquidity requirements, regular stress testing, resolution planning, and working with the industry to enhance strategies to improve cyber resiliency. I support efforts that better align regulation and supervisory oversight

with the location of the potential system risks—including proposals to make regulation less burdensome on community banks in the United States. However, I think it would be a mistake to unwind the steps taken since the financial crisis that have led to a more resilient financial system. I would like to see how the new settings perform throughout the cycle before making major changes. The bills being discussed by the Congress to unwind the reforms made to money market funds are misguided. We should do all we can to make the financial system more resilient. In my mind, this means we should set standards for the structural resilience tools somewhat higher than they would be if we had more experience with, and confidence in, our countercyclical tools.

My second conclusion is that even if, in theory, using macroprudential tools might be preferred, their limits suggest we may, in some cases, need to at least contemplate using monetary policy to address financial imbalances—we should be thinking now about how we might do that and in what situations. To that end, later this year, the Conference of Presidents' Committee on Financial Stability will be holding its second tabletop exercise to clarify our thinking further about our strategy for dealing with an economy facing increased financial stability risk. Governor Brainard will be participating in this exercise. I plan to update the Committee as appropriate about any lessons learned from the exercise. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chair. I, too, appreciate the staff's ongoing assessment of vulnerabilities in our financial system and the potential shocks that might trigger them. Because the assessment of financial-sector leverage depends significantly on judgments that the largest banks are sufficiently capitalized, my comments focus briefly on this component of the analysis.

Without question, large bank capital levels and capital quality have improved over the past decade. As this report highlights, the largest banks passed their stress test this year, and the four largest banking firms anticipate paying out essentially all of their income to shareholders. The largest banks are no longer building capital. And although the report frames this outcome as a sign of resilience, which it may well be, it strikes me as a reason to be cautious. High dividend payout rates, such as those approved under CCAR, run counter to financial stability aims, in my view, at a time when downside economic risks are notable, asset prices appear elevated, underwriting standards are easing, and certain sectors of the economy pose credit risk challenges.

I understand that these stress tests can serve a valuable role in informing macro views of financial stability and even certain aspects of capital strength. But I do worry that we rely too heavily on their use when it comes to communicating capital requirements, at the risk of mischaracterizing their role. It would be preferable, in my view, to set clear and consistent regulatory capital expectations. Ad hoc capital decisions by way of a stress test increase complexity and uncertainty, leading to greater risk of future mistakes and potentially weakening financial stability. For this reason, considering the value of the countercyclical capital buffer or other capital enhancements might well be appropriate at a time when several risk indicators are flashing “moderate” to “elevated” and most forecasts project continuation of these current trends. Thank you.

CHAIRMAN POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Mr. Chairman. In light of the staff’s report on financial stability, I think there are three central and probably obvious questions. What has changed since the previous assessment? How vulnerable is the system? And what does that imply for what we ought to do?

So, what's changed since the previous assessment? The changes, in general, are modest. To my mind, there were two that deserve emphasis. One we had a fair bit of discussion about, which is that growth in the prices of houses has continued and might even have picked up since the previous time. And prices are now somewhat above their long-run relationship to rents and other fundamentals. That is a phenomenon that will always bear watching. But I, at the end of the day, do not yet think it's worrying, for all of the reasons that were outlined in the long discussion about the relationship to trend. And also, the stress tests consider resilience to very large house price declines, and they indicate that banks would not likely amplify a reversal in house prices currently in a destabilizing way. In addition, mortgage debt is advancing at a moderate pace and primarily among borrowers that have strong credit histories. You know, I think the special topic memo on household vulnerabilities painted a compelling picture of strong mortgage underwriting currently. And, finally, I don't find it surprising that house prices will be either somewhat above or somewhat below trend as part of normal fluctuations in housing markets, and right now, the current deviation from fundamentals doesn't appear to be outsized, at least on a national basis.

The second element in the staff's analysis that certainly drew my attention relates to conditions in leveraged lending markets. We continue to see signs of weakening in lending standards in those markets. I think the phrase is "market participants are saying that 7 is the new 6." And we see strong demand for leveraged loans and a pickup in supply related to increasing M&A activity. Right now, supervisory staff are currently performing the review of shared national credits, and that's likely to confirm these anecdotes from market participants.

The second question is, where do those changes—on top of the evolution over the past several years—leave us with respect to financial stability vulnerabilities? I, at least, tend to

agree broadly with the staff assessment. Asset valuations are elevated across a broad range of assets, but no major asset class is caught in a wild speculative bubble like in the late 1990s or the mid-2000s. Overall, nonfinancial borrowing appears moderate. Corporate borrowing, especially by speculative-grade firms, has been growing more rapidly for years, but household borrowing is advancing in line with GDP. And offset against that, financial-sector leverage is very low by the standards of the past several decades. In the banking sector, that relates to the regulatory standards that have been put in place and the stress tests. But leverage is also relatively low elsewhere in the financial system. Maturity transformation is also low. Banks are substantially less reliant on short-term wholesale funding, and, at least for the time being, the run risk associated with prime money market funds has been nearly eliminated.

So how does all of that get put together? It's not as much of a science as we would hope it would be to combine that set of vulnerabilities into an overall assessment. And, as Rochelle indicated in her briefing, the staff has judged that overall vulnerabilities have been moderate for four years, despite a steadily increasing move to evaluate evaluation pressures and elevated corporate borrowing. But despite those caveats, I do agree that, at least for now, vulnerabilities are moderate overall, all things considered. The corporate credit cycle will turn down at some point, but the financial sector appears ready to absorb, rather than unusually amplify, that shock.

So, the third question is, what does that assessment imply for the appropriate policy response? The baseline for the Board's countercyclical capital buffer framework is that moderate overall vulnerabilities do not call for additional countercyclical policy actions to promote financial stability. Instead, current vulnerabilities at a moderate overall level suggest that it's important to maintain the resilience of the financial sector. Stress tests support that goal. Again, as Rochelle's presentation indicated, this year's scenarios, which were the most severe we

have ever done, mean that the large banks will maintain high capital levels over the coming year, and some of the largest will, in fact, increase their capital levels. And we need to ensure that our supervisory expectations for corporate lending are met.

So, as I mentioned, the SNC review is under way, and we will be considering that review in the near future. That said, we shouldn't be complacent. Our greatest risk is complacency. And it's important to continue to probe whether vulnerabilities are rising and how we should address those vulnerabilities. But we shouldn't also overstate the likely efficacy of countercyclical tools. They are what they are, but my understanding of the various analyses that have been done of the likely effects of the countercyclical capital buffer by our staff, by joint work internationally, and by independent academics is that the CCyB is unlikely to have material effects on the growth of credit or asset prices. Instead, the primary effect of the CCyB is enhanced resilience at large banks and across the financial system when we assess that financial stability risks are high. And right now, our assessment is that they are moderate.

So in light of these analyses, it's not clear that the CCyB would help limit elevated asset prices or corporate borrowing or provide much support to lending during a downturn. The CCyB has an important role. But that role is enhancing resilience—not taming the business cycle.

Finally, notwithstanding the fact that I spent a little bit of time talking about why I do think it's sensible at this moment not to have turned on the CCyB, I do want to be clear that that's a new tool, and I at least have an open mind, both to new analyses and to the implications of incoming data as to the appropriate setting of the CCyB. And I look forward to continued discussions about how our decisions regarding the stance and tools of monetary policy can be complemented by Board actions to promote financial stability.

CHAIRMAN POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you. The quarterly surveillance highlights two broad areas that merit heightened vigilance. First, asset valuations and risk appetite now exceed the 90th percentile of the historical distribution. Notably, spreads on leveraged loans and the securitized products backed by those loans are very low, and the SLOOS suggests that underwriting standards for leveraged loans may be declining to levels that we haven't seen since 2005, with an increasing share having debt multiples above 6. Similarly, issuance of CLOs backed by commercial real estate loans has been doubling every year for the past few years, driven by strong investor demand, a trend that staff analysis suggests bears careful monitoring. In my discussions with market participants, there has been increased focus on the over \$2 trillion in corporate bonds that are close to the edge of investment grade, which could be vulnerable to downgrades in the face of a negative shock. Analysis by our colleagues in New York suggests that forced sales of such downgraded speculative-grade bonds by institutional investors and outflows at open-end mutual funds could lead to liquidity dislocations.

Second, elevated valuations and risk appetite in business credit markets are mirrored on the demand side by an increase in business leverage to historically elevated levels. In the nonfinancial business sector, the debt-to-income ratio has increased to near the upper end of its historical distribution, and gross leverage at speculative-grade and nonrated firms is near its historical peak.

As we have seen in previous cycles, unexpected negative shocks to earnings, in combination with increased interest rates, could lead to rising levels of delinquencies among these borrowers and related stresses to some banks' balance sheets.

Against this backdrop of elevated risk-taking and historically high business indebtedness, it's reassuring that our supervised banking institutions remain well capitalized because of requirements that we and other regulators have put in place. If asset valuations return to more normal levels, or corporate defaults rise, these strong capital buffers will be vital in ensuring that banks can absorb the fallout and continue to provide credit. But, as can be seen in the quarterly surveillance report, overall regulatory capital has flatlined in the past two years when measured against either risk-weighted assets or total assets. Indeed, for our largest globally systemic banking institutions, the ratio of common equity to risk-weighted assets has actually declined since 2016.

I would like to echo comments voiced by Presidents Mester and George. Looking ahead over the medium term, in order to maintain the same degree of resilience, some banks may well need capital buffers that are somewhat thicker than they are now. Recent history suggests the business cycle and the financial cycle are increasingly intertwined. The previous two expansions ended because of financial imbalances, and financial excesses also played a role in the early 1990s downturn. Thus, if recent history is any guide, it's a good bet that as the expansion continues, financial imbalances will extend still further.

The results of this year's CCAR illustrate some inherent limitations of such stress tests in serving as our primary countercyclical tool. In recent years, a design principle has been to make those stress tests tougher as the financial and business cycles mature in an effort to use them as both structural and countercyclical tools. By design, as you saw in the picture, the unemployment rate reaches 10 percent in a severely adverse scenario when the economy is strong. And with the starting point for the unemployment rate moving lower and lower, a progressively larger shock is needed to achieve that level. This year, overall, the stress tests

were the toughest yet. Despite that, however, the largest firms have announced plans to make payouts that are in excess of projected earnings overall. With assets likely to be growing in this expanding economy, this implies that capital buffers relative to risk-weighted assets are likely to edge down further for those largest banks.

Because it's important that banks build resilience as cyclical risks mount, it may become appropriate for the Board to activate the countercyclical buffer for the first time. The purpose of that buffer is precisely to ensure that large banking organizations retain capital as cyclical pressures build, in order to sustain resilience when there's an elevated risk of above-normal losses, which often follows periods such as those we see today. This should help counterbalance the competitive pressures they otherwise face to pay out all of their earnings. The buffer is intended to be released as the economy weakens—and, in fact, we saw that in the United Kingdom recently. Unlike the stress test, with the CCyB, banks have ample time to incorporate the buffer into their capital plans. There's no element of surprise specific to any particular bank, and the buffer can be increased very slowly over time in increments as small as 25 basis points per year, as we saw in France.

Tomorrow, we'll turn to monetary policy. As we have discussed in the past, the first line of defense in promoting financial stability should be targeted tools, such as the countercyclical capital buffer. In the absence of deploying the countercyclical buffer, monetary policy may well need to carry a greater burden in leaning against those financial excesses, and that would be unfortunate because adding financial stability concerns to the burden monetary policy must carry could well undermine the sustained achievement of our employment and inflation goals. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. If there are no further comments—I don't believe there are—on financial stability, we now turn to our go-round on the economy, beginning with President Bostic.

MR. BOSTIC. Thank you, Mr. Chairman. Reports received from Sixth District directors and contacts suggest that demand remained robust for the second quarter. Most contacts continue to expect a solid pace of activity over the next year or so, even if not at the level seen in the second quarter. But expectations regarding future demand were mixed. Attitudes remain guarded, primarily due to continuing uncertainty about trade policy. Although second-quarter real GDP growth came in higher than I had previously anticipated, the presence of a few special factors underlay that result, and I'm hesitant to conclude that last quarter's strength was a clear signal that the economy has shifted into a higher gear. Outside the oil and gas mining sector, business fixed investment posted a moderate gain, falling short of its solid but unspectacular four-quarter growth rate.

The strong point on consumer spending might be a sign of greater stimulus from tax cuts than I'm expecting, but at least some of the strength is plausibly due to some payback after the miserly growth in the first quarter.

And then there are soybeans. [Laughter] As others have noted, they provided a temporary boost to second-quarter growth. But, just as an aside, my staff pointed out to me that over the past six years, soybean exports have had roughly the same effect on quarter-to-quarter fluctuations and output growth as residential investment. And that is a sentence I never thought I would utter. [Laughter]

Our regional intelligence-gathering efforts uncovered some hint of the trade policy front-running that apparently drove some of the surge in exports. Several contacts indicated that they

were stockpiling both materials and finished goods as a hedge against tariffs. Because there was no evidence of building inventories in the second-quarter data, I'm largely discounting these stories as special cases, but it may be something to keep our eyes on. Overall, I'm not inclined to change my forecast of real GDP growth this year, which is in the high 2 percent neighborhood, and I'm holding to my previous view that the risks around my growth prediction are balanced.

That said, it wouldn't take much for me to shift my risk assessment to the downside. Apprehension concerning trade policy has clearly intensified. Most of our contacts suggested that they are not materially altering their business plans with respect to capital expenditure just yet, which is a view that was largely echoed in the results of our most recent Survey of Business Uncertainty. Only about one-fifth of survey respondents indicated that they were reassessing their 2018 and 2019 capital expenditure plans as a result of trade concerns. Of that group, 6 out of 10 indicated that plan expenditures were under review as opposed to dropped, or postponed, or accelerated, or newly added.

In previous meetings, I have expressed concern that trade developments may already be exerting direct negative effects on business investment. Our survey results, combined with anecdotal reports from my region, suggest that material negative effects are not yet widespread, at least with respect to business investment. But, like everyone else, I'm concerned that the situation could turn quickly, and that concern has been manifest for the past two meetings. What I have not been particularly worried about before today are potential price pressures associated with trade policy. But things, as they say, have changed. In contrast to what we heard over previous cycles, many contacts are now reporting the ability, or the expectation of the ability, to pass along input cost increases to their customers. A significant fraction of these reports are related to tariffs in industries that use steel and aluminum as inputs. But I get the sense that

businesses are more broadly feeling that they can pass along price increases to offset some of the increase in expenses associated with freight, fuel, and so on.

The lion's share of cost pass-through is still concentrated in the intermediate stages of production or to wholesalers. However, I perceive a growing belief among my contacts that cost increases are going to find a way into the consumer's market basket and will be a moderating influence on demand when they do so. Thus, it is my view that the question President Harker asked earlier about how much, if any, observed changes in inflation we should look through is a question that all of us around this table will need to wrestle with and find peace with, whatever answer we come up with in the coming months. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. My economic outlook is little changed from the June meeting. Despite occasional concerns expressed by businesspeople about the effect of potential tariffs, the primary concern they discuss is the difficulty of finding additional workers. Most employers seem to be dealing with tight labor markets by using hiring bonuses, stock options, more job training, and other measures that do not disrupt the overall salary structure. However, more firms are explicitly discussing whether they can continue to hold the line on wages and how their business models may need to adjust to an extended period of labor shortages. In my region, New Hampshire, Vermont, and Maine now all have unemployment rates below 3 percent. And complaints about labor shortages in these states are particularly acute for unskilled labor, in part because of the difficulties in getting temporary visas.

Given that we already have tight labor markets—and with the likelihood that labor markets will tighten much more over the course of this year—my staff is looking at the association between tight labor markets and job-to-job switches. Because workers in a tight

labor market may be able to get higher wages by switching employers without a spell of unemployment, it is possible that job-to-job switches may provide a better indication of labor market tightness than focusing only on unemployment rates. When my staff compared the signals provided by the unemployment rates relative to job-to-job switch rates at the state level, it quickly became apparent that the two series are very highly correlated. However, the job-to-job switch rate does tend to rise more than proportionately as the unemployment rate gets quite low—say, to 4 percent or lower. My staff then looked at state-level wage equations and found that if one allows for a nonlinear response to the unemployment rate at very low rates, the job-to-job switch rate provides little additional information above and beyond the unemployment rate.

To be sure, higher labor demand in states with tight labor markets, proxied by the unemployment rate, generates higher wages at the state level and possibly even more so as unemployment dips especially low. If we start to see more wage and price pressures as labor markets tighten over the course of this year, an important question will be how much we should tighten monetary policy in response. It is notable that the Tealbook projection needs monetary policy to tighten vigorously by 2020, with the federal funds rate reaching 4¾ percent, just to stabilize the unemployment rate at 3.4 percent and ultimately move us in the direction of full employment. In contrast, the median SEP has the unemployment rate stabilizing at a slightly higher unemployment rate of 3.5 percent with much less tightening. The median federal funds rate in the most recent SEP is 3.4 percent, just 50 basis points higher than the median estimate of the long-run federal funds rate.

One possibility for the difference between the median SEP and the Tealbook may be that FOMC participants believe that the economy is much more interest sensitive—a possibility that is explored in one of the simulations in the Tealbook. However, even in this simulation, the

federal funds rate needs to rise more than the median SEP projection. As currently constructed, the median SEP has the unemployment rate falling below the SEP range for the long-run unemployment rate, leading to a modest target overshoot by both core and total PCE inflation rates. The SEP-implied policy rate path, coupled with the recent tendency to overestimate the path of the unemployment rate, may require running the economy above capacity for a very long time before then returning to full employment.

Our current framework does not explicitly state the average period over which monetary policy should attain its goals. The current strategy, however, seems to be stretching this horizon very far into the future. We do not have much to refer to in terms of historical episodes of the economy running above full employment for a prolonged period of time. Still, the assumption that inflation will continue to follow the same linear relationship *vis-à-vis* the unemployment rate, and that other imbalances will not emerge, may not be the most prudent. Of course, if the Committee were to change its strategy to allow for more flexibility on the inflation goal either temporarily or indefinitely, the SEP policy rate path might be just what we would need to obtain the higher inflation rate. Absent such a change in the framework, however, the risk is that we will simply overstimulate the economy. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Bullard.

MR. BULLARD. Thank you, Mr. Chairman. I began talking about the possibility of yield curve inversion on December 1, 2017, in a speech. Since that time, the curve has flattened further, and it continued to flatten during the intermeeting period. There's also been a healthy debate on this issue both inside and outside the Committee during this period, and I think it has been very beneficial that this debate has proceeded well ahead of any actual inversion event. I agree with many of you and many in financial markets that the U.S. economy faces no

difficulties on this dimension as of today. The various measures of yield curve slopes remain positive. Recession probability 6 to 12 months ahead remains low. I'm thoroughly aware that people like to measure the yield curve slope in different ways, but my view on this is that these different measures are highly correlated, and if we get a meaningful inversion event, all or most of these will invert.

Despite the fact that we're in good shape today, we do face a conundrum, as we did in the mid-2000s. Longer-term yields are not rising in tandem with the policy rate increases of this Committee. A 50 basis point increase in the policy rate in the second half of 2018 may well bring this matter to a head. Because of the way the Summary of Economic Projections works, a September decision to raise the policy rate is likely to be more of a 50 basis point decision, not a 25 basis point decision. This is because the SEP will also indicate how many rate increases we expect for the remainder of the year, and, to the extent that the Committee will see one more increase for the rest of the year, that will be cemented in the expectations of financial markets. So I think September is probably a bigger decision than it may appear.

Of course, longer-term yields could begin to rise at any moment more sharply, and in that case, the Committee strategy will work well. My purpose here is to try to plan for the alternative case, in which the longer end of the yield curve does not cooperate. Should an inversion threaten, I think this Committee should have a plan to pause rate increases until we get more clarity on the direction of longer-term yields.

What is the interpretation of relatively low longer-term nominal Treasury yields and, hence, the flat yield curve? One interpretation is that there's a mismatch between the thinking of global financial markets, the long end of the curve, and the thinking here at the Fed, the short end of the curve. Markets see slower U.S. real GDP growth ahead, plus very little inflation pressure,

plus a low global rates environment and, therefore, predict low rates ahead. The traditional Fed analysis is in terms of gap-based models even while acknowledging that the empirical evidence behind this view has weakened considerably over the past two decades. The empirical evidence on Phillips curve effects has weakened for a good reason. As I have discussed here before, the rise of the inflation-targeting era since approximately 1995 has made inflation low and stable, and, hence, movements in inflation have become difficult to relate to any real variables in an empirical analysis.

Is the market view reasonable? I think it is. First, slower real growth ahead is widely predicted, including by this Committee. We're looking at something close to 3 percent real GDP growth year over year today. Most are projecting slower growth in 2019 and still-slower growth in 2020. Why is this the standard prediction in the forecasting community? It's because of slow productivity growth, which is not expected to pick up meaningfully, and limited scope for labor force growth. In essence, the market is unwilling to bet on improvements in productivity growth. Instead, they are betting that we are in a low-productivity regime.

Second, the market sees very little inflation pressure. TIPS-based inflation expectations remain subdued. These expectations, as I discussed last time, are interesting because they contain all available information, including recent fiscal policy changes, changes in the supply of U.S. Treasury securities and other developments in credit markets, and other factors—including the future policy of this Committee. Markets tend to think that the Committee will be more dovish than the Committee itself thinks. So, putting all of that together, it's impressive that inflation expectations are as low as they are, according to market-based measures.

Finally, the market sees a low global rate environment. As far as foreign policymakers are concerned, the Bank of Japan and the ECB look unlikely to make any meaningful rate

move—certainly in the next year and possibly beyond that. In the low global rate environment, higher U.S. yields find many buyers, and this is helping to keep longer-term nominal yields low in the United States.

One message from the ongoing yield curve debate seems to be that the Committee’s narrative is somewhat miscalibrated. This suggests to me that the Committee’s policy thinking could benefit from moving closer to one of the following: One possibility would be the price-level targeting example in the Tealbook, in which we would make up for past misses on the inflation target on the low side by allowing inflation a little bit on the high side. There’s been a lot of talk about symmetry of the inflation target around the table. We could lean more in that direction. I think that would help.

Another possibility would be to look at a Taylor rule variant that implies reduced emphasis, or even zero emphasis, on the output or unemployment gap, as illustrated in the Cleveland Fed monetary policy rules webpage. This orientation would acknowledge that the empirical evidence on the Phillips curve has faded in recent decades and would be a way to make an adjustment in that direction.

A final way we could go would be the asymmetric loss function example in the Tealbook, in which the Committee does not try to raise unemployment to its own perception of a natural rate of unemployment but merely allows labor market outcomes to be what they will be, so long as inflation outcomes remain close to target. All of these possibilities would provide a basis for a more subdued planned policy rate increases than what is currently contained in the Committee’s SEP median.

I have a couple of other comments that I wanted to make here. First of all, there’s the Tealbook and briefing evidence on international yield curve inversions. The international

evidence is that yield curve inversions do not predict recessions as well—the cross-country evidence is weaker on this dimension than it is in the United States. In earlier incarnations in my career, I took this evidence very seriously and dismissed the yield curve signal in the United States. I was burned by that in 2000 and again in 2006, when the yield curve did a good job of predicting trouble ahead for the U.S. economy. I think the problem is that the United States is not equal to other countries, which tend to be much more open economies than ours. So in a foreign economy, the policymaker may be doing something that's responding to local conditions, but the longer end of the yield curve may be moving for reasons that are unrelated to domestic macroeconomic prospects.

Also, in the international correlations, you're looking at the same thing over and over again for several countries in Europe—Germany, France, Italy, and, to some extent, the United Kingdom. Other countries around the world are much smaller, and some of them have much different situations—Latin America and parts of Asia. So I'm not sure that we can take the international evidence quite as seriously as maybe I would have taken it in the past and so am dismissing this to some degree. I think that in the United States, you have a relatively closed economy in which the yield curve, therefore, sends a better signal about the future U.S. prospects.

I want to turn to key risks in the outlook. The alternative simulations in the Tealbook seem to suggest that the major trade war is the key risk, and we just talked about this a few minutes ago. I understand that there are many caveats around that analysis, but based on my contacts in the Eighth District who are expressing considerable angst on this issue, I think it probably is the key risk that's facing the Committee in the near term. I think we should take that seriously and calibrate monetary policy appropriately.

The other alternative simulations meant to simulate other possible risks to the U.S. economy seem to suggest to me that inflation is unlikely to deviate very meaningfully from the 2 percent target even if some of these major risks materialize. So if you take the alternative simulations together, I interpret them to mean that we can confront inflation risks relatively easily, at least according to this analysis. Either the trade war would develop and we'd go into recession or one of the other risks would develop. But, in those scenarios, we would be able to contain inflation, according to the analysis in the Tealbook. So I just don't see a lot of inflation risk that we have to get in front of at this juncture. To President Bostic's question about whether we should look through the increase in prices associated with a trade war, it would certainly seem that we should. A 4 percent drop in GDP—to the extent that's the number that you think is a reasonable one—would be very serious indeed for the U.S. economy, and the increase in prices associated with that would be temporary.

As a final thought, let me return to price-level targeting and just put a thought in your head. From 1995 to 2012, as I mentioned earlier, U.S. monetary policy did look like *de facto* price-level targeting directed toward a 2 percent rate of price-level increase. We did stay right around that trend line all during that 17-year period. Since 2012, we have fallen off that price-level path, and we're now about 4½ percent below that path. To get back to that price-level path, which could be argued to be optimal monetary policy, we would have to be at 2½ percent inflation for a decade. So I put that out there as a rule of thumb about what we should be thinking about in terms of optimal future monetary policy for the Committee. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you. Underlying momentum in domestic demand is strong by any measure. The BEA estimates that real GDP rose at a robust 4 percent annual rate last quarter, and incoming data on the labor market have likewise been strong. Because of the boost to spending that fiscal policy will provide over the next year or so, momentum should remain robust.

Cutting through all of the puts and takes in the second-quarter real GDP release, private domestic final purchases, a good indicator of underlying demand, increased 4 percent. Beyond that, there were offsetting contributions from net exports and inventories. Net exports contributed more than 1 percentage point to annualized GDP growth, in part because many firms sought to export goods before tariffs might go into effect. And, of course, with soybeans making an outsized contribution, that's unlikely to be repeated. On the flipside, the BEA estimates that there was a drawdown in inventories that led to a roughly offsetting negative contribution. These forces are likely to exert offsetting pressures in the opposite direction from now on.

In the future, it's likely that above-trend growth will continue here at home. Business confidence and consumer confidence remain high, and we've yet to see the full effects of the recent tax cuts and spending increases. The staff's estimates suggest that fiscal impetus will contribute about ½ percentage point to real GDP growth this year and next.

Looking at global real growth, we are seeing somewhat greater divergence. After posting solid gains last year and early this year, foreign economies appear, overall, to be settling into something closer to trend growth. Real GDP growth in the advanced foreign economies appears to have slowed earlier this year. More recent indicators have been more encouraging. But growth has slowed among emerging economies. The trend is particularly important in China, whose slowing growth reflects the Chinese government's earlier campaign to address financial

imbalances as well as more recent trade tensions. The authorities there seem well positioned to provide offsetting support, however.

With foreign economic activity overall decelerating this year, the theme of divergence between the U.S. and foreign outlooks has gained prominence, with expectations that monetary policy will increasingly diverge following the emergence of strong divergent paths in fiscal policy. Consistent with that theme, the dollar has appreciated by about 1 percent since our June meeting and 4 percent so far this year. Most recently, U.S. trade policy appears to be a contributing force. Notably, we saw a 6 percent appreciation of the dollar against the Chinese renminbi in the intermeeting period, which coincided with news about possible new tariffs on Chinese imports as well as pronouncements by Chinese monetary authorities of easing measures.

But broader comprehensive indexes suggest overall financial conditions remain quite supportive of real GDP growth and are little changed on net. As of Friday, the 10-year Treasury yield was unchanged from the June meeting. Private-sector yields are also little changed. Equity prices are up about $\frac{3}{4}$ percent since June. But as I just noted, the stronger dollar provides somewhat of an offset to that.

Regarding our policy goals, the economy's underlying strength is confirmed in evidence of a very strong labor market. So far this year, payroll gains have averaged over 200,000 per month, which is a step-up from last year and well above the levels required to keep the unemployment rate moving down. By a variety of metrics, the labor market appears to be tight. The ratio of job openings to measures of available workers is the highest we have seen since 2000. The quits rate is similarly close to levels last seen in 2001 and above those seen in 2007, and supplier deliveries are also showing delays at levels not seen since the pre-crisis period, anecdotally reflecting driver shortages.

In contrast, although the unemployment rate is currently below most estimates of its long-run level, the prime-age employment-to-population ratio still remains about 1 percentage point below its pre-crisis peak. In my view, that shortfall could present some upside risk.

Wages also suggest a mixed picture. With productivity gains over the past couple of years now moving back toward pre-crisis levels, I will be looking for nominal wage gains also to move back up to pre-crisis levels, a period when core inflation was just slightly above 2 percent. For the ECI, it looks like we may be within striking distance. This morning's data, with the ECI increasing 2.9 percent over the most recent four quarters—that is about $\frac{1}{4}$ percentage point shy of the pace in 2005 to 2007—suggest that resource utilization is indeed getting tighter.

Regarding the second leg of our dual mandate, overall inflation measures are also encouraging. First, this morning's report suggested core prices were up 1.9 percent, up a few tenths from a year-earlier period. The latest data on inflation are encouraging, and I'll want to see further evidence that the underlying trend is also moving up. Thus, although core PCE inflation over the past year is very close to our target, in its May reading, the Dallas Fed's trimmed mean rate was still somewhat below the target at 1.8 percent and very little changed from a year earlier. I would feel more confident if we saw this measure, too, coming in sustainably at or above 2 percent.

Second, while survey measures of longer-run underlying inflation expectations have moved up over the past year, on net, they still seem to be indicating longer-run expectations remain somewhat below our 2 percent objective, and the story for inflation compensation is similar. It's moving in a positive direction but not yet recovering to the levels that we saw in 2013 and 2014. And that same story is evident in the results of exercises using statistical filters. The models of the permanent component of inflation that the Board's staff follow are currently

clustered around 1¾ percent, not yet evidencing any upward movement. In order to ensure that inflation expectations are firmly re-anchored at 2 percent for all of the reasons we discussed this morning, I am comfortable with having a monetary policy that tolerates a modest overshoot along the lines of the median path we saw in the most recent SEP.

Our goal should be to sustain full employment and re-anchor inflation expectations. We should aim to sustain the current “Goldilocks” trajectory. But it would be unwise to underestimate the risks associated with this course. With the incoming data suggesting an economy close to full employment and target inflation and with additional fiscal stimulus in the pipeline, avoiding the imbalances associated with overheating is likely to require continued increases in the federal funds rate. Thank you.

CHAIRMAN POWELL. Thank you. I’m going to suggest that we take an extralong coffee break now. You’ve been good. [Laughter] So why don’t we come back at three o’clock by that clock. Thanks.

[Coffee break]

CHAIRMAN POWELL. Okay. The economic go-round continues with President Kaplan.

MR. KAPLAN. All right. Thank you, Mr. Chairman. The Eleventh District economy continues to be very strong. In Texas, job growth was estimated to be 3½ percent in the second quarter of 2018 and 3.6 percent job growth for the first half of the year. This is an unprecedented rate of job growth for the State of Texas. Employment gains are broad based geographically and across industries, but the energy sector is still adding jobs at a faster rate than any other sector in the state. We do believe that Texas job growth will cool off in the second half of 2018 because of a historically tight labor market, and we do think trade tensions will have some effect on

export growth. We think the increase in the value of the trade-weighted dollar, which was talked about earlier, is going to have some effect on export growth. And we actually got some benefit—which we haven't talked about in the past few months—in the first half of the year from the boost resulting from Hurricane Harvey spending, and that benefit will fade.

Our contacts report that a tightening labor market is resulting in mounting wage pressures, particularly, though, for small and midsize firms. For bigger firms—and that means over 1,000 employees—it's interesting: Our surveys and the follow-up discussions suggest that wage growth, particularly away from very skilled positions, is more muted. We speculate—and they speculate—it could be due to greater opportunities for upward mobility in a larger firm, greater job benefits in a larger firm, and the fact that larger firms simply have more levers with which to address competitive pressure pertaining to workers. But we will continue to watch that carefully.

Certainly, various contacts across a wide range of industries in our District are expressing concerns regarding trade tensions, not surprisingly—particularly U.S.–China trade frictions but also uncertainty regarding NAFTA. Texas is an extremely large exporting state, and Mexico and Canada make up 45 percent of our exports. Having said all of that, our businesspeople are hopeful these issues will be resolved. Some of the soundings from Mexico are more moderate than they were—as was mentioned earlier—and I think people are more optimistic that some of these trade disputes, at least with Mexico and Canada, will get resolved. So they are taking a wait-and-see approach on cap-ex.

Regarding energy, the most notable thing that's happened since the previous meeting is outages from Venezuela—and, we'd say, increasing supply uncertainty due to U.S. threatened sanctions on Iran. This has contributed to substantial price volatility. The upward price

pressure, though, has been partially alleviated by statements from OPEC members, particularly Saudi Arabia and Russia, that they plan to increase production. Just to put all of this in context, U.S. production certainly is growing very rapidly, and we see this in the cap-ex numbers. Our estimates indicate that U.S. production already reached 11 million barrels a day in early July. That's crude oil production. The United States now roughly matches the production of all of Saudi Arabia. And in comparison, Russia produces about 11½ million barrels of crude oil per day on average.

The reason I mention these numbers is, behind those big three, you get Iran and Iraq. Iran hasn't been discussed as much, produces about 3.8 million barrels a day, and exports about 2½ million barrels a day. And you could see why, even though Saudi Arabia increased their production, there are limits to their ability to offset what might be lost from Iran. It's our own estimate that the increase from Saudi Arabia and Russia just offsets the loss of production from Venezuela and a modest expectation for loss of exports from Iran. I'll come back to that. About 70 percent of the growth in the United States since 2017 has come from the Permian Basin, but we'd emphasize that drilling activity in the Permian will continue to be hampered by infrastructure constraints—particularly lack of pipeline capacity—rising service costs, and labor shortages.

We maintain our view that global oil supply and demand are now roughly in balance, and we continue to expect global oil consumption to grow by 1.4 million barrels a day in 2018. So when you put all of this in context, we've got relative balance in global supply and demand. We've got constraints to shale production growth. It's not that producers here need any more motivation to produce more. There's a limit to how much, physically, they can produce. There's a lack of long-lived project spending, which has been going on now for six or seven years, and

we've got continued global demand growth. We think this should lead to continued price volatility. And at this point, we are particularly vulnerable to an upward price shock, particularly if the United States presses and is successful in causing Iran's exports to be substantially curtailed.

Right now, our own judgment is, the market is assuming that we're going to lose only about 250,000 barrels a day from Iran exports. As they export 2½ million barrels, that could easily be more. It would not surprise us to wake up one day and see the price spike up because of either some miscalculation or other issue with Iran that curtails their exports. So we are worried about tariffs, but we probably add to the watch-out list this issue of a sudden price spike in oil. It may not happen. We're hopeful that it won't, but we're vulnerable to it.

Now, our analysis also suggests that in the short run—obviously, it goes without saying—it'll hurt consumers. If you go a little bit longer in the medium term, because the United States is approaching energy independence—we're not there yet, but we're going a long way—this will ultimately be balanced out by higher cap-ex and higher activity in the oil and gas sector, not without some political stress. But in the short run, I think it's just something to be aware of, because you could see it bite one of these days, particularly if there's some type of miscalculation or depending on how these geopolitical issues unfold.

Regarding the U.S. economy, it's our expectation still that real GDP growth in the United States will be approximately 2.9 percent in 2018. That's similar to our outlook at the previous FOMC meeting. We continue, at the Dallas Fed, to expect real GDP growth to slow in 2019 and taper down to potential, as was discussed earlier today by David Wilcox. We continue to agree that we're going to taper down to potential growth in 2020 as the fiscal stimulus fades and monetary policy accommodation is removed. We continue to be concerned by sluggish

workforce growth due to aging, lagging education and skill levels—which we believe are affecting productivity—and, as I mentioned earlier, government debt to GDP going from being a tailwind in 2018 and '19 to potentially being a headwind, as was discussed in the Tealbook.

It is our own view at the Dallas Fed that the shape of the yield curve is very consistent with this narrative, and we think it helps explain why the yield curve is flattening. We can debate—and we do debate—what the implications are of an inversion, but it's clear to us the bond market, at a minimum, is saying we are late in the business cycle. It doesn't mean we're at the end of the cycle, but we're late cycle, and it is raising issues, we believe, about sluggish outyear growth, which are worth paying attention to.

While the unemployment rate rose from 3.8 to 4 percent in June because of an increase in participation, we don't expect that to continue, and we expect the unemployment rate to fall into the mid-3s over the next year. We continue, though, to have an ongoing discussion—at least my staff—as to the question, is there more labor slack? People on disability. People maybe will work longer than we're expecting. Previously incarcerated. People who are late bloomers and haven't entered the workforce and are living at home. We're continuing to scrub to try to ask the question, could we grow faster without creating inflation pressures? I must say, I continue to be skeptical, but we're continuing to ask this question to see if there's some way, maybe, potential growth could increase at the moment. As I just said, I continue to be skeptical.

While we note that there's little evidence of much nationwide rise in wage growth in the June data—and we pay attention to a lot of the wage trackers, particularly the Atlanta Fed's wage growth measure—we think this puzzle is something we will continue to study, and we still believe that cyclical wage pressures are building. But, again, as I mentioned earlier, our contacts

are saying, particularly with small and midsize companies that don't have other ways to cope with it, we're going to see more wage pressure.

Last comment on the Dallas trimmed mean inflation rate. The last reading of the Dallas trimmed mean—for June—was 1.8 percent. This will be made public on Friday. But with some of the data revisions that just came out, we would expect this number to get rounded up to 1.9 percent. The key for us is, we now feel more strongly that by year-end, the trimmed mean number will hit 2 percent. And we feel more confident of that than we did in the previous meeting. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Evans.

MR. EVANS. Thank you, Mr. Chairman. Reports received from my directors and other contacts were similar to those of our previous round. Activity is strong, the labor market is tight, and worries about trade policy are widespread. One indicator of the strength in demand is that consumers seem to be shrugging off higher energy prices. United Airlines reported robust demand despite the pass-through of higher fuel prices to airline fares, and Discover Financial noted that consumers are spending more on gasoline but not cutting back on other purchases.

The labor market is also strong. Our contact at Manpower said that their managers with decades of experience report that conditions are as tight as they have ever seen. Manpower is making some customer segmentation choices. The business translation is that they will no longer accept orders from clients who are unwilling to raise wages enough to make recruitment feasible. That said, Manpower reported that nominal wage growth has only picked up a little. Firms continue to be restrained. Only a few say they will do whatever it takes to find workers.

Continuing a theme from the past couple of rounds, trade policy is weighing on otherwise buoyant sentiment. Midwest farmers and their bankers are concerned about crop prices that have

in effect been driven lower by tariffs. Outside the agricultural sector, an insurance contact with significant investments in middle-market companies reported that many of these firms are delaying investment because of trade-related uncertainty. However, most other contacts said that business spending has not yet been reduced by such uncertainty.

Regarding the national outlook, our views on growth haven't changed much. The strong incoming data led us to boost our 2018 real GDP growth forecast a touch, to 3.2 percent. Our forecast for 2019 and '20 have not changed. We continue to expect growth to slow to 1.9 percent by 2020, which is a shade below our estimate for potential output growth at that point. We also raised our unemployment rate path one-tenth in light of the recent data. Similar to the Tealbook, this just reflects some adjustment at the margin between the unemployment and participation rates. We haven't changed our overall view on labor market slack.

As an aside, I am becoming increasingly concerned about the extent of public misunderstanding of the difference between the incoming data on economic growth and what is the sustainable pace over the longer run. I know many of us have spoken about this distinction in the past, but I think now is a good time to stress it even more in our public speaking. I think President Bullard's comments about lower output growth expectations are in line with this type of helpful commentary. We're going to receive some criticism as we raise rates further. Still, it's better if more people understand that our monetary policy actions are squarely aimed at guiding the economy along a sustainable growth path and that monetary policy can do little to alter that path.

Our outlook for inflation has moved up a touch, and we now have core PCE inflation reaching 2.2 percent in 2020, but I think it is very unlikely that inflation will be much higher over the forecast period—say, above 2½ percent—on a sustained basis. Even though many of

our forecasts have the unemployment rate running 1 full percentage point or more below its natural rate, the flat Phillips curve means that this boosts inflation two- or three-tenths at most. And dollar appreciation and low inflation expectations are still downside factors. So I'm not seeing anything in the outlook at odds with our symmetric 2 percent inflation target.

I'd like to finish by describing some work that my staff did to analyze the slope of the yield curve as a recession indicator. We started by following up on the analysis done by Eric Engstrom and Steve Sharpe—it was featured in the June Tealbook—and decomposing the slope into short- and long-term spreads. We then used our dynamic term structure model to divide the 2-to-10-year spread further into its component parts: a real rate risk premium spread and an inflation risk premium spread. So we're trying to add information about the kinds of risk market participants are pricing.

Like Eric and Steve, we find that the short-term spread is the most powerful predictor of recession risk, but the real rate and inflation risk premium spreads are also statistically significant. Our model's current estimate of recession risk over the next year is low, around 15 percent. So it's close to the unconditional probability of a recession.

This decomposition delivers another interesting insight—namely, increases in the long-term real rate risk premium spread, which steepen the yield curve, are also associated with an increased risk of recession. This means that modest increases in the yield curve slope may not always be a good thing. Our estimates of the long-term real risk premium spread did rise some in 2013 but have been moving sideways since. So, according to our model, the market sees this source of recession risk as having been pretty stable.

I believe this exercise is a useful reminder that it's important to take a careful look under the hood and understand the economic factors that underlie any particular configuration of the

yield curve. And no matter what any yield curve analysis tells us, we also need to look at a wide range of other economic indicators for corroborating evidence. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Harker.

MR. HARKER. Thank you, Mr. Chair. Over the intermeeting period, growth in the Third District remained moderately positive. Firms continue to hire, and the unemployment rate for our three states is converging to that of the nation. Manufacturing continues to grow, as does our service sector. The main sector that is not sharing in the overall economic expansion is residential investment, with little growth over this year.

Employment growth has remained positive but has slowed, with the three-month moving-average growth rate declining to 0.3 percent in June. However, certain sectors, such as manufacturing, eds and meds, and professional and business services, are increasing employment at a very healthy pace. The unemployment rate continues to decline and, at 4.3 percent, is more aligned with that of the nation.

As well, we are seeing very few pockets of high unemployment, so job growth appears to be broadly based across the District. Some MSAs, for example, have achieved historically low unemployment rates. We are hearing increasing concerns over the shortage of labor, with firms making multiple offers in order to make a hire and one firm actually closing because it just simply couldn't find workers. Staffing companies are seeing strong growth as well, and businesses are using them as a way to test-drive workers before making a permanent hire. Our directors are universally talking of nominal wage growth at their firms and are uniformly puzzled that this is not being picked up in the aggregate numbers.

Manufacturing in our region is growing strongly, with our general business activity index well above its nonrecessionary average. Additionally, we are seeing some of the highest

readings on prices paid and prices received in series history. The prices received index has not been this high since June 2008, and one has to go back to February 1989 to find readings on the prices paid index that were this elevated.

However, firms in both manufacturing and services appear less optimistic regarding the future. Tariffs are adversely affecting a number of establishments, and the ability to pass through increased costs for steel and aluminum seemed to vary considerably among our respondents. For example, one firm is shifting over to steel made in South Korea but recognizes that shift is going to take time, and it's going to hurt in the short run.

Residential real estate is the only sector in which growth is muted. Permits remain flat, and contacts in the region are not looking for much of a pickup. Now, supply constraints are definitely part of the story, with available lots scarce and long waits to get building approvals. With the exception of Philadelphia, house prices are growing rather modestly. However, at an 8.4 percent increase in home prices as measured by the May CoreLogic index, the Philadelphia Metro Division has, for the first time since the start of the recovery, exceeded national house price appreciation.

Now, regarding the national economy, I see little basis on which to quibble with the Board staff view, although I continue to believe that the funds rate path in the Tealbook is overly aggressive. The risk to my outlook has, however, increased, and the scenario regarding the effects of a trade war is concerning. Currently, we appear to be in somewhat of a "sweet spot," as far as policy is concerned, but a significant rise in trade tensions could adversely affect that position. So I encourage the staff to continue to monitor the possibilities of a trade war and to continue to provide trade war scenarios as information is received. This type of exercise definitely will factor into my overall policy position. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Mester.

MS. MESTER. Thank you, Mr. Chair. Incoming information from business contacts points to continued moderate economic expansion in the Fourth District. The Cleveland Fed staff's diffusion index of economic conditions declined in July, but this was from a very high level in June, and the average reading so far this year exceeds last year's average.

Business sentiment in the District remains upbeat. As has been true for the past couple of meetings, more than 40 percent of District contacts expect some improvement in business conditions over coming months. The vast majority of firms report they have not changed their plans or revenue outlook in response to concerns about escalating trade tensions and slower growth abroad.

A Cleveland staff analysis estimates that the announced tariffs on trade between China and the United States will have a relatively modest effect on District employment and gross state product, reducing each by less than 0.2 percent. These estimates do not include effects of the steel and aluminum tariffs or those being discussed on autos, and, of course, the effects would be larger if business sentiment deteriorates in the wake of continued uncertainty about the trade situation.

District labor market conditions remain strong. For the past two months, year-over-year growth in payrolls has exceeded 1 percent. This is a pickup from the average pace last year and earlier this year and is well above the District's longer-run trend employment growth. The District's unemployment rate was 4.4 percent in June, nearly 1 percentage point below the Cleveland staff's estimate of the District's natural rate of unemployment.

Firms continue to report difficulty finding workers, and this is affecting business. A trucking company contact reported that his firm has idle trucks because he can't find workers

with commercial driver's licenses. A manufacturing firm tied to the auto industry reported hiring workers with lower qualifications, hoping to adequately train them.

Wage pressures in the District continue to rise. About 40 percent of contacts reported raising their wages within the past eight weeks. Inflation pressures in the District continue to rise. More than half the District contacts and more than two-thirds of those in manufacturing reported increases in nonlabor input costs in recent weeks, with some of these increases driven by tariffs on steel, aluminum, and lumber. Many contacts reported they're raising their own prices in response in order to maintain profit margins, and some firms said that they've been able to increase their profit margins because of strong demand.

At the national level, the economy remains fundamentally strong. Personal incomes are rising, and household balance sheets are sound. Monetary policy and financial conditions remain accommodative, and fiscal policy will add to growth. Real GDP growth picked up significantly in the second quarter. Now, some of the pickup may reflect transitory factors like the surge in soybean exports, but both consumption and business investment were strong, suggesting some underlying momentum. While growth may step down in the third quarter, over the four-quarter horizon, I expect growth to be above its longer-run trend—which I estimate at 2 percent.

Labor markets continue to tighten, moving the economy further beyond maximum employment. Through June, monthly payroll gains have averaged 215,000 this year, up from about 180,000 last year and well above trend. The vast majority of measures show less slack in the labor market today than at the peak of the last expansion before the financial crisis. Wages and broader compensation are beginning to accelerate, although low productivity growth is likely to constrain the pace of increases. Under the growth outlook, I expect labor markets to tighten

further and the unemployment rate to move down, and I expect that, over the forecast horizon, the unemployment rate will remain below its longer-run level, which I estimate at 4½ percent.

The inflation news is positive. Inflation continues to firm, with recent total and core PCE inflation readings near 2 percent. And with measures of long-run inflation expectations broadly stable, I expect inflation to be sustainable near 2 percent over the medium-run horizon.

Provided we continue to move policy rates up gradually, consistent with our June SEP, I see the risks to the outlook as broadly balanced. Fiscal policy is expected to add to aggregate demand growth over the rest of this year and next year and is an upside risk to growth. There may be some positive effect on the supply side of the economy as well, but, based on past episodes, these effects are usually not very large, and they occur much later.

The trade situation is a downside risk. In addition to the direct effects of higher tariffs, there could be an additional effect due to the uncertainty surrounding trade, causing firms to postpone and possibly cancel some planned investment. However, at this point, the economy has been quite resilient in the midst of these concerns.

With respect to inflation, on the downside, inflation has been stubbornly below target, and that could continue. But the continued strengthening of output growth and labor markets poses upside inflation risk.

Fiscal imbalances need to be carefully monitored at this point in the cycle. Valuations are high, and, should we fail to remove monetary policy accommodation at an appropriate pace, financial stability risks will build.

I do not find compelling arguments that the flattening of the yield curve in and of itself should influence our policy choices. If the economy gets hit by a sizable negative shock—say, the bad trade scenario is realized—we will experience it in the context of a relatively flat yield

curve. Now, some will say, “See, the yield curve was flat, and we got a recession.” They will add another data point to those wanting to argue for a causal link and a structural relationship, and it will frustrate me. [Laughter]

Now, I acknowledge that there is a correlation between the slope of the yield curve and recessions. This correlation isn’t difficult to understand. The yield curve flattens when we begin to tighten monetary policy. Because long-term yields reflect expectations of future short-term interest rates, when the market expects the tightening to stop and perhaps be replaced by an easing, the yield curve can invert. This happens late in the cycle, which, by the way, is also when—almost by definition—recessions happen.

Today there are reasons to believe that the relationship between the slope of the yield curve and the state of the business cycle has changed. For example, estimates of the term premium embedded in long yields are lower than in the past. Note that our asset purchases were intended to do precisely that. And Tealbook B gives estimates that they’re currently lowering the 10-year Treasury term premium by 78 basis points.

At the very least, we need to redefine the slope at which we begin to get concerned. In any event, the message I take from the correlation is that, instead of curtailing gradual increases in the policy rate in the midst of a very positive outlook merely to avoid a yield curve inversion, we need to base our policy decisions on the medium-run outlook and strive to avoid the situation of getting behind the curve and having to play catch-up by raising short-term rates aggressively, engendering both a significant inversion of the yield curve and a recession. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Mr. Chairman. I continue to be optimistic about the outlook. Yes, the bump-up in growth in the second quarter seems likely to fade. But, like many—if not most—of you, I think the underlying pace of real GDP growth this year is going to remain solid, supported by fiscal policy, strong investment, and favorable financial conditions.

Despite many anecdotal reports of difficulties in hiring, it's been hard to identify signals of binding constraints on growth in the aggregate data. Inflation pressures remain subdued. Wage growth, although picking up, still remains well below the pre-crisis norm.

It was encouraging that the increase in the unemployment rate that we observed in June reflected higher labor force participation. Even this far into the recovery, only a year away from being the longest expansion on record, labor force participation remains depressed in some key demographic groups, including particularly prime-age males, for reasons that aren't well understood. But a recovery in participation in these groups would provide considerably more slack in the labor market and allow the economy even more room to run.

That said, I do think that we should continue to be open to signs besides inflation that the economy is overheating. As I mentioned last time, there are risks in pushing the economy into a place it doesn't want to go. Generally, we have relied primarily on inflation as a warning of the economy's discomfort. But we should be open to the possibility that the signal value of inflation has diminished recently or at least may be arriving with a considerable lag.

As such, we should be attendant to other indicators of constraints in overheating, in addition to inflation. Put another way, while I think that there's enough doubt around our measure of labor slack that we should not feel compelled to accelerate our tightening pace, I also think that there's enough doubt about inflation as an infallibly reliable measure of resource

constraints that neither should we slow our pace. Like pilots back in the days of radio beacons, don't chase the needles.

A significant increase in trade tensions remains a risk, though one that I think has diminished following last week's agreement with the EU and with the progress that appears to be being made in the NAFTA discussions before the end of the summer. Although the tariffs and retaliatory measures implemented so far are clearly meaningful for certain firms and industries, it seems unlikely that their effect on the overall economy is all that large. Investment remains strong. Surveys continue to show elevated sentiment among businesses and manufacturers.

Now, of course, a full-on trade war, as illustrated by Steve's presentation, could have severe implications for the economy, depressing near-term growth but also negatively affecting productivity, in part as the complex and integrated supply chains that underlie modern manufacturing begin to unravel, with consequences that are very difficult to predict. At this point, however, that prospect would seem to be fairly remote.

And just a word on the yield curve. I, for one, am not overly concerned about a potential inversion of the yield curve. Notwithstanding the predictive record of inversions for recessions in the United States, the evidence in foreign economies is considerably more mixed, suggesting that the link between inversions and recessions is not an immutable law of the universe. Additionally, there are reasons to believe that the present signal coming from the yield curve is likely being distorted by both our own large balance sheet and an increased global demand for safe assets. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Barkin.

MR. BARKIN. Thank you, Mr. Chair. The economy remains quite strong. I note especially second-quarter consumer spending and the continuing growth of employment at a rate well above population growth. And, as expected, inflation has come in at target.

The Fifth District economy is in a similar place. Our manufacturing and service indexes are quite high, and there are growing signs of supply constraints, rising transportation costs, shipping delays, and input cost increases. The theme of supply constraints carries over to the tight labor market, in which a shortage of qualified labor is the dominant concern for many firms, and some reference service-level challenges. Our regional surveys don't yet show widespread acceleration of end-user pricing, but their expectations for the future are rising. We'll see.

Like many of you, we've been digging into tariffs, recognizing that their duration and endgame are uncertain. I would say the price effect is real and pretty immediate. The headline example is steel and aluminum prices, covering not just the price of imports but also domestic producers, who, we're told, have raised their prices at the same time.

More broadly, as President Bostic said, any intermediate goods tariffs give producers confidence or cover to move prices. And even the toughest customers, some of whom we've talked to, tell us they're poking through invoices—they're not going to accept much, but they know, in the end, they're going to have to accept the pass-through of tariffs.

In contrast, we've talked to many who are facing tariffs abroad, and they see coming oversupply. Indeed, the most pessimistic executives I've met in my seven months here were those leading a major pork producer who reported significant drops in livestock prices and, I guess, doesn't quite know what to do with a lot of excess pigs. [Laughter]

With effects in both directions, I don't see much net effect on inflation, and this seems to match with the Tealbook baseline. But while the longer-term employment and investment

effects of these tariffs are uncertain, I do believe that the medium-term effects on employment and investment will be negative.

Supply chains are costly to reconfigure. Reconfiguration requires a lot of capital. Moves are hard to reverse. The uncertainty of the endgame means most executives tell me they have little option but to wait and see. In the interim, they tell me new investments are unlikely. And if your product is being tariffed, you will cut back employment on the margin while waiting to see how things play out.

More broadly, today is budget season. CFOs are setting their revenue targets and investment guidelines for 2019. As I speak to them, I ask them about their posture, and what I hear is that the tariff conversation is introducing a note of caution into what otherwise might be an aggressive plan. This runs the risk of damping growth next year.

Another potential effect of tariffs is on the banking system. The prevalence of contract farming in our District highlights the potential for spillovers from protracted trade conflict into agricultural lending.

Regarding the yield curve, like many of you, I have followed its day-to-day movements with some interest. In the past, the relationship between yield curve inversion and recession in the United States has been remarkable. However, we have been digging into the question of whether low term premiums may have implications for what the yield curve tells us today, and many of us have talked about the same topic.

In each of the past four business cycle expansions, the term premium has fallen to successively lower levels and is currently negative. All else being equal, a lower term premium will imply a greater likelihood of inversion. And under standard assumptions, a zero term premium would imply a yield curve inversion roughly half the time.

I'd note that the one false positive in the U.S. data in 1966 occurred at a time when the term premium had been fluctuating around zero for several years. This point receives additional support in international data. The Tealbook box shows a weaker relationship between recession and inversion in other industrialized countries, in which term premiums both are lower than in the United States and have declined from 1990 to 2009, as shown in work by Jonathan Wright in the *American Economic Review*. All of this is to say there remains a great deal we don't understand, and our stance on the yield curve might be driven by the extent to which we believe the low term premium itself is sending us a message.

While the yield curve and trade policy uncertainty have raised concerns about downside risks, a wide range of labor market indicators point to the risk of overheating. So I continue to watch nominal wage growth with interest. Our contacts clearly believe the labor market is tight, and wage increases are notable for new hires and for occupations like truck drivers, nurses, and construction. Yet overall wage increases are still only in the high 2 percent range. As I've said before, turnover matters. And to see substantial wage increases, we need to have higher turnover that would motivate higher increases for people who are job stayers.

I might note that corporations are focused on employee engagement today as they never were before. And if you think that what they're doing is sensible, you might say that some of these engagement efforts effectively increase costs while not directly raising the wages that we measure, things like training, or better facilities, or ropes courses, or one contact who has started "Beer-Cart Fridays." I would point out that "Beer-Cart Fridays" are a better predictor of future recessions than yield curve inversions. [Laughter]

It also seems reasonable that some of these efforts are helping firms retain workers and thus limiting the extent to which the tight labor market is driving increased attrition and,

therefore, increased compensation for job stayers. And, of course, there are limits. By the time we start to see “Beer-Cart Wednesdays,” we might be in recession. [Laughter]

CHAIRMAN POWELL. Thank you. Acting President Gould.

MR. GOULD. Thank you, Mr. Chairman. It’s an honor to be here, and I recognize I have big shoes to fill with John Williams’s departure. In John’s specific case, that means dozens of pairs of sneakers in any conceivable color and design. [Laughter] But I’ll do my best not to embarrass him—or myself, for that matter.

The national economy continues to power along. Even smoothing through the second-quarter surge, real GDP is expanding well beyond its potential rate. Similarly, employment growth continues to surpass its underlying sustainable pace, which is especially impressive this far along in the expansion. We expect the unemployment rate to fall further, bottoming out around 3½ percent toward the middle part of next year, and this labor market strength should support ongoing gains in wages and salaries.

One potential downside risk to the outlook comes from rising trade frictions. While concerned, my District contacts have not yet seen significant negative effects, and they remain hopeful that trade tensions will abate. There is also risk that the effect of the ongoing federal fiscal stimulus will fall short of consensus expectations because of the limitations imposed by an economy that’s already booming.

On the other hand, the upside risks are readily apparent, with an economy that keeps delivering positive surprises. Similar to several other comments, my business contacts are more worried about finding qualified workers for their job openings than by other threats to the expansion. Twelfth District labor markets are sufficiently tight, but small businesses in some sectors have scaled back their expansion plans.

In the Bay Area, one restaurant recently shuttered three locations after being unable to maintain sufficient staffing to keep them open and profitable. This is remarkable but perhaps not surprising, as the unemployment rate in California is already at a low not seen since the late 1960s.

On the flip side, very tight labor markets have been bolstering labor force attachment nationally, causing the participation rate to rise. This cyclical recovery has offset the downward pressure coming from the “silver tsunami” of retiring baby boomers. On balance, this has held the participation rate overall largely constant over the past four years. New analysis by my staff suggests that participation has essentially returned to its long-run trend. So, looking ahead, this means that additional cyclical increases are unlikely. Instead, we will begin to see the iron arithmetic of the baby-boom retirements show up in a gradually declining participation rate. This conclusion is in line with separate findings of the Board staff, the CBO, and others.

In separate work, my staff also explored some of the factors that have been holding down labor force participation beyond the effects of an aging population. They found the disappearance of traditional blue-collar jobs in manufacturing, due largely to outsourcing and automation, explains about half the decline in prime-age participation since the year 2000.

In conjunction with other research on declining prime-age participation, this work tells us not to expect a reversal of the underlying downward trend in participation. Overall, I see a national labor market and economy that are operating beyond potential and expected to stride further past it over the next several years. Inflation is already close to target, and growing resource constraints are likely to push it up further. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chairman. Labor shortages and trade policy concerns remain prominent themes from our business contacts in the Tenth District. Employment growth in the region has increased over the past six months in every major industry, with labor shortages cited by many District firms, particularly for low- and medium-skilled workers. These firms report that a lack of applicants is their primary challenge filling positions, followed by a lack of technical competency.

Construction activity is strong, with multifamily and industrial completions near levels last experienced in 2000. And our manufacturing and services surveys continue to indicate solid levels of activity, with many survey respondents reporting higher input prices as a result of tariffs, including higher prices for lumber, aluminum, steel, and other metals.

Consistent with the ongoing expansion, we are seeing state tax receipts across the region continue to rise. And, although state budgets look healthier than a year ago, longer-term challenges continue to face legislators as they weigh the need for higher spending on public health and public pensions with constituents' demands for more education and transportation funding.

Energy activity continued to expand in the second quarter, according to our energy survey, and expectations about activity over the next six months were also quite optimistic. Our contacts tell us that the oil price needed to substantially increase drilling rose to \$69 per barrel, compared with \$56 per barrel a year ago, in part because of rising oilfield costs. Finally, the agricultural sector has weakened further since the previous meeting, as the price of corn and soybeans dropped sharply.

Regarding the national economy, my outlook is little changed since our previous meeting. Although trade policy issues remain in focus, my baseline does not incorporate effects of

proposed tariffs or trade policy uncertainty. Last week's second-quarter GDP estimate points to continued strong economic activity. And with output moving further above potential, I expect the unemployment rate to tick down somewhat below 4 percent in the second half of the year.

As labor markets tighten and reports of labor shortages grow, I continue to look at resource utilization measures for signs of labor supply constraints along the lines highlighted by the staff's analysis in Tealbook A's alternative view box.

Employment growth over the past few years was enabled in part by a rising labor force participation rate of prime-age women. As their participation rate flattened about a year ago, rising participation by prime-age men allowed for continuing strong employment growth for about six months. Since the start of 2018, however, the participation rate for prime-age men has also flattened. Unless we see the participation rate of one of these groups resume its rise, it seems unlikely that we will continue to see strong employment gains for much longer. And although it is certainly possible that more prime-age workers will find employment, it's worth noting that the employment-to-population ratio for prime-age women has fully returned to pre-recession levels. And the same ratio for prime-age men, who face structural employment headwinds, has recovered 80 percent of its recessionary decline.

Understanding these labor market dynamics is important in judging the signals for wage growth measures relative to past expansions and what the moderate pace of wage growth tells us about the cyclical position of the economy. Certainly, a tightening labor market should boost wage growth, but I increasingly see other factors weighing on wage acceleration, including slower structural productivity growth during this expansion, a longer-term decline in the labor share of income—which has fallen in the business sector from 63 percent in 2000 to 56½ percent

in 2017—and nominal wage rigidities. These crosscurrents in the wage data lead me to put more weight on direct measures of labor utilization than on wages.

Finally, measures of consumer price inflation have increased this year and place inflation more squarely at the Committee's objective than it has been for some years, and I see upside risk to inflation. Rapid increases in raw materials costs are likely to pass through to output prices. The ISM input price index for manufacturing in recent months has been at its highest in seven years. Likewise, the index for prices paid by nonmanufacturing firms has risen in the past year. Firms increasingly plan to pass on the higher costs to consumers, as noted in the NFIB survey of small businesses, in which the percentage of firms planning to raise their selling prices moved up this year to its highest level of the expansion. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman. Moderate growth continues in the Ninth District. Most industries we talked to are expanding, especially manufacturing and multifamily residential construction, but sharp declines in corn and soybean prices are hurting the ag sector. Firms continue to report strong hiring activity but anecdotally continue to report difficulty finding workers, as the rest of you reported. There's some evidence of rising prices, especially for freight and logistics.

Regarding the national economy, solid growth continues: strong second-quarter real GDP growth of 4.1 percent. There's no evidence yet of a slowdown in job growth, which continues at around 200,000 jobs a month. Labor force participation has edged up further, but prime-age LFP remains notably below pre-recession levels.

Inflation has inched up since our previous meeting: Core PCE inflation is now at 1.9 percent. Inflation expectations have not moved very much, and, similarly, there has not been

much change in measured nominal wage growth, growing at around 2.7 or 2.8 percent in nominal terms, depending on your measure. Such slow wage growth is hard to reconcile with the view that current employment is unsustainably high.

I talk to, as I'm sure you do, a lot of labor economists around the country. And when I talk to both conservative and liberal labor economists, they both tell me the same thing: If the economy is creating jobs at 200,000 a month consistently in a modest wage growth environment, we're not at maximum employment. I find it interesting that both sides of the aisle are telling me the same thing, and it's pretty remarkable how consistent the 200,000 jobs a month is.

The discussion of capacity constraints to the economy reminds me of the discussion of peak oil about a decade ago. You know, at some point the world will reach its limit of how much oil it can produce. The idea that we're at a capacity constraint that doesn't show up in the price strikes me as pretty farfetched. If we are actually bumping up against capacity constraints in the U.S. economy, it needs to show up in inflation, or it needs to show up in wage growth—or it's just an imaginary concept. I just don't know what a capacity constraint is, absent price growth.

Now, regarding financial markets and the yield curve, there's been a lot of discussion of it. To me, whether there's a causal mechanism is less important than what it's telling us about the neutral rate. First of all, the notion of a causal mechanism—to me, it's, do we believe monetary policy affects the real economy? If we believe monetary policy affects the real economy, when we raise rates, we remove accommodation and that flattens the yield curve; when we move to a contractionary stance, that inverts the yield curve, and we can cause a recession.

I don't think that that mechanism is that mysterious, so, to me, the most important thing about the yield curve right now is that it's telling us that we're close to neutral. And if inflation expectations were picking up or if real growth prospects were picking up, they would be showing up as a higher longer-term interest rate, and they're not.

What I'm nervous about is our SEP path. The median dot plot is showing us blowing through neutral and moving to a contractionary policy stance, which will also mean an inverted yield curve. I'm less concerned about the inverted yield curve than the fact that we're going to move to a contractionary policy stance. And unless we see wage growth pick up or inflation expectations pick up, I don't see any justification for moving to a contractionary policy stance. That's where my concern lies.

In summary, we're very close to our inflation target. I think there's still slack in the labor market, and I think we're close to neutral. I am cautious about wanting to move to a contractionary stance. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. Vice Chairman Williams.

VICE CHAIRMAN WILLIAMS. Thank you, Mr. Chairman. Incoming data indicate the U.S. economy remains quite strong, with significant momentum entering this quarter. After stumbling a bit in the first quarter, consumer spending looks again to be off to the races, and business fixed investment also remains on a strong upward trajectory.

Consistent with the spending numbers, labor market conditions continue to strengthen. Payroll employment increases over recent months have been well above levels needed to maintain a stable unemployment rate over the longer run. The job openings rate remains near its historical high, and other indicators point to a very strong labor market.

Regarding inflation, the 12-month percent change in the core PCE price index is near our objective of 2 percent. It should continue to remain there for the rest of the year.

So, taken together, the recent data point to a picture of an economy that's heating up even as we progressively remove policy accommodation. Fiscal policy is providing significant stimulus, and, as the Tealbook emphasizes, the trend in global real GDP growth remains positive. I expect U.S. real GDP growth to be about $3\frac{1}{4}$ percent this year and to moderate to about $2\frac{1}{2}$ percent in 2019, still far above my estimate of $1\frac{3}{4}$ percent for potential growth.

So, consistent with this strong outlook for growth, I anticipate the unemployment rate will edge down to a touch below $3\frac{1}{2}$ percent by next year, well below my estimate of the natural rate of unemployment, and I see unemployment remaining around $3\frac{1}{2}$ percent through 2020. That's the strongest labor market we will have seen in 50 years.

With such a sustained tight labor market, I expect wage and price inflation to pick up further, producing a modest overshooting of our 2 percent objective in the next couple of years. And, so far at least, there are no incipient signs of a more rapid takeoff in inflation.

I see the risks to the outlooks for both real activity and inflation as balanced over the medium term. One upside risk to real GDP growth, which has already been mentioned, is that we may be underestimating the strength of the tailwinds that have been driving the stronger-than-expected growth that we've been seeing.

Counterbalancing this are two downside risks, one from the deterioration of international trade relationships and a second from a sharper-than-expected slowdown in the housing sector. Now, the Tealbook alternative scenario nicely illustrates some of the risks associated with a trade meltdown. Many others have talked about that today, so I won't go into that further. I will make a few comments about the possibility of a sharper-than-expected cooling of the housing sector.

Although house prices continue to rise, housing construction and sales appear to be showing signs of the adverse effects from increases in interest rates. Real residential investment fell in the second quarter, and housing starts, new home sales, and existing home sales have all declined of late, likely in part because of declining affordability, as both home prices and mortgage interest rates have increased. Although the medium-term fundamentals of the housing sector still look favorable, recent developments should prompt a little caution in this optimism.

Finally, I would like to raise an issue that may present significant challenges for us down the road—one that President Kaplan referred to—and that is the possibility of a reversal in fiscal policy in a couple of years. Now, I won't mention any cartoon characters but will instead point to the latest CBO current-law baseline, which shows that nominal discretionary outlays are essentially unchanged in fiscal year 2020 because of the reimposition of spending caps. This follows projected increases of nearly 5 percent in fiscal 2018 and nearly 6 percent in fiscal 2019, and this pattern represents a significant reversal of fiscal stimulus that would reverberate throughout the economy. Now, the Tealbook projection assumes that such a sharp deceleration in federal spending won't materialize. Nonetheless, it goes without saying that it is hard to predict how political and other factors could influence fiscal policy in the future, and we should keep this risk on our collective radar. Thank you.

CHAIRMAN POWELL. Thank you. And thanks for all your comments. I will add a few of my own. Overall, I see the baseline outlook as remaining quite strong. While downside risks may have increased just a bit, I continue to see the risks overall as roughly in balance.

First-half data say that real GDP growth appears to have accelerated this year and is running at a pace of around 3 percent, well above potential GDP growth. The second-quarter headline number was likely inflated by transient factors, but the underlying signal of continued

growth remains strong, consistent with healthy fundamentals and ongoing strength in household spending and business fixed investment.

The labor market, too, has strengthened. Payroll gains have accelerated this year to 215,000 per month, a level even further above trend labor force growth. Modest upside surprises in participation have limited the decline in the unemployment rate, which, at 4 percent, is now only three-tenths lower than a year ago despite quite strong job growth. Participation has moved around in a fairly tight range now for almost five years.

Offsetting the overall aging trend has been an ongoing rise in participation among different age groups. Time will tell how long that pattern can sustain itself, but, for now, I'm open to the possibility that it may reflect some structural factors, such as the continued rise in educational attainment of the workforce, in addition to cyclical factors.

Many of the indicators that we consult are consistent with a labor force that is at or beyond maximum sustainable employment. Still, prime-age labor force participation remains below 2007 levels, especially for men, and there's been no meaningful or sustained acceleration in wages over the past couple of years. These factors continue to suggest that the labor market is at least not overheated.

Regarding prices, the data have come in largely as anticipated, with headline and core inflation running near 2 percent. Lower readings on the Dallas trimmed mean and other indicators suggest that transitory factors may be pushing inflation up a bit, although I hear President Kaplan's forecast that the Dallas trimmed mean is returning to 2 percent. So while recent readings are much improved, they're not yet fully consistent with our goal of inflation moving for a sustained period in a range with 2 percent as its center.

The news on economic activity abroad has been a bit more mixed, as overall growth has slowed slightly, reflecting a broad softening among emerging market economies amid tightening financial conditions. Incoming data for the advanced foreign economies are generally consistent with the staff's earlier assessment that the first-quarter softness was mostly transitory.

Regarding the risks, the upside surprises in domestic output and payrolls suggest that growth this year may turn out to be even stronger than anticipated, particularly as fiscal policy support arrives. Trade policy developments, however, represent an offsetting downside risk. A trade war has the potential to slow down growth while pushing inflation up, as illustrated by the high trade barriers in the alternative scenario discussed in the Tealbook. The outcomes of our various trade disputes with our major trading partners remain so uncertain that it's not yet appropriate to incorporate them in the baseline. And the recent apparent rapprochement with the EU was unexpected and may be a positive development, but leaves many questions unresolved. It remains a risk that uncertainty could undermine confidence, leading businesses to hold off on investment or hiring.

While the stated purpose of the exercise is lower tariffs, there is a risk that these confrontations may ultimately produce a more protectionist trend, disrupting supply chains and reducing trade. If that does happen, it is likely to lead over time to lower productivity, slower growth, and lower incomes. On the international front, monetary policy normalization and trade tensions represent rising risks to emerging market economies. Taking all of that on board, I see the risks to the outlook as having tipped perhaps slightly to the negative but as still roughly balanced.

Looking ahead to tomorrow's discussion, this year both growth and job creation have accelerated, and inflation is running close to target. The real federal funds rate is still slightly

negative and well below most estimates of its longer-run neutral level. I view these conditions as consistent with continued gradual increases in the federal funds rate. While the outlook is perhaps a bit more uncertain, I view that as reinforcing the wisdom of moving gradually.

We can afford to leave the target rate unchanged at this meeting and see how events play out between now and September. If things do turn out roughly as expected, I would likely see it as appropriate to raise the target range for the federal funds rate another notch at that meeting.

And now that's the end of our round. I suggest that we proceed with Thomas's monetary policy briefing before breaking for our reception and dinner. Thomas, over to you.

MR. LAUBACH.⁶ Thank you, Mr. Chairman. I'm afraid I didn't prepare to fill the hour to five o'clock. [Laughter] But I'll do my best. I will be referring to the "Material for the Briefing on Monetary Policy Alternatives."

Following the significant changes you made to your postmeeting statement in June, alternative B at this meeting is a straightforward update of that statement. Assuming that you will adopt this alternative tomorrow, I will focus in my briefing on an issue that you will likely be confronting before too long. Today all three alternatives continue to state that "the stance of monetary policy remains accommodative." Should the federal funds rate continue to rise over time along a path similar to the median path of participants' June SEP submissions, you will need to decide at what point your statement should stop characterizing the stance of monetary policy as remaining accommodative. In this connection, I will also briefly touch on historical experience of raising the federal funds rate into restrictive territory and associated communications issues.

The most recent time the Committee faced this decision was 2005. One of the Tealbook boxes reviews the Committee's discussions before it ceased to characterize the policy stance as "accommodative" in the December 2005 statement. As you recall, the Committee raised the federal funds rate target from 1 percent to 4 percent between June 2004 and November 2005, and the accompanying FOMC statements continued to refer to monetary policy as accommodative. Early in the tightening cycle, there was broad consensus among Committee participants that monetary policy was accommodative, because the real federal funds rate was below most estimates of the neutral real federal funds rate at the time.

At the November 2005 meeting, the staff reported that indicators of the economy, including those shown in the top-left panel, had generally moved toward full resource utilization over the course of 2005. At that meeting, participants discussed

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

extensively the appropriateness of continuing to characterize the stance of monetary policy as accommodative. As shown to the right, the real interest rate, the black line, had reached the lower end of a range of model-based estimates of its neutral level, the red shaded region. Participants agreed that the usefulness of references to policy being “accommodative” had run its course, either because monetary policy was, in fact, no longer accommodative or because the uncertainties surrounding their estimates of the neutral rate were sufficiently large that an implicit reference to a neutral rate level was no longer helpful. At the December meeting, all FOMC members agreed to adjust the language in the statement.

Expectations of market participants for the postmeeting statements broadly tracked the evolution in the Committee’s views. The Desk’s Survey of Primary Dealers showed that for much of 2005, only a few survey respondents expected a change in the “accommodative” language in the next statement, but expectations for such a change firmed up following the release of the November minutes. By the time of the December Survey of Primary Dealers, more than three-fourths of the respondents expected the FOMC to change the characterization of the stance of monetary policy. Following the release of the postmeeting statement, investors appeared to interpret the removal as a sign that the end of the tightening cycle might be closer than they thought, and policy rate expectations beyond the near term edged down.

The top-left panel paints a picture of the economy in late 2005 in which gaps—for output, unemployment, and the real rate—uniformly appeared to be closing. Nonetheless, as noted in the middle-left panel, signs of upside inflation pressures were apparent in higher near-term inflation expectations and rising energy prices. As a result, the Committee signaled that “some further measured policy firming” would likely be needed to damp these inflationary pressures. The economic situation today is different. Core PCE inflation has finally moved up near 2 percent and the real federal funds rate is approaching the bottom of a range of estimates of its neutral level. But the unemployment rate is well below most estimates of its longer-run level and is anticipated to remain below it through 2020. The Committee may wish to raise the federal funds rate above its neutral level in the current tightening cycle to prevent resource utilization pressures from building further, balancing upside risks to inflation and possibly financial stability risks against the risk that the economy could tip into recession or that inflation would run persistently below 2 percent.

What is the risk that raising the federal funds rate above its neutral level might be followed by a recession? In an attempt to answer this question, the middle-right panel provides a historical perspective by plotting the real federal funds rate, the black line, against the range spanned by five statistical estimates of the neutral rate since the early 1980s, the blue shaded region. The red dashed line shows the real rate gap, calculated as the actual real federal funds rate minus the mean of the five neutral rate estimates. As shown by the red dots, four quarters before the onset of each of the past three recessions, the real rate gap exceeded 50 basis points. That said, the second half of the 1990s was a prolonged period when monetary policy was restrictive according to this metric, yet the economy kept expanding.

The bottom-left panel plots predictions from a model that uses the estimated real rate gap shown in the middle right to predict the probability that the economy will enter a recession at some point over the next four quarters. The model is estimated over the period from 1960 through the first quarter of this year. The predicted recession probability did increase notably before the three most recent recessions, though never above 40 percent. The modest variation in recession probabilities as the real rate gap increases suggests that estimates of the real rate do not provide much guidance on how far it is prudent to raise the federal funds rate.

In the current environment, characterizing the stance of monetary policy as “accommodative” implicitly provides guidance on the direction of the policy rate. As noted in the bottom-right panel, the challenge is to communicate how far the federal funds rate might be raised without significantly increasing the vulnerability of the economy to adverse shocks. As I mentioned earlier, when removing the “accommodative” language in December 2005, the Committee added the phrase that “some further measured policy firming is likely to be needed.” At the time, investors had placed high odds on a couple of more hikes beyond that meeting. At present, the statement expresses the expectation that “further gradual increases in the target range . . . will be consistent” with the attainment of your objectives. A question that you will likely be confronting is for how much longer this language remains consistent with your policy intentions and your SEP submissions, and how you may want to amend your statement as you approach economic conditions at which you think this tightening cycle will end.

Thank you, Mr. Chairman. That completes my prepared remarks; the June statement and the draft alternatives are shown on pages 2 to 9 of the handout. I will be happy to take any questions.

CHAIRMAN POWELL. Questions? President Kaplan.

MR. KAPLAN. I just want to make sure I heard you right. You said it isn’t that useful to estimate—did you mean the neutral rate or the real rate? You said the real rate. I don’t know if you mean that or the neutral rate.

MR. LAUBACH. No, the real rate gap.

MR. KAPLAN. The gap.

MR. LAUBACH. It’s simply, as you can tell, not—

MR. KAPLAN. You’re saying not very indicative.

MR. LAUBACH. —not an informative predictor.

MR. KAPLAN. Okay. Got it.

MR. LAUBACH. Not enormously informative—

MR. EVANS. Why do you say that? What are you pointing to when you say that?

MR. LAUBACH. I would conclude that on the basis of the rather modest variation in the probabilities here. I mean, this is quite different, say, from the standard charts. If you think of these types of charts that we show you when we use measures of the yield spread or things like that, we typically see that the spikes in recession probabilities before recessions move much higher—say, up to 80 percent or something like that. Whereas here, this variation—say, from 20 to 40 percent—is rather modest in comparison with other recession predictors.

MR. EVANS. Well, we could probably have a long discussion about that. You're putting a lot of weight on your probit model as your indicator of whether it's useful, whereas the right-center chart sort of shows that policy is above your range of the neutral rate, and then you take into account the fact that you're in a mature expansion. You're looking at other data as well. The red dots seem reasonable to me in the sense that you've got policy that's not accommodative. I don't know how restrictive it is. It just seems like we could have a much longer conversation about this before dismissing the usefulness of that, in my opinion.

MR. LAUBACH. I agree that the red dots, of course, tell you the story that, yes, the real rate gap was positive four quarters before the onset of recession. I suspect what is behind the fact that the probability doesn't go up all that high is that, if you want a number of false positives—in particular, in the mid-'90s you had a prolonged period when the real rate gap was at approximately the same level, yet the economy kept expanding.

Obviously, there is some level—and, again, I'm omitting here the earlier history of these theories, right? If you look back to the 1970s, clearly you see real rate gap levels of such a

magnitude that it's quite plausible that that real rate gap, in fact, was important in inducing a recession. But over this period here, it's not particularly compelling.

CHAIRMAN POWELL. Vice Chairman.

VICE CHAIRMAN WILLIAMS. Even if the results are not that strong, I do think that this chart that you show is actually helpful for a lot of the discussion that we have, because we tend to focus so much on the issue of the yield curve. I think what we're really talking about is, is monetary policy so tight that it contributes to recessions? I actually do find this useful.

I actually have a different comment, and that was on the box on the removal of the “remains accommodative” language in 2005, which was very helpful. You made reference to it. But you said something—and it's also in the written version of what you said—that I wanted to probe a little bit. And that's this idea that there was some market reaction to the post–December 2005 FOMC meeting. In the event study, longer-term yields came down, and there was some reaction.

Do you think that today, the SEP interest rate numbers that come out every quarter might solve some of this problem about how market participants interpret this change of language? In other words, if we have the median dot showing whatever it's showing in terms of a rise in interest rates, that would maybe trump removing some of this language? Because back in 2005, obviously, we didn't have the interest rate projections. How should I think about that?

MR. LAUBACH. I would first quibble with one of the premises. I would look at these reactions here that are shown in the Tealbook as very small.

VICE CHAIRMAN WILLIAMS. No, I know.

MR. LAUBACH. So it didn't seem that that was a major misunderstanding in terms of—

VICE CHAIRMAN WILLIAMS. But there was a worry about it.

MR. LAUBACH. It's true, of course, that now the SEP dots are in the information set of market participants, and they would certainly look to them also for guidance. Nonetheless, the SEP numbers are, of course, a collection and summary of individual projections, whereas, arguably, the statement is a stronger reflection of the consensus of the Committee.

So it's difficult to say exactly in which direction market participants would interpret this. Just removing the accommodative language could be interpreted ambiguously. It could either be, this is a signal that the Committee is close to the end of the tightening cycle, or it could be a signal that there is a willingness to basically go into restrictive territory. So it's not obvious exactly how market participants would react to that.

MR. POTTER. But the other big difference is, there's a press conference. That's a big—

VICE CHAIRMAN WILLIAMS. That's what I was trying to say: If we take out some language but the SEP still shows, say, essentially the same rate path, and there's a press conference, which can explain what this is, that seems to be maybe a more favorable environment for making this kind of change than in 2005. And even in 2005, there wasn't much market reaction.

MR. POTTER. That's right.

MR. ROSENGREN. I had the opposite reaction to the SEP—if we remove the accommodative language before we get to what we estimate the neutral rate is, which we're now interpreting to be 2.9 percent, how does the public interpret that we're removing accommodative language if we do it with an interest rate that's lower than what we say we think the equilibrium rate's going to be in the longer run? Doesn't that complicate the communication? Because we have a median forecast in the SEP that defines "accommodative" as below 2.9 percent. So if we pick a time other than that, do you see a communication challenge? And, yes, we have other

ways to deal with it, but I think that the SEP will be a complicating factor. So I think the language doesn't stand by itself. I don't know how you would think about that.

MR. LAUBACH. I don't know whether this would be weaseling out of the problem, but I think many of you are on the record emphasizing uncertainty around neutral rate estimates. As I pointed out, that was also part of the 2005 discussion—some participant said that they thought that the uncertainty was so high that it was just, at this point, not wise to take a strong stand on whether monetary policy was still accommodative or not. So even though you have the point estimates out in the public, my guess is that most observers are very much aware that these individual estimates are surrounded by very large ranges of uncertainty.

MR. ROSENGREN. I mean, that's our best point estimate, presumably. So if we remove the language before the funds rate reaches our best point estimate, we can say there's a large standard error around this estimate. I still think it seems a little incongruous.

MR. LAUBACH. I could now take a somewhat literalist approach and point out that in 2005, actually, the statement was a little more guarded in how it described the stance. Namely, it said that “the Committee believes that . . . the stance of monetary policy remains accommodative,” whereas today your statement states it as a fact: “The stance of monetary policy remains accommodative.” No beliefs and no judgment. [Laughter] It is stated as a fact.

So I don't know whether that would help in that context, but I think it would be a defensible position to say, “We think that at this point, it's prudent to no longer pronounce on exactly whether the stance of monetary policy is accommodative or restrictive, because the range of uncertainty is just pretty large.”

MR. POTTER. Thomas, the other point is, the r^* that you're producing comes along in 2023 and 2024. And the current estimates are the short-run r^* —I don't want to get into all of the

different versions, but the short-run r^* could be lower than that. If you look at the surveys that we do, they haven't moved up, but they are lower than the implicit 0.9 that you have in the SEP.

MR. ROSENGREN. I don't think what you just said is a straightforward communication to the public, to be honest.

MR. POTTER. That's why you have the press conference.

CHAIRMAN POWELL. Governor Brainard.

MS. BRAINARD. Well, I do think it's very important for us to make clear in our communications that that long-run federal funds rate is not equivalent to the shorter-run or medium-run r^* . I mean, we always get a medium-run r^* estimate in the monetary policy discussion in the Tealbook. I think we distinguish in our own thinking.

What I would hate to see is an effort for the Committee to agree at any point in time, do we have a consensus view about what short-run r^* is? I mean, this would put a lot of burden on precision in this Committee to keep estimating where we are relative to a concept that we may not agree on precisely where that is. I will argue tomorrow that I think it's better to get rid of it sooner rather than later so that we don't have to be precise about whether we have an agreement about an unobserved variable in the short run.

CHAIRMAN POWELL. By the way, I think you can explain this ahead of time and let people get used to the idea, which would certainly help. President Barkin.

MR. BARKIN. I just think it might be useful. It feels to me there's where we are today, there's "we're getting close," and then we're going to stop talking about it. And it's probably worth getting the language together for the three of them as a package. Maybe it's the "for now" language. Maybe it's the "further gradual increases may still be warranted." But it would be

very helpful, I think, as we get closer to this to see all three of them and how we're going to lay it out.

MR. LAUBACH. I'm afraid that "see all three of them" would—

MR. BARKIN. We have language right now?

MR. LAUBACH. Yes.

MR. BARKIN. Oh. You're suggesting there's transition language, which is whatever version of "we're getting close," and then there's the language that we use when we actually think we're at whatever the number is.

MR. HARKER. Or just drop it altogether.

VICE CHAIRMAN WILLIAMS. Yes.

MR. BOSTIC. Is that what you're suggesting?

MR. BARKIN. I thought the 2005 suggestion felt very much like transition language to me.

MR. LAUBACH. Okay, I think I should clarify. My briefing approach was premised on the notion that there's one decision on when you want to remove the "remains accommodative" language, but then there is the other issue that you already have currently in the statement, which is that it talks about further gradual increases. That provides some guidance.

In 2005, the Committee essentially started providing that guidance at the time when it took out "remains accommodative," because then it was talking about some further measured policy firming. At some point, you will also have to revisit the "further gradual increases" because, well, "increases" means at least two [laughter]. So at some point, you'll have to consider when you want to be less firm on that point.

CHAIRMAN POWELL. President Bullard.

MR. BULLARD. Thank you, Mr. Chairman. And thank you, Thomas. I think this is a good analysis. I just wanted to look at this “Recession Probability Based on Real Rate Gap” picture here, in the bottom-left part of the exhibit.

I think the 1990s are a very instructive period for the Committee today, and 1995 was a point at which the Committee had normalized rates quite a bit following the early ’90s recession. There was a recession scare, actually, in the first half of 1995, and the Committee stopped raising rates and went to a policy of reacting to incoming events.

So if you look at this real rate gap measure, as you say, it doesn’t really tell us very much about when the recession was going to come, so there are a lot of false positives. But what does actually send a good signal is the yield curve during this period, the second half of the ’90s, when the yield curve remained positive through most of this period. The spread between the 10-year and the 2-year rates was between 50 and 100 basis points, fluctuating around. The Committee moved the policy rate up and down at various junctures. One juncture was the Asian currency crisis. Eventually, the yield curve did invert, and then we got a recession. Now, you could say, well, that was just late in the business cycle or something like that. But this went on for five years, and it was a booming economy for five years. And it’s just implausible to me that the recessionary shock just happened to show up at the moment that the yield curve inverted.

So this is why I think that there’s more to the yield curve inversion story—the signal that the market is sending us and the mismatch between market-based expectations and what the Committee thinks—than just the idea that we’re somehow late in the cycle and, therefore, more susceptible to shocks. So that’s my take on this.

CHAIRMAN POWELL. Further comments? [No response] All right. We will adjourn, and we’ll meet in the elegant West Court Café [laughter], as usual, at five o’clock, at which time

it'll be ready. And thanks, everybody. Look forward to picking this up at nine o'clock tomorrow morning.

[Meeting recessed]

August 1 Session

CHAIRMAN POWELL. Good morning, everyone. We're going to start off now—one minute early, I have to say—with our monetary policy go-round. And we're going to start with Vice Chairman Williams.

VICE CHAIRMAN WILLIAMS. Thank you, Mr. Chairman. I support alternative B as written, something I sense I'll be saying a lot.

After Friday's real GDP release, the economy appears to be performing even better than we'd been expecting at our previous meeting. The near-term outlook is favorable, and risks are balanced. We're as close to achieving our dual-mandate goals as likely we'll ever be. This argues for staying on the path of gradual removal of accommodation that we've been on these past few years. Barring any dramatic change in the outlook, I fully expect that a rate increase will be appropriate at our next meeting. And, again, assuming the economy performs about as expected, I anticipate that another rate hike will be appropriate in December.

In this case, we enter next year with a target funds rate that is nearing the range of estimates of the longer-run neutral rate, and this is entirely appropriate in the context of an economy with a 4 percent unemployment rate and inflation at our 2 percent goal. And the prospect of closing in on the neutral rate stance late this year means that we will need to revisit in coming months our statement language that says “the stance of monetary policy remains accommodative.” We had an early preview of that discussion yesterday afternoon, and I found that helpful, but I also found the discussion in the box about removing the language in 2005 instructive.

When I think about this issue of this language, I look ahead to where we will be at some point in the future and try to work backward from there. And when I look ahead in that way, I

honestly cannot imagine a situation in which we would want to replace this language with a formulation that says that policy is restrictive. Therefore, the plausible end game is one in which the accommodation sentence is just removed. So then the question that comes up, which we started discussing yesterday and we discussed back in May, is how best to transition to this desirable end point.

One possible solution is to move in small steps, perhaps by adding the modifier “somewhat” before “accommodative.” I don’t see this as particularly advantageous for several reasons. First, such a change would seem to overly stress the precise value of the neutral rate as a guide for our policy decisions. As we’ve discussed many times, there’s a great deal of uncertainty about the level of the neutral rate, making it nearly impossible to speak with any confidence about the relative stance of policy once the funds rate starts to near 2 percent.

Second, I don’t think we have a clear consensus here on the Committee on what is meant exactly by the expression “accommodative policy stance” at this juncture. For example, are we talking about short-run r^* or the long-run r^* that shows up in our SEP? Do we include the effects of the balance sheet when we think about a policy being accommodative? Do we include the fiscal stimulus in thinking about policy being accommodative? These are all differences of views or opinion about what this word means, but the fact that there isn’t a strong, clear consensus—I think that makes this phrase problematic for communicating our policy intentions in the future.

Third, I see the neutral rate as only one of the many factors in our policy decisions over the next few years. Honestly, we will be more focused on what’s happening with inflation and unemployment, implying that we should not overemphasize the relevance of the neutral rate as we go forward.

Finally, I'm not too concerned about a market reaction to deleting the sentence in one go. After all, we made several substantive changes in the statement in our previous meeting, and that generated very little market attention.

So, based on these considerations, I conclude that the best approach is to remove this sentence in one go—pull the bandage off, if you will. And in terms of timing, my concern is that the longer that we keep this sentence in the statement, the more the public will wonder and ask, what does it mean, what is to be inferred from this, and what implications does it have for our policy in the period ahead? Indeed, there's already a lot of speculation in the market that once we remove this “accommodative” language, that means that we've completed the tightening cycle and perhaps we'll take a pause. So I think that the longer this sentence is in there, the more problematic it is for our communication of our policy strategy and our policy outlook. And, again, I think that argues for not only deleting the sentence in its entirety, but also doing that relatively soon. Thank you.

CHAIRMAN POWELL. Thank you. President Bullard.

MR. BULLARD. Thank you, Mr. Chairman. I support today's decision as written in alternative B. I think we're in good shape for today, but I also think that the general strategy laid out by the Committee is coming under increasing pressure, as the market does not see as much inflation risk over the forecast horizon as the Committee does. In my view, the burden will be on the Committee to be able, credibly, to cite inflation risks for the period ahead.

With the Phillips curve as flat as it is, it will be difficult to uncover enough rocks to find these risks. The alternative scenarios section of the Tealbook found no scenarios under which inflation meaningfully exceeded the inflation target. This means that even relatively large

shocks that are adverse from an inflation perspective can easily be handled by the Committee. This suggests to me that there's no need to be preemptive in the current situation.

Why is this happening? A good way, in my view, to think about the Committee actions during 2017 and 2018 is that we have already been preemptive with respect to potential inflation threats. We have already raised the policy rate substantially, on the order of 175 basis points, while inflation was still below target. We began to normalize the balance sheet during this same period. These preemptive actions have snuffed out inflation risks over the forecast horizon. The risk now is that taking even more action against incipient inflation at the September meeting and beyond may be overkill and may increase the risks of an end to the expansion. This is the message that the market is sending through ongoing yield curve developments.

I think the market view is about right. Growth in the economy is likely to slow over the forecast horizon. Market-based inflation expectations are muted. Global yields are low and unlikely to move higher. This constellation of data suggests that we are at a neutral level of rates today, putting neither upward nor downward pressure on inflation.

The September meeting is shaping up to be an important one, because the Committee seems prepared to move at that juncture and will likely send a signal that a further December increase is essentially locked in through the SEP. Accordingly, the September move will be priced in as 50 basis points instead of 25, with an option to do more. Indeed, markets already put a high probability on two further moves in the second half of 2018.

Our problem is that, in the current environment, it will be quite difficult to get off this train. What is the stopping rule for this Committee? How much more inflation risk has to be squeezed out of the system? Haven't we already done this? And what about the risk of pushing too hard and ending the expansion prematurely?

On the yield curve question, many are arguing, both inside and outside the Committee, that this time is different. But this argument has been made before. Prudent policy would respect the signal being sent by markets and adjust our approach to policy accordingly. As I noted yesterday, there are simple and compelling alternatives in the Tealbook, including adopting an asymmetric loss function, under which one does not worry about forcing unemployment up toward a preconceived notion of the natural rate of unemployment. If we remain with our current ideas that unemployment has to rise before we can claim to be at neutral, I do not see a natural stopping rule for the Committee until a recession occurs. Unemployment is unlikely to rise into the 4.5 to 4.8 percent range slowly, according to historical experience. Instead, we may keep raising rates until a recession occurs, at which time unemployment will increase very substantially, on the order of several hundred basis points.

Adopting an asymmetric loss function would get us out of this trap. What we should do is monitor inflation more directly instead of indirectly through unemployment or real GDP developments. A good start on this would be to monitor market-based inflation expectations directly, for instance, and not worry as much about the state of labor markets or the state of economic growth. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Mr. Chair. I support alternative B. Not surprisingly, the market currently anticipates a very low probability of tightening for this non–press conference meeting but a very high probability for a tightening in September. This is quite consistent with a continued gradual increase in interest rates. With inflation at target and labor markets tightening well beyond my estimate of full employment, I believe that we should continue to tighten gradually, and that we will need to continue gradually tightening for some

time. The lack of immediate inflation pressures, in a situation of an apparently flat Phillips curve, gives us the flexibility to move more gradually than we have in the past, when inflation concerns became acute more quickly.

While gradual increases still remain appropriate, we are running the risk that the unemployment rate falls to around 3½ percent, as much of the Committee expected in the most recent SEP. Inflation pressures and financial stability might be subject to more-nonlinear dynamics. More rapid increases in inflation or more quickly unraveling financial stability would make it more difficult for us to move only gradually.

Previous periods in which the economy fell substantially below estimates of the natural unemployment rate for a year or more have been very good indicators of subsequent recessions, maybe even better than an inverted yield curve. In our current SEP—which is, of course, based on appropriate policy—we assume that we can fall well below the natural unemployment rate for an extended period without causing imbalances that ultimately lead to a recession. This time may be different, but I am skeptical, and I believe that there is substantial risk that allowing the economy to fall much further below our estimate of full employment will increase significantly the risk of a recession. And should we have a recession, we also run the risk of a deeper-than-normal recession for reasons discussed yesterday. That is, I am concerned that both monetary policy and fiscal policy are sufficiently constrained that they will not have the ability to stabilize the downturn as effectively as we have historically.

Just a couple of comments following up on the discussion yesterday. Actually, unfortunately, I think it would have been good to have that discussion go on a little bit longer than it actually did, because I think it is important to think about the timing of removing the word “accommodative.” Good communication ideally would have the SEP, the press conference, and

the statement all well aligned with one another. Removing language as soon as September will force us to explain why we are not accommodative any longer when our forecast has GDP growth above potential, unemployment falling, and inflation gradually rising over the next two years. I would view a January removal of the “accommodative” language as more appropriate.

CHAIRMAN POWELL. Thank you. President Bostic.

MR. BOSTIC. Thank you, Mr. Chairman. I support the policy action in alternative B and have no comment on the proposed statement language.

As I said in the economy round, we had a strong second quarter. But I’ve also heard a lot from business contacts about uncertainty, especially related to trade policy, that makes them hesitant to make big bets on this run rate being sustained. Thus, this is a good juncture at which to pause, observe, and evaluate. Overall, the recent data have not caused material change in my outlook, and I still feel comfortable with a total of three 25 basis point moves this calendar year.

I will be keeping an eye on tariffs and the ability of firms to pass on these extra costs into final prices. As I noted yesterday, how the Committee communicates about such inflationary pressures could influence the public’s inflation expectations as well as expectations about the future stance of monetary policy. I hope we will have some more clarity about tariff policy and possible responses by the September meeting.

I will also continue to look for signs of increasing price pressures coming from the labor market. Like others, I have been getting regular reports of businesses having trouble finding workers, but most still tell me they are not increasing wages in response. More say they are doing that today than six months ago, and if this trend continues and strengthens, I will support a steeper federal funds path in coming months.

Finally, I very much appreciated yesterday's discussion. Like President Rosengren, I thought it was a good discussion about what our communications strategy should be as we get closer to a neutral policy stance. How we shape the public's and the market's understanding of our policy pivot is important, and, as I've said here before, many are looking to the Federal Reserve for stability and certainty. Especially in these times, we must take care not to undermine that confidence.

So in this context and in the context of the discussion that's gone before, I believe it's appropriate to remove the "accommodative" language at some point before the end of this year. I'm open to discussions about exact timing, and I think that will be an important decision point for all of us. In terms of articulating what the removal means, I might suggest that we view this as another step in the normalization process—that it makes no judgment about whether we think we have stopped being accommodative completely, but rather we're returning to an approach in which we let the market make judgments and view the market and the economy on their own. And I would say that we should also remind everyone that we are increasing transparency through the press conference process, and that would provide opportunities to gain more clarity as we move forward. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. Acting President Gould.

MR. GOULD. Thank you, Mr. Chairman. I support alternative B as written. Recent data confirm that the economic expansion continues at a robust pace and that we've effectively reached our inflation target. Most labor market indicators suggest we've already exceeded full employment. With the economy firing on all cylinders, inflation looks likely to move modestly above 2 percent over the next year or two.

Under these very favorable economic conditions, the language in alternative B is appropriately consistent with a gradual path of policy normalization. It conveys the message that there's been little substantive change in the outlook and that we remain on track to have additional policy rate increases.

Looking ahead, I am in favor of gradually raising the funds rate, at least until we're sure that the stance of monetary policy is no longer accommodative. Continuing our return to neutral is the clear next step. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Kaplan.

MR. KAPLAN. Thank you, Mr. Chair. I support alternative B as written. Based on my forecast, I believe we should be gradually removing accommodation and moving toward a neutral monetary policy stance. For me, that's somewhere in the range of 2½ to 2¾ percent.

On the basis of that, I would think that September, for me, feels a little bit too soon to drop the “accommodative” language, and I think it would be easier to explain to the public if we did that in either December or January. My fear would be, once we drop that phrase, we may give the impression that moves after dropping that phrase are “restrictive.” But I'm open minded to arguments on both sides of this, number one.

Number two, once we get to neutral, whether that's the first quarter or first half of next year, I am not yet convinced that we should be moving to a restrictive stance, but I don't need to make that judgment yet. I'd prefer to make that judgment at that time. The reasons for my caution are: first, the structural drivers we talked about—aging, sluggish productivity, and the fiscal problems that we face in the outyears; second, the consideration that our tools are asymmetrical. For me, almost the biggest conclusion I took from the forward-guidance and alternative policy discussion yesterday—it was a reminder to me that it's much easier for us to

tighten than to ease. And in the next downturn, we won't have fiscal policy, and we're going to have to be very creative from a monetary policy point of view. But, again, it emphasizes to me our tools are asymmetrical, which, for me, suggests we should be cautious as we remove accommodation.

I'm also aware that monetary policy acts with a lag. I think this is particularly tricky for us because we've got this sizable fiscal stimulus that we believe will fade, and I think, as we move into next year, the outlook may look different as this fiscal stimulus does fade. So I want to give us a chance to assess what we've done once we get to neutral and also give us a chance to see more clearly as fiscal policy effects begin to fade sometime next year.

Regarding the yield curve, one last comment. We will, I am sure, continue having the debate on inversion, and this is a debate in which there is no answer. It will continue, and I think that's appropriate. For me, the part that I do have conviction about is, the yield curve is saying to me at least that we are late cycle—not the end of the cycle, but late cycle. It also says to me that the market expects growth to moderate in 2019 and certainly in 2020. It obviously says something about the global search for safe assets.

For me, I am not so concerned if the yield curve inverts while we're accommodative. I would be much more worried, though, about an inverted yield curve if we were actually adopting a restrictive stance. So, again, I think that will cause me to be more cautious, certainly as we get to a more neutral stance sometime late next year or early in 2019. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Harker.

MR. HARKER. Thank you, Mr. Chair. I support alternative B as written. As I mentioned yesterday, we're in a bit of a sweet spot in the economy, and I am more confident that the return of inflation to target is not a transitory fact or phenomenon and, therefore, lean toward

a likely rate hike in September. And I believe an additional rate hike in December may likely be appropriate. But, as always, the data will be the final arbiter of appropriate policy.

On language, in terms of whether we drop the sentence or modify the sentence, I think September is probably, for my taste, a little too early. But there is an alternative between September and December that we might want to consider that we could put on the table. And we have a couple of options, I think. One is to drop it, I mean, as Vice Chairman Williams talked about. The other is to modify the language—to use a technical phrase, fuzz it up a little bit. So one possible alternative is to say something like “The stance of monetary policy continues to support strong labor market conditions and the achievement of our 2 percent symmetric inflation target.”

I worry a little bit about just dropping it—how the markets will react. We could say a sentence like that. I’m not saying exactly that sentence, but a sentence like that would give us some room to move, because I don’t like the directional components of this—that is, it’s accommodative, or it’s restrictive. I think we need, clearly, to remove that. But we could continue to say that we believe that policy is appropriate. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. Governor Quarles.

MR. QUARLES. Thank you, Mr. Chairman. When the time comes thousands of years from now, when all that is left of our civilization are the transcripts of the FOMC meetings [laughter], archaeologists will write learned tomes explaining that while it is difficult to say exactly what they were intending to accomplish, there was apparently one talismanic phrase that, when the priests gathered with the passage of the seasons in the temple, needed to be repeated verbatim before each priest began his final ululating chant: “I support alternative B as written.” [Laughter]

Holding the policy rate unchanged at this meeting is consistent with the gradual pace of tightening that I feel is appropriate. Inflation is at target, with few signs of overheating. We can be patient but steady in our withdrawal of accommodation.

On the question of the evolution of the phrase “remains accommodative,” I thought the Tealbook box and Thomas’s discussion yesterday were quite enlightening. It’s heartening to confirm that markets were able to adjust to such a momentous change in the statement language without the earth being hit by an asteroid. That was likely helped by an intensifying discussion within the Committee that showed through to the minutes. Because I have a relatively high estimate of the neutral rate of interest, with all of the caveats that Vice Chairman Williams would attach to that, and a policy rate that is mildly more gradual than the SEP median, I’m in somewhat less of a hurry to begin this conversation, but not tightly wrapped around the axle on timing.

I thought that the staff memo on recent developments in the federal funds market was interesting. It’s encouraging that markets reacted as we expected to our adjustment of the IOR relative to the top of the target range. That said, the narrowing of the spread between the effective federal funds rate and the IOR appears to be more persistent than we might once have anticipated. So the question is, is this narrowing telling us anything about the demand for reserve balances?

Now, from the memo and many discussions, I take it that the staff would be cautious in interpreting price moves this way. The quantity of excess reserves is still very large by historical standards. It seems unlikely that scarcity would be putting upward pressure on prices, but can we be sure? There’s a lot we don’t know about the demand for reserves, and we have admitted as much in our policy normalization addendum. I think the sentence was—in fact, I know it

because I have it written down here—“The Committee expects to learn more about the underlying demand for reserves during the process of balance sheet normalization.” I think we should be open to doing so.

One key area of uncertainty is the interaction of the post-crisis regime of bank liquidity regulation and reserve demand. It’s not only that we’re uncertain over the response of systemwide demand to the new regulatory framework, but this uncertainty is compounded by evidence that, in this new world, banks do not seem to have uniform preferences for the composition of their HQLA between reserves and other assets. Now, there could be a variety of reasons for that, including that the banks simply don’t know yet what they’re doing. It could be that, just as we are attempting to learn about banks’ preferences regarding reserves, the banks themselves are learning about their own preferences, raising the potential for volatility and unexpected shifts in demand.

So where does that leave us? In discussions regarding the long-run framework, the staff has presented a helpful graph that includes a demand curve for reserves that’s kinked between a steep portion, in which reserves are scarce, and a flat portion, in which reserves are abundant. Although this is a useful illustrative device, I do think we have to be prepared for a reality in which the underlying demand for reserves is fluid, is volatile, and evolves over time—which is to say that we should be prepared for the possibility that running down the balance sheet might not be quite as boring as watching paint dry. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President Evans.

MR. EVANS. Thank you, Mr. Chairman. I support alternative B. Economic fundamentals continue to be strong, and inflation is showing signs of remaining near 2 percent. I think it’s appropriate for monetary policy to continue to move gradually to a more neutral

setting. Alternative B indicates this approach is still appropriate. And the dot chart in the SEPs also provides helpful additional information about FOMC participants' views about future appropriate monetary policy, plus you have your press conference to explain this.

Should we take out the phrase about accommodative monetary policy? Yes, we should do that at some point. Should we say at some point that monetary policy moves to a restrictive stance? Probably not. I don't remember if we've ever done that before. Should we say that the policy will be supporting continued real GDP growth and inflation near 2 percent, along the lines of what President Harker mentioned? That sounds like that could be workable. I support the evolution of that phrasing, and I support alternative B. Thank you.

CHAIRMAN POWELL. Thank you. President Mester.

MS. MESTER. Thank you, Mr. Chair. On the basis of my outlook and assessment of risk, I believe it's appropriate for the FOMC to continue on its path of gradually raising the federal funds rate. Inflation is rising and is near 2 percent, and labor markets continue to tighten beyond sustainable levels of employment. In my view, the risks to the outlook are balanced. It's important that we calibrate monetary policy to the strong economy in order to sustain the expansion. Yet the current real federal funds rate is negative, and it's below the range of estimates of the neutral rate.

The lessons of earlier expansions both here and abroad indicate that it's difficult to engineer soft landings. As history shows, the costs of running an overheated economy for too long can be high if things go badly.

Now, over this expansion, the association between labor market tightness and inflation has been weak. While this has been a factor in the economy's undershooting 2 percent inflation over much of the expansion, it has provided a benefit in allowing us to follow a strategy of

gradually removing accommodation rather than having to move rates up more steeply. As the expansion has continued, we've been able to move the funds rate up at a considerably more gradual pace compared with past cycles. But a gradual pace doesn't mean no changes in monetary policy in the midst of an economy that continues to strengthen.

There are uncertainties. But it seems risky allowing things to continue too far beyond what the best available evidence suggests is maximum employment and inflation at our 2 percent goal. An aggressive response is not called for. But as we move further beyond estimates of steady state, imbalances can show up in financial markets and the macroeconomy. We need to calibrate monetary policy to lower these risks.

Now, we haven't prepared the public for a move today, and gradual increases don't mean rate increases each meeting. So I accept alternative B and the associated statement language. But if the economy continues to perform as anticipated, I will support increasing the funds rate at our next meeting, with further increases later this year and next year. And I'll support statement language indicating that gradual increases in the funds rate are warranted to sustain the expansion.

In my view, continuing the gradual removal of accommodation in the midst of a strong economy seems like a very good "investment in our future," and we should take steps to solidify this message with the public. Of course, if there's a material change in the outlook, monetary policy will need to respond appropriately.

Regarding the language in paragraph 3 on the Committee's assessment of the stance of policy, which Thomas Laubach discussed yesterday, I would imagine that market participants and the broader public are interested in that mainly because they use it to glean something about the Committee's views on the expected future path of the policy rate. So long as we retain the

language in paragraph 2 that the Committee anticipates further increases are likely to be warranted to sustain the expansion, then deleting the language on the stance of policy would seem to me less likely to change the public's policy expectations. That's one benefit of removing the language on stance sooner rather than later, while further rate increases continue to characterize the Committee's consensus view.

Another reason to remove it sooner rather than later is that, at some point, monetary policy may need to move beyond neutral in order to promote our dual-mandate goals, as suggested in the median policy rate path in the June SEP. Does the Committee want to be burdened with having to characterize its policy stance as restrictive? So here I agree with Vice Chair Williams that the answer is no.

Also, there are a wide range of estimates of the short-run neutral rate, which varies with the state of the economy and about which there are likely to be varying views around the table. I could imagine it might be easier to reach consensus on a policy rate decision than on a characterization of the stance of policy relative to neutral. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. President George.

MS. GEORGE. Thank you, Mr. Chairman. I support alternative B. Leaving the funds rate unchanged is consistent with the Committee's current strategy for gradually removing accommodation. With labor markets tight and inflation at the Committee's longer-run target, I see our policy choices growing more difficult over the forecast horizon. Judging the stance of monetary policy relative to an expected lower equilibrium rate will be clouded by fiscal stimulus, a large balance sheet and its lingering effects, and the uncertainties associated with trade policy actions.

Under the current outlook, I anticipate that it will be appropriate to next adjust the stance of policy at the September meeting. And although appropriate policy, in my view, calls for further increases in the funds rate to bring policy closer to neutral and to keep unemployment and inflation near their current levels, the flow of data will shape my view on how many and when we should proceed with future rate increases.

Along these lines, I continue to support adjusting the forward guidance in our statement, including the eventual removal of the word “accommodative,” in order to express greater data dependence and less certainty regarding the future rate path. Thank you.

CHAIRMAN POWELL. Thank you. President Kashkari.

MR. KASHKARI. Thank you, Mr. Chairman. I support alternative B. I may be an outlier in that I would support dropping the phrase “monetary policy remains accommodative” today. I’m not actually putting it on the table. I don’t expect that to happen, but I’d be supportive of it today. And I’ll talk a little bit more about that in a moment.

I continue to focus on three key indicators to gauge the appropriate policy stance. One is core inflation, the second is inflation expectations, and the third is assessments of labor market slack. Core PCE inflation is essentially at our target, and I think we’ve made real progress there. Inflation expectations are stable, but, I still think, somewhat low by historical standards. And slack remains uncertain. As I said yesterday, the economy continues to create 200,000 jobs a month, with fairly modest nominal wage growth. That suggests to me that slack still remains. So I think some monetary policy accommodation is still appropriate. But then moving to neutral, I think, is going to be important.

Now, when archaeologists thousands of years from now read our transcripts, I think they’re going to be most shocked by John Williams saying that r^* is not that important.

[Laughter] I think r^* is quite important, John, and assessing where we are relative to neutral is really where I'm focused. You know, the staff in the Tealbook says that the neutral rate is 0.5 percent. As all of us know, there's huge uncertainty associated with the models that create these numbers. So, what do we do? How do we make decisions in light of this uncertainty?

One option is, everybody has their own favorite model that we anchor ourselves to. A second is that we take the average or median of a bunch of models. I'm not sure that that's any more intellectually rigorous. Third, I'm looking at the yield curve as giving us feedback as to where the market thinks neutral is. I can't tell you that there's an exact science behind it, but it's as good as any of these other methods that I just described. So, to me, I think the markets are signaling—I think we've probably got one more hike before we flatten the yield curve, at least the spread between the 2-year and the 10-year rates that I'm focused on. And that suggests to me that the market thinks the neutral rate is somewhat lower than what the staff thinks in the Tealbook. Maybe the neutral rate is 0.25 real instead of 0.5. So, to me, I don't see any evidence right now that we should be moving to a contractionary policy stance.

I think I heard people around the table say that, at some point, we want to drop the word “accommodative,” but we don't want to put in the word “restrictive.” So we want restrictive policy—we just don't want to call it what it is. I think we should own it. If we're going to move to a restrictive stance, we should just wear it and say we're moving to a restrictive stance. I understand why that's not going to be a very pleasant thing to do, but I think we should own our policy position.

Now, I could probably support a hike in September because I think that'll probably get us to around neutral. What would I take to support further hikes beyond September, beyond neutral? One is if the long end of the curve starts to climb. And what would cause that?

Inflation expectations climbing or real economic growth prospects climbing—it would show up in the long end of the curve. Then we would not, in fact, invert the yield curve. And I think that that would support further rate hikes.

If the long end of the curve does not climb, what would it take for me to support more rate hikes? It would have to be a bout of much higher near-term inflation. Me, I'm thinking core inflation of 2.5 percent or above and some confidence that it continues to climb. And why would we raise rates then? I think we would raise rates then to make sure that inflation expectations remain anchored. But if the long end of the curve stays pegged at around a 3 percent rate, near-term inflation is 2.2 or 2.3 percent, and there are no signs that inflation expectations are unanchoring, I'm not sure why we would move to a restrictive policy stance. Thank you, Mr. Chairman.

CHAIRMAN POWELL. Thank you. President Barkin.

MR. BARKIN. Thank you. I support alternative B. The economy's performance continues to merit our persistence on the gradual path we've outlined.

On the memo, I agree we need to carefully plan the messaging as we approach neutral. We could choose to just remove the "accommodative" sentence, but I worry that if we do, we might inadvertently send a message that we are now knowingly restrictive, because we'll still have the sentence that says further gradual increases are coming. As several others have said, I believe there'll be at that time enough diversity of opinion in this room that we might want language that reflects those differences, as opposed to trying to characterize it specifically.

My instinct is that the end of the year would be a good time for us to do that, depending on how the economy evolves. It would be a timely moment to look forward and set expectations for the next year or so in coordination with our SEP forecast. At that time, we might well be

50 basis points higher, with the real rate gap around zero. And then we can use the press conference to send the right message about uncertainty regarding the outlook.

On a separate topic, I was struck by how negative the outcome of the tariff war looked in the Tealbook alternative scenario, especially as opposed to all of the other alternative scenarios that weren't anywhere near as negative. As I do believe significant and persistent tariffs—and even a broader set of them—are a real possibility, we may want at some point to devote further attention to what appropriate policy would be in response to a tariff-induced recession that, in parallel, drives a spike in inflation. That outcome is certainly not my baseline. But I do think we ought to be prepared for it as a possibility.

CHAIRMAN POWELL. Thank you. Governor Brainard.

MS. BRAINARD. Thank you. With strong momentum in underlying demand and fiscal stimulus in the pipeline, continued increases in the federal funds rate are likely to be appropriate to sustain full employment and inflation around 2 percent. The economy is continuing to expand rapidly at a time when we are at or beyond most estimates of full employment. Furthermore, we have yet to see the full effect of fiscal stimulus, which will likely keep the economy growing above trend well into next year.

While some overshooting is welcome, in light of the need to reestablish the credibility of our 2 percent inflation objective, there could be risks, as President Rosengren noted. For instance, if underlying trend inflation were to change unexpectedly—or unemployment rates that haven't been observed in 50 years—or, as discussed yesterday, if financial vulnerabilities were to rise, we'll need to strike a balance, and that may involve a somewhat steeper path than was readily apparent at the start of the year.

On the other hand, if trade disruptions or foreign shocks were to materialize and spill over in a meaningful way into the domestic economy, we should be prepared to adjust in the other direction. Presently, repercussions associated with possible future trade measures and their macroeconomic effects are too speculative and muted to call for any preemptive adjustment. Furthermore, the stimulus in the pipeline provides some insurance in the next two years against the economy being knocked off course by trade.

In the period ahead, the Committee will be probing the appropriate path of the federal funds rate to sustain full employment and re-anchor inflation expectations without generating imbalances that could jeopardize growth. Against that backdrop, I would recommend laying the groundwork today and in the minutes to eliminate the second sentence of paragraph 3, as suggested by Vice Chair Williams. Although that sentence served an important purpose early in the normalization process, when the economy was far from full employment and target inflation, its utility is no longer clear, and the scope for confusion is likely to increase. As we navigate forward, the appropriate benchmark for judging whether policy is accommodative could become increasingly subject to misinterpretation.

Currently, each Committee member reports on our expected federal funds rate path along with our estimate of the long-run equilibrium federal funds rate. As I noted yesterday, some Committee members may view the neutral rate of interest as elevated in the short and medium run relative to that benchmark due to temporary tailwinds, for instance, such as fiscal stimulus, that are projected to dissipate beyond the medium term. I certainly do. The neutral rate is an unobserved variable, and Committee members do not report our estimates of the neutral rate publicly. Most estimates have wide confidence bands around them.

The 2005 analogy presented by the staff yesterday suggests that we could seek to reach agreement among Committee members about the short-run neutral rate in order to remove the language just before the federal funds rate reaches that level. I think this is needlessly complicated to pull off and communicate. Instead, it would be simpler to signal, through the minutes, the language is no longer providing useful information and is likely to be deleted at a subsequent meeting. Our communication should make clear that the elimination of that language would not reflect any Committee judgment that the federal funds rate has reached its neutral rate or what that level is.

September may provide a particularly opportune moment to eliminate the language without eliciting market reaction, because Committee members will be providing additional information about the expected rate path through the addition of the 2021 projections, and the Chair will have the opportunity to both explain the language change and use the SEP to contextualize it in the press conference.

In a coming meeting, I hope we will soon have a chance to discuss the balance sheet—the other important dimension of monetary policy. As Lorie outlined yesterday and Governor Quarles highlighted, recent developments have raised the prospect that shrinking the balance sheet may not be as uneventful as President Harker’s colorful term “watching paint dry.” The effective funds rate has been approaching IOER more quickly than we had anticipated. That development may or may not have implications for the ultimate size of our balance sheet. However, it does suggest we should start to discuss a few things. First, we should clarify sooner rather than later whether the policy framework will continue to operate a system of abundant reserves or instead return to the pre-crisis framework of scarce reserves.

Second, assuming we retain the current framework with abundant reserves, before too long, we should consider what criteria we will use to decide when the balance sheet runoff process has run its course. As the balance sheet shrinks and, along with it, reserves, it's likely the effective funds rate will continue to rise relative to IOER. That's a straightforward implication of a downward-sloping demand curve. In addition, if history is any guide, it's likely that the demand curve will soon become steeper or will become steeper eventually. In the pre-crisis regime, with scarce reserves, the demand curve was very steep, whereas more recently, with ample reserves, it's been quite flat.

Along with a steepening demand curve, we're likely to see the funds rate becoming more volatile as reserves shrink. So that suggests a few criteria we might want to discuss to help assess when is the appropriate time to stop shrinking the balance sheet. First, it seems desirable to retain a regime, at least to me, in which the high-frequency volatility of the funds rate is sufficiently low that frequent open market operations aren't necessary. So one reference point might be the intraday volatility of the funds rate in the pre-crisis framework. If, for instance, high-frequency volatility were to revise much above those levels, starting to necessitate frequent open market operations, that would likely mean we had gone too far.

Second, IOER should remain connected to the target range for the federal funds rate. When we began this normalization cycle, we set IOER at the top of the target range. That was helpful for a number of reasons, including to anchor views about the funds rate. We've recently adjusted it to be 5 basis points below the upper end, and it's likely, as Lorie noted yesterday, that as the balance sheet normalization continues, the Committee will want to move IOER down further relative to the top of the target range. Just as setting it at the top of the range helped

anchor thinking about the funds rate initially, it might be helpful to anchor IOER no lower than the bottom of the range once the balance sheet is normalized.

Since the balance sheet runoff is a novel policy for the Committee, we don't know with any certainty how conditions in the federal funds market will evolve as the balance sheet and reserves shrink, and we will need to continue learning as we go. Still, it would be helpful if we started discussing what our desired end state looks like to provide clarity to the markets and because it may have implications for our overall policy trajectory.

I'll look forward to discussing these issues in future meetings. For today, I support alternative B. Thank you, Mr. Chair.

CHAIRMAN POWELL. Thank you. And thanks, everyone, for your comments. Let's talk first a little bit about the "accommodative" language, and I appreciate everyone's comments on that. This is something that's not before us for a decision today, but I think it's good to have had this discussion and the one last night. First, it clearly is important that we communicate very, very carefully about the path, and it gets more important, as we come closer and closer to neutral, that we do so carefully. And that comes down to sensible decisions that are well telegraphed and well explained. But I think we can explain these things, and I'm very mindful that this is sort of the next important one on the horizon.

I think that we could do this as soon as September. I haven't decided that that's what I think we ought to do, but you can explain it. In a way, I think you can think of it as, do you want to take this language out before the federal funds rate reaches the range of r^* estimates of the Committee, or do you want to do it when you're in that range? If you do it before you're in that range, as Governor Brainard was suggesting, you can characterize it as trying not to be in the business of picking a particular moment at which you've reached r^* . So you don't want to be in

that business, and you're saying that it's no longer a useful guidepost. And the SEP is there, and 2021 is there—there's a lot to talk about at the September meeting. So you could do it then. I think you could also do it in December.

I think if you wait until you're in the range of participants' estimates of the neutral rate, then you're in the business of having to convince people that there isn't some consensus that you've now reached neutral. So, oddly enough, I think it gets harder to avoid that discussion the longer you wait.

All of that said, I think—again, we're not voting on this today—but I guess my thinking is, this is something that we ought to do later this year. And, clearly, that's a discussion we'll be continuing.

So, now to the things we are actually voting on today. Clearly, there's support around the table for keeping the target range for the federal funds rate unchanged and for alternative B as written. Thank you for that. And I'll turn it over to Jim Clouse to talk about what we're voting on and conduct the vote.

MR. CLOUSE. Thank you, Mr. Chairman. The vote will be on the monetary policy statement as it appears on page 4 of Thomas Laubach's briefing materials, and the vote will also encompass the directive to the Desk as it appears in the implementation note shown on pages 6 and 7 of Thomas's briefing materials.

Chairman Powell	Yes
Vice Chairman Williams	Yes
President Barkin	Yes
President Bostic	Yes
Governor Brainard	Yes
President Mester	Yes
Governor Quarles	Yes
President George	Yes

CHAIRMAN POWELL. Okay. Now we have two sets of related matters under the Board's jurisdiction: corresponding interest rates on reserves and discount rates. I first need a motion from a Board member to leave the interest rates on required and excess reserve balances unchanged at 1.95 percent.

MS. BRAINARD. So moved.

CHAIRMAN POWELL. Second?

MR. QUARLES. Second.

CHAIRMAN POWELL. Without objection. Finally, I need a motion from a Board member to approve establishment of the primary credit rate at the existing rate of 2.5 percent and establishment of the rates for secondary and seasonal credit under the existing formulas specified in the staff's July 27 memo to the Board.

MS. BRAINARD. So moved.

CHAIRMAN POWELL. Second?

MR. QUARLES. Second.

CHAIRMAN POWELL. Without objection. Thank you. And our final agenda item is to confirm that the next meeting will be on Tuesday and Wednesday, September 25 and 26, 2018. That concludes this meeting. For those of you who eat your lunch really early [laughter], wonderful boxed sandwiches are available next door. I look forward to seeing all of you next September, if not before. Thanks very much.

END OF MEETING