

**Meeting of the Federal Open Market Committee on  
April 28–29, 2015**

A meeting of the Federal Open Market Committee was held in the offices of the Board of Governors of the Federal Reserve System in Washington, D.C., on Tuesday, April 28, 2015, at 1:00 p.m. and continued on Wednesday, April 29, 2015, at 9:00 a.m. Those present were the following:

Janet L. Yellen, Chair  
William C. Dudley, Vice Chairman  
Lael Brainard  
Charles L. Evans  
Stanley Fischer  
Jeffrey M. Lacker  
Dennis P. Lockhart  
Jerome H. Powell  
Daniel K. Tarullo  
John C. Williams

James Bullard, Christine Cumming, Esther L. George, Loretta J. Mester, and Eric Rosengren, Alternate Members of the Federal Open Market Committee

Narayana Kocherlakota, President of the Federal Reserve Bank of Minneapolis

Helen E. Holcomb and Blake Prichard, First Vice Presidents, Federal Reserve Banks of Dallas and Philadelphia, respectively

Thomas Laubach, Secretary and Economist  
Matthew M. Luecke, Deputy Secretary  
David W. Skidmore, Assistant Secretary  
Michelle A. Smith, Assistant Secretary  
Scott G. Alvarez, General Counsel  
Steven B. Kamin, Economist  
David W. Wilcox, Economist

David Altig, Thomas A. Connors, Eric M. Engen, Michael P. Leahy, and William Wascher, Associate Economists

Simon Potter, Manager, System Open Market Account

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

Robert deV. Frierson,<sup>1</sup> Secretary of the Board, Office of the Secretary, Board of Governors

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<sup>1</sup> Attended the joint session of the Federal Open Market Committee and the Board of Governors.

Michael S. Gibson, Director, Division of Banking Supervision and Regulation, Board of Governors

Nellie Liang, Director, Office of Financial Stability Policy and Research, Board of Governors

James A. Clouse and Stephen A. Meyer, Deputy Directors, Division of Monetary Affairs, Board of Governors

William B. English, Senior Special Adviser to the Board, Office of Board Members, Board of Governors

Andrew Figura, David Reifschneider, and Stacey Tevlin, Special Advisers to the Board, Office of Board Members, Board of Governors

Trevor A. Reeve, Special Adviser to the Chair, Office of Board Members, Board of Governors

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

Michael T. Kiley, Senior Adviser, Division of Research and Statistics, and Senior Associate Director, Office of Financial Stability Policy and Research, Board of Governors

Ellen E. Meade and Joyce K. Zickler, Senior Advisers, Division of Monetary Affairs, Board of Governors; Jeremy B. Rudd, Senior Adviser, Division of Research and Statistics, Board of Governors

Joshua Gallin, Associate Director, Division of Research and Statistics, Board of Governors; Fabio M. Natalucci,<sup>2</sup> Associate Director, Division of Monetary Affairs, Board of Governors; Beth Anne Wilson, Associate Director, Division of International Finance, Board of Governors

Jane E. Ihrig<sup>1</sup> and David López-Salido, Deputy Associate Directors, Division of Monetary Affairs, Board of Governors

Edward Nelson, Assistant Director, Division of Monetary Affairs, Board of Governors

Burcu Duygan-Bump, Adviser, Division of Monetary Affairs, Board of Governors; Eric C. Engstrom, Adviser, Division of Research and Statistics, Board of Governors

Penelope A. Beattie,<sup>1</sup> Assistant to the Secretary, Office of the Secretary, Board of Governors

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<sup>2</sup> Attended the portion of the meeting following the joint session of the Federal Open Market Committee and the Board of Governors.

Dana L. Burnett, Section Chief, Division of Monetary Affairs, Board of Governors

Katie Ross,<sup>1</sup> Manager, Office of the Secretary, Board of Governors

Jonathan E. Goldberg, Economist, Division of Monetary Affairs, Board of Governors

James M. Lyon, First Vice President, Federal Reserve Bank of Minneapolis

James J. McAndrews, Executive Vice President, Federal Reserve Bank of New York

Troy Davig, Michael Dotsey, Evan F. Koenig, and Spencer Krane, Senior Vice Presidents, Federal Reserve Banks of Kansas City, Philadelphia, Dallas, and Chicago, respectively

Todd E. Clark, Sylvain Leduc, Giovanni Olivei, Douglas Tillett, and David C. Wheelock, Vice Presidents, Federal Reserve Banks of Cleveland, San Francisco, Boston, Chicago, and St. Louis, respectively

Kei-Mu Yi, Special Policy Advisor to the President, Federal Reserve Bank of Minneapolis

Matthew D. Raskin, Assistant Vice President, Federal Reserve Bank of New York

Andreas L. Hornstein, Senior Advisor, Federal Reserve Bank of Richmond

James M. Egelhof,<sup>1</sup> Markets Officer, Federal Reserve Bank of New York

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April 28–29, 2015**

**April 28 Session**

CHAIR YELLEN. Good afternoon, everyone. I'd like to welcome back First Vice Presidents Holcomb and Prichard, who will again be representing Dallas and Philadelphia, respectively.

On a sad note, my understanding is that this is the last FOMC meeting for New York First Vice President Chris Cumming. Chris has attended 92 FOMC meetings, 70 of which she attended as an alternate voter. And, as all of you know, Chris has been involved in a wide array of System work over many years in all facets of what we do and has been a very wonderful colleague. Chris, I really thank you for your service and want you to know that you will be very much missed. [Applause]

Next, I'm pleased to let you know that Brian Madigan has agreed to return to the Board's Division of Monetary Affairs as deputy director, reporting to Thomas, effective June 1. I think all of you know that Brian served as director of the division and as FOMC secretary from 2007 to 2010. Since he retired from the Board, Brian has been a visiting professor in the Department of Economics at Georgetown University.

Now, as I think many of you know, in recent years, the job of director of the Division of Monetary Affairs has become increasingly burdensome. It has entailed serving as the Committee's chief monetary policy advisor, as secretary of the FOMC, and as leader of a large organization with critical responsibilities. As part of a strategy to create a more sustainable situation, Brian will have oversight responsibility for the FOMC Secretariat and will play a key role in the production of the minutes and transcripts of FOMC meetings. Obviously, these are things he has done superbly well in the past and for which he is eminently well qualified.

Accordingly, I intend to propose that Brian be appointed by the FOMC as its secretary. Unless there are objections, I will ask the FOMC Secretariat to send out a request in early June for notation votes to select Brian as our secretary. Under this arrangement, Thomas will continue to serve as the Committee's primary advisor on monetary policy and will also be able to dedicate more of his energy to ensuring that the Division of Monetary Affairs fulfills its critical role in supporting our monetary policy and other responsibilities.

Okay. Now, the first two items on our agenda today will be considered in a joint meeting of the FOMC and the Board of Governors, and, accordingly, I need a motion to close the Board meeting.

MR. FISCHER. So moved.

CHAIR YELLEN. Thank you. Without objection. Our first item is financial developments and open market operations, and let me call on Simon to deliver the Desk report.

MR. POTTER.<sup>1</sup> Thank you, Madam Chair. Lorie and I will split the briefing into three parts. First, I will review financial market developments. Next, Lorie will review Desk operations. Finally, I will discuss staff work on enhancing the calculation methodology for the federal funds effective rate.

Over the intermeeting period, domestic financial conditions eased following more-accommodative-than-expected U.S. monetary policy communications and weaker-than-expected economic data, including the March employment report. On net, nominal Treasury rates declined by as many as 25 basis points, the S&P 500 index gained 2 percent, and the DXY dollar index decreased nearly 3 percent.

A substantial portion of these changes came around the time of the March FOMC events, which were characterized as being more accommodative than expected despite the removal of "patient" language from the statement. Investors pointed, in particular, to the large downward shift in the target federal funds rate projections in the SEP and, to a lesser extent, the downward revisions to Committee participants' projections of inflation, GDP growth, and the longer-run unemployment rate. The left column of your top-left panel shows that nominal and real interest rates declined in the one-hour window around the statement and SEP releases, while measures of inflation compensation rose, equity prices increased, and the dollar weakened. As shown in the right column of the table, the absolute magnitudes of these moves were

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<sup>1</sup> The materials used by Mr. Potter and Ms. Logan are appended to this transcript (appendix 1).

very large relative to changes in one-hour windows around FOMC statement releases over the past decade.

One hypothesis for seeing moves of this magnitude could be decreased market liquidity. Indeed, late in the trading session outside the window used to measure these FOMC announcement effects, there was a very large move in the euro–dollar currency pair. The move pushed the intraday trading range for the currency pair to over 4 percent, a 5 standard deviation move over the period since 2004, as shown in the top-right panel. The size of the move is comparable to the 6 standard deviation range in the 10-year Treasury yield on October 15, both of which took place amid very high volumes.

The March FOMC events shifted out expectations for the timing of liftoff according to the Desk surveys, as shown in the middle-left panel. The “flash” survey, taken three business days after the March FOMC meeting, suggests that most of the shift occurred in response to the meeting and the large price moves in the hour following the March FOMC statement release, therefore likely reflecting shifting policy expectations as opposed to outsized liquidity effects. Since the flash survey, soft domestic economic data and speeches from Federal Reserve officials appear to have further solidified this shift in policy expectations.

The April surveys also showed a notably slower expected pace of policy normalization after liftoff. The middle-right panel shows that the probability distribution for the pace of tightening in the first year after liftoff, assuming no return to the zero bound, shifted toward a slower pace over the period, the first notable shift in these views since the question was originally asked last September. A similar shift occurred in the distribution of the expected pace of tightening in the second year after liftoff.

In considering when the Federal Reserve will begin to normalize monetary policy, market participants are particularly focused on the outlook for inflation and the Committee’s reasonable confidence that inflation will move back to its 2 percent objective. We asked survey respondents to score the importance of various factors they believe the Committee will use in assessing whether reasonable confidence in the inflation outlook has been achieved. As shown in the bottom-left panel, respondents assigned the most importance to a further improvement in the labor market and the absence of weakening in realized core inflation.

Over the intermeeting period, market-based measures of inflation compensation increased alongside higher energy prices and a weaker U.S. dollar, as shown in the bottom-right panel. Forward measures of inflation compensation increased at both shorter- and longer-dated horizons but remain below levels at the end of 2013. The increases over the period were attributed to the March FOMC communications, somewhat higher-than-expected realized inflation, the increase in oil prices, and positioning dynamics in the TIPS market. Longer-term inflation expectations from Desk surveys were little changed over the period. Meanwhile, front-month Brent crude increased nearly 22 percent but remains more than 40 percent lower since the

end of 2013. As I noted, the DXY dollar index declined nearly 3 percent over the intermeeting period but is over 20 percent higher since the end of 2013.

Despite the depreciation over the period, market participants expect the exchange value of the U.S. dollar to continue its broad appreciation amid ongoing monetary policy divergence across major economies. Desk dealer survey respondents reported that dollar appreciation seen since last summer has prompted them to revise lower their forecasts for 2015 growth and inflation, with the median markdowns to 2015 GDP growth and core PCE inflation of roughly 40 basis points and 20 basis points, respectively.

A key factor contributing to broad dollar strength has been widening global interest rate differentials, especially between the United States and the euro area. These interest rate differentials became more pronounced as euro-area sovereign rates have traded increasingly negative and yield curves have flattened substantially. The top-left panel of your next exhibit shows the extent of negative rate trading by country and maturity. Red indicates that 100 percent of the bonds in that category trade at a negative yield, while green indicates that none trade negative.

Despite the continued decline in euro-area rates and the increasing universe of securities trading at negative yields, there have been few market-functioning issues, and the ECB has stated that it has had little trouble achieving its purchase targets thus far. Even so, it is possible that market functioning strains will emerge over time, and to help address such strains, the ECB unveiled details of an augmented securities-lending program aimed at supporting bond and repo market liquidity.

The declines in euro-area rates, coupled with the very large currency depreciation and increase in equities, have substantially eased European financial conditions since President Draghi's remarks at the Jackson Hole symposium last August. It is interesting to compare the asset price reaction with recent LSAP programs. Using the price changes from when asset purchase expectations began to form until three months after the purchase programs were announced, the ECB's PSPP and BOJ's QQE, shown in the left and middle columns of the top-right panel, respectively, contributed to significant currency depreciation and meaningful equity price increases. The ECB's program resulted in large declines in German nominal forward rates, but it has not been accompanied by an increase in longer-dated forward inflation measures. In comparison, Japanese policies supported a large rise in forward inflation compensation and a pronounced increase in equities, perhaps stemming from the focus on reaching the new higher inflation target. By contrast, U.S. asset price reactions to LSAP3 were more limited, as the right column shows—though it did have a large effect in the mortgage markets, which is not included in the panel.

One potential flashpoint for financial markets is the highly fluid situation in Greece. While Greek asset prices have responded sharply to recent developments, the broader market reaction to perceived downside risks in Greece has been relatively muted and perhaps a bit complacent. Market participants attribute the lack of



spillovers to institutional improvements in the euro area, reduced private-sector exposure to Greece, and the effects of ECB asset purchases. Reflecting the mounting liquidity pressure from deposit flight and bank funding strains, Greek banks have also increased their borrowing via the emergency liquidity assistance program to €76 billion in April from €69 billion in March. As would be expected, Greece's Target2 liability, which represents balances owed to others in the Eurosystem, rose in March, shown in the middle-left panel. This level is near Greece's prior peak Target2 liability in June 2012. It is uncertain how long the Greek government will be able to meet its debt obligations. Some market participants still expect an agreement between Greece and its creditors to be reached but only after a high-stakes game of brinkmanship. Steve will further discuss Greece in his briefing.

Shifting to emerging markets, there has been a very sharp increase in Chinese equities over recent months, shown in the middle-right panel. Over the intermeeting period, mainland Chinese and Hong Kong equities rose by 23 percent and 16 percent, respectively, and, over the past year, the Shanghai Composite has more than doubled. Mainland equity outperformance came despite a worsening domestic economic outlook and probably involved some speculative dynamics, though it was supported by expected and actual monetary policy easing. During the intermeeting period, the People's Bank of China cut their reserve requirement ratio by a larger-than-expected 100 basis points; most contacts expect additional cuts to reserve requirements or decreases in lending and deposit rates in the near term.

Equity prices in other emerging markets also increased, and, as shown in the bottom-left panel, broader EM asset prices rose, partially retracing prior period declines. The moves were supported by the accommodative March FOMC communication as well as a moderate abatement of risks in a number of countries, including Brazil and Russia. This partial retracement of emerging market asset prices came despite continued markdowns of expected growth in several countries. These markdowns and recent U.S. dollar strength have contributed to a broader trend of emerging market currency depreciation since the May 2013 JEC testimony or so-called taper tantrum.

Some market participants are concerned that taper tantrum-like volatility in emerging markets could materialize as the Federal Reserve approaches normalization. Recall that implied volatility in emerging market currencies rose sharply with U.S. interest rate implied volatility in spring 2013, shown in the bottom-right panel, and has recently moved back to similar levels. Decelerating emerging market growth and rising corporate leverage, as well as volatility in commodity prices may make emerging markets vulnerable as normalization nears. However, these risks are somewhat offset by lower emerging market asset valuations and reportedly more cautious positioning from emerging market investors, as discussed in the special QS memo.

Volatility in emerging markets is only one part of broader financial market volatility that some worry could ensue from expected Federal Reserve normalization. Indeed, a senior IMF official recently warned of a "super taper tantrum," in which



negative term premiums would be rapidly decompressed as domestic policy rates are increased; Thomas will comment more on this risk in his briefing. Given the punctuated bouts of recent realized volatility in the very deep and liquid markets I discussed earlier, financial market volatility during normalization could be even more challenging for relatively illiquid markets. I will now take questions before turning to Lorie.

CHAIR YELLEN. No questions? Lorie.

MS. LOGAN. Thank you, Madam Chair. I'll start with exhibit 3 and provide an update on MBS reinvestments, discuss testing of normalization tools, and conclude with the staff recommendation to extend the existing central bank liquidity and swap arrangements.

The Desk's MBS reinvestment operations continue to go smoothly, and MBS market liquidity remains stable. The continued trend toward higher prepayment speeds in March was largely an ongoing result of the low mortgage rates witnessed earlier in the year and has pushed the current monthly reinvestment amount up to approximately \$40 billion, as shown in the top-left panel of your third exhibit. Despite the increased size of reinvestments, we do not anticipate having any issues with the execution of MBS operations, but we have increased the frequency of our operations to accommodate their larger size.

Testing of the Federal Reserve's overnight and term RRP operations continued over the intermeeting period. Patterns of total RRP demand remained broadly consistent with recent experience, as shown in the top-right panel. The additional 25 counterparties that began participating in operations on March 16 have only modestly affected overall RRP usage.

For broader perspective on the Federal Reserve's involvement in reverse repo activity, this panel also includes reverse repos conducted with foreign official institutions, known as the "foreign RP pool," shown in gray. The size of the foreign RP pool is notably above its pre-crisis levels, largely a reflection of central banks' desire to hold greater dollar liquidity buffers, while at the same time they are tightening their counterparty risk-management frameworks. Increases in the foreign RP pool this period, and since the beginning of the year, have been primarily driven by a single customer who has sought to increase the liquidity profile of its FX reserves due to precautionary financial-stability motivations, in part by raising its cash balance held at the Federal Reserve.

The Desk conducted two term operations over March quarter-end, the first a \$75 billion, 14-day operation and the second a \$125 billion, 7-day operation, summarized in your middle-left panel. This \$200 billion offering in term RRP reduced the Federal Reserve's overall RRP offered amount spanning quarter-end to \$500 billion, down from the \$600 billion offered at year-end. However, the reduction did not appear to have an adverse effect on markets or meaningfully change participation, likely because the amount offered was perceived to still provide ample

headroom above expected demand. The 14-day operation was modestly oversubscribed, with \$81 billion in propositions and a stop-out rate of 9 basis points, a slightly higher rate than was expected. The 7-day operation conducted on March 30 was undersubscribed, with \$101 billion in propositions submitted and a stop-out rate at the max offering rate of 10 basis points, similar to the rates on the undersubscribed operations held closer to year-end. Substitution between overnight and term RRP and the breakdown of counterparty demand at the March term operations were broadly similar to behavior observed in December.

As shown in your middle-right panel, the Desk's RRP operations continued to provide a soft floor under short-term interest rates, even around quarter-end. The federal funds effective rate averaged 12 basis points over the period and printed at 6 basis points on quarter-end. While rates and volumes in unsecured markets over quarter-end were broadly in line with expectations, temporary funding pressures in secured markets were much larger than expected, with the overnight GCF repo index for Treasury collateral, shown in the dark blue line, printing at 45 basis points.

Further, the dispersion in repo rates increased notably. For example, the spread between rates on overnight Treasury GCF repo and triparty repo widened considerably on quarter-end. This spread, shown in your bottom-left panel, reached 30 basis points on quarter-end. While all the factors that drove the larger-than-expected widening between repo rates are not fully understood, institutions with stable access to triparty repo funding appeared to demand increased compensation to intermediate between triparty cash lenders, like money funds, and GCF borrowers, such as smaller or less creditworthy dealers.

It should also be noted that the spread between GCF and triparty repo rates has been gradually widening over the past several months even outside quarter-end. This trend is likely partially driven by financial institutions modifying behavior in response to regulatory changes and associated higher costs to intermediate between triparty and GCF repo markets.

Looking forward, pursuant to the resolution adopted at the March FOMC meeting, the staff proposes conducting term RRP tests over June quarter-end.

For the June quarter-end, we suggest a slightly different approach to the public communication about the term RRP than was used in December and March. As outlined in your bottom-right panel, the Desk proposes to release a statement shortly after the April FOMC meeting minutes on May 20 that would note the tentative intention to offer at least \$200 billion of term RRP in addition to capacity of overnight RRP for the June quarter-end. Based on our experience with the March term operations, we believe that \$200 billion in term RRP capacity over June quarter-end, in combination with at least \$300 billion capacity in overnight RRP, should provide sufficient headroom on total RRP availability, assuming no change in the target range. Further, we would propose noting in the statement that the Desk would release the remaining details on Monday, June 22—that is, after the June FOMC meeting.

We would thus come back to the Committee with a recommendation of the exact size and maximum offering rate for each operation at or shortly after the June meeting. This communication approach could be replicated in future quarter-ends and should provide the market with confidence in available supply around quarter-ends, but, importantly, retain some flexibility to adjust the specific parameters of the operations should the Committee decide to lift off.

In order to maintain operational readiness with the TDF—both within the Federal Reserve and among banks—the staff is developing plans to resume a routine, every-other-month testing schedule that would be similar to that employed prior to the series of special larger test operations conducted over the past year. Offering rates, counterparty limits, and other terms of these operations would be set so that the scale of such testing operations would be modest. The tentative plan is to announce and resume the routine periodic testing beginning next month.

Additionally, the work on implementing changes to the methodology for calculating interest payments is proceeding according to schedule. Comments on the *Federal Register* notice are due by the middle of May. If there are no major issues raised by those comments, the staff should be in a position to implement the new methodology before the June FOMC meeting as planned.

Your fourth exhibit begins with the focus of some market participants over the intermeeting period on the discussion of normalization tools that appeared in the March FOMC minutes. Contacts specifically highlighted the discussion concerning temporarily elevated capacity for the ON RRP facility. In the Desk's April surveys, respondents were asked to provide their expectations for both the level of the daily aggregate cap and level of ON RRP demand around the time of liftoff.

As shown in the top-left panel of your final exhibit, 10 respondents expected there to be no cap on the ON RRP facility immediately following liftoff. Among those respondents expecting a cap at liftoff, the median expectation was a cap of \$500 billion, and all anticipated that ON RRP demand would be at or below the cap. Across all respondents, regardless of whether they expected a cap, the median expected level of ON RRP demand immediately after liftoff was \$300 billion, unchanged from the March survey.

However, many respondents did update their expectations for ON RRP demand from the previous survey—both immediately after liftoff and one- and three-years ahead. Expectations shifted in both directions, with a number of participants moving their expectations by several hundred billion dollars, perhaps pointing to significant uncertainty about the likely level of take-up.

Respondents were also asked about their expectations for the variation in ON RRP demand over various time horizons. They expected the variability of the ON RRP demand around the time of liftoff to be more elevated than recent experience, largely due to uncertainties over the mix of overnight and term RRP as well as how

regulatory reforms might affect money markets when rates rise from the zero lower bound.

In terms of the expected levels of money market rates at liftoff, the median estimate across respondents for the level of the federal funds effective rate was 35 basis points—very close to the center of the expected target range. The April surveys also asked respondents for the probability they attach to the level of the effective rate averaging within certain ranges during the month following liftoff. As shown in the top-right panel, respondents assigned very high probabilities to the effective rate being within the target range and only a negligible probability to the effective rate being outside the range.

Finally, as discussed in the memo sent to the Committee on April 15, we would like to ask the Committee to vote on the authorization to renew for another year the standing liquidity swap arrangements with foreign central banks and NAFA swap arrangements. While the liquidity arrangements were authorized for an indefinite period in October 2013, the FOMC has the ability to unilaterally terminate its participation with six months' notice. This is similar to the NAFA swap arrangements with Mexico and Canada, which are renewable annually on or before December 15 of each year and require six months' notice to terminate.

The use of liquidity swap lines recently has been sparse, as shown in the middle-left panel, with demand limited to regularly scheduled seven-day dollar auctions held by the Bank of Japan over year-end and March quarter-end. While this is consistent with relatively calm conditions in dollar funding markets, we believe the swap lines are an important liquidity backstop, helping to maintain stability and confidence in global funding markets. Additionally, liquidity swap and NAFA swap arrangements are tangible and constructive signals of cooperation among central banks, and their attendant costs are minimal. Liquidity swap arrangements also support the approach that the Federal Reserve along with other major central banks have endorsed that there are “no technical obstacles” to central banks' capabilities to provide liquidity quickly to a systemically important financial market utility. Therefore, the staff recommends that the Committee vote to renew the liquidity swap lines and NAFA arrangements.

I will now turn back to Simon to discuss the calculation methodology for the effective funds rate.

MR. POTTER. Thanks, Lorie. As detailed in a memo circulated in advance of the meeting, the staff has assessed that there might be some merit in changing the calculation methodology underlying the federal funds effective rate concurrent with the change in data source to the FR 2420. We are interested in the Committee's initial feedback on this assessment.

As you are aware, the federal funds effective rate is currently calculated as a volume-weighted mean. That is, each observed transaction rate is weighted by the share of total volume transacted at this rate, and the effective rate is the sum of these

weighted rates. The distribution of volume by rates for a particular day from the FR 2420 data is shown in the middle-right panel.

The staff's assessment is that it may be more appropriate to calculate the effective rate as the median (that is, the 50th percentile) of the distribution rather than its mean. As shown in the bottom-left panel, the volume-weighted median generates a statistic that is the same as, or very close to, the mean at most times except for the crisis period. However, on those occasions when the mean and median do differ significantly, the staff's preliminary analysis shows that the median is typically a better measure of broad money market conditions across a wide range of situations. Moreover, the median is much more robust to invalid data. In general, for an invalid transaction to affect the median, it must have a large volume attached to it, while the mean can be moved by an invalid transaction that has a more typical volume and rate. The staff believes this characteristic of the median would enhance both the integrity of the effective federal funds rate as a reference rate as well its credibility as a monetary policy instrument. We look forward to your views on this subject, and, based on your feedback, the staff may present a plan to move forward at the June meeting. Thank you, Madam Chair. That concludes our remarks.

CHAIR YELLEN. Thank you. Are there questions or comments, particularly in response to Simon's request for comments on the federal funds rate? Governor Powell.

MR. POWELL. Thank you, Madam Chair. I found that the staff memo and also the memo to Reserve Bank research directors made a pretty good case, to my mind, for using the volume-weighted median. It's a better measure of financial conditions for all the reasons that you went through, Simon. In addition, it's more difficult to manipulate. What I mean is, in theory, any trade moves a mean, whereas to move the median, it either needs to be further away or bigger. Anyway, I think it is a good case, and I guess I have two questions relating to when we do "socialize" this to the public, which we may not have the answers to today. One is, will a median versus a mean have a differential effect on existing contracts, of which there are many trillions? Two is, I'd be interested to hear how market participants react to this mean–median thing.

I think that the potential cost that's laid out in the memo is that of successfully communicating it to the public. I don't really see that as an insurmountable concern. I mean,

very few people even know what the effective federal funds rate is in the first place, and the kind of people who know that are probably able to tell the difference between a volume-weighted mean and a median if they want to and need to. I don't see that as a big thing, but I would certainly be sensitive to the views of market participants on that.

MR. POTTER. In terms of the contracts that are written on the effective federal funds rate, if we were to pursue this, there would be a long lead time during which the market participants would know that the change is coming. We would have to weigh the effect that that would have, and it would have some effect because the median is not always equal to the mean, but many of these contracts average over a long period of time. So occasions on particular days when we do see differences are probably not going to have a large effect on those contracts.

What they will be perhaps more interested in is the level of rates that you'll be setting in the future. If you think about a contract in 2016, that's going to be very heavily influenced by where they think you'll be setting the target rate. The kinds of issues to do with the gap between the mean and the median are very second-order, compared with that. They also have to think of things like, "Where would the effective federal funds rate be trading in the range?," and so on. I don't believe this change is anything of first-order importance for a contract, and it's pretty typical for the uncertainty that market participants face overall in terms of trading in the federal funds market, which we know some large participants have left and some other participants could leave in the future, affecting where the federal funds rate trades in the range.

On the market participants' knowledge of this, I agree that many people probably don't know that much about the detailed calculation of the effective federal funds rate. Those who do would find it pretty understandable, I believe, that we switch from a volume-weighted mean to a volume-weighted median, partly because one of the things that we do know is that the mean is

quite heavily influenced by a small transaction at a rate that is far away from where most of the volume is.

MR. POWELL. That's helpful.

CHAIR YELLEN. Any other comments? President Bullard.

MR. BULLARD. Thank you, Madam Chair. In the LIBOR case, the issue about really small changes in LIBOR from what was perceived to be a correct LIBOR pricing was considered a big issue. Here you've got a picture of a 20 or 40 basis point difference. It gives me a little bit of pause that the people who are contracting on this might be upset by this change.

MR. POTTER. In the crisis period, particularly as the balance sheet got larger, we didn't have that much control over the federal funds rate, and that was an event that really was exogenous to the calculation method. Whichever calculation method we would have used, there would have been more variance at that time. If, arbitrarily, the Federal Reserve had turned up on one day and said, "We are going to change that calculation method," without any kind of forewarning, that would make payments flow differentially to what people expected. The plan here is, if there is support for moving forward with this, it will be clearly communicated well in advance, and it will be the type of consideration that all market participants should have to take into account when pricing contracts.

MR. BULLARD. Thank you.

CHAIR YELLEN. Any other comments? Governor Powell.

MR. POWELL. Well, I have a question now. This refers to the expectations about the size of the ON RRP facility post-liftoff. This is anecdotal, but it sounds like there's a systematic difference between buy-side participants, who tend to be predicting a larger facility, and primary



dealers, who are predicting something more in line with what the Committee has been thinking of saying. Is that accurate?

MS. LOGAN. We do see some distinction between the two. The median for the dealers is \$190 billion at liftoff for demand. For the buy side, it is \$350 billion. There is some variation, but there is variation within the dealer estimates as well. But I think you are correct that the buy side is skewed a bit higher.

MR. POTTER. There is variation within the same firm.

MR. POWELL. Are we inclined to attribute more or less weight to the buy side?

MS. LOGAN. I don't think there's anything in the commentary that would suggest the buy side has some better analytics of understanding that from what we're reading in the commentary. As Simon said, even within firms, we're hearing the numbers to be quite different. In the survey, we did find that some firms had produced written reports that had different expectations than those who filled out the survey, so I don't think there's any additional knowledge or analytics that the buy side is drawing upon.

MR. POWELL. Thank you, Madam Chair.

CHAIR YELLEN. Other questions or comments? [No response] Okay. Then let's turn to swap arrangements. We have a proposal to renew both the NAFA swap arrangement with Canada and Mexico and a proposal to renew the liquidity swap arrangements. Let me first ask whether there are any questions or comments on these proposals. President Lacker.

MR. LACKER. Thank you, Madam Chair. I'd like to respectfully dissent again on the foreign swap arrangements. The Richmond Reserve Bank has dissented on these swap lines going back 20 years on the grounds that they facilitate inappropriate actions by the Federal Reserve. One is sterilized foreign exchange operations, which are inappropriate for reasons I

spoke about in January. The other is channeling intergovernmental assistance to our NAFA partners, among others, who may be well deserving of such assistance, but that constitutes fiscal policy that's best left to fiscal authorities, in our view. Thank you.

CHAIR YELLEN. Any other comments or questions? [No response] Okay. Hearing none, seeing none, we need two separate votes. I'd like to first ask—and this is an FOMC vote—on the renewal of the NAFA swap arrangements with Canada and Mexico. All in favor? [Chorus of ayes] Any opposed?

MR. LACKER. Opposed.

CHAIR YELLEN. President Lacker is opposed. Okay. I think that passes, and, second, I'd like to ask for a vote on the liquidity swap arrangements. All in favor? [Chorus of ayes] Any opposed?

MR. LACKER. Opposed.

CHAIR YELLEN. Thank you. Okay. We need one more vote to ratify domestic open market operations. Is there a motion?

VICE CHAIRMAN DUDLEY. So moved.

CHAIR YELLEN. Any opposed? [No response] Okay. We will consider those approved as well. Next, I think we're going to move to our second topic, which is normalization procedures, and I'm going to call on Ellen Meade to provide a briefing.

MS. MEADE.<sup>2</sup> Thank you, Madam Chair. I will be referring to the handout labeled "Materials for Briefing on Governance Issues Associated with Liftoff."

When you commence the normalization process, the Committee will set the stance of policy by announcing the new target range for the federal funds rate. In addition, as you've discussed previously, the Committee and Board will set the administered rates—the IOER rate will be set to the top of the new target range and the ON RRP rate will be set to the bottom of the new target range. The Federal Reserve will also announce the details associated with the capacity of the ON RRP

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<sup>2</sup> The materials used by Ms. Meade are appended to this transcript (appendix 2).

facility and the discount rate, which will be set at a spread above the top of the federal funds rate target range.

Earlier this month, you received a memo outlining possible arrangements for enhanced reporting of market developments and the governance of decisions on operational adjustments to the administered rates around the time of liftoff. In the early days after the liftoff announcement, it may be somewhat difficult to get a clear picture of how normalization is proceeding because it may take several days for some participants in money markets to adapt to the new market environment. For example, money market participants may need to revise investment guidelines, counterparty limits, or other restrictions on their allocation of funds so that they are able to engage in the arbitrage opportunities available after liftoff.

Even if the federal funds rate initially lies below the Committee's new target range, you may judge that the prudent course is to monitor developments while giving money markets some time to adjust. During these early days, you may find it useful to prearrange briefings during which the staff could provide updates on market developments and assess the effectiveness of policy implementation, and you could ask questions. For example, you could schedule daily briefings for perhaps the first two weeks following the liftoff announcement; such briefings could be held via audio or videoconference. These briefings would not be FOMC meetings, so no transcripts or minutes would be prepared. Should you wish to express your views about market developments or discuss whether to adjust the target range or the administered rates, the briefings could be readily converted into joint meetings of the Committee and Board. If the liftoff process does not proceed as planned and the funds rate is persistently outside its new target range, then you would presumably wish to discuss the timing and course of possible policy actions, and the scheduled briefings would be replaced by joint videoconference meetings.

As discussed in the memo we sent you, the FOMC and Board may also wish to establish decisionmaking procedures that would govern small operational adjustments to the administered rates after the first two weeks or so following the liftoff announcement. Adjustments to these administered rates could be helpful if the effective federal funds rate were persistently outside its new target range. The memo did not discuss the advantages or disadvantages associated with adjusting the IOER and ON RRP rates, either separately or together, relative to the new target range for the federal funds rate. The memo focused on the governance of any such adjustments, and we provided two approaches for you to consider.

Under the first approach, each adjustment would be approved by a vote of the Committee or Board. The Chair could convene a joint FOMC and Board meeting via videoconference at which you could discuss potential changes to the administered rates; all policymakers would be involved in the discussion of changes to the IOER and ON RRP rates. Following that discussion, the FOMC would vote on any change to the ON RRP rate, while the Board would approve any change to the IOER rate. A variation on this approach would involve policymakers using SDS to submit comments on proposed adjustments to one or both of the administered rates, with

approvals for changes to the ON RRP rate and/or IOER rate recorded via notation votes by the FOMC and Board, respectively. While this would be operationally less burdensome than holding a meeting, and would not require the preparation of transcripts and minutes, it would not allow for an interactive discussion and, as a result, might be most appropriate for relatively straightforward adjustments that the Committee had previously discussed.

Under the second approach, you would delegate to the Chair authority to adjust the ON RRP and IOER rates, subject to limitations established by the FOMC and Board. If the first couple of weeks of the normalization process had proceeded smoothly and you felt comfortable with the delegation approach, one of the staff briefings could be converted to a meeting at which you would formally take the decision to delegate authority. You might prefer this approach to ensure that the Federal Reserve is able to respond quickly should market conditions warrant. This delegation would allow the Chair to make small adjustments to the administered rates if deemed necessary to keep the federal funds rate trading in its new target range. As an example, the memo suggested that the Chair could be authorized to make adjustments of perhaps 5 or 10 basis points in the administered rates and also indicated that policymakers could determine in advance whether they preferred to address such a situation by adjusting the IOER rate, the ON RRP rate, or both rates in parallel in order to maintain a constant spread between them. There may be some communications advantages associated with the delegation scenario in that it would clearly separate your decisions on the stance of policy—the target range for the federal funds rate established by the FOMC—from small technical adjustments to the administered rates necessary to achieve that policy stance.

The final page of your handout lists the questions that were distributed with the memo for today's go-round on governance issues. Another memo that was distributed at the same time concerned the setting of the primary credit rate. The lending rate for primary credit was originally set in 2003 at 100 basis points above the Committee's target for the federal funds rate. The spread was reduced twice during the financial crisis, and has stood 50 basis points above the top of the federal funds rate target range since February 2010. The memo discussed two options for the setting of the primary credit rate spread: maintaining that spread at 50 basis points above the top of the Committee's new funds rate target range at the time of liftoff and for some period thereafter, or raising the spread to 100 basis points at the time of liftoff. During the go-round, you may also wish to share any views you might have on that issue. Thank you; this concludes my prepared remarks.

CHAIR YELLEN. Thank you. Before we turn to questions for Ellen and our go-round, I would like to just make a few remarks of my own. At the outset, I want to emphasize that although our policy tools, by law, have different governance structures, the overall conduct of monetary policy is obviously the purview of the FOMC. The governance issues before us this

morning really don't concern the determination of our intended stance of monetary policy. Rather, this discussion pertains to the narrow issue of how to make tactical adjustments to our policy tools to deliver the intended stance of policy.

We have spent a great deal of time and effort in devising our framework for normalization, and I am highly confident that it will work. But it is clear that when the time comes to raise the federal funds rate, we will face unprecedented uncertainties, and we need to stand ready to make adjustments, if needed. It is important that we agree on an approach for managing both the initial phase of liftoff and the process for subsequent adjustments that may conceivably be needed once that initial phase is complete.

The staff memo proposed that, for the first two weeks or so after liftoff, we set aside time on our calendars to receive frequent market updates and, if necessary, hold meetings to make adjustments to our tools through the Committee and Board votes. During this time, the FOMC may need to reconsider the setting of our tools, including the administered rates, parameters of the overnight RRP facility, and the use of term tools. I just want to make clear that, in my own view, decisions during this initial period should not be delegated to me.

The FOMC and Board should vote on adjustments that are deemed necessary after debating the relevant policy considerations and alternative approaches. For example, if the funds rate is trading soft relative to the target range, the Committee should decide whether to raise both rates, keeping the IOER–ON RRP spread constant, or to instead adjust only one of the rates. These decisions are not entirely tactical or routine. My expectation, however, is that after some initial period, which the memo is guessing might be two weeks, we will have a reasonably good sense regarding how our approach is working, and only minor adjustments, if any, might be subsequently needed to keep the federal funds rate in the target range.

Assuming that our approach works roughly as expected, such intensive monitoring on the part of the Committee shouldn't be necessary beyond this initial phase. We ought to be able to settle into an arrangement in which, at most, modest adjustment to our tools, especially to the administered rates, will be called for to keep the federal funds rate in the target range. I hope that such adjustments, if they prove necessary at all, can be made in a simple and efficient manner. From a practical perspective, I tend to favor an approach in which authority is delegated to me as Chair to make modest adjustments, perhaps up to 5 or 10 basis points, to the IOER and overnight RRP rates to help maintain the federal funds rate in the Committee's target range. These adjustments would be in accordance with a strategy pertaining, for example, to the spread that had been decided by the Committee. In such circumstances, I would, of course, keep the Committee fully apprised of ongoing developments. If any problems in implementing policy emerged, clearly we would need to convene a meeting.

I would expect the Committee to decide on any such delegation only at a time when we feel we have a good sense for how our approach is working and not at the time of liftoff. Of course, if many of you are not comfortable with such an arrangement, we will have to, as Ellen indicated, work out a method for holding Committee and Board votes, likely by notation voting, and possibly on short notice, to make these potential modest adjustments once the first couple of weeks after liftoff have passed. Regardless of the approach we agree on, it will be important that it serves to reinforce rather than undermine market confidence and our normalization approach. Let me stop there. I very much look forward to hearing your views. We have now scheduled a full go-round, so—Vice Chairman Dudley.

VICE CHAIRMAN DUDLEY. So I am going to make a forecast that we are all going to agree that, at least for the first few weeks, we are going to want to have some sort of a discussion

if the funds rate is trading outside the target range. If we are going to do that, I have a couple of questions of the staff. At what time of day would it be most appropriate to have those meetings? How would it work in terms of having the meeting, making the decision, notifying the markets—what would the timeline look like as you are carrying that forward? Because the memo didn't really get into the mechanics of how you would actually implement this. I was just curious if there is any thought given to that at this point.

MS. MEADE. I think that we were trying to be optimistic when writing the memo. So we were thinking about the first couple of weeks or so as being briefings and not being about decisionmaking.

VICE CHAIRMAN DUDLEY. Let's say they were about decisionmaking. When will you know enough in the day to have a meeting, to have decided? When would you have to announce it to the market?

MR. POTTER. We are still looking at when some of the volume is transacted and also scheduling, because not everyone is in the same time zone. I think we believe that later in the afternoon will work. And that will give us enough time to then announce to the market that evening what the changes would be.

VICE CHAIRMAN DUDLEY. Okay.

MR. POTTER. The other choice is to announce very early in the morning.

VICE CHAIRMAN DUDLEY. I guess I would say that, if we agree on this, we should nail that down pretty soon, because, in principle, this could happen as early as June, and it would be helpful if people actually had the time blocked out on their calendar. I think we need to figure out the time slot.

MR. POTTER. We are working on it.



CHAIR YELLEN. Other questions before we begin the round? President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. Just to clarify your proposed approach, any adjustment in the first two weeks of the overnight reverse repo rate would be an FOMC meeting.

CHAIR YELLEN. Yes. I know the memo used two weeks. I am thinking there is an initial period.

VICE CHAIRMAN DUDLEY. Until things settle down, basically.

CHAIR YELLEN. Yes. When we are figuring things out, and if we have to make adjustments, we need to meet, we need to discuss it, and during that phase, until we decide further things are—let me just call them “routine”—there would be FOMC votes. We would probably be having videoconference briefings that would be converted to meetings, and both groups would be voting. Only after whatever that initial period is when things have settled down would we agree that now we have fallen into a rhythm, and any adjustments, if they are needed at all—I mean, I think in the most likely case, we are not going to need any further adjustments—but if we do, those things will be routine, and then we are talking about delegating. Let’s see. First, President Lacker, then President Rosengren.

MR. LACKER. In this initial period, would you envision all meetings, or a mix of briefings and meetings?

CHAIR YELLEN. My understanding is the idea is that we are going to preschedule these times. When we start the video meeting, we will have some sense of whether things are going smoothly, and we really don’t have decisions to make, in which case the staff could be relieved of the burden of doing transcripts and so forth. I would call that a briefing. But clearly, if things are not going very smoothly and we need to deliberate, we would convene that as a

meeting right from the outset. And, I suppose, even in the middle, if something began as a briefing, and we decided in the middle of that briefing, “Look, we need to discuss something.”

Is that fair to say?

MS. MEADE. Yes.

CHAIR YELLEN. We could then say, “Look, let’s convert this now to a joint Board and FOMC meeting.”

MR. LACKER. Okay. I ask because it has been a while since this group gathered in a briefing format. I think we did it back during the crisis. There are some rules about not saying something that matters, or has substance, or—

CHAIR YELLEN. Well, we can’t deliberate.

MR. LACKER. That’s not quite—

CHAIR YELLEN. We can’t deliberate.

MS. MEADE. It is really a distinction, I believe, between asking questions and discussing among yourselves.

MR. LACKER. If we have something to say, like “I think this means we should do *X*,” then we have to convert it to a meeting to say that?

MR. POTTER. Well, you could pose it as a question.

MR. ROSENGREN. Like in *Jeopardy!* You have to ask a question. [Laughter]

CHAIR YELLEN. I see Scott Alvarez is fretting back there.

MR. ALVAREZ. A briefing is an interaction with the staff, and you can ask questions, and it is for the purpose of disseminating information. If the Committee wanted to have a discussion in which they are deliberating about a decision, that would be a meeting itself.

MR. LACKER. Okay.

MR. ALVAREZ. We could set it up so that it could start as a briefing and be converted into a meeting, if that seemed to be the direction the Committee wanted to go in. We can, as the Chair says—I think the thought process is that we will have a pretty good idea before we set it up whether there is going to be a discussion, and we will just start from scratch as a meeting if that's the case.

CHAIR YELLEN. President Rosengren.

MR. ROSENGREN. Just a follow-up to Vice Chairman Dudley's question. For how many of the short-term credit markets is it important to know about the closing in Europe? As we think about the timing of the meetings, are there a bunch of short-term instruments that would make it relevant to act in the morning, because of when Europe closes?

MS. LOGAN. For the repo markets, most of that is going to be U.S. activity, and that is going to be early in the morning. For unsecured federal funds and Eurodollars, there is going to be some very active trading in the early morning hours from Europe. We saw this during the crisis when there was a lot of volume done early, and then there is some late-day volume as well in the United States. It is going to be a mix. We are going to do more analysis on the full pattern of volume data in the unsecured markets before we recommend a time of 3:30 or 4:00 or 4:30 in the late afternoon. But you can think of the unsecured markets as having two trading periods, and the repo as being mostly very early in the morning.

MR. ROSENGREN. Thank you.

CHAIR YELLEN. President George.

MS. GEORGE. I was looking for a clarification. In the context, the memo offers that both the IOER or ON RRP rates might be subject to these technical adjustments if we delegate them. When I go back and look at the normalization principles, as they are described, they talk

about IOER as being the primary mechanism by which we will move the funds rate into the target range. Let's say we delegate on a technical adjustment basis the ON RRP rate. That seems to take care of itself. But by delegating some adjustment to the IOER rate, does that signal a change in policy stance in any way? Or will it be understood that you are trying to move the spread in lockstep?

MR. POTTER. I have gotten this question quite a few times in public. I use an idea that Jamie came up with, which is that everything we are doing in terms of the mechanics of lifting rates comes from interest on excess reserves. We are trying to keep the overnight RRP as small as possible, and that means it is just trying to get better trading in the arbitrage relationship in which you are getting interest on excess reserves. I view it as the primary way we are lifting rates. But it is not really a measure of the stance of policy. The stance of policy is the federal funds target range.

MS. GEORGE. Okay. In the context of these basis points we have talked about, it would be understood these are technical moves, and that—

CHAIR YELLEN. The Committee has set the target range and decided to make small adjustments to keep the funds rate there.

MS. GEORGE. All right. Thank you.

CHAIR YELLEN. Governor Tarullo.

MR. TARULLO. Yes. This is just a logistical question, Madam Chair. Do I understand correctly that what you anticipate doing is, if we agree with the concept of having these prearranged briefings, that all of our calendars will need to be kept open for two weeks following each of the next I-don't-know-how-many FOMC meetings?

MS. MEADE. I think we were thinking initially about the liftoff meeting. Oh, well, yes, of course.

MR. TARULLO. Unless you know something I don't know.

VICE CHAIRMAN DUDLEY. You'd have to prepare for the earliest meeting you might liftoff for, right?

CHAIR YELLEN. I suppose—I mean, people will have some conflicts, right?

MR. TARULLO. They have major ones.

CHAIR YELLEN. We can't for the next whatever meetings—I mean, we can try to block out those times. But some people will have trips presumably that they can't—I suppose if somebody can't participate—

MR. TARULLO. There are already a number of international meetings that several of us on the Board, I think, are going to have—and Vice Chairman Dudley will have conflicts with as well.

VICE CHAIRMAN DUDLEY. That's my point. I'd prefer to get this nailed down sooner rather than later, so we can block out the time as efficiently as possible. That would be my preference.

CHAIR YELLEN. Maybe we can call in—I mean, we normally have videoconferences, but conceivably we can call.

VICE CHAIRMAN DUDLEY. In the old days, we had telephone calls, right?

CHAIR YELLEN. Yes. Maybe we could have some telephone calls that people could take from—

MR. POTTER. As long as they were secure. That would be the issue.

CHAIR YELLEN. Okay. Well, we need to work this out for sure. Governor Brainard.

MS. BRAINARD. This is just from a communications point of view. Would we communicate at the outset that the FOMC is going into the mode of daily briefings with the possibility that they could take intermeeting action? Or would we simply be silent on that until such time as we found it necessary to take an action?

MS. MEADE. The minutes of this discussion will reflect that you have discussed some of these issues.

MR. POTTER. I take your question as, “Let’s be very careful,” and I agree we should be very, very careful. Maybe we want to think hard about how this is described, because we don’t want everyone thinking every day the FOMC is meeting at 4:00 p.m., and we are waiting for this thing to come over the wires about what the rates are going to be the next day. That is probably not—

VICE CHAIRMAN DUDLEY. This is contingency planning.

MR. POTTER. Yes. This is a contingency plan.

VICE CHAIRMAN DUDLEY. This is contingency planning for something that doesn’t work as well as we think it is going to work. I think we want to present it in that manner.

CHAIR YELLEN. Okay. President Evans.

MR. EVANS. My question is in terms of contingencies—do you anticipate that we could do this by notation vote? Possibly, if there was a conflict and you were traveling, you missed the videoconference and maybe a staff member was sitting in—they could give you a quick executive summary and then the notation vote could be done by a BlackBerry anywhere, right?

MR. POTTER. Again, we would have to look at the timing exactly and tell you what that window is, because the meeting could go quite long. Then we would still have to put out the announcement or switch to 7:00 a.m. in the morning or something.

MR. EVANS. You anticipate making an adjustment in the middle of the day—I mean, for the market.

MR. POTTER. No, no. After the meeting, it is probably pretty good practice to announce the decision. I would feel more comfortable announcing quite soon after the conclusion of the meeting, rather than waiting, but—

MR. EVANS. That does put a premium on the turnaround.

MR. POTTER. —you could have some time gap there and instead do it early in the morning. To Governor Brainard’s question, there are a lot of complications—if this is the way you want to go—that we would need to describe to you, so you understood exactly which way you wanted to go.

VICE CHAIRMAN DUDLEY. Presumably, Simon, you would want to announce this the day before, because the money market trading starts very early they need to have this information, so they can digest it.

MR. POTTER. We are actively checking so you have the full information to make that choice.

CHAIR YELLEN. Okay. Let’s begin the go-round. President Williams.

MR. WILLIAMS. Thank you, Madam Chair. On the first question, my answer is “Yes.” It’s as simple as that. On the second question, regarding approaches, I actually think you laid out the approach we should take really well in your comments just a moment ago. We hope we won’t need to do any of this, but having a serious meeting to discuss what is causing the funds rate to trade outside the target range, understanding what the effects of moving the two different administered rates would be, and having FOMC/Board of Governors decisions seems like the right approach. But once things have—I think “settled down” is the phrase you used—I think it



would be completely appropriate to delegate to you any further tweaks, plus or minus 10 basis points, say, to the two administered rates. I fully support the approach that you laid out today. I do view this as representing prudent contingency planning more than something that I would expect to happen. I am still pretty confident that we won't have problems keeping the federal funds rate within the range, but I think it is good planning.

I do think that one of the issues that came up in the questions asked in the past minute or two is really important, and that is about the communications in connection with this. One of the Committee's long-standing principles is that, to the extent possible, policy decisions regarding monetary policy really should be separated from technical issues associated with the implementation of policy. I'm thinking back to the good old days when the Desk had wide latitude to adjust the amount of reserves in the System in order to achieve the target federal funds rate. I think it would be very useful, if we can—and this is going to be the challenge—frame the communications regarding these adjustments to the administered rates so that we indicate that these are just mostly technical decisions reflecting, of course, the decisions of the FOMC and the Board of Governors on the policy decisions, but really communicated as technical means to achieve the policy goals that we have agreed on. We really want to avoid this perception that moving around these administered rates reflects some kind of shift in the stance of policy or creating some noise in connection with that. I think we are doing prudent planning. It is April now. Thinking through these issues now makes a lot of sense. Again, I support the approach that you laid out. Thank you.

CHAIR YELLEN. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Madam Chair. I am in favor of delegating to the Chair certain tactical decisions that ensure that we attain the policy goals voted on by the FOMC. This

is consistent with the FOMC setting strategy but delegating tactical implementation of monetary policy. However, determining the scope and timing of that delegation should wait until we have a better understanding of how the constellation of short-term interest rates will respond to our setting of IOER and overnight RRP rates at, and immediately following, liftoff. I am still somewhat uncertain about how successfully we will be able to target the federal funds rate and other short-term rates at liftoff. As a result, I could imagine a wide variety of adjustments that may be necessary following liftoff.

While the federal funds rate and other short-term rates may be comfortably bounded by the IOER and overnight RRP rates, I can easily imagine situations in which that is not the case. I can also imagine circumstances in which some market rates do not adjust as expected to changes in our policy rates. In addition, it is difficult to predict how variable policy or market rates will be at liftoff.

My preferred approach, in light of my concerns, would be to have frequent briefings, initially following liftoff, along with the flexibility to turn those into joint FOMC–Board meetings, if necessary. Once the relationship of the funds rate and other market rates to our tools, as well as the variability of those rates, is better understood, we could agree on the appropriate delegation of tactical decisions to the Chair. Predetermining our arrangements for delegation at this time serves little purpose, if they are quite likely to change after liftoff. I recommend being humble about how much we know now about liftoff and plan appropriately to have significant consultation and adjustments as we develop a more practical understanding of the challenges of lifting interest rates from the zero lower bound.

Similarly, it is probably premature to determine the normal relationship we expect for the primary credit rate. The current spread of 50 basis points above the IOER rate seems an

appropriate spread at liftoff. We can decide to alter the spread once it is clear where the federal funds rate and other short-term rates are likely to trade relative to our policy tools.

In summary, I suggest a highly flexible policy that is highly consultative. Once relationships are better understood after liftoff, we can discuss delegation of tactical decisions for achieving our goals. Thank you.

CHAIR YELLEN. Thank you. President Mester.

MS. MESTER. Thank you, Madam Chair. I am comfortable with a governance approach that involves prescheduled staff briefings for a period of time after liftoff and then, after the initial period when things appear to have settled down, delegating authority to the Chair to make small technical adjustments to the ON RRP and IOER rates between FOMC meetings. These technical adjustments would be for the purpose of keeping the funds rate from moving persistently outside the FOMC's target range. If the Committee agrees on the delegation governance structure, then this delegation of authority should be communicated at the time of liftoff. It is important that the Committee be aware of the developments in financial markets and the effectiveness of policy implementation after the liftoff announcement, and the briefings would be very useful in that regard. Whether two weeks is the appropriate time for the initial period isn't clear to me at this point. If we opt to prearrange daily briefings for two weeks, we might also prearrange a weekly briefing for the remainder of the intermeeting period. Of course, the briefings could be converted to meetings, if necessary.

I do believe it is important that we demonstrate after liftoff that we have the tools to bring the federal funds rate into our target range. That may necessitate making modest changes in the ON RRP rate or IOER rate in a nimble way. Delegating the decisions for these technical changes to the Chair seems appropriate. I believe we should treat the IOER rate and the ON

RRP rate symmetrically with respect to delegation. That is, if we delegate to the Chair, we should delegate the authority to make technical changes in both rates.

Changes that are strategic policy decisions should remain under the purview of the full Committee. These would include decisions to deploy the auxiliary policy tools, like term deposits and term RRP, as well as making larger changes in the IOER and RRP rates and, of course, changes in the federal funds rate target. Particularly if liftoff doesn't go as planned and the funds rate is trading persistently outside its target range, the full Committee needs to be responsible for making those hard choices and helping to communicate them to the public. The Chair shouldn't have to go it alone.

The Committee hasn't had a full discussion of what constitutes successful liftoff. This will help inform whether a technical adjustment is needed. Let me offer the view that liftoff will be successful if the federal funds rate is within the target range on most, but not necessarily all, days. In my view, successful liftoff does not require that the funds rate be at the midpoint of the range. We plan to operate with a target range of 25 basis points because we don't expect to have precise control over the funds rate. Under those conditions, I don't think we should require the funds rate to be close to the midpoint of the range.

Communication of any technical adjustments is an issue. We have indicated to the public that at liftoff we will continue to target a range for the funds rate that is 25 basis points wide and set the IOER and ON RRP rates at the upper and lower bounds of the funds rate target range, respectively. If we find that adjustments are necessary to keep the funds rate in the target range, we must depart from these plans in one way or another. Presumably, this can better be handled if, at the time of liftoff, we acknowledge to the public that technical adjustments to the two rates might be necessary and that, as we proceed with liftoff and normalization, the Board of

Governors and FOMC have delegated authority to the Chair to make those adjustments, and also that any technical adjustments would not constitute a change in policy. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Vice Chairman.

VICE CHAIRMAN DUDLEY. Thank you, Madam Chair. I am comfortable prescheduling the staff briefings during the first few weeks following liftoff. They can be canceled if they are not needed—all is working smoothly, for example, and the federal funds rate is trading within its target range—or they could be converted to joint FOMC–Board meetings if adjustments to the overnight RRP and IOER rates are needed to keep the federal funds rate in its target range. Obviously, we have to retain some flexibility about how long this period lasts, depending on what our experience is.

Turning to the governance approach beyond this initial period, I very much favor distinguishing between changes that are tactical, such as small shifts in the overnight RRP rate and the IOER rate to achieve the federal funds rate target selected by the Committee and changes in policy, which are shifts in the target federal funds rate—this goes to President George’s question.

I think there is a long history that tactical changes needed to implement the monetary policy stance that has been selected by the Committee can and should be delegated either to the Chair or to the Desk. If you consider how policy was implemented prior to the crisis, the Desk, in close consultation with Board staff, decided how much in reserves to add or drain each day in order to keep the federal funds rate close to its target. For many years, presumably as a governance measure, there was also one FOMC member on the call, essentially to keep an eye on the proceedings.

The decision on the amount of intervention and the means of intervention was left during normal times to the staff, the New York Desk, and the Division of Monetary Affairs at the Board. In unusual circumstances—for example, August 2007—the staff consulted closely with the Chair in making those reserve adjustment decisions. The issue in my mind is whether changes in the overnight RRP and the IOER rates that are small and designed to keep the federal funds rate in its target range meet this tactical criteria, and I think they do.

The changes contemplated would be to implement the monetary policy stance that had already been mandated by the Committee. So this argues for delegation. One could even argue for delegation to the Desk and the Division of Monetary Affairs staff, but I don't see any reason to go this far. I would favor delegating it to the Chair to make clear that it is receiving the attention it deserves by senior policymakers. Also, delegation to the Chair might be more appropriate in this particular case, because such decisions are about the level of interest rates offered on our facilities rather than as in the past, on the amount of reserves we might add or drain.

To implement this after the initial period, I would give the Chair the discretion to move the overnight RRP rate up or down by as much as 10 basis points, so a range of 20 basis points, and the IOER rate up or down by as much as 10 basis points as needed to keep the funds rate within its target range. The adjustments could either be in tandem to maintain a constant spread, or the spread could be widened or narrowed subject to those criteria.

In contrast to the delegation of modest IOER and overnight RRP rate changes to the Chair, I think any other changes—such as implementing the time deposit facility and things like that or changing the size of the cap on the overnight RRP facility—should be left to the full Committee. With respect to the overnight RRP cap, this is pretty consequential because it will

affect the composition of money market flows, and also it is unlikely that changes in the overnight RRP cap are going to be needed on a day-by-day basis. So having the Committee make these changes is not going to be particularly arduous; they will probably be made on a much more irregular basis, if at all. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Lacker.

MR. LACKER. Thank you, Madam Chair. Yes, I'm comfortable scheduling a bunch of briefings that can be converted at short notice to meetings. I think that adjustment of the IOER or the overnight RRP rates in the first few weeks following liftoff should clearly require an FOMC meeting.

I would point out that it took us almost a year to figure out how we wanted to set the IOER and the overnight RRP rates relative to the funds rate. Committee members brought different considerations to the tradeoffs involved, and the initial settings involve a compromise among different views about those tradeoffs. New information about performance of those settings after liftoff is likely to inform Committee members' views about those tradeoffs and likely require recalibration of that compromise.

For me, it's hard to imagine a routine adjustment. The analogy has been drawn to the Desk's draining and adding reserves through open market operations. I'd point out that it has taken decades for those to become as routine as they did. And at times when the FOMC has changed its operational regime, those things have been tricky at first, and the Committee has likely, in many of those instances, been very involved. I'm thinking about the early 1980s and times in the 1970s, when the instructions to the Desk were very different. It's going to take a while for changes to the IOER or overnight RRP rates to be seen as routine or technical rather than something like: "All right, we've set up a new regime, we're trying to calibrate the settings



of these things,” and the Committee needs to be involved. What I’d advocate is that we plan to make all the decisions at meetings until the first meeting at which a decision that is made appears, in hindsight, to have been clearly routine; from then on we can delegate the routine of changing it.

I don’t think routine changes are likely, to my mind. If you think about it, what’s at stake here is the spread: the arbitrage margin between the funds market and the IOER rate. It seems like 20 basis points, 15 basis points, somewhere in there. That doesn’t seem like something that’s likely to fluctuate the way the need for adding or draining reserves fluctuated on a daily basis. If it fluctuates, that’s big news if it goes to 30 or 40 basis points. I’d be kind of surprised about that, and I think we’d want to get to the bottom of it. I don’t think we have an understanding of those markets in which it looks like, yes, they should routinely fluctuate by 10 or 20 basis points. I’d urge us just to plan on making these decisions at meetings. I’m happy to delegate if it comes to pass that these turn out to be routine decisions that the Committee feels like delegating. Let’s go and make one of those decisions at a time like that and then delegate thereafter.

I also wanted to talk about the discount rate spread. The discount rate spread is 50 basis points, and it’s irrelevant to monetary policy right now in the sense that it doesn’t limit spikes in the federal funds rate when reserve supply is unexpectedly shortened. It’s not going to be relevant to monetary policy implementation in that sense until—2020, I think, is the latest staff projection. Its relevance now is basically for small banks that come up short on reserves due to poor planning or some unforeseeable contingency that they could claim is outside their control but probably isn’t. Now, large banks have a ton of reserves that insulate them against shocks, and they don’t come to the window. Right now, in our current situation of large reserve

balances, this is basically about giving the incentive to small banks to manage their accounts sensibly.

I think our old normal spread of 100 basis points would provide a more appropriate incentive, given the amounts of money involved if you actually do the overnight calculation. I think we should move back to 100 when we lift off. I would favor that. It was there. We set that in 2002. We did some analysis. There was some thought given to the tradeoff involved. I think it makes sense. It would also signal normalization in a way that would be useful.

When you talk about discount window borrowing, the word “stigma” inevitably comes up, and the idea is advanced that, well, keeping the primary credit rate low helps reduce stigma. That is certainly true in the only model we have of stigma and discount window lending, but the survey research we’ve done as part of the a group looking at discount window issues—they did some survey work on stigma, and what they found is that it is not a relevant consideration for small banks. Small banks don’t feel stigmatized. Maybe they feel stigmatized already, but they don’t feel as if stigma inhibits their borrowing from the window. It’s just a big bank or a too-big-to-fail bank kind of issue, and large banks don’t borrow now. In the last crisis, we lowered the primary credit rate when it looked as if there was a rationale for big banks borrowing at the window. It turned out they were getting all of the money they needed from Federal Home Loan Banks anyway, so it didn’t seem to be particularly relevant to large banks either. I don’t think stigma is a reason to keep the discount rate spread at 50 basis point rather than 100. That’s the import of that. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. My reaction to the questions posed is that they’re really matters of pragmatism. I agree that planning for daily briefings with the option of

invoking an FOMC meeting is sensible and workable. I'm certainly fine with that. I'm also comfortable with the approach that you laid out, with the Committee and Board making the decisions the first two weeks, and then after that, the delegation of small adjustments. So I'm comfortable in both cases. There are some details yet to be worked out, and under certain scenarios, we may have time to work them out. We could hear a second version of this possibly down the road.

I haven't given a lot of thought to the discount rate question, but I'm glad that President Lacker raised it and talked about it a little bit. With regard to trying to figure out what that spread should be, I want to throw out one thought, and that is a recollection that during the crisis, the Federal Home Loan Banks became a sort of surrogate discount window. And the relationship of our setting of the rates to their operations and their settings may be relevant for us to consider. Those are my thoughts. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. First Vice President Prichard.

MR. PRICHARD. Thank you, Madam Chair. I'm entirely comfortable with the approach described by the staff and yourself to be used for informing the FOMC on the effectiveness of policy implementation during the initial period after liftoff. I'm also entirely comfortable with the approach described as that to be used for delegating authority to the Chair on tactical matters once we have declared victory on a successful liftoff.

As it concerns the spread between the IOER rate and the discount rate, I think it's actually probably best to quiesce and minimize the variability at, and immediately after, liftoff. My preference would be to stay with the 50 basis point spread until we have some separation of these events. I think the number of moving parts at the time of liftoff could work against us,

especially as we try to understand all of the different things that could be happening, and one more change, I think, that isn't necessary might best be saved for later.

I will add to the earlier discussion on the median and midpoint—a behavioral issue that I would just like the staff to consider to the extent that we talk about changing the definition of the federal funds rate. I don't know what the behavioral reaction to that would be. It seems like when we whisper, people think we shout. I just don't know whether people would make more of that than is needed, again, at the time of liftoff. I understand we're not contemplating the definitional change then, but even announcing the plan of a change could have a behavioral effect. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. First, with respect to the meetings and briefings, I guess I'm having trouble seeing what the utility of daily briefings for a couple of weeks would be in the circumstance that we think is likely to obtain, which is that there's a reasonably successful liftoff. It seems to me more likely that we would want a briefing or a meeting on the Friday following liftoff. Thereafter, I'm just not sure how much there will be to say unless things are going wrong, in which case, as everybody says, we're going to actually need meetings and not just briefings. But I just note that in passing. I know this Committee can fill up virtually any meeting that is set with questions and conversation, but I'm just not sure how much there will be to say other than getting emails from Simon and Lorie telling us what has happened on day three.

With respect to governance, like everybody, I think, who's spoken on this point, I favor giving discretion to the Chair, but actually I think I would go further than the staff though. Indeed, I'm going to disagree with the Chair in the interest of giving her more discretion than she

asked for. I guess I don't quite understand why we wouldn't give her discretion for this kind of modest change in the IOER rate or the ON RRP rate or both, even in the immediate post-liftoff period. It is new, but we have spent most of the past year talking about how important it is to have a smooth and credible liftoff. And, notwithstanding my substantial uneasiness with the potential medium-term effects of a large ON RRP facility, I've joined the consensus that our dominant goal should be that smooth and credible liftoff, and presumably that smoothness and credibility are going to be most important in the immediate post-liftoff period, which is to say the first couple of days. It seems to me that if we regard the adjustments as fine-tuning in pursuit of a particular federal funds target rate range, it would be useful to give her the discretion in that first couple of days to make such adjustments in an effort to get, as Loretta says, to at least the bottom of that range.

If there's a major problem with liftoff, we're going to need another full FOMC meeting. But suppose, for example, there's a little bit of softness in the floor on the first day or two after the announced liftoff, and that softness might be firmed by a modest adjustment in the IOER rate. A quick action of that sort might actually buttress the credibility of our tools and intentions right from the outset and thereby make the whole process smoother. I don't think, in any case, it represents a policy change, because we can talk about it beforehand. Now, it's possible that markets might read such a quick adjustment as indicating that we lack confidence in the efficacy of the decision we had just made a day or two before. But that's a judgment that the Chair could make in consultation with those best able to discern what market sentiment and intentions may be.

Just by indicating that nimbleness is a desideratum, I think I've already explained why an FOMC decisionmaking process won't do the trick. I just think the logic of what we're talking

about here argues for giving the Chair this kind of very limited discretion to adjust those two rates that we've been talking about and we will set at the time of liftoff in the period in which they might be most efficacious in changing or shaping perceptions of how this whole process is going to go.

As to communication, it does seem to me proper to indicate in advance that small, operational adjustments might be made in the IOER and ON RRP rates between meetings. Characterizing those as operational adjustments beforehand and contemplating them, I think, helps reinforce the sense that these are technical changes rather than policy changes. The suggestion that any actual changes be noted by the Desk, as opposed to the Chair or the Committee as a whole, also seems to me a good idea since it would reinforce the fact that these rates are more or less operational changes rather than policy changes.

On the primary credit rate spread, I thought President Lacker's comments were very interesting. Notwithstanding the fact that they are interesting and we should think about them, particularly this difference between small and large bank stigma when we do discuss this, I personally would prefer to wait until the staff thinking about stigma effects and perhaps other elements of the discount window are done and maybe a more fulsome memo has been produced and circulated so that we can have a discussion of that. It seems to me we've got plenty on our plate right now, and we might usefully put that conversation off just a bit.

I want to end by saying I hadn't thought about it this way, but I fully endorse what Loretta said about the criteria for success in how we regard the meeting of the target range post-liftoff, and I think if we all subscribe to that, it would be useful for us, through appropriate mechanisms, to get that expectation out as well so that we're being evaluated by commentators and markets in a manner consistent with what our actual intentions and aims are. Like President

Mester, again, this is another reason why I think these little adjustments even right after liftoff are fine for the Chair to make. And, like President Mester, I think using any of the other tools is something that should involve the entire Committee. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Did I see a two-hander? President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. Like Governor Tarullo, I came to the meeting prepared to support delegation in the first two weeks. I interpreted your earlier suggestion as, one, respect for governance in a critical period and, two, maybe a desire to have more of a group decision than an individual decision. Could you maybe speak more for another moment or two on what your thinking is regarding that?

CHAIR YELLEN. I feel that in the days after liftoff, if things are not going exactly as we intend, and the funds rate is drifting outside the range, I do really think it's appropriate for the entire Committee to meet, discuss what is happening, try to get to the bottom of what the problem is, and decide on what the approach is.

Now, we could make the decision that this is no big deal, the funds rate is just fluctuating around relative to the target range by more than we had anticipated and this is the "new normal." If we wanted to address it not by moving the band or changing the spread, but by moving one or more rates around to deal with this when we see persistent movements outside the range, and early on the Committee says, "Let's just do this. It's not that big of a deal. That's the way to address this"—and at that point you regard those adjustments as essentially routine, and it's early, and then you want to delegate it along the lines of what Governor Tarullo said, I am perfectly comfortable with that, and, of course, that makes life easier. But I think the Committee needs to feel comfortable that we have established procedures that have been determined by the Committee that we think are workable and appropriate. First Vice President Holcomb.

MS. HOLCOMB. Thank you, Madam Chair. On the staff briefings issue, I say by all means they should be useful and perhaps important. If it should turn out that between the regularly scheduled FOMC meetings the funds rate begins to trade frequently below the overnight reverse repo rate for a reasonably sized ON RRP facility, I support the Chair having limited discretionary authority to restore funds rate control by raising both the IOER and the ON RRP rates while maintaining the spread between the two rates. I agree with Governor Tarullo that this could be within the first days as well. That these rate changes are not to be subject to a vote would signal that they are technical adjustments designed simply to implement previously-agreed-upon policy. The main focus would stay on the target band for the federal funds rate set by the FOMC.

The simplicity of a system in which the IOER and the ON RRP rates are set equal to the top and bottom of the target funds rate band, respectively, is appealing and easily communicated. Deviations from that simple system should be temporary with reserve-draining tools, like term deposits and term RRP, being brought to bear when systematically greater interest rate control is required. I understand that we are entering uncharted territory and may need to act nimbly. Therefore, a good solution is for the FOMC and the Board to give the Chair discretionary authority to adjust the IOER–ON RRP band relative to the funds rate target range between meetings while maintaining the width of the band at 25 basis points. Thank you.

CHAIR YELLEN. Thank you. President Evans.

MR. EVANS. Thank you, Madam Chair. The staff has laid out a perfectly reasonable plan for prescheduled briefings during the first two weeks after liftoff. I expect the process will go smoothly and these will end up like routine morning calls. If problems arise, I am



comfortable with turning the briefings into formal teleconference meetings to handle any policy decisions we may have to make.

After the initial burn-in period—perhaps two weeks—I also favor the Board and the Committee delegating authority to the Chair to adjust the IOER and ON RRP rates by up to 5 to 10 basis points, if necessary, to keep the funds rate within the target range. I am comfortable delegating this authority as early as you'd like. Even at the outset would be all right with me. Basically, these are efficient ways to tweak the dials as necessary, and I see a communications advantage to this approach, as it reduces the odds of small technical adjustments to the IOER or the ON RRP rates being misread as changes in the stance of policy. I completely trust that if any major issues arise, the Chair will not hesitate to bring us in on the decisionmaking process.

I did have a question. I can't remember if this was in the documents or other people have mentioned this, but at the time of the first liftoff, would we be comfortable preannouncing that we have no intention of adjusting the stance of monetary policy before the next policy meeting so that any intermeeting adjustments would be seen as nimble adjustments, just technically to get the funds rate in the range? I mean, I can't imagine that we would really think that we are going to have to have a policy tightening in between the first and the second meeting. But it would be unusual, I understand that.

CHAIR YELLEN. Certainly, we should make clear that we have an intended target range that reflects policy and stand prepared to make adjustments in the administered rates, and that we may need to do that.

MR. EVANS. You can say that in your press conference rather than it finding its way into the statement. Thank you, Madam Chair.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. Yes. Thank you, Madam Chair. I'm not entirely comfortable with the pre-commitment approach that President Evans outlined. As the Vice Chairman talked about in some of the remarks he made publicly in the intermeeting period, we don't know exactly what is going to happen to financial market conditions necessarily at the time of liftoff. If we saw a very abrupt tightening in broader financial market conditions, there might be a reason for the Committee to think about retracing the steps they have taken, even within the intermeeting period. I thought it was an interesting idea, but I, myself, wouldn't be comfortable with that. Thanks.

CHAIR YELLEN. President George.

MS. GEORGE. Thank you, Madam Chair. I would be happy to set my calendar for prescheduled staff briefings during the first two weeks to offer some insight, and I would be equally happy to remove them [laughter] if the staff judges that everything is going smoothly and there is nothing to report. I am also comfortable delegating to the Chair a degree of authority to make technical adjustments, and I think we will know whether those are technical or more substantive as we go along.

On the issue of the discount rate spread, my comments here really are along the lines of President Lacker's—I think this issue doesn't have much effect right now on overall financial market conditions. But we did make changes to the discount rate during the crisis to narrow the spread and then widened it to its current 50 basis points. Smaller banks do regularly use this facility, and Boards of Directors of the Federal Reserve Banks are required to make recommendations about the rate. It seems worthwhile to me to clarify how this rate is going to work as we contemplate normalization so that we minimize confusion and perhaps even mixed signals at the time of liftoff. Thank you.

CHAIR YELLEN. Thank you. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I appreciate the thoughtful analysis and the memos that discuss the intermeeting governance of the IOER rate, ON RRP rate, and other policy tools during the early weeks of liftoff. I thought that the approach described of scheduling daily staff briefings during those first few weeks is prudent and should meet our needs initially, given that we could convert them to official meetings as needed.

One thing I would note is that it might not always be clear what it would mean to “settle down,” so if liftoff takes place, say, in mid-June or mid-September, things might settle down after the passage of quarter-end and then you might have this issue of whether that is really settling down from the point of view of being able to deal with quarter-end. You might want to have staff briefings, again, scheduled for the end of the following quarter, which I guess, if we raised in September, would be at the end of December. I think just the passage of time is not necessarily going to tell you that this is going to be working and working fine. I think that is something to keep in mind as we go forward.

The staff memo noted that there are quorum rules for the Committee. Those might be useful in the context of these staff briefings. Not everyone needs to be here for every meeting, and the Committee still can operate. That might come up in this situation. I didn’t say this at the very beginning, but I should say that I am very confident that this is all about contingency planning. I am confident the tools are going to work. I think these meetings are going to become boring very quickly. It is going to be like the call. Not to say that’s boring, but—[laughter]—I misspoke. But it will become routine, at least. That’s our baseline scenario, but I do think it’s useful to engage in this contingency planning.

I think I am going to be in the minority on my next point, which is, can we transition to a situation in which we simply delegate so-called technical decisions to the Chair? Here I am not supportive of that delegation, and my answer there is shaped by three considerations. First, when my staff and I thought about the context in which increases in the ON RRP rate would be considered, we weren't sure that those situations would be that technical *per se* or tactical. It seemed like those would be situations in which the effective federal funds rate would be below the bottom of the target range, and that seemed likely to occur in conjunction with the cap on the ON RRP volume being binding. Then there would be some interaction, at least, in your discussion about raising the ON RRP rate, and also discussion about raising the cap. Now, the cap is a big deal. We have talked about that at length. The Committee certainly has strong views about that. It just immediately seemed to bring substantive issues into play.

The second consideration is that, as I listen to people talk about analogies with the past, if we were talking about delegating to the staff, I would almost be more comfortable with that than delegating to the Chair. [Laughter] I say that because I think if it is routine enough to be delegated to staff, we can delegate it to the staff. This is clearly not routine enough to delegate to the staff. This is about the Committee deciding that a decision, which is not sufficiently routine to delegate to the staff, is being delegated to the Chair instead. That is not something I feel as comfortable with.

Third, basically, there is an issue here of precedent. This is not about this Chair. I feel perfectly comfortable with you, Madam Chair, and your discretion in this matter. But future Committees may not have that level of comfort with future Chairs in related situations. Getting together for meetings is hard and challenging. It is always easy to delegate, and I think we want

to fight that tendency, especially in view of how easy modern technology makes it to pull together a quorum of the Committee for substantive discussion and deliberations.

For these reasons, Madam Chair, I recommend that the Committee not delegate authority for intermeeting adjustments to the Chair. Again, this is all about contingency planning, but I think the Committee could make contingency plans to vote, as needed, between scheduled meetings, be it by telephone, videoconference, telepresence, secure lines—all of the other suggestions that are out there.

A quick comment on the primary credit spread. I thought the idea of doing more research and work on this was a very interesting one. At liftoff, especially if we are going to be doing liftoff in the near term, the June–September time frame, I would favor keeping the 50 basis point primary credit spread at that time, then continuing to do work on the issue before we decide. Thank you.

CHAIR YELLEN. President Williams.

MR. WILLIAMS. I just want to mention that there has been some loose talk about comparing the timing of these briefings to the morning call, and I am not in favor of tying them to the morning call. Let me be clear on that.

CHAIR YELLEN. Notice when I was faced with that, I devised a way to end the requirement that—

MR. WILLIAMS. I call that leadership by—

CHAIR YELLEN. Thank you. [Laughter]

MR. EVANS. So it can be done? That's what you're saying?

CHAIR YELLEN. It can be done. It only took 50 years, but—

VICE CHAIRMAN DUDLEY. It can be done.

CHAIR YELLEN. President Bullard.

MR. BULLARD. Thank you, Madam Chair. Generally speaking, I'm comfortable with the prescheduled staff meetings. Based on the discussion here, I'm wondering whether we need one every day. Maybe twice a week—I'm picking up on some of the comments of Governor Tarullo. I'm not sure how much information you're going to get from Tuesday to Wednesday. You could probably review this a couple of times a week.

Also, picking up a little bit on themes Vice Chairman Dudley was talking about, could you do this with a subcommittee of the FOMC? Do you really have to have the entire Committee reviewing what is supposed to be a technical issue? You could bring the whole Committee in, if necessary, but if everything's going okay, it seems that it could be done by subcommittee. That's something to think about.

On the governance approach, the first part was, should we have a vote of the FOMC to adjust ranges? I view this as pretty cumbersome for something that's supposed to be a technical issue. It sounds nontechnical. It makes it sound like it's a policy change regardless of what we say, and so I see that as a difficult way to go.

Now, for the Chair's authority of 5 or 10 basis points, first of all, I think that moving these ranges should be subject to a high bar. That's one of my main comments. You really don't want to do this unless you really have to because of the communications issues that we're going to encounter. The payoff to doing this is ultimately pretty low. For instance, maybe the federal funds rate is trading a few basis points below the range, and now you make this move. Now the federal funds rate moves into the bottom part of the range. So you've gained a few basis points, but at the expense of markets asking, "What are you guys doing? Are you changing policy?"

Another question I have that has not come up yet is the authority to go 5 to 10 basis points over what time horizon. Would you be able to go 5 basis points and then the next week another 5 basis points, and the next week another 5 basis points? I don't think that's the intent, but that's something you've got to think about here. And if you went the full 10 basis points and it didn't work, then I guess the whole Committee would have to come in at that point.

I see a core problem here, which we've talked about before in our discussions. The Committee insists on saying that the federal funds rate is the policy rate, but relatively few trades are occurring at that particular rate. According to the Committee, the IOER rate is not the policy rate, but, on the other hand, that is the rate that affects the largest banks in the country, and it affects their funding costs. And, in other contexts, we have said IOER is our workhorse rate.

And then you've got overnight RRP, which we're also saying is not a policy rate, but which is for a market that has many traders and that is potentially large at the time of liftoff. So we might say that the policy rate is the federal funds rate, but what does that mean to markets? It's really the markets that are saying what the policy rate is, and if they think moving these other rates is more important than where the federal funds rate is trading, then we've changed policy in a macroeconomic sense.

So, I think this is a conflict, but that is part of the situation we're in, given the way we've decided to do this. I think it does have potential to sound like a policy move to people inside financial markets even though we're saying, well, the federal funds rate range has not changed and so we haven't done anything different. The bottom line is that I am worried about communications issues. Because of that, I don't think you want to do this unless it's absolutely necessary. You know, overall I would say 5 to 10 basis points per intermeeting period is okay

with me. I would agree with President Rosengren that it might be premature to decide on this today. You could make the delegation decision later around the time of liftoff, if necessary.

Let me finish with one story that old-timers here around the Federal Reserve will remember from the early 1990s. I am going to mention “He-Who-Must-Not-Be-Named,” who is former Chairman Alan Greenspan. At the time, it was considered that the Chairman had 25 basis points on the federal funds rate target and that the Chairman could make that adjustment during an intermeeting period without consulting the Committee. And the Chairman at that time made a bunch of those moves and then came into the meeting and said, “Now that I’ve made the move, now we don’t have to move at the meeting.” This was extremely hot and divisive on the Committee in the early 1990s. We don’t want to get into any kind of situation like that, and I know that’s not your intention, but it is a bit of a slippery slope: What’s going to be delegated? Who’s agreed to it? How much have you agreed to? Under what circumstances? It is a very tricky issue, and it has been a situation in the past on this Committee that has been problematic from a collegiality perspective.

I know we’re not really thinking about anything like that, but I think it is a bit of a slippery slope. You’ve got this issue about what rates really matter versus what rates we are calling the policy rate, and you’ve got this precedent in the past when it didn’t go so well. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Fischer.

MR. FISCHER. Thank you, Madam Chair. I’m comfortable with the governance approach in the first two weeks of scheduling daily staff briefings, but I assume that we’ll quickly work out whether we need them every day and we can probably unschedule a few of them within a day or two. So I think there’s some flexibility there.



With regard to the governance approach for technical adjustments in the IOER or ON RRP rates, I don't know about previous Chairmen. I've only had one Chair in my life on the Board, and my experience with that Chair is that if there is going to be any question about a need for discussion, she will call for it. I haven't detected her trying to get around the FOMC or the Board, and I think we can rely on that. So I'd be perfectly willing to give the Chair an adjustment up to 10 basis points. I agree that we need to specify that the discretion would be granted between meetings.

I'm not sure about the wisdom of constraining the gap between the ON RRP and IOER rates to 25 basis points. We may find reasons why we need to move one without moving the other, and my general approach is, don't constrain yourself if there's no need to constrain yourself, because the law of unintended consequences is very powerful.

On the primary credit rate, I agree with those who think we should try to minimize the number of adjustments we make at the time of liftoff, and that this issue is sufficiently important for banks to which we give a lot more attention than their size would imply. I'm not sure why we would want to start by raising the cost of borrowing by 50 basis points for the smaller banks who do borrow at that rate, and we'd need to look at what would happen when we raise the rate. And so, for both reasons, I favor examining that after liftoff. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Powell.

MR. POWELL. Thank you, Madam Chair. I'm very well aligned with the Chair's original comments and additional comments and response to Governor Tarullo's and President Lockhart's points, and with many others around the table as well.

As for the briefings, I think it is fine to schedule them, and if we have them I'll attend them, but I think the only case in which we would actually want to have them is if things are

really not going well. And I don't expect that that is likely at all in a world in which we have taken the cap off the overnight RRP or, for that matter, put a very high cap on.

As far as delegation is concerned, if the test is adjustments that are routine or technical in nature, I completely trust the Chair's instincts on that. I will say that if what we're dealing with is a very difficult and failed liftoff situation, I don't think, in real time, that's going to feel either routine or technical. I think it's going to feel like something that all of us ought to be involved in and accountable for. I also would not constrain ourselves by holding this space between the IOER and the ON RRP rates at 25 basis points. It might make sense to do something different, again, in real time. So, for all of that, I think it's essentially impossible to anticipate all of these things, and I would just say that I will do what is reasonable at the time.

In terms of the primary credit facility, it is an interesting subject on which we can have a lot of debate. I wouldn't touch it until well after liftoff. In my view, it's just not a complication that we, in my view, need to be taking on right now. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Brainard.

MS. BRAINARD. Thank you, Madam Chair. I support the proposal. I think it's very important for us as Committee members to take responsibility for actively being engaged in assessing the effectiveness of monetary control and the relative roles of the IOER and the ON RRP rates in maintaining the federal funds rate in the target range for some initial period. The length of that period, I think, should be determined by events. My guess is that if the decision to lift off is made coincident with a meeting with a press conference, as seems very likely, I would expect that period of active involvement to span that quarter-end, but beyond that, I think it would be unwise to be too prescriptive at this point.

When market functioning has settled down, it will be appropriate to delegate to the Chair the authority to make the necessary changes to the levels of the IOER and the ON RRP rates, or possibly to the spread between them, in order to maintain effective monetary control. I think the Committee can make that decision once it judges that the frequent briefings and meetings no longer serve their purpose, along with the parameters of the delegation. It's very important that we carefully manage communications regarding the heightened vigilance and possible activity of the Committee and the Board during those initial weeks so that our communications bolster confidence in the normalization process and contribute to smooth market functioning.

With regard to the appropriate level of the primary credit spread, I would be open to a recommendation from the staff as to returning it to pre-crisis levels. But like many others around the table, I would want to put some distance between the timing of liftoff and the timing of possibly changing that spread so as not to further complicate our already challenging communications around the time of liftoff. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. I think this has been a very useful discussion. Let me say the Board meeting is now adjourned. We're ready to go on to item 3, and I suggest we have the economic briefings and then we'll take a coffee break before going into our round. Let me turn things over to Bill Wascher.

MR. WASCHER.<sup>3</sup> Thank you, Madam Chair. I'll be referring to the top exhibit on your pile, which is labeled "Material for the U.S. Outlook." The data on spending, production, and hiring that we received since the March Tealbook were all weaker than we expected. On the spending side, the February PCE data and March retail sales report led us to make a sizable reduction in our estimate of first-quarter real PCE growth. This downward revision to consumer spending accounts for much of the downward revision to first-quarter real GDP growth shown in panel 1 of your forecast summary exhibit. In addition, a number of other categories of spending—particularly business investment and residential construction—have also surprised us to the downside in recent months, as have the incoming data on factory output. I would note that after the April Tealbook was closed, we received the advance report

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<sup>3</sup> The materials used by Mr. Wascher are appended to this transcript (appendix 3).

on capital goods orders and shipments for March, which was also weak but broadly in line with our expectations.

One of the crucial questions that we faced—and that you face as well—was how to interpret this batch of disappointing news, and whether, in particular, it is best seen as just another hiccup in a recovery that fundamentally remains on track toward achievement of your policy objectives, or the leading edge of a more serious slackening in the pace of recovery. For the most part, we have leaned toward the former interpretation. Accordingly, our projection calls for near-term real GDP growth to return to a pace that is not too different from our March forecast. In particular, although it is difficult to quantify their influence precisely, we believe that several transitory special factors—including unusually severe winter weather and production disruptions related to labor disputes at West Coast ports—were a small drag on first-quarter real activity. In addition, we think that measured first-quarter GDP growth will be held down a bit by seasonal adjustment issues that affected estimates of state and local construction spending and by a distortion in the BEA's translation of retail sales to PCE associated with the steep decline in gasoline prices and the increased share of gasoline sales at large retail establishments such as Wal-Mart. We do not judge any of these factors to be exerting a large influence on their own, but as a group, our back-of-the-envelope calculations put the effect at about  $\frac{3}{4}$  percentage point.

That said, we have not completely discounted the weaker-than-expected incoming data. Specifically, we trimmed our estimate of consumption growth in the second quarter a bit as a result of the weaker-than-expected March retail sales report, and we made a noticeable downward revision to our projection of near-term residential construction activity in response to the lack of a significant pickup in starts and permits in March. We also lowered our forecast for nonresidential structures spending, as the latest data on drilling activity suggest that the recent drop in oil prices is having a larger effect on drilling and mining investment than we had previously anticipated. Because we believe that the fundamentals underpinning household spending remain solid, we continue to expect that real GDP will rise at a pace that exceeds our estimate of potential output growth over the remainder of the year. Even so, the level of real output at the end of this year is almost  $\frac{1}{2}$  percent lower than in our March forecast.

As a way of providing another perspective on the near-term outlook, panel 2 presents the results from the Board staff's dynamic factor model. This model uses the information from a large number of activity and price indicators to generate forecasts of near-term real GDP growth, and it was among the specifications we showed you in the April Tealbook box on nowcasting models. As you can see, using the data that we had available when the April Tealbook was closed, the model also predicts a very low GDP growth figure for the first quarter followed by a modest pickup in the current quarter. Of course, the model does not know about any of the special factors that we think will unwind and provide an additional boost to growth this quarter. And I would note that the range of predictions for first-quarter growth coming from the

various nowcasting efforts across the System is quite wide, underscoring the uncertainty surrounding the interpretation of the pace of activity last quarter.

To wrap up the discussion of the near-term spending data, I would remind you that we will receive the BEA's advance estimate of first-quarter real GDP tomorrow morning. Given how low our current point estimate is—and in light of the relatively large degree of uncertainty that surrounds these estimates, even on the eve of a release—it would not be especially surprising from a statistical point of view if we were to see either a small decline tomorrow or a noticeably stronger increase than we have penciled in. And, of course, the BEA's initial estimate is itself subject to substantial revision over time.

Moving to the middle panels, the labor market has continued to improve, but here, too, the data point to somewhat less momentum than we had anticipated in our previous forecast. In the establishment survey, March total nonfarm payroll employment growth was considerably weaker than the very strong pace that we had expected. Incorporating revisions to previous months, the average monthly change in payroll employment over the first quarter now stands at about 200,000, which is 70,000 less than we had written down in the March Tealbook. The news from the household survey also came in a little weaker than we had anticipated: The unemployment rate held steady at 5.5 percent in March—we had expected it to tick down one-tenth—while the participation rate, which we had expected to hold steady, edged lower.

To summarize the information from the various pieces of labor market data that we have received, panel 3 shows our labor market conditions index, or LMCI. As you can see from the inset box, the LMCI was basically flat last month. For the first quarter as a whole—the rightmost bar in the main chart—the index did increase, but at a slower pace than what we have seen in recent quarters. Just as we did with the spending data, we took a modest signal from the incoming labor market news and reduced our projected pace of monthly payroll job growth by about 40,000 over the current quarter. We also nudged up our forecast for the unemployment rate in coming months.

Over the remainder of the medium term, our projection of real GDP growth is little revised from March. The main conditioning factors that we built into the baseline forecast this round—particularly, the lower projected path for the exchange value of the dollar—are, on net, expected to be slightly more supportive of real activity. By the end of the medium term, the effects of these changes offset roughly half of the downward revisions we put through to the near term, leaving the level of real GDP just a little lower relative to our March projection.

Although it had only a small effect on our projection regarding real activity, I would point out that we now assume that the federal funds rate will lift off from its effective lower bound in September, one quarter later than in our previous forecast. Our revised liftoff assumption is broadly consistent with both the “flash” primary dealer survey that was taken after the March FOMC meeting and the latest dealer

survey, and it is more consistent with the timing suggested by financial markets. In addition, as best we can tell, a September liftoff date does not appear to be sharply at odds with FOMC participants' March SEP submissions, in which the median participant pointed to the third quarter as the most likely quarter for liftoff. After liftoff—and consistent with our usual practice—the projected path for the funds rate is set by mechanically applying an inertial version of the Taylor (1999) policy rule.

Panel 4 gives our projected path for the unemployment rate. With the level of real GDP at the end of the medium term only a little lower relative to March—and with no change to our supply-side assumptions this round—the unemployment rate is expected to be 5.1 percent at the end of 2017. This is one-tenth higher than its level in the March Tealbook and one-tenth below our estimate of its natural rate. The slow pace of decline in the unemployment rate reflects both the modest pace of GDP growth projected over the medium term and our assumption that the strengthening labor market will draw more individuals back into the labor force.

Panels 5 and 6 summarize the inflation outlook. The incoming data on price inflation have been a touch above our expectations and support our projection that both total and core inflation will step up in the second quarter. Further out, the inflation projection is little revised. As in previous Tealbooks, we expect that inflation will gradually move higher as resource slack diminishes, energy prices rise, and prices for imported goods turn up again.

Finally, I wanted to call your attention to a change we made this round to how we characterize forecast uncertainty in the Tealbook. Specifically, we have revamped the methodology that we use to compute confidence intervals based on our historical projection errors and have also reworked our presentation of these intervals to include a comparison with the historical range of key forecast variables. The new intervals are typically a little wider than the ones we reported previously, and they tend to show more asymmetry, which is most noticeable in the prediction interval surrounding the unemployment forecast. When we miss big on unemployment, it tends to be because unemployment turns out to have been much higher than expected, not much lower. Additional details on this new methodology were presented in a box and associated technical appendix in the Risks and Uncertainty section of the Tealbook and in Jeremy Nalewaik's pre-FOMC briefing. These new intervals complement our other methodology of using stochastic simulations from the FRB/US model to produce confidence intervals around our projection, and we intend to show both sets of uncertainty measures in future Tealbooks. I would note that the confidence bands shown in my exhibit today continue to use the FRB/US measures, but our intention is to eventually extend the new methodology to compute confidence intervals around our quarterly forecasts as well. Steve will continue our presentation.

MR. KAMIN.<sup>4</sup> Thank you, Bill. The harsh weather we endured last winter left many potholes in U.S. roads and, as Bill Wascher has described, helped create one large pothole in U.S. GDP growth. Interestingly, as shown in panel 1 of my

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



presentation on the international outlook, a pothole also appears in the path of foreign growth in the first quarter. Incoming data have been surprisingly weak in countries as diverse as Canada, which shared our harsh winter; China, which was actually warmer than usual; and Malaysia, which arguably has no winter at all. As shown in panel 2, the downturn was also evident in global trade, suggesting some underlying malaise that was sweeping the globe.

As indicated by the yellow bars in panels 1 and 2, we faced a very similar picture exactly a year ago, with U.S. growth, foreign growth, and global trade all turning down in the first quarter of 2014. Accordingly, I went back and looked at my remarks for the April 2014 FOMC meeting for lessons that we might apply here. First, I found that I used the same tired pothole metaphor a year ago. [Laughter] Second, at that time, I also predicted that foreign economic activity would clamber out of its pothole and resume moving along the path to recovery, just as Bill Wascher did for the United States. Unusually enough, we both turned out to be right, and we are making the same call today.

Certainly, the fundamentals favor a return to solid growth abroad: Monetary policy is generally very accommodative, oil prices remain low, and most currencies have weakened considerably against the dollar since last summer. Moreover, many of the factors that pushed down global growth in the first quarter appear to be transitory. Canada's economy is estimated to have flatlined on account of unusually harsh winter weather and a step-down in oil investment, but with oil prices bottoming out, growth should bounce back in the coming quarters. Mexican output is estimated to have decelerated sharply in the first quarter along with U.S. manufacturing, and we anticipate that the projected rebound in U.S. activity will boost growth in Mexico as well.

China also accounts for some of the pothole in foreign growth, but its situation is more complicated. As shown in panel 3, GDP growth fell from 7 percent in the fourth quarter to only 5.3 percent in the first, well below expectations, as exports and industrial production dropped sharply. It is difficult to parse out how much of the first-quarter shortfall reflects reduced external demand, how much reflects the ongoing correction in the property sector, and how much reflects longer-term developments such as the rebalancing of the economy and decline in potential output growth. In any event, the authorities had been easing monetary policy even before the weak GDP reading, and they have now stepped up this stimulus, including reducing the required reserve ratio 100 basis points. In our projection, the combination of heightened policy stimulus and rising external demand pushes growth back up to over 7 percent later this year before it edges down thereafter. Like the booming Chinese stock market, however, this forecast is somewhat speculative, and we have revised down our projection a bit in response to the recent weakness.

Ironically, nearly the only bright spot in the global economy has been the euro area, for which strengthening industrial production, retail sales, and PMIs point to a rise in first-quarter GDP growth to 1¾ percent (panel 4). Notably, financial conditions are becoming more of a positive for the economy, in part reflecting the

ECB's asset purchase program. Bank lending standards are loosening, credit to nonfinancial corporations is finally picking up a bit, interest rates are extremely low, and the real trade-weighted euro is at its weakest level since 2001. Accordingly, we see euro-area growth firming to 2¼ percent in the next few years, provided that spillovers from Greece's crisis remain contained, as we assume in our baseline.

That, however, is a big "if." The Greek government is struggling in its efforts to negotiate additional financial assistance from European authorities and the IMF, even as it is running arrears to suppliers and raiding the accounts of local governments in order to stay afloat. More than €10 billion in payments on its medium- and long-term debt are coming due in the next four months. Although the Greeks have reshuffled their negotiating team in an apparent effort to ease tensions with their creditors and strike a deal, there is still a good chance that the government could miss one or more of these payments. Such an event could trigger a run on Greek banks, and unless the ECB stepped up its liquidity support by a substantial margin, the government would have to declare a bank holiday and impose capital controls, with a much-heightened chance of Greece eventually exiting the euro area altogether. Had such developments occurred at the height of the euro crisis in 2012, spillovers to the rest of the euro area would have been very destructive. However, as Simon noted, the region's financial, institutional, and policy framework has strengthened in recent years. Accordingly, we are building into our euro-area forecast only a small drag due to spillovers from Greece's intensifying crisis. Nevertheless, we recognize that, as described in the Tealbook, far more dire scenarios are possible, not just for the euro area but for the global economy more generally.

While the pace of economic activity abroad remains quite unsettled, two key external drivers of U.S. economic prospects have been a bit more quiescent of late. First, oil markets have not yielded any big surprises. To be sure, spot prices, shown in panel 5, are up more than \$8 per barrel since the time of the March Tealbook, as falling rig counts and other signs of declining investment have led markets to expect lower U.S. oil production. However, prices for futures contracts further out on the curve are up by less, so that our projected path for Brent prices has been raised just a bit and remains well below levels prevailing last summer.

Second, for the first time since last July, the dollar has come down over the intermeeting period, as shown in panel 6. This depreciation likely reflected weak data and the fall in expected policy rates here in the United States. However, I would like to remind you that, starting with the March Tealbook, we decided to deviate from our standard random-walk-oriented model and projected a further rise in the dollar. That also must have contributed to the dollar's subsequent decline. [Laughter] In the event, from its lower starting point, we assume the broad real dollar will still move up some 2¼ percent between now and the end of the year as the U.S. economy bounces back and markets refocus on the policy divergences among major central banks.

Your next exhibit puts movements in the dollar and their implications for economic growth into broader perspective. As shown by the black solid line in panel 1, even at its projected peak early next year, the broad real dollar would be well



below its previous two peaks. The black solid line in panel 2 shows the contribution of net exports to real U.S. GDP growth. We project it at negative  $\frac{3}{4}$  percentage point this year and next. This is the largest drag on growth since the early 2000s, and it almost entirely reflects the appreciation of the dollar. It may seem strange that the dollar should depress the net export contribution to such an extent when it remains so far below its previous peaks. However, what matters for the contribution of net exports to GDP growth is not the level of the dollar but how much it moves, and the dollar has appreciated sharply since last summer. Additionally, the share of trade in the U.S. economy has grown over time, amplifying the effects of dollar movements on net exports and growth.

Were the dollar to rise further than we are currently projecting, it would exert even stronger effects on the economy. Returning to panel 1, the dashed line shows the 10 percent rise in the dollar described in the “Stronger Dollar” scenario in the Tealbook. As shown below, the contribution of net exports to GDP would fall to its lowest level since the early 1980s. Additionally, as indicated in panel 3, core inflation would fall below 1 percent on a four-quarter basis before rebounding. Josh will now continue our presentation.

MR. GALLIN.<sup>5</sup> Thank you. My material is titled “Financial Stability Developments.”

My remarks draw on the recent QS financial stability report. In sum, valuation pressures in asset markets have increased since the January assessment and remain notable. In addition, vulnerabilities related to maturity and liquidity transformation remain moderate, but leverage in both the financial and the nonfinancial sectors, overall, remains relatively low. Taken together, we think that conditions in the financial sector are moderately prone to amplify shocks.

I begin with valuations in fixed-income markets. The yield on the 10-year Treasury note—the blue line in the upper-left panel—and term premium measures—the red and black lines—have remained quite low since the January financial stability briefing. The possibility that term premiums will move up sharply remains a focus of staff analysis. I will return to this issue near the end of the briefing.

In corporate bond markets, yield spreads to comparable Treasury securities have moved down a bit in recent months. As shown by the red line in the panel to the right, the far-term forward spread for high-yield corporate bonds—one measure of risk premiums—remains near the middle of its historical range, which suggests that valuations are reasonable—relative, that is, to seemingly richly valued Treasury securities. In addition, as shown by the light blue bars in the middle-left panel, issuance of high-yield bonds, a nonprice measure of hot markets and thus valuation pressures, remained robust through the first quarter of the year. Somewhat in contrast, issuance of leveraged loans—the dark blue portion of the bars—has declined, on net, in recent quarters. Although supervisory analysis of completed

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<sup>5</sup> The materials used by Mr. Gallin are appended to this transcript (appendix 5).

deals suggests a modest improvement in underwriting quality, fairly lax nonprice terms were reportedly still prevalent in recent deals.

Moving to the stock market, the expected real return on corporate equities—the black line in the middle-right panel—has fallen significantly since the previous stability briefing, as stock prices have advanced and expectations of corporate earnings have been revised down. The low expected return suggests that valuations are quite high. The equity risk premium, which is the difference between the expected return on stocks and the expected real yield on the 10-year Treasury note, shown in teal, has also moved down sharply, though it remains closer to the middle of its 30-year range. Our overall assessment is that equity valuations are somewhat more stretched now than they were just a few months ago.

A variety of changes in the structure of fixed-income markets may add to the volatility of interest rates, and, perhaps, to the volatility of volatility. First—and I’m not referring to any panel quite yet—increased electronification of the Treasury market could contribute to occasional and surprising spikes in volatility, such as that which occurred on October 15 of last year. In addition, the continued decline in intermediation by dealers—as illustrated by gross and net dealer borrowing, shown in the lower-left panel—is consistent with anecdotes that new regulations have made dealers less willing to provide marketmaking liquidity, even in normal times. A bond market selloff could also be temporarily amplified if investors in bond mutual funds rush for the exits, forcing funds to sell into an illiquid market. The rapid growth in assets under management at such funds—shown in the lower-right panel—including funds that hold less-liquid assets, suggests that the scope for such an amplification has increased in recent years.

The first panel of the next exhibit shows an estimate of the level of “runnable” private money-like instruments. This measure of maturity and liquidity transformation includes cross-holdings of money market instruments, such as when a money fund holds repo. It is therefore an indicator of the vulnerability of the financial system through intermediation chains that rely—at one link or more—on short-term funding. The level of these runnables has been fairly stable at a relatively high level during the past two years, as growth in uninsured deposits—the light blue region—has offset a decline in repo—in red—which suggests that the financial system remains moderately vulnerable to runs.

A fairly bright—or should I say, green—spot on the financial-stability map is leverage in the banking system. As can be seen in the upper-right panel, capital cushions at bank holding companies, as measured by both the Tier 1 common equity ratio—in black—and the leverage ratio—in red—have increased notably. This reflects both Basel III requirements and the resilience required in annual stress tests. As you know, no CCAR bank fell below the stress test’s quantitative benchmarks in the most recent round, although three firms had to adjust their planned capital distributions.

As far as we can tell—which, admittedly, is not very far—leverage in the nonbank financial sector continues to be a vulnerability. As summarized in the middle-left panel, overall margin credit has moved down in recent months but remains quite elevated, and hedge funds appear to be using a fairly large amount of portfolio margining from prime brokerages to lever up in equity markets. In addition, responses to the March SCOOS provided some evidence that counterparties have been demanding more leverage to fund non-agency RMBS, high-yield corporate bonds, and securitized CRE loans. Unfortunately, leverage embedded in derivatives is hard to measure, so it remains difficult to assess the overall leverage of hedge funds, mutual funds, and other investment vehicles.

Moving to the private nonfinancial sector, the middle-right panel provides the big picture for households: Modest increases in household debt continue to be driven mostly by prime borrowers—the orange line—though debt of subprime borrowers—the black line—ticked up in the fourth quarter. Student loans and subprime auto lending have remained rapid even as delinquencies on these kinds of debt have moved up. Although we do not currently consider student and subprime auto debt to be direct vulnerabilities for the financial system, we are alert for potential spillovers to other debt markets.

As can be seen in the lower-left panel, the debt-to-assets ratio for all nonfinancial corporate businesses—the black line—and for high-yield and unrated firms—the red line—moved up further in the fourth quarter, which suggests a continued buildup of the vulnerability of this sector.

The lower-right panel provides a very brief roundup of the potential shocks to the financial system that appear most proximate. A sharp rise in term premiums could precipitate a sudden drop in a variety of asset prices, especially for those with stretched valuations. Moreover, for reasons mentioned previously, these shocks could be temporarily amplified if liquidity were to deteriorate just when it is needed most or if bond mutual funds were to experience large and disruptive outflows. That said, the risk of a sustained amplification is mitigated by the apparently modest amount of leverage in the financial system. We are also attuned to the possibility of damaging spillovers from a rate spike here to emerging market economies. As we concluded in a special memo, although blowback to the United States through financial connections would likely be limited, a significant EME recession and a presumed increase in risk aversion would damage the U.S. economy as well. It is worth noting also that term premiums could, instead, stay low for longer than anticipated. Such an outcome would be a shock to investors who have positioned themselves for rising yields and could also lead to a further buildup of vulnerabilities if investors are driven to “reach for yield.” Other potential shocks of note that have been around for a while include a disorderly Greek exit from the euro zone, significant geopolitical disruptions, or distress at a large global financial firm brought about by, say, legal penalties.

I will conclude my prepared remarks by noting a few policy initiatives that the staff are pursuing related to specific financial vulnerabilities, which appear at the top

of the final exhibit. With regard to interest rate risk, the staff are independently measuring the risks at banks and working with those banks to manage their exposures. On market liquidity, the staff are undertaking a variety of projects to better understand changes in the structure of bond markets, including increased electronification, and are working with other agencies to prepare a public report on the Treasury market. Regarding asset managers, the staff have begun evaluating the potential for the growth of managers' activities, perhaps through the use of leverage and liquidity transformation, to contribute meaningfully to systemic risk and whether reforms are needed. Finally, on leveraged loans, supervisors continue their monitoring efforts and will begin a more comprehensive Shared National Credit review in May. Thanks. That concludes my remarks.

CHAIR YELLEN. Thanks. Questions for any of our presenters? President Bullard.

MR. BULLARD. Thank you, Madam Chair. I'm looking at exhibit 2, "Alternative Scenario: Stronger Dollar." What are the confidence bounds around these dotted lines?

MR. KAMIN. Well, the simulations come from a DSGE model, but it's not an estimated model. So we don't compute those, although I assure you that an estimated version of SIGMA that would allow us to compute those is on our long-term work agenda.

The most tenuous thing is whether or not you will actually get a 10 percent additional rise in the dollar. As you can tell from the chart, that's not a common occurrence. That's something that, broadly speaking, we think there might be a 1 in 10 chance of for a couple of years. So that, in some sense, is the most tenuous.

In terms of thinking about the effects on net exports and then on U.S. real GDP, that's actually a little bit more straightforward in the sense that the results from SIGMA—particularly for what I'm showing here, which is the net export contribution—are broadly consistent with our estimated trade models, and those don't give you very different results. So the effect of a higher dollar on exports and on imports is relatively straightforward, and obviously there are errors, but they're probably not subject to huge errors.

A larger area of uncertainty comes in when translating the effect of the change in net exports into GDP, because there is some uncertainty there about the multipliers. And there's

also some uncertainty about to what extent you want to build in a monetary policy response and what impact that has. So, for the net export contribution itself, I would guess that, relatively speaking, is not a huge confidence error. The confidence errors would rise as you then translate that through to real GDP growth.

MR. BULLARD. Let me follow up with a slightly different question. Over the past 25 years, firms have become more globalized and have learned how to handle global currency fluctuations. They adopt hedging strategies, and they put production in various countries and switch production in response to currency movements. In light of those changes, should we be estimating effects of real exchange rate movements using data for the 1980s and 1990s?

MR. KAMIN. Well, that's an excellent question. Let's just say we periodically do revise our import equations, and we do look for signs of parameter instability. So we're alert to that issue, and we haven't found any strong evidence of these changes in coefficients. There are other factors that, of course, are naturally parsed in. They kind of correlate with what you mentioned, which is that, over time, the share of trade in the U.S. economy has grown, and that is fully taken into account in our estimations because our models do incorporate the fact that, as the dollar changes exports and imports, those have a larger effect on GDP.

MR. BULLARD. Thank you.

CHAIR YELLEN. Thanks. Any other questions? President Evans.

MR. EVANS. Thank you. I have a question for Bill Wascher related to the Tealbook inflation outlook. I think in your presentation you mentioned that the inflation outlook is trending up because—I think you said—energy prices are going to be going up, resource slack will be diminishing, and maybe imported goods prices—I can't recall the entire list. Could you

refresh my memory on the contribution of changes in longer-term inflation expectations for delivering that increase in inflation?

MR. WASCHER. So, over the medium-term forecast, our view is that the underlying rate of inflation is 1.8 percent, and that serves as an attractor for the inflation rate.

MR. EVANS. Inflation expectations, is that—

MR. WASCHER. Yes. We call it underlying inflation, but in some sense you may think of it as inflation expectations over the medium term. Over the longer run, that drifts up to 2 percent because the FOMC says the target is 2 percent, and because tightness in the labor market is pushing inflation up. So it does serve as an attractor, as one reason inflation moves back up toward 1.8 percent in the medium term and toward 2 percent in the longer run. But, in addition, these other factors are important in getting there over the medium term.

MR. EVANS. All right. That's helpful. That is different from the way I was remembering it. I thought that underlying inflation was pegged to your assessment of longer-term inflation expectations, and that they were still about  $1\frac{3}{4}$  percent, but you've got a—

MR. WASCHER. That's right. I think that's right. But maybe I'm not quite getting your question. Over the longer run, we have those inflation expectations drifting up from  $1\frac{3}{4}$  percent to 2 percent.

MR. EVANS. Right. Thank you.

CHAIR YELLEN. President Mester.

MS. MESTER. Yes, I want to compliment the staff on the new charts on uncertainty. I think they are very helpful in thinking about the uncertainty associated with the forecast. Now, going on from what President Evans was asking, maybe, the PCE inflation in Tealbook A, page 69—if I look at that, it looks, from the way the errors look on that forecast, like the staff has been

underestimating PCE inflation. Should I interpret this as being that we have upside risk to the staff's inflation forecast?

MR. WASCHER. Which chart are you looking at? The top one?

MS. MESTER. I'm looking at PCE inflation.

MR. WASCHER. That's largely because of the energy price run-up in the mid-2000s. I think we didn't project that, and I think that's why the solid line, the median, is above the data there.

MS. MESTER. But even the distribution looks like—

MR. WASCHER. Yes. Again, I think that's because of the energy price shock. This is a relatively short sample with which we calculate standard errors around for PCE inflation, for two reasons. One is, we don't have data going back a long way, and two is, we think that this is a period over which inflation had different properties—it was more stable recently than in previous periods. So, because of that, I think the influence of energy prices is more prominent here than it might be in the longer run.

MR. ENGEN. If I could add just one thing that amplifies that point, if you look in the middle right at core PCE, the median and the projected paths are virtually on top of each other, which is another way of showing that the total is being influenced by the run-up in energy prices and how it feeds into total inflation.

MS. MESTER. Thank you.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. Yes, thank you, Madam Chair. I wanted to follow up on President Evans's line of questioning. During the intermeeting period, President Rosengren suggested the possibility of raising the inflation target. If the FOMC were to introduce a new



inflation target that was higher, would that have a higher gravitational pull in the staff's model that we'd be pulled back to that higher target?

MR. WASCHER. In terms of modeling and the way we do it in the FRB/US model, I think the answer is "yes," because we do have a small term that reflects the FOMC's stated target relative to current underlying inflation. I think it would be gradual, but I think in the FRB/US model, it would be a stronger attractor than a 2 percent target. Also, if I used the Taylor rule, I think it would imply a much easier policy as well.

MR. KOCHERLAKOTA. That's true, a different reaction function. Thanks.

CHAIR YELLEN. Great. Okay. I suggest we take a break for 15 minutes to get some coffee. When we return, we have a few people who would like to comment on financial stability, and then we'll go to the economic round.

[Coffee break]

CHAIR YELLEN. We now have an opportunity for people to comment on financial stability, and three people have indicated they would like to. President Rosengren, do you want to start us off?

MR. ROSENGREN. Thank you, Madam Chair. When I talk to asset managers in Boston, the biggest concern raised is the problem of liquidity in the secondary market for corporate bonds. They worry that when we begin to raise rates, a rush to sell positions in corporate bonds will occur, and a crowded exit with few buyers could lead to a rapid increase in the yield on corporate bonds. At least some elements of this concern probably deserve greater attention.

First, the average size of trades in corporate bonds has fallen significantly relative to the average size of trades prior to the financial crisis. This may reflect an actual or perceived



difficulty in transacting large trades due to weakened liquidity in the market. This raises the concern that if a significant portfolio rebalancing were to occur, it may be difficult to sell large positions in a timely manner.

Second, there has been a significant decline in the corporate bond holdings of broker-dealers. According to the SEC's FOCUS reports, while J.P. Morgan held \$29.5 billion in corporate securities in 2007, those holdings had plummeted to only \$11.3 billion by the end of 2014. Similarly, Credit Suisse held \$30 billion in corporate securities in 2007, and their holdings collapsed to only \$4.4 billion by the end of 2014. Such sizable declines in corporate securities holdings among these key liquidity providers lends some credence to the concern about potential liquidity problems in this market.

Third, bond mutual funds—which were shown in the earlier charts on financial stability—and bond exchange-traded funds have grown significantly since the financial crisis. The exchange-traded funds pose a particular problem if investors view them as highly liquid. At the end of 2008, assets under management at exchange-traded bond funds totaled \$57 billion. By the end of February this year, assets under management at exchange-traded bond funds had soared to \$320 billion. If investors assume that the corporate bond market is liquid and, more specifically, that their exchange-traded fund shares will always be liquid, and if they choose to sell as we tighten, they may be surprised at the price at which they transact.

In summary, the concerns with corporate bond market liquidity as we approach liftoff bear watching. The degree of movement out of bonds is likely to be highly sensitive to the projected pace of tightening as well as to the timing of tightening. An oversized reaction in this market could result in a bumpy exit from the zero lower bound. Thank you, Madam Chair.

CHAIR YELLEN. Thank you.

MR. TARULLO. May I ask Eric a question?

CHAIR YELLEN. Yes, sure.

MR. TARULLO. Eric, can you take it a step further and say what the implications of your concerns are for policy? Is it for monetary policy? Are you advocating a relaxation of capital requirements?

MR. ROSENGREN. No, I am not advocating a relaxation of capital requirements.

MR. TARULLO. I didn't think so.

MR. ROSENGREN. I think it highlights that how we communicate around the time of liftoff actually is critically important for whether people decide that this is something they need to do—to rebalance their portfolios quite quickly. I think the way that financial stability interacts with monetary policy is, it highlights that the communication issues become pretty important.

MR. TARULLO. That's helpful. Thanks.

MR. LACKER. Also, if it happens, we can say we talked about it.

CHAIR YELLEN. All right. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I want to thank the staff for the excellent assessment of financial stability. It's my reading that the assessment again indicates that current policy has not produced any material signs of financial instability. Indeed, it appears that the main financial-instability consideration for monetary policy at the moment is that a near-term increase in the target range for the federal funds rate could lead to financial instability. As the report says, "Term premiums in benchmark U.S. and other advanced economy bond yields are again near historical lows reached before the taper tantrum, raising the risk of similarly outsized market reactions at liftoff."

The staff also identified a vulnerability that could propagate this shock from the increase in rates. Specifically, page 4 of the assessment notes that changes in the structure of the Treasury market could amplify the effects of an initial rate move and lead to sudden swings in prices and liquidity.

Now, how can we best mitigate this risk? President Rosengren, I think, highlighted one way to think about this, which is through communication, but I have a slightly different perspective on the answer to this question. To answer this question, I think we have to understand why long-term rates might rise dramatically in response to a small increase in short-term rates. And here I believe that a key consideration is the policy signal associated with such a move in the near term. Raising the federal funds rate in the near term would mean they're initiating liftoff when inflation is far below target and the growth outlook has been weakening. Liftoff in such an environment would indicate that the FOMC is considerably less willing to provide accommodation to respond to adverse shocks than financial market participants currently anticipate. As a result, they would expect less accommodation in general but especially so in bad times, and this expectation of higher interest rates and lower bond prices in bad times translates directly into higher term premiums.

Now, it's tempting to conclude that we can somehow mitigate this potential financial instability only through reassuring verbal communication at the time of liftoff, but I think it's difficult for words to trump the communication content of our actions. So, in my view, we can best mitigate this financial stability risk by ensuring that our actions are always clearly connected to our pursued, declared objectives. In the current context, that would mean deferring liftoff until the economic data clearly indicate that raising interest rates is necessary for the FOMC to achieve its declared objectives of 2 percent inflation and maximum employment over the

medium term. I'll say more about what this conclusion means for our policy deliberations tomorrow. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Williams.

MR. WILLIAMS. I'm going to pick up on the same topic that President Rosengren introduced and President Kocherlakota discussed. However, I will not be expressing my views on monetary policy at this time. [Laughter] I think Governor Tarullo asked a great question: What do you do with this information? I'm going to go a slightly different direction based on something Josh said, which I found very interesting.

I was struck by two sentences on page 17 of the QS report. They are right after each other. One is that large banks' liquidity ratios continue to improve. The next sentence is basically that there is less liquidity in markets. These two sentences are right next to each other, and immediately, when I read this, I said, "What's the connection here? To what extent is the liquidity requirements or the capital requirements, for that matter, affecting the willingness of broker-dealers to basically make markets and provide market liquidity, especially in a stressed environment?" But it also led me to what Josh pointed out, which is that this is apparently a longer-term research project about market liquidity and understanding what's happening there, and how much amplification we may see, whether it's in corporate bond or Treasury bond markets, in response to shocks.

My comment is that I think this is a really important subject not just for thinking about our policy decisions or policy communication, but more generally, to understand what's happening in those markets and understand to what extent it is changes in regulation, changes in technology, or other things. Really, my comment is wanting to see more on that sooner, because I think this is a key issue, as others have mentioned. Thank you.

CHAIR YELLEN. Great. Does anyone else want to comment? [No response] Seeing no hands, let us begin the economic go-round with President Mester.

MS. MESTER. Thank you, Madam Chair. The Fourth District economy continues to expand. In April, the diffusion index of business contacts reporting better versus worse conditions was 23 percent, up from 18 percent in March. Retail freight and both residential and commercial construction firms reported improved conditions. All manufacturers and energy firms reported worse conditions.

Anecdotal reports suggest some slowing in the pace of growth in the first quarter. Factors cited by contacts reporting slower growth earlier this year include the harsh winter weather, spillovers from the West Coast port strikes, declining energy prices, and the appreciation of the dollar.

The effects of weather and the strike are transitory. Almost all of our contacts reported that the effects of the winter weather have now passed, although I should note that it snowed in Cleveland last week. The effects of the port strike are expected to dissipate by the fourth quarter.

The fall in oil prices continues to challenge firms engaged in energy development or extraction as well as their suppliers, like steel producers. Suppliers of raw materials that use petroleum-based products report a falloff in orders as customers run down their inventories in anticipation of further price reductions. My business contacts believe that oil prices have likely bottomed out, and that the effects of lower oil prices are likely to be temporary for most exposed sectors. Of course, that remains to be seen.

Conditions in District labor markets continue to follow national trends. The District's unemployment rate, at 5.2 percent, is below the national rate of 5½ percent and below the 5.7 percent District average over the 2001–07 expansion. Contacts in all sectors except energy

reported increasing staffing in the previous six to eight weeks, although, except for construction, the additions were somewhat smaller than previously reported. So far, wage pressures remain limited to occupations such as trucking, skilled construction trades, and quantitative white collar jobs. Prices of finished goods continue to be stable despite more businesses reporting declining costs for nonlabor inputs.

Turning to the national economy, we have received a number of disappointing data reports since our previous meeting across several sectors, including manufacturing, business fixed investment, and consumer spending, and including the employment report for March. As was the case last year, there was very harsh winter weather, but this year we also had the port strike, the sharp drop in oil prices, and the sharp appreciation of the dollar. Similar to last year, we have seen a growth slowdown in the first quarter, and we are trying to extract the signal about future growth from the incoming data. This is difficult to do in real time.

A good case can be made that this is a temporary setback, just as it was last year, and that is forecast in the Tealbook. The effects of bad weather and the West Coast port strike are transitory. Using a Bayesian VAR model augmented to include weather indicators, my staff estimates that the unusually cold weather reduced GDP growth by 0.9 percentage point, and there will be some rebound in the next couple of quarters.

We have seen the negative effects of lower oil prices on energy-related firms but not much positive effect on consumer spending, although that is likely to come, and oil prices appear to be stabilizing. Dollar appreciation has been a drag on exports and the profitability of firms with multinational operations. But as the rate of appreciation slows, the drag can be expected to diminish as well. The slower growth seen in our trading partners might be a reflection of the slower growth in the United States. If our growth picks up, it could be that theirs will as well.

In addition, not all of the incoming data were negative. The rate of job openings reached another cyclical high, and initial claims are very low, just below the trough reached in the last economic expansion. These indicators suggest that the weakness in payroll jobs in March could be temporary. Although the Conference Board's consumer confidence measure was down in April, consumer sentiment came in high, and underlying fundamentals for consumer spending, including improved balance sheets, remain quite good.

The news on inflation was also a bit better over the intermeeting period. Core inflation is modestly firming. Both headline CPI and core CPI increased 0.2 percent in March for the second month in a row, and core CPI inflation edged up to 1.8 percent on a year-over-year basis. The Cleveland Fed's median CPI measure, which helps predict headline inflation over the medium term, has remained near 2¼ percent since April of last year. The Federal Reserve Bank of Cleveland's measure of the 10-year expected inflation rate was essentially unchanged in April.

So this is the positive view of things. Of course, there is also the possibility that the slower growth will be more persistent and inflation developments will worsen. I don't believe we have enough information right now to reach a firm conclusion today, and we don't have to. We can remain agnostic until we see more data over the next couple of months. Incoming data will help us determine whether the slowdown in the first quarter is proving to be temporary, like it was last year, or whether it is pointing to something more fundamental. In particular, we are going to get two employment reports before our June meeting. These are going to be quite important in my own thinking about the economic outlook. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Madam Chair. Recent economic data have had a distinctly weaker tone since our previous meeting. The March employment report indicated little

overall improvement in labor markets, the unemployment rate was unchanged, and payroll employment growth was surprisingly weak. Similarly, wage and price data have yet to show a clear trend toward our 2 percent inflation goal. While some of the weakness can be attributed to the severe weather in some parts of the country, many of the higher-frequency data before and after the harsh winter weather have also been on the soft side.

As a result, in my view, neither of the conditions for liftoff articulated in the March FOMC statement has been sufficiently met at this time. The March Summary of Economic Projections reflected some significant changes in longer-run variables. The central tendency of the longer-run unemployment rate has slipped from a range of 5.2 to 6 percent in June 2012 down to 5 to 5.2 percent in March. Similarly, participant estimates of the long-run equilibrium federal funds rate have declined. The central tendency in June 2012 ranged from 4 to 4½ percent, but now it is down to only 3½ to 3¾ percent. Our assessment of these key variables has changed significantly, which, in retrospect, is not surprising, considering changes in demographics and productivity since the financial crisis.

While I and many other participants have lowered our estimates of one of our dual mandate goals—the natural rate of unemployment—we have not engaged in any comprehensive discussion of our other goal, the inflation target. That target has remained unchanged at 2 percent since it was adopted in 2012.

We have learned a great deal about conducting monetary policy in a low-inflation environment since 2012. I am fully aware that we should have a high threshold for changing our inflation target, as frequent changes would undermine its usefulness. But the accumulated weight of economic experience suggests, in my view, that a reexamination of our inflation target is warranted for several reasons.



First, the choice of an inflation target was largely based on research both here and abroad, indicating that the likelihood of reaching the zero lower bound and the cost of being at the zero lower bound was small. This research suggested a relatively low probability of reaching the zero lower bound, typically below 5 percent, and relatively brief spells at the lower bound once reached, usually a couple of quarters. In part, this optimistic read could have been based on faith in the efficiency of alternative monetary policy tools. However, the experience of the past decade has been less favorable. Today most major developed countries are at the zero lower bound, and, despite employing alternative policy tools, none has yet exited, even though we are now more than six years past the financial crisis. In short, the research on the expected cost of hitting the zero lower bound has not been consistent with the economic outcomes we have observed.

Second, we have revised our assessment of variables that should affect the probability of hitting the zero lower bound. The most obvious example is the lowering of the equilibrium federal funds rate. With the same inflation target, a decline in the equilibrium federal funds rate should increase the probability of hitting the zero lower bound. The most recent SEP submissions, for example, report a decline in the equilibrium real rate of more than 50 basis points, and this assessment is echoed among private forecasters and market participants. If one of the rationales for setting a positive inflation target is to reduce the frequency of hitting the zero lower bound, a lower equilibrium real rate implies the need for a higher inflation target to reduce this probability. On a practical note, the fact that Japan, the United Kingdom, Europe, and the United States have each hit the zero lower bound and have remained there for a very long time should make us wonder whether the global convergence to a value of 2 percent for the inflation target was misguided.

Third, we have learned more about the cost of being at the zero lower bound. After more than six years, we have still not returned to the 5 to 5.2 percent unemployment rate range that the SEP central tendency currently indicates is consistent with longer-run unemployment rates. While the new tools of quantitative easing—purchasing mortgage-backed securities and lengthening the maturity of our holdings—have resulted in growth faster than we otherwise would have experienced, we have missed both elements of our mandate for more than six years now.

This is not an acceptable outcome. The consequences of not being able to exit the zero lower bound more quickly have been a long period of underutilized resources and below-target inflation that risks eroding the credibility of the central bank. A higher inflation target would surely have given us more room to lower real interest rates using our conventional policy tools, likely saving hundreds of thousands of jobs.

Despite our willingness to alter other variables, we have not recently had a comprehensive review of our choice for the inflation target. In light of the accumulating evidence that inflation targets globally may have been set too low, this choice may have resulted in a great cost to the global economy in terms of lost economic output and employment. Thus, we should have a fuller discussion of our choice for the inflation target before we set our longer-run strategies at the beginning of next year.

In addition to the longer-run implications of the inflation goal for monetary policy, a higher inflation goal would have more immediate policy implications. Entertaining a higher inflation target would imply an even larger inflation shortfall, compelling us to wait even longer before lifting off. A weaker version of this proposition suggests both that we should delay liftoff until we see clear evidence that inflation is increasing, and that we should be willing to entertain

an inflation rate that exceeds our current target. This strategy would, of course, be akin to price-level targeting, a notion that President Evans and others have previously discussed.

In summary, we should recognize that the economy's performance over the previous six years has a bearing not only on our estimates of full employment and the equilibrium federal funds rate, which many of us have adjusted in the SEP, but also on the inflation target. I understand the concern with shifting an inflation target that we set after years of deliberation and following years of success in bringing inflation down. But our failure to hit either of our mandated goals for six years and running demonstrates the potential cost of an inflation target that is too low. Recognizing the many complications that a change in the target would entail, I believe we should have a more fulsome discussion about what the previous decade of economic history has taught us about the optimal inflation rate. Should we be willing to entertain an increase in the inflation goal, this would, of course, have implications for the timing of liftoff, which we will be discussing tomorrow. Thank you, Madam Chair.

CHAIR YELLEN. Vice Chairman.

VICE CHAIRMAN DUDLEY. I would like to ask President Rosengren a question. You are implying that the only margin for adjustment is on the inflation target rate. Presumably there is another margin for adjustment, taking a lot of steps to make a future financial crisis of the type that we experienced in 2007, 2008, and 2009 less likely, right? Because you could argue that one reason why we are in this position is because we had a really, really bad financial crisis. So, in principle, one could take steps to make the probability of a financial crisis lower, and that would presumably lessen the need to change the inflation target. How do you think about that?

MR. ROSENGREN. If you think you can significantly change the probability or amplitude of those shocks, then you are right. But the equilibrium federal funds rate has come

down quite a bit. Our own internal estimates of what that implies for how frequently we will hit the zero lower bound are that it is substantially higher given that most of the time the equilibrium federal funds rate that many of those models were estimated on was 4½ percent. We are now at 3½ percent—I actually think you could make an argument that it is lower than 3½ percent. So if you have an equilibrium federal funds rate that is lower, the implication is that you hit the zero lower bound more frequently unless you think you can dramatically alter either the frequency or severity of having the kind of shocks that we experienced.

CHAIR YELLEN. Isn't it the case that some of the steps we would take to reduce the odds of a financial crisis—strengthening capital and liquidity—may actually, by raising the cost of intermediation, lower the equilibrium real rate?

VICE CHAIRMAN DUDLEY. Yes, I think that's right. But my point is just that the room you need depends on the size of the shocks that you are dealing with. And if you do other things and reduce the size of shocks, that also should be a factor. I don't really disagree with a lot of the points that you made, but it seems to me that that's not the only potential margin—

MR. ROSENGREN. Yes. I'd just raise one other countervailing argument that, certainly, the experience around October 15 of the very sharp movement in financial markets at a time when no real economic news was occurring makes me wonder—I am not convinced yet that all of the actions we have taken have necessarily, dramatically changed the probability or likely severity of shocks in the future from what we experienced before.

VICE CHAIRMAN DUDLEY. In that shock, though, implications for the real economy were trivial.

MR. ROSENGREN. In that case.

MR. BULLARD. Madam Chair?

CHAIR YELLEN. President Bullard.

MR. BULLARD. I appreciate your bringing this up, President Rosengren. Just one comment about your rhetoric on this. Missing the inflation target over six years—if you look at headline inflation year over year, it was above target in 2011 and 2012, and it came back down. I know you like to think in terms of core inflation, but I think this is an issue for that piece of the puzzle. When you evaluate the Committee over that kind of a time frame, I think you have got to look at headline.

MR. ROSENGREN. Yes. I would say that hitting an inflation target temporarily because of an oil price shock is a Pyrrhic victory. You care more about the underlying rate of inflation.

MR. BULLARD. These are the prices people pay.

CHAIR YELLEN. Okay. No doubt we will return to this. President Lockhart.

MR. LOCKHART. Moving right along. Thank you, Madam Chair. Over the intermeeting cycle, my staff conducted 56 interviews separate from our board meetings. We focused the interviews on any indications in their businesses that would confirm the weakness indicated by first-quarter data and, more to the point, suggest that first-quarter weakness might persist.

We found that overall business sentiment remains quite positive, somewhat at odds with our reading of the incoming data. On balance, our contacts and directors portrayed demand as continuing to improve at a steady pace. We noted, however, that compared with the previous cycle, their optimism is accompanied by a hint of caution. We heard more reports of negative effects of the dollar. Exporters, port operators, and firms with significant foreign operations all noted market or other challenges that they attributed to the dollar.

As expected, we heard reports of investment pullback and layoffs in oil and gas exploration and production firms as well as in oil services companies. That drag is being partially offset by greater investment activity in business sectors benefiting from low energy prices. We also continued to hear reports that firms are trying to hold on to margin improvement coming from fuel and other commodity cost declines.

Declines in gasoline prices have yet to translate into a meaningful boost in consumer spending. A director with knowledge of consumer markets commented that product categories that historically have been leading indicators of stronger consumer activity—to wit, apparel, eating outside the home, and movies—have not yet signaled an upturn.

We received positive reports on real estate investment activity, both commercial and residential. Architects and contractors indicated improved pipelines. Our banking contacts report that new mortgage and investment activity is strong.

Regarding employment, we heard continued concern about turnover and retention. At the same time, we detected little change in reports this round regarding wage inflation. On that subject, although most data indicate that the trend in nominal wage growth remains flat, a measure constructed by my staff from the Current Population Survey does show an acceleration in year-over-year wage growth in the first quarter. Wage growth increased to a 3 percent pace in the first quarter, up from 2.8 percent in the fourth quarter and up from 2.4 percent a year earlier.

Continuing on employment, I'll mention something we heard for the first time from three large employers in quite different businesses. All said they have begun shifting their work forces away from part time toward full time. They all cited the high managerial and logistical cost and quality challenges of a large, part-time workforce.

We've been struggling to reconcile these generally positive anecdotal reports with the hard data on the first quarter and early indications of second-quarter performance. Our tracking estimate of first-quarter GDP growth is just marginally above zero, at the low end of the spectrum presented in the Tealbook. Our tracking model is a straight statistical model with no judgmental overrides. We would not claim it's the most accurate read of the first quarter, but it's what the raw data are telling us, and we'll have an official reading soon enough—tomorrow morning. At this point, I'm holding to the view that weather and other factors played a significant role in first-quarter weakness, and that significant payback can be anticipated in the current quarter. We also observed—and this is nothing more than an observation—that weak first-quarter growth has been a pattern during the recovery, normally giving way to a stronger rest of the year.

We've made a small adjustment to our full-year GDP growth forecast to reflect a weaker first quarter, but otherwise we have kept our forecast for growth and inflation unchanged from the March meeting. We made no material change to our outlook. We have growth resuming a run rate between 2½ and 3 percent, with second-quarter growth above 3 percent. A strengthening of consumer activity from the first quarter is a key factor in our outlook.

We currently judge the risk to our growth and inflation outlooks as tilted to the downside. With the greater uncertainty I perceive at this juncture, the Tealbook alternative scenario titled “Persistent Slowdown in Economic Activity” captures my concern that my outlook may be overly optimistic. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Williams.

MR. WILLIAMS. Thank you, Madam Chair. As many have already noted, the recent data have been disappointing, but it is worth noting, as President Lockhart just did, that over the

past four years, first-quarter GDP growth has averaged more than 2 percentage points lower than growth during the rest of the year, and there is no single smoking gun that can explain this string of seasonal aberrations. Each year, the winter slowdowns have proved to be temporary.

So, if past is prologue, I expect the same pattern will occur this year, with an anemic Q1 followed by above-trend growth for the rest of 2015. I'm confident that the underlying momentum in the economy once again will be more apparent as the first quarter fades in our rearview mirror.

This is consistent with what I've been hearing from my business contacts. In particular, the fundamentals of the economy remain quite positive. Solid job growth should lift income and consumer confidence further, helping to pave the way for continued consumption growth. In addition, highly accommodative monetary policy will continue to boost spending, and these factors are very evident in my District. In fact, some sectors of the economy, the 12th District economy, are red hot. An executive in the tech sector recently mentioned that to retain talent, some tech firms are now offering 20 percent or more pay raises. And if that wasn't enough, they're also throwing in housing for good measure, and in the Bay Area, housing is something that is very hard to come by and obviously very dear. The other thing that we heard was that you can be vested in stock options after one month. So this is an amazing time in the Silicon Valley economy, and about half of my staff ran off to apply for jobs.

In addition, I will mention that some of my contacts in different sectors, including commercial real estate, have emphasized the abundance of financing that can be obtained at very generous terms. It's an issue that I noticed was highlighted in both the SLOOS and the QS reports, and we're hearing about that in our District, too. Of course, continued low inflation remains a key issue. I view the recent low inflation readings as being consistent with an



economy still operating below potential and facing temporary disinflationary factors. Important questions remain. In the remainder of my remarks, I'll focus on two of these issues. The first is, what signal should we be taking from the market-implied measures of inflation compensation? And, second, what's the empirical relationship between wage growth and inflation?

The softness in inflation of late would be a lot more troublesome to me if it was also accompanied by a clear decline in inflation expectations. This kind of scenario is discussed in the Tealbook alternative scenario simulation. But so far, the weight of evidence suggests that this isn't happening. Long-run survey expectations from households and professional forecasters remain well anchored. In addition, as I pointed out in the past, long-run inflation expectations implied by a Phillips curve model estimated over the past 15 years, a period during which our credibility was firmly established, were also well anchored at 2 percent.

Now, of course, the one discordant note comes from the market-implied measures of inflation compensation. Inflation compensation has fallen significantly since the middle of last year, and while much of the focus has been on longer-horizon measures, there's also a question about what signal we should take about the nearer-term inflation outlook.

My staff looked at this question, and they conducted a forecasting comparison between measures of inflation compensation and five other competing forecasts, among them a random walk forecast and also the survey from the Survey of Professional Forecasters. We wanted to avoid liquidity issues that are associated with shorter-term TIPS, so they looked at inflation compensation derived from inflation swap rates. These typically move very closely together with inflation compensation derived from the Treasury market, but are based on trading in a deeper market. Here we're looking at one- and two-year-ahead inflation forecasts for headline CPI inflation.

The striking result, which is very robust in all of their experiments, is that forecasts based on inflation compensation were the worst performers of all the measures. Basically, inflation compensation did not give useful information about where inflation was going relative to survey forecasts. So, really, looking at inflation compensation for insights into the future path of inflation is not supported by the data.

One problem with our analysis is that data limitations preclude doing a similar exercise for long-term inflation expectations. I'm going to go out on a limb here and say that the results we have for one- and two-year inflation compensation not being a useful predictor for future inflation will apply also to longer-term inflation. We don't have that much data right now, but in five years when the transcript comes out, we'll see whether I was right or wrong. We'll wait for that.

Again, President Kocherlakota has highlighted the fact—in a memo that he co-authored—that inflation compensation is not a reliable forecast for inflation because it reflects other aspects of risk associated with different inflation outcomes. But I want to mention another interesting finding in our work about inflation compensation, and that is that these one- and two-year-ahead inflation compensation measures are very highly correlated with recent past inflation, especially with past inflation associated with movements in oil prices. That puts into question how to interpret this. It is a very similar result that we've found in the past when we looked at household surveys. Household surveys of inflation expectations tend to be very sensitive to lagged inflation, especially with regard to oil price movements, and for this reason we have tended to discount movements in household inflation expectations when the movements are driven by energy prices. My staff suggests using a similar caution when trying to interpret inflation compensation measures as an indicator of people's views on future inflation.

The second issue I'll discuss briefly is that of nominal wage growth. As has already been mentioned, wage growth has been stuck around 2 percent for most of the recovery. And, as economic theory would tell us, employee compensation makes up a huge fraction of a firm's costs. You would expect there to be a pretty tight relationship between nominal wage growth and price inflation, but this connection has been remarkably hard to find. Many papers and research projects have looked at this, and, basically, if you look back at the history of the literature, in every business cycle there's a whole bunch of papers written about the relationship of nominal wage growth and price inflation. The consistent finding through this literature is that it's really hard to find any relationship between nominal wage growth and future price inflation. Recent research by Jim Stock and Mark Watson, and also some really nice work done at the Federal Reserve Bank of Cleveland and elsewhere, has shown that the additional information on wages or labor compensation has done little to improve the accuracy of standard inflation forecast models. My understanding is that the staff's inflation forecasting models tend to be these price–price Phillips curve models or models that don't really emphasize nominal wage growth.

The lack of a close empirical link between nominal wage growth and future inflation likely reflects several factors that have affected labor markets in recent decades—some of which I've talked about in the past. One is that nominal wage growth is probably being held down by rigidities in wage setting that kept wages from falling during the downturn and have been restraining wage growth as the economy improves—that is, there is downward nominal wage rigidity. The second is that globalization, changes in unionization, and changes in technology have affected the share of productivity gains that are going to workers, and that distorts the

relationship between wage growth and price inflation. Put another way, the labor share of income has fallen dramatically since the 1980s.

To summarize, based on the evidence accumulated over the past several decades of extensive research on this topic, there's little or no information to suggest that aggregate wage data should inform our medium-term inflation outlook. Now I'm going to break my rule that I stated earlier—I do not view a rise in nominal wage growth as a necessary condition to be confident in the return of inflation to 2 percent. All told, our current low inflation rates, I think, are pretty easy to understand in the context of transitory factors—import prices, energy prices—and the fact that there is still some considerable slack in the labor market. As the labor market moves back to maximum employment, and as these transitory factors dissipate, I expect inflation to move back to 2 percent.

President Bullard mentioned 2011. I think we should learn a lesson from that. We did see inflation rise quite a bit as a result of a rise in some special factors. We were experiencing high inflationary pressures due to large increases in the price of oil and other import prices, and what we did then, I think, is the right thing. We looked past the transitory effects of those and looked more broadly at the long-term inflation outlook, and that is how I am viewing it, too. Thank you.

CHAIR YELLEN. Thank you. President Evans.

MR. EVANS. Could I ask an information question? The research that you mentioned is very interesting, but I am not sure I followed the details. The inflation compensation measures were one- to two-year horizon expectations—and you also had survey measures of inflation expectations.

MR. WILLIAMS. The horse race was basically this: We aligned the inflation swap rate one year ahead with the swaps of months 13 to 24 ahead—one year ahead with one year ahead. And then we looked at the Survey of Professional Forecasters and Blue Chip for each year.

MR. EVANS. At the same horizons?

MR. WILLIAMS. Same horizons.

MR. EVANS. I see, and those were helpful? Because, if I understand some of the Board work, they use these long-term inflation expectations for their modeling because, as attractive as it is theoretically to use a short-term expectation, nobody can find a good measure of short-term inflation expectations. Isn't that right, Bill?

MR. WASCHER. We use the longer-term inflation expectations in our models. That's right.

MR. WILLIAMS. Yes, but the question I'm asking is: What do you think inflation is going to be over the next four quarters? The SPF is actually a very good forecast. This is roughly as good as the Tealbook. It's asking what inflation is going to be over the next—

MR. EVANS. Well, but the Tealbook won't use any short-term inflation measures, that's my understanding.

MR. WILLIAMS. No, no, no. I'm just looking at the forecast itself.

MR. EVANS. Oh, yes, but those forecasts are lousy. They might be better than the other ones, but they're all lousy.

MR. WILLIAMS. Well, I think the research says that the Tealbook is maybe a little bit better than the SPF and Blue Chip over the next year or two—

MR. WASCHER. Just in terms of forecasting? There's probably not much difference.

MR. WILLIAMS. So it's basically the same.

MR. EVANS. The Tealbook does something which is not in line with theory, to use long-term inflation expectations for a one-year-ahead inflation because, well, it kind of works, right?

MR. WASCHER. Yes, we view the anchoring of inflation expectations as best approximated by long-term survey measures of inflation expectations.

MR. EVANS. Yes, that's why I was asking the question about whether I understood you right, you've currently got it anchored at 1¾ percent and are hoping to goes up to 2 percent.

MR. WASCHER. Right.

MR. EVANS. But at any rate, I'm done. Well, I mean, it's interesting. I appreciate that.

CHAIR YELLEN. Please proceed.

MR. EVANS. Okay. Thank you, Madam Chair. For the most part, my directors and business contacts expect that the recent spate of soft economic readings will be short-lived. The one report that seems to sum it up the best came from the chairman of Manpower who, when talking about soft first-quarter numbers, said none of his clients are getting depressed about it. The view seems to be that there is enough momentum from last year that growth should pick up soon.

Separately, I didn't hear of any meaningful reports of wage or price pressures from my contacts. My own outlook for the real economy continues to be for real GDP growth to run between 2½ and 3 percent over the remainder of this year and next. Our assumptions for potential output growth are somewhat stronger than in the Tealbook, so our GDP path translates into a very similar reduction in resource gaps as the Tealbook's. By the end of 2016, we have the unemployment rate down to around 5 percent, which is my current assessment of the natural rate.

My inflation forecast has not changed. Like the Tealbook, I do not see inflation reaching target until sometime in 2018 or 2019. I should again point out that my assessment of appropriate monetary policy underlying this forecast has lower rates than most people around the table.

Now, I want to spend some time today talking about why this outlook leads me to favor a whites-of-their-eyes approach for our policy response to rising inflation. I have talked about risk management many times before. Today I want to articulate three additional reasons the data lead me to prefer a cautious approach to raising rates. First, forecasting inflation is inherently difficult, and that's the discussion that we were just having. This implies a high burden of proof to say we are sufficiently confident that our currently low core inflation will move back to 2 percent in a reasonable period of time. Second, despite near-zero nominal rates and a large balance sheet, I am not convinced our current policy stance is all that accommodative to begin with. And, third, I actually see benefits to risking a modest overshooting of our 2 percent inflation target.

Let me start with why it should take strong evidence to have confidence in an outlook of low inflation rising back to 2 percent. Anyone who has looked at the forecasting performance of statistical inflation models knows that everyone's abilities in this area are limited. Indeed, there is a body of research that shows it is not that easy to be a random walk forecast. Even the best-performing models seldom forecast a rapid change in inflation, and they always imply substantial forecast uncertainty. That said, we do have many analytical reasons to think our current low inflation will rise at some point. Most of the commentary I hear at this table centers on the economy regaining traction, resource gaps closing, and the upward gravitational pull of high and stable inflation expectations, like in the Tealbook forecast. I also suspect that simple mean

reversion probably plays a role in these forecasts as well. I agree that these forces will eventually deliver. The question is, when? Taking until 2019 to reach our target is not acceptable to me.

Given all of these difficulties in forecasting inflation, my own preferred dashboard of indicators is mostly a list of factors coincident with rising inflation. While measures of labor market slack are important, I would not rely on them alone, as it is possible something has changed in the structure of the economy that makes those historical benchmarks less trustworthy. In addition, I will continue to look for increasing core inflation, faster wage growth, and firmer market-based measures of inflation compensation to provide corroborating evidence of stronger inflationary pressures. As I said, the absence of statistically strong leading indicators suggests that these observations are likely to be more coincident than predictive. But at least once we see them, we can have more confidence that inflation is moving up persistently. Until then, I remain wary.

Now, my second point—that current policy is not as accommodative as we might think—comes out of the model analysis. A fundamental benchmark for thinking about the level of monetary accommodation and inflation pressures is the difference between the actual real rate of interest and the equilibrium, or Wicksellian, real rate of interest. As Milton Friedman said, low interest rates alone do not mean monetary policy is accommodative. The relevant question is whether, after adjusting for inflation, our current real federal funds rate is far enough below the equilibrium real rate to achieve our policy objectives in a reasonable amount of time—that is, for inflation to actually get up to 2 percent, as the forecasts embody.

I think the answer to that question is “no.” There are a number of simple observations that suggest that the current equilibrium rate is quite low. Namely, even with our interest rate



and balance sheet policies in place, we still see the continued existence of resource gaps, a lack of any meaningful upward movement in inflation, and relatively low levels of capital spending despite piles of cash on corporate balance sheets. These cash stockpiles are an indication that expected real returns on physical investment are not very high.

To put a number out, the Tealbook-consistent equilibrium real rate shown in Book B, as circulated over the weekend, is negative 0.1 percent. Some might look at the current real funds rate of minus 1.18 percent, as reported in the Tealbook, Book B, and say we have adequate accommodation in place. I don't agree. Recall that the Tealbook's equilibrium real rate is calibrated to close the output gap in 12 quarters. It says nothing about inflation. In the Tealbook baseline, the inflation gap is still with us until 2019. That would mean that inflation would have to run below target for more than a decade and, to me, that is simply too long to be considered the result of appropriate policy.

I want to mention that President Bullard referred to the fact that PCE inflation rose to 2 percent in 2011 and 2012 on the strength of commodity price increases. I think the reason we focus on core inflation is that core is a better indicator of what inflation is likely to be next year, because the shocks in headline PCE often are transitory. The real test, I would say, is, when did the Tealbook ever forecast inflation two years out as being at 2 percent or above? I think that has not been the case for quite some time.

While we can all lament the fact that there are large uncertainties regarding the value of the equilibrium real rate of interest, uncertainty over inflation forecasting and the stance of monetary policy accommodation go hand in hand. Logically, because the equilibrium rate has a strong bearing on the inflation outlook, uncertainty over it ought to translate into comparable uncertainty over inflation itself. In other words, how can we declare we are confident that

current low inflation is headed back up to 2 percent unless we are also confident that our policy setting relative to the equilibrium real rate is able to return inflation to target?

This brings me to the third reason my outlook is premised on a whites-of-their-eyes policy approach. I recognize that the usual policy lags might mean that a delay in tightening could cause inflation to modestly overshoot 2 percent sometime down the road. But so what? Is that such a big cost? No. On the contrary, it could be a benefit. Considering how long inflation has been below target, adopting a policy that allows the possibility of such an overshoot actually seems necessary to support the credibility of our symmetric inflation objective. If we find ourselves with the federal funds rate at 1 percent or a little bit above that while inflation is still too low, we could easily regret the conservative credibility that we've built up.

I would also say that if we are not willing to allow an overshoot of our inflation objective, then I think we should definitely be having the conversation that President Rosengren was suggesting we have in terms of the appropriateness of the level of the inflation objective, if it is something that we are not allowed to overshoot with any reasonability. I think that's important. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. First Vice President Holcomb.

MS. HOLCOMB. And now for something completely different. Thank you, Madam Chair. The Texas economy has decelerated since I last reported to the Committee. Continued low oil prices, the strong dollar, and a weaker national economy pushed state employment down by almost 12,000 jobs in March, the first decline in 40 months. Over the first three months of the year, combined job growth averaged a positive but still dismal 0.7 percent, down from 4.2 percent during the fall of 2014. Our forecast for December-over-December job growth, which is

derived from the Texas Leading Index, now stands at 0.5 percent. That's down from a forecast of 1 to 2 percent growth six months ago.

Besides oil and gas, the manufacturing sector has seen the greatest slowing. Companies in the computer and electronics industry say that they are losing opportunities as the appreciating dollar pushes up the relative price of U.S.-made capital equipment. Chemical producers report lower selling prices and margins and lower exports. Producers of primary metals have noted increasing import competition, too. Companies in the professional and business services industry have been indirectly affected by both low energy prices and the strong dollar, particularly those with a significant fraction of their clientele in the energy and manufacturing sectors. There have been some reports of adverse spillovers from energy to financial services as well.

Our most up-to-date information comes from our Texas Manufacturing and Service Sector Outlook Surveys. The latest manufacturing survey results, released only yesterday, show production declining in April for the second straight month—the first consecutive two-month decline since the recession. The New Orders Index, too, has registered its worst two-month performance since the recession, posting readings of minus 16.1 and minus 14.0 in March and April, respectively. In contrast, our latest service sector survey results, released this morning, show the headline revenue index rising to 14.6 in April from 10.7 in March. April's reading is the highest reported so far this year, but it is considerably lower than levels reported through most of 2014.

Despite slower job growth, the Texas unemployment rate continues to fall, and at 4.2 percent in March, it reached its lowest level since July 2007. We have anecdotal reports of laid-off energy workers shifting into construction, especially along the Gulf Coast, where skilled

construction workers remain in short supply. The wage and benefit indexes from our manufacturing and service sector surveys indicate that upward wage pressures are somewhat less intense than they were last year. Looking ahead, health-care contacts are concerned about losing experienced workers in a coming wave of retirements. In finance, our bankers report flat demand and unchanged standards across all major loan categories.

Oil prices have moved irregularly upward since last month's FOMC meeting, with WTI closing some of the gap with Brent. Year-to-date volatility has been driven by conflicting supply developments, including unexpected increases in OPEC output—namely, Saudi Arabia's production was up 4 percent in March—inventory buildups in the United States, and reports of slower growth in U.S. oil production. If the Iran negotiations successfully conclude in June, that country could ramp up its output by more than 700,000 barrels per day—0.7 percentage point of world supply—by the end of 2016, which would be enough to lower the price of crude between \$5 and \$15 per barrel in 2016, all else staying constant. The conflict in Yemen is another source of uncertainty. Yemen itself is a negligible producer of crude oil. However, the threat of wider conflict between Saudi Arabia and Iran, and Yemen's proximity to the fourth-busiest chokepoint for crude oil flows in the world, have created fears of supply disruptions.

Our energy industry contacts tell us that the number of drilled but uncompleted wells, or DUCs, has increased between 33 and 50 percent since the end of last year. These are wells that have been drilled but are kept out of production. They are underground inventory. New capital projects are difficult to initiate, but spending continues on existing contracts. U.S. oil production is expected to peak within the next two to three months. We are also likely to hit above-ground storage constraints within that time frame. Drilling costs are down 20 percent, partly as a result of real efficiency gains and partly as a result of cheaper labor and equipment. There is cautious

optimism that the worst is over, coupled with recognition that we're unlikely to see a return to \$100-per-barrel oil any time soon. Repercussions and adjustments in the broader Texas economy are ongoing.

We are a bit more sanguine about the national economic outlook today than we were a couple of meetings ago. It appears considerably less likely now that we will blow through full employment at full throttle. That revised assessment is based on predictions from a small suite of models we use to forecast real activity two to four quarters out. Although each model relies on its own set of financial and policy indicators, all are now telling a consistent story: solid if unspectacular GDP growth, on average, in the second and third quarters of 2015 and a gradual deceleration in employment growth over the course of the year, with the unemployment rate leveling off in the neighborhood of 5 percent heading into 2016. We expect trimmed mean PCE inflation, our measure of the underlying trend in headline inflation, to average about 1¾ percent over the next four quarters. As compared with the Tealbook, we are more optimistic on both halves of the dual mandate, but we're certainly not only in the same ballpark as the Tealbook, but in the same outfield. Hopefully, it's not left field.

Although we are looking forward to tomorrow's GDP report, we don't expect to take a strong signal from it, whatever the number turns out to be. The first estimate relies on a lot of guesswork, and in any case, GDP growth is volatile from quarter to quarter. As a result, we've not found real-time estimates of lagged GDP growth to be especially helpful for forecasting at the horizons that are of interest to us. Thank you.

CHAIR YELLEN. Thank you. President Bullard.

MR. BULLARD. Thank you, Madam Chair. Data on economic conditions in the Eighth District have improved notably during the intermeeting period. The pace of job creation was

revised up for 2014, and preliminary data for 2015 has generally been positive. The District unemployment rate continues to decline and stands at 5.7 percent today, according to the most recent reading—only slightly higher than the national rate.

According to the revised BLS data, District job creation occurred at about twice the pace in 2014 as compared with 2013, which was itself revised higher. One of the largest revisions was in the Louisville MSA which was revised from an original estimated value of 2.3 percent growth to an updated value of 3.8 percent. By sector, notable upward revisions occurred in transportation, manufacturing, and professional and business services. Correspondingly, Louisville's average hourly earnings growth is significantly faster than the national average.

On the downside, one of the most notable developments in the local labor market was the announcement by U.S. Steel that they would temporarily idle their Granite City, Illinois, plant, laying off over 2,000 employees effective in May. Media reports suggest that the layoffs are due, in part, to a rise in imports of relatively inexpensive Chinese steel—steel that, evidently, the Chinese do not need in their home market.

On this dimension, my recent intermeeting visit to China, combined with discussions with CEOs and my interpretation of some hard data, has suggested to me that trend growth in China may be notably slower than commonly appreciated. I think this goes beyond the relatively weak reported growth rate in the first quarter to a trend rate of growth as low as 4½ percent. Chinese GDP statistics are notably opaque—a topic of macroeconomic discussion for the past 15 years or more—but corroborating data and anecdotes now seem to be diverging more sharply from official reports, suggesting that a Chinese slowdown is to be taken far more seriously this time. The proximate cause of the slowdown is likely the ongoing anticorruption campaign,

which is reportedly casting a very wide net and is likely creating a chilling effect on new business formation and business expansion.

Turning to the national outlook, I have five main areas for comments on the current narrative for the United States, as reported in the Tealbook, FOMC speeches, and popular commentary. The comments are in the following areas: one, potential over-interpretation of the Q1 slowdown; two, an unemployment forecast that I think is not credible; three, assumptions about  $r^*$  that may be suspect; four, over-interpretation of the likely effects of the value of the dollar on U.S. growth prospects; and, five, underappreciation of the risks of asset price bubbles during the next two to three years as rates remain exceptionally low. I'm going to comment on the first three of these today. I'm not commenting directly on inflation because I think the situation in that dimension has not changed greatly during the intermeeting period. I continue to expect inflation to return to target and eventually overshoot 2 percent in 2016.

On the first issue, potential over-interpretation of the Q1 slowdown, data are clearly weaker on a tracking basis since our previous meeting. GDP will be reported tomorrow morning, and the staff has penciled in an estimate close to zero. But suppose we take the median of the nowcasting table reported in the Tealbook, which is an approximately  $1\frac{1}{2}$  percent annual growth rate of GDP in the first quarter. On that basis, the year-over-year growth rate would be 3.3 percent. I think this number gives a better sense of the underlying pace of growth in the U.S. economy and provides a better point of reference for shaping GDP expectations for the remainder of this year. In addition, I think that seasonal factors for Q1 are being called into question. We considered Q1 GDP growth averages versus averages for Q2 through Q4 over different time periods, excluding recessions, since the mid-1990s. Average Q1 real GDP growth

has been notably lower in these subperiods. This broad-brush analysis suggests that low Q1 growth rates are not occurring by accident, and that Q1 seasonals may need revamping.

The second issue is unemployment projections balancing out at about 5 percent over the forecast horizon despite easy monetary policy, by conventional definition. I do not think that such a forecast is credible, and I continue to disagree with the labor force participation assumption behind it. A key paper in the *Brookings Papers on Economic Activity*—by Aaronson and others, published in 2014—suggests that labor force participation has been dropping according to demographic factors since 2000, and, furthermore, that this downward trend will continue through the forecast horizon. This suggests that, on balance, there will be no sustained upward improvement in labor force participation and, therefore, that unemployment will continue to drop into the 4½ to 4 percent range over the forecast horizon, barring any major disruption in the U.S. economy. This dynamic would be very similar to what was observed during the 1990s expansion and again during the 2000 expansion. On both of those occasions, unemployment moved into the low 4 percent range.

Previous staff predictions in this area have emphasized increases in labor force participation but have turned out to be wrong. Indeed, the predictions given in the Summary of Economic Projections have also relied, in part, on this story and have also been wrong. The median SEP forecast as of September 2012 for unemployment at the end of 2014 was too high by more than 1 percentage point. The same was true of the median SEP September 2013 forecast for unemployment.

So what's the bottom line? We're charting a course for very low interest rate monetary policy based on an unrealistic assessment of future labor market performance, and this will harm FOMC policymaking in the quarters and years ahead. We can, of course, cite other labor market



indicators and thereby bring to bear more information on overall labor market performance. The Board of Governors' labor market conditions index does exactly this, conveniently summarizing information on many different dimensions of labor market performance. The Federal Reserve Bank of St. Louis calculated that the value of this index is comfortably above its long-run average since 1986. This indicates that, based on the totality of available information, labor markets are not weak but instead are relatively strong viewed in historical perspective. I like this index because it brings all information together in one place and avoids cherry-picking particular indicators that may or may not be indicative of overall labor market performance.

The third issue is  $r^*$ . Some commentary has suggested that an  $r^*$  parameter in a Taylor rule is low based on estimates of Laubach and Williams, which, combined with relatively small inflation and unemployment gaps, would suggest, through a Taylor-rule-type calculation, that current policy is approximately the policy recommended by the rule. This argument could rationalize current policy settings, although it would suggest that policy is perhaps not as accommodative as people would intuitively think. One comment is that the value of  $r^*$  is highly uncertain, either from a theoretical perspective or a measurement perspective. Time-varying  $r^*$  Taylor rules are relatively untested and do not represent the empirical tradition behind Taylor rule estimation and recommended policy outcomes. For this reason, I am skeptical of using time-varying  $r^*$  as a rationale for current policy settings.

The value of  $r^*$  from a broader perspective should represent the Wicksellian natural rate of interest, which one might view as governed by the real rate of interest that would prevail in an economy without frictions and without monetary policy influence. In a wide class of models, we know what the real rate of interest would be. It would be the sum of the rate of productivity growth and the rate of labor force growth. These factors alone would drive the real output

growth rate in this class of models. My staff calculated an  $r^*$  value based on such a view. It turned out to be 2 percent today, and this seems like a good benchmark for  $r^*$  from which to calibrate Taylor rule policy recommendations. Such recommendations would suggest that policy is indeed accommodative today, which would match most people's intuition about current policy settings. Interestingly, this value of  $r^*$  has historically been somewhat lower than the Laubach-Williams measure. It has been near zero in recent years, but as of today has moved above zero to a value of about 2 percent.

The bottom line is that there are many ways to look at this value of  $r^*$ , but a sensible guess is that  $r^*$  is 2 percent or higher, meaning policy today is accommodative, as intuition suggests. Thank you, Madam Chair.

CHAIR YELLEN. Thank you.

MR. TARULLO. Madam Chair, if I could—President Bullard, I was a little bit confused by what you were saying about labor force participation, and particularly the staff's assessment of it. My understanding of what the staff has been saying is that while they project a downward trend in labor force participation because of demographics, they also assess the decline in the immediate post-crisis years to have been substantially steeper than that. And what they were predicting—and continue, I think, to predict, unless Bill corrects me—is a less steep decline or a flattening-out of current labor force participation, which eventually has their projected demographic trend-based participation rate converging with the actual participation rate. And that, I think, is what's been happening over the past year and a half or so, during which, with a little bit of fluctuation up and down, the labor force participation rate has been roughly stable, which I think is bearing out the staff's expectation of the convergence of their projected trend with actual labor force participation.

MR. WASCHER. Yes, I think that's how I interpret it as well. I don't think what we have in the forecast is at all at odds with the Aaronson and others paper of 2014. The gap we have in there is roughly what we estimated in that paper, and as Governor Tarullo indicated, we expect the downtrend in the participation rate to continue and the actual participation rate to close the gap by falling less than the downtrend we have.

CHAIR YELLEN. First Vice President Prichard.

MR. PRICHARD. Thank you, Madam Chair. Economic activity in the Third District slowed during the first quarter. While still expanding, the rate of expansion has been below expectations. However, it appears that the recent slowdown may be temporary, and that sentiment is widely held among contacts in our region. Unemployment in the region ticked up to 5.7 percent in March, with Pennsylvania experiencing a significant decline in employment, enough that the first-quarter job growth in the state was actually negative. However, both our April Manufacturing Business Outlook Survey and Nonmanufacturing Business Outlook Survey indicate that the manufacturing and service sectors expanded employment in April and point to further job growth and capital expenditures over the second half of the year. One prominent manufacturer in the region indicated that his businesses are poised to grow rather more robustly in the second half of the year once they have worked through the necessary inventory correction. Although he doesn't anticipate 2015 to be as strong as last year, the second half of the year should see solid growth.

In response to a special survey question on the effect of the dollar's appreciation on their manufacturing activity, respondents who have exchange rate exposure indicated that the appreciation negatively affected their operations. However, our District does not overly engage in foreign trade, with exports accounting for only 10 percent of revenues and imports

representing about 5 percent of nonlabor costs. Thus, the overall effect of the dollar's rise was fairly small for Third District manufacturers.

Both nonresidential and residential construction weakened in March. We are also seeing a softening in multifamily housing. Reflecting the overall weaknesses in this sector, house price appreciation is also slower than in the nation as a whole, with prices growing in the 3 to 3½ percent range. Retailers in the region have been reporting healthy sales over the intermeeting period and moderate year-over-year sales growth. Contacts report that sales are starting to be bolstered by lower gasoline prices, and consumers in the region remain highly confident. They are also paying down post-holiday debt, and debit and credit card lines are declining. Bankers in the region indicate that the growth in the commercial loan segment of their portfolios has picked up substantially, while other loan activity has remained fairly flat.

Thus, our District reflects fairly well what might be transpiring in other regions nationally—a bit of a step back in labor markets, a falloff in manufacturing activity, and a lack of any significant improvement in residential investment. This slowdown is well reflected in one of the series we produce in our real-time research center, the Aruoba-Diebold-Scotti Business Conditions Index. The ADS uses six high-frequency data series to construct an index of current economic activity. Those series include, one, initial jobless claims through the week ending April 11 of this year; two, payroll employment through March; three, industrial production through March; four, real personal income through February; five, real manufacturing and trade sales through January; and, six, real GDP through the fourth quarter of last year. The index is centered on zero, which indicates normal growth rates, and the index has recently turned negative. However, we are receiving indications that the somewhat slower growth we have

witnessed is a temporary phenomenon, and that economic activity is expected to bounce back to trend growth rates.

As mentioned by President Bullard, we also find that, historically, first-quarter GDP growth may not be adequately adjusted for seasonal variation. Over the past 30 years, seasonally adjusted growth in first-quarter GDP has averaged significantly less than growth over the remaining three quarters—1.8 percent as opposed to 2.7 percent. Additionally, if one examines the timing of the 10 weakest quarters over that span, six occurred in the first quarter and, 50 percent of the time, the weakest quarter was the first quarter of the year. Observations like these may point us to placing more weight on GDI—gross domestic income—or on GDPplus, which incorporates the income side of GDP, in interpreting current economic activity. GDPplus has the advantage that, unlike GDI, it is available with the same timing as expenditure-side data.

With that as background, we continue to project that overall economic activity will accelerate modestly, that utilization gaps will continue to progressively narrow, and that inflation will continue to firm. With a substantial amount of data forthcoming before our June meeting, I expect that we'll have a clearer view of the emerging trends and confirmation—or not—that first-quarter economic performance was, indeed, a poor harbinger of the year to come. Thank you, Madam Chair.

CHAIR YELLEN. Thank you very much. President Lacker.

MR. LACKER. Thank you, Madam Chair. The incoming national data suggest that the economy hit a soft patch in the first quarter, which is consistent with the recent information on economic activity in the Fifth Federal Reserve District. At the same time, our reports indicate that the weakness is widely viewed as temporary. Our diffusion index of manufacturing activity, released this morning, was slightly negative in April, and that followed a reading of negative 8

for March. But our index of expected shipments six months ahead was a robust plus 38, a level that has not been exceeded since 2011. Similarly, our index for nonretail service-sector activity was also slightly negative in April, but the index of expected demand six months ahead held steady at a pretty positive rate. And the indexes for employment remain positive across all sectors. Retail revenue rose 5 points to plus 17.

More broadly, commentary from our directors and industry roundtable participants was more positive this month than last, and we've heard numerous reports about transitory factors having affected recent activity. An executive at an engineering firm in West Virginia said that "weather has been the primary factor in our business slowdown." Several other reports cited production slowdowns attributable to the West Coast port strike. For example, a manufacturer of industrial safety products stated that production was interrupted by delays in receiving shipments of just one critical part manufactured in China. These reports suggest that it's quite reasonable to expect a rebound in growth in Q2.

As usual, any discussion of labor markets these days turns quickly to the subject of shortages of skilled workers. It does seem as if these shortages are having noticeable effects. For example, the CEO of a large building materials company told of a trucking company refusing outgoing shipments due to a lack of drivers. We also continue to hear about markets experiencing wage pressures, and, while not universal at this point, the scope of these observations appears to have broadened of late. This was most apparent in the reports from representatives of several staffing firms, both national and regional, who serve on our roundtables, including a regional representative from Manpower. One large staffing firm is telling clients to expect upward wage pressure "in all skill levels" later this year. Two grocers in Richmond recently announced double-digit starting-wage increases, perhaps in response to Wal-

Mart's announcement. A large auto manufacturer plans to raise starting wages for assembly line workers at a plant in our District from \$13.17 an hour to \$15.85 an hour—about 20 percent. A lumber company in West Virginia has responded to a shortage by bringing in entry-level workers from Puerto Rico, renting houses for them, and hiring an interpreter, all of which raise the cost of labor by 10 to 15 percent. These reports suggest that broader wage pressures may be about to emerge, although I recognize that wage acceleration is not yet apparent in the monthly figures for average hourly earnings.

Turning to the national economy, as I said, we've clearly hit a soft patch recently. Some of that softness was due to well-known temporary factors. Combined, these transitory factors could well explain a large part, if not all, of the first-quarter slowdown. Moreover, this wouldn't be, as many have noted, the first flat quarter we've seen during this expansion. So the question is how rapidly economic activity picks up again from here as the effect of these transitory factors fade. I share this Tealbook's optimism on consumer spending, and that's based on robust income growth, solid consumer sentiment readings, and continued improvement in labor market conditions. The rebound in car sales last month was an important piece of evidence that consumers have the confidence to boost spending in the months ahead.

Turning to inflation, the latest readings have been a bit firmer than expected. Core CPI inflation averaged 2.3 percent at an annual rate from December to March. The staff's translation into core PCE inflation is 1.4 percent over the same three months, and that implies that Q4 will be the low point for core PCE inflation. Oil prices appear to have bottomed out and the run-up in the dollar seems to have lost steam, so the transitory downward pressures on headline inflation are waning. Thus, it seems fairly clear to me that we are emerging from this inflation dip, and inflation will be moving towards 2 percent in coming quarters.

Looking ahead, as several of you have mentioned, we will receive more than the usual amount of data over the upcoming intermeeting period, including, importantly, two employment reports and two reports on personal income and consumption. If the data come in consistent with the Tealbook forecast, we would have solid evidence in hand at our June meeting that consumer spending growth had rebounded and that inflation was moving up. If so, I believe the case for raising rates would be strong, so it seems premature to make any statements at this meeting or in the days immediately ahead, I believe, that could be interpreted as taking June off the table.

Thank you.

CHAIR YELLEN. Thank you. President George.

MS. GEORGE. Thank you, Madam Chair. Unemployment in the Tenth District remains very low at 4.2 percent, and recent employment growth has been modest but is mixed across states and industries. Several District states are seeing sizable oil and gas layoffs, and negative spillovers are showing up in regional factory and transportation activity as well as in consumer spending areas and those that are energy dependent. Through the first quarter of this year, District energy jobs were down 4½ percent, and firms in our latest energy survey expect their employment to fall by 12 percent this year. District manufacturing is also feeling the effect, as the last time our manufacturing survey composite was lower than its April reading was in early 2009.

Firms responding to our energy survey, however, note that breakeven oil prices have fallen considerably as services costs have dropped, providing some encouragement for future activity as oil prices edge higher. On the other hand, District states with virtually no oil and gas activity have seen a solid start to 2015. Colorado, in particular, continues to grow rapidly, driven by strong tourism and construction activity. As a result, total employment in the region is up



slightly this year, and overall services activity in the District continues to grow despite the energy layoffs. In agriculture, drought has worsened, although winter wheat production is shaping up to be similar to its recent five-year average, and corn and soybean planting intentions are generally strong. Still, persistently low crop prices and elevated input costs continue to increase farmers' short-term financing needs.

For the national economy, my outlook for growth over the medium term is little changed. I assume that the softness in first-quarter GDP proves transitory, as it has for the past several years. Weather effects and the sharp decline in energy investment look to be important factors holding down first-quarter growth. However, more persistent factors producing softer export growth and a broader slowing in new investment bear watching. Alternatively, personal consumption appears to have some upside potential, as there is yet to be a significant boost to spending from lower gasoline prices.

March's payroll numbers were clearly below expectations, though the labor market continues to improve in several aspects. The services sector continues to perform well. In the first quarter of this year, services added, on average, 179,000 additional jobs per month. This is better than the 134,000 average in the first quarter of last year. Overall, I expect average monthly payroll growth to drift down from the rapid pace of 260,000 per month last year to 200,000 this year before settling down to a pace of around 150,000 next year as the labor market continues to tighten and growth moves to its trend level.

Research by my staff also indicates improving labor market conditions, as reflected by the number of workers moving from lower- to higher-paying sectors—that is, the extent of cyclical upgrading. Their analysis shows that the rise in the quits rate over the past two years is primarily due to a higher quits rate in sectors with lower pay, like wholesale/retail trade and

leisure/hospitality. Tracking individual workers in these sectors using Current Population Survey data shows that they have recently been moving into higher-paying sectors, like education and health services, at rates similar to those before the recession.

Turning to inflation, I expect inflation to remain somewhat below target due to lagged effects from low energy prices and a stronger dollar. Inflation in some sectors, such as health care, have also notably slowed. In addition, because of some of the current factors affecting inflation, year-over-year core could drift lower as stronger readings from a year ago—core PCE readings from March to June of last year were running at a solid 2 percent pace—drop out of the 12-month window. Such base effects have not affected my overall confidence regarding the medium-term outlook for inflation, assuming there are continued improvement in the labor market and stable longer-term expectations. Thank you.

CHAIR YELLEN. Thank you. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I will start with a few observations about the Ninth District economy. It's generally robust, but the decline in oil prices is certainly creating challenges in some areas. I will then turn to the national economy, where I see continued shortfalls in aggregate demand relative to supply.

Labor markets are tight in many parts of the Ninth District, with contacts reporting significant swaths of unfilled openings. There are signs of growing wage pressures in some economic sectors and geographical areas. However, overall, wage pressures remain muted. Importantly, many businesses report having little or no ability to pass on wage increases to consumers in the form of price increases. So this is actually a flip side of the argument that President Williams offered—he indicated that he didn't need to see wage increases to feel confident in the return of inflation to 2 percent. The flip side of this is that we might see wage

increases happening and still not see inflation, because the question is whether those businesses experiencing the wage increases have the pricing power to pass that on. The contacts that we talked to in the intermeeting period suggested they do not.

Contacts at businesses with an international footprint expressed concern during the intermeeting period about how the high value of the dollar would affect the demand for their products, especially in light of overall softness in global demand conditions. And some of the comments that President Bullard offered about China echo things we heard from our contacts during the intermeeting period.

Not surprisingly, economic activity has slowed greatly in the oil-producing areas of North Dakota. However, overall confidence in the Bakken region remains high. Many, if not most, of our contacts report seeing the currently low level of economic activity as a welcome opportunity to shore up critical infrastructure needs in the western part of North Dakota.

Let me turn to the national economy. Both real and nominal variables are telling us a similar story, I believe: There is insufficient aggregate demand to use available resources in an effective fashion. In terms of real activity, if we look back over the past five years since the end of 2009, real GDP growth has averaged 2.3 percent. There is little sign of this pace quickening—last year, real GDP growth was only 2.4 percent. Here I’m using annual averages to get away from some of the seasonal adjustment factors that have been highlighted in previous interventions. This year now looks like it may be even worse than this weak average performance. In the wake of the data that we’ve received from the first quarter, Tealbook, Book A, has downgraded its outlook for 2015 economic activity, and it now projects growth in this calendar year to be less than 2 percent. We will get more information, of course, tomorrow morning along these lines.

The persistence of these patterns has led some to conclude that they reflect a permanent downward shift in the productive capabilities of the United States. I think we should be very cautious before accepting these claims. We saw significant improvement in all labor market metrics in 2014. This improvement seems to have had little effect on the excess supply of human resources in the economy. We saw little upward pressure on compensation or on the inflation outlook. This conjunction of low price pressures and strong employment growth suggests that the “Room to Grow” scenario in Tealbook, Book A, might be quite relevant. And if you look at the implications of that scenario, the weakness of aggregate demand relative to supply creates concerns with respect to nominal variables. The outlook for inflation in Tealbook, Book A, is that it will be below target until 2019, well over four years from now.

Just to follow up on some of the discussion we heard earlier about inflation over the past few years, headline inflation did go above 2 percent in 2011, but I think if you go back over 2008, 2009, 2010, 2012, 2013, and 2014, in all of those years, it was below 2 percent. In 2011, it was above 2 percent. On average, over that time frame since the end of 2007, it’s been about 1.3 percent. Market-based longer-term inflation expectations remain low.

I want to say something about the prediction issue. It’s absolutely true, I think, that if you do horse races of the kind that President Williams talked about, market-based measures don’t really fare that well. I think it’s actually because they’re of value to policymakers, not just to statistical forecasters, because we’re interested in a different loss function. We’re not interested in just minimizing mean squared error, we’re actually interested in trying to mitigate low inflation, especially when it’s going to be costly to households. And I think that monitoring these market-based measures of inflation expectations is helpful along those lines.

Tealbook, Book A, notes that we've seen some slippage in Michigan survey measures as well—I don't want to put too much weight on that at this stage, but it's something to watch. I think there are signs in these data that we may be facing a prolonged period of inflation running substantially below our target. Now, why should we care about a possible downward slippage in inflation and inflation expectations? This builds on some of the remarks that President Rosengren already made, that persistently lower inflation expectations translate to lower nominal interest rates. Lower nominal interest rates translate into little recession-fighting capacity for the central bank. And such a reduction in policy capacity would be especially troubling because it would build on the policy capacity associated with a significant decline in the neutral real interest rate noted by President Rosengren. So this decline in inflation expectations really creates a first-order loss in terms of what we are trying to accomplish because it increases the probability of hitting up against the zero lower bound.

As President Rosengren suggested, the decline in the neutral rate of interest should lead us to consider raising the inflation target. I see a great deal of possible merit in this suggestion. More generally, I think that it would be useful to have discussions about the long-run goals that we have established. We learn more over time, and it's useful to take that on board. We don't want to do it every year, certainly, but I think at intervals we should be taking on information and reevaluating the longer-run goal statement. The Bank of Canada does this on a five-year basis. Every five years they go back and relook at their framework and what they've learned, and I think there's something to be gained from that kind of systematic reevaluation of our framework. So I would be very supportive of further discussion of President Rosengren's suggestion.

With that said, first things first. We actually need to forestall a possible decline in inflation expectations today generated by a failure to hit the current low target. During the

intermeeting period, Governor Haruhiko Kuroda of the Bank of Japan visited Minnesota and gave an excellent speech. He described the aggressive efforts of the Bank of Japan to stimulate an increase in inflation expectations. As I listened to him, I was reminded yet again of how we need to do all that we can to avoid leaving our successors with the kind of tough situation that Governor Kuroda now faces. I don't see that determination reflected in alternative B, but I won't talk about that until tomorrow. Thank you.

CHAIR YELLEN. Thank you. Vice Chairman.

VICE CHAIRMAN DUDLEY. Thank you, Madam Chair. In terms of the economic outlook, I'm of two minds. On the one hand, I'm more uncertain about the growth outlook and more concerned about the potential downside risks to growth. On the other hand, I think the downside risks on the inflation side have lessened considerably. At the last meeting, I would have said that I expected further labor market improvement but was not yet reasonably confident that inflation would return to our 2 percent objective over the medium term. Now, I would at least partly reverse things. Conditional on further improvement in the labor market, I'm getting closer to being reasonably confident that inflation will return to our 2 percent objective, but I am less confident about when I will see further labor market improvement and how quickly it will occur.

Turning first to the growth side, it strikes me that there are a lot of crosscurrents right now, and it's really difficult to assess the net effect. To me, this sharp slowing in payroll growth in March should not be a big surprise, however. As I noted in my comments at the March FOMC meeting, a big gap had opened up between payroll growth and GDP growth, so unless one thought that the productivity growth trend would remain extraordinarily poor, it seemed reasonable to expect either GDP growth to pick up or payroll growth to slow down. As it turns

out, GDP growth slowed rather than picked up, so that left payroll growth to bear the brunt of the adjustment.

As I assess the first quarter, I do think there are both transitory and more persistent factors responsible for the slowdown. On the transitory side, the Federal Reserve Bank of New York's staff analysis does suggest that severe winter weather did have a sizable effect. We put the impact at about 1½ percent on the annualized growth rate, slightly less than last year. Having said that, I wouldn't take that point estimate too literally. Also, I do think the West Coast port slowdown did disrupt economic activity. We had a small business advisory group meeting, and I was surprised that two out of the eight or nine businesses that attended referenced the port slowdown as hurting their businesses in the first quarter—this is around upstate New York and New Jersey, and that's not really where I would expect the port slowdown to actually manifest itself, so I thought that was meaningful.

There are also some more long-lasting components as well. As Steve Kamin made clear, the dollar's sharp appreciation has led to a deterioration in U.S. net exports, and the Federal Reserve Bank of New York staff estimates that a 15 percent appreciation of the broad real trade-weighted dollar, which is a little bit more than we have right now in hand, would cut about 0.6 percentage point from the level of real GDP after one year, and I think that's pretty consistent with the Tealbook estimates. And I think it's important because that's just the partial equilibrium effect. If you have a trade drag, it also drains real income from the economy, so there's also the risk of second-order effects.

Now, the second thing is that oil and gas investment is plunging. I'm not sure how severe the knock-on effects will be, but I don't think we're done yet. Firms have been protected, in part, this year by hedging their future forward production by selling oil forward, and they'll

become more exposed to the current oil prices as time passes, so I expect a downward trend in investment to continue. As Helen Holcomb pointed out in her comments about the Texas economy, the effect does seem to be quite a bit larger, I think, than expected. Richard Fisher said—in January, I believe it was—at that time he thought that employment growth in Texas, which was well above average compared with the country, would slow down to the national average. But if you look at the payroll data in March for states on a seasonally adjusted basis, payrolls in Texas fell by 25,400 people, which is pretty sizable for Texas. And it's interesting that Oklahoma was the state with the second-largest decline in payroll. So, clearly, the fall in oil and gas investment is having a significant effect. It's rippling through to incomes, and it's rippling through into commercial real estate construction, so I think it actually has a more sizable effect than just looking at oil and gas investment itself.

Third, I think the inventory accumulation, which I don't think anyone has mentioned, looks to me like it's poised to be a drag on growth. If you look at the inventory-to-sales ratios, they have been drifting up, and if you look at the rate of inventory accumulation in the first quarter—well, we'll see what we get tomorrow, but it looks to be on the high side in terms of what's sustainable over the medium term. So if you had to ask yourself, “Are inventories going to contribute positively to growth or negatively to growth over the next year?” They are almost certain to be a drag on growth. In the face of all of these crosscurrents, I think the next few months of data are really important. I'm really looking at what April and May look like. And even if we get strong April and May data, I'm not really sure what to make of it—is this just a bounce after first-quarter weakness, or is this the new trend?

In contrast to the growth side, I am getting more comfortable that inflation is starting to stabilize and is likely to start drifting back up toward our 2 percent objective. When I look at the



inflation data and all the other factors that feed into the inflation outlook, I think most suggest that inflation—despite a stronger dollar, lower energy prices, and still-sizeable slack in the labor market—actually seems to be stabilizing. So let me run through the evidence very quickly. If you look at the three-month change in the core CPI, it's now above 2 percent compared with a 12-month change of 1.8 percent. Inflation compensation, as measured by the five-by-five forward TIPS versus nominal Treasury has moved up a bit. Survey measures of inflation expectations are generally stable, and I would argue that wage compensation growth trends are stable to slightly higher.

So the fears I had of inflation getting unanchored to the downside seem to have diminished. I could imagine that things could have worked out quite differently. We'd have lower headline inflation feeding through into core inflation. That, in turn, would depress nominal wage growth and cause inflation expectations to be anchored to the downside. And the fact that we haven't seen that at this point, I think, makes that dynamic much less likely. So I'm much more confident now that inflation will return to our 2 percent objective, subject to having sufficient growth to continue to close the output gap. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Fischer.

MR. FISCHER. Thank you, Madam Chair. This discussion has appropriately focused on the significantly weaker-than-expected incoming data on first-quarter economic activity. The staff forecasts a return to higher growth of around 2 percent or more in the second quarter and the second half of the year, and we've heard similar forecasts during this round of discussion from several of the Reserve Bank presidents. The Tealbook forecast is, not surprisingly, consistent with what we see in the charts given to us by Bill Wascher—in particular, the two real GDP forecasts and their fan charts. So there's a fair probability that will happen, but it's not a

guarantee that we're going to bounce right back in the coming quarter and there have been some weak data in April.

In terms of elementary textbooks—looking at  $C + I + G + NX$ —the Tealbook forecasts expect the bulk of the rebound in the second quarter to come from consumption, which is a reasonable forecast in light of expectations for employment and real disposable income. The Tealbook also expects government purchases to rebound significantly, net investment to decline more slowly than it did in the first quarter, and net exports to decline at the same rate as in the first quarter. This is all very interesting, but of course, we're waiting for tomorrow's first estimate of first-quarter growth to clarify, perhaps, what happened in the first quarter.

When you focus on recent growth rates, you get a fairly pessimistic picture of what's happening, and we need to remind ourselves that the overall position of the economy is good. Let me start with the labor market. The unemployment rate remains at 5.5 percent, a level that is not that much above many estimates of the natural rate today and is not above estimates of the natural rate that we had going into the March meeting. A year ago we didn't think we'd reach a rate that low until 2016. And, importantly, some, though not all, of the other labor market indicators whose behavior suggested that the U-3 unemployment rate understated the extent of labor market problems appear to be returning to pre-recession levels. So, from the policy viewpoint, the basic question on output and employment is whether employment will continue to grow at a rate sufficient to bring further improvement in the labor market in coming quarters.

The inflation rate remains below target, and that is a problem. However, one gets the impression that while we are committed to looking through transitory factors—particularly dollar appreciation and the decline in oil prices, and gasoline prices in particular—popular discussion both here and in Europe has not focused on what that means. It does not mean focusing solely

on core inflation, because both energy and import prices affect core inflation. Core PCE inflation was 1.3 percent over the 12 months through March. According to Board staff estimates in the Tealbook, increases in the dollar, which are very unlikely to persist indefinitely, are holding down that figure by 0.3 percentage point this year, bringing what could be called nontransitory core inflation to something like 1.6 percent. And current energy price changes are reducing core inflation by another 0.1 percentage point, which brings you to a nontransitory core inflation rate of 1.7 percent.

Now, you might be concerned about this if the low core numbers were being reflected in declining inflation expectations, but the survey measures seem to be relatively well anchored. And all this, again, seems consistent with the data presented in the bottom two charts in Bill Wascher's handout, which show inflation coming back rather quickly to just below 2 percent. I expect that the transitory factors—which are, fundamentally, oil and the exchange rate, which may or may not turn around reasonably soon—will gradually abate and possibly begin to reverse themselves. We only need them to abate. And labor market slack will continue to diminish, putting inflation on a path that, over the medium term, will take us very close to our inflation target. Thank you.

CHAIR YELLEN. Thank you. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. A lot of people have talked about Q1 and have posed the question, “Was Q1 an aberration?” I certainly hope that it was an aberration, and I expect that it has been an aberration. And I don't think, personally, that we're going to learn that much from the GDP number tomorrow morning. If it's kind of low or really low, it may not tell us very much because we had a really low number in the first quarter of 2014, and that didn't seem to mean very much a quarter or two later.

I actually think the question is not so much “Was Q1 an aberration?” but more the question that was implicit in some of Vice Chairman Dudley’s analysis a minute ago: “Are there things at work in the economy that will give us a growth path for the rest of the year that’s somewhat lower than what many of us expected toward the end of last year?” Not that it will in any way resemble Q1, but that somehow there are forces that are restraining growth a little bit more than we would have anticipated. Vice Chairman Dudley suggested one in his presentation. Another possible explanation of that phenomenon, should it occur, is the one that I think lies behind the Tealbook’s alternative scenario of a persistent slowdown—that is, that there is a kind of confidence problem that’s inhibiting consumer spending despite the extended improvement in income fundamentals because of job growth and maybe a little bit of wage growth, as well.

I think for that reason one has to be a little agnostic right now in awaiting data over the next couple of months—as President Mester, Vice Chairman Dudley, and several other people have said. Although, as someone—I think it was Vice Chairman Dudley—also said, even then, it’s not clear how much some of the questions we’ve been asking will be clarified because there’s going to be a certain degree of snapback. So instead of trying to speculate about all of that, I wanted to put on the table in a little bit more detail something Simon had an exhibit on in his presentation at the beginning of this meeting and that is the phenomenon of negative interest rates on European sovereign debt. This phenomenon may be relevant to an assessment of the most likely medium-term U.S. growth trend because of its potential effects on financial markets and the dollar, potential downside risks, and—and I’m not going to talk about this, but it may be relevant to the great debate about secular stagnation.

There have been negative interest rates on some shorter-term European sovereign debt for several years now, but the last six months or so have seen a qualitative change in the

phenomenon in a number of respects. First, negative rates have moved down along the yield curve in European countries with the strongest credit reputations to the point that, as in the chart that Simon distributed, we now see negative interest rates in a nontrivial portion of 5- to 7-year debt in the stronger European sovereigns. Second, yield curves, as he mentioned, are quite flat in these countries. I just checked this morning, and the spread between German 2-year and 10-year government bonds is about 40 basis points. That compares to a spread of about 140 basis points for U.S. Treasury securities. The 30-year bund is still trading positively but at 63 basis points, which is a pretty low number for a 30-year. As everybody knows, the Swiss 10-year sovereign issue earlier this month went out at negative rates, and I believe that's the first time in history that any sovereign debt of that duration has been priced negatively. And so, as far as Thomas Jordan knew, he was setting a precedent, or at least his country's government was setting a precedent.

Currently, as Simon's chart shows, more than 35 percent of all euro-zone government debt carries a negative interest rate. As recently as two weeks ago, I think, it was up over 40 percent. There's been a little bit of an interest rate change since then, which has affected the yields in some of those medium-term tenors. Substantial portions of some non-euro-zone sovereigns, notably Denmark and Switzerland, also are priced at negative rates, and some shorter-duration corporate bonds of the highly rated European firms are also priced at negative rates now.

Clearly, this is all related to long-standing European economic problems—and, more immediately, first the prospect and now the reality of the ECB's QE program. It's also related, I guess, to the relative scarcity of sovereign debt instruments issued by countries like Germany that continue to run tight fiscal policies and large current account surpluses, notwithstanding

economic conditions in the euro zone more generally. The unprecedented nature of this phenomenon has caused most thoughtful analysts to offer only tentative views of the relative importance of various stories that explain why investors would hold longer-term sovereigns with negative yields. Logically, I think the explanations fall into three categories. First is gloom about the long-term prospects for the countries in question. Now, it's true, there's not a whole lot of high optimism to be found about European growth prospects, but almost everybody discounts this as a dominant explanation—that is, the idea that there's going to be negative growth or deflation for 10 years in Europe.

The second group of explanations are based on investor inertia, basically—whether forced, as in the case of pension funds and some other institutions, which may be required by law or regulation to hold certain percentages of extremely low-risk bonds, or unforced, as in the case of other investors who are themselves unsure of what all of this negative rate stuff means and are waiting right now to see what happens, and maybe change their investment decision if things don't turn around relatively soon.

The third set of explanations is that, in an environment that doesn't offer a lot of appealing investment options, there may be some plays available here. For example, you may get capital gains if yields go even further into negative territory, or you may get exchange rate gains whether from short-term developments that cause quick swings in currencies or from longer-term appreciations of currencies with very low inflation or even deflation. That is, if you think that there's going to be very low inflation in Switzerland for a long time to come and you are a U.S. investor, and you think that there's going to be inflation in the United States, you might actually end up profiting by that play. As an example of this search for an investment play, I took note of one analyst's advice to his clients that the best play may be in bonds with a

good bit of convexity so as to maximize the chances of catching the wave of large market movements when these trends reverse.

To date, as a very good Federal Reserve Bank of New York MarketSource report indicated, there have been relatively few discontinuities observed in European debt markets. But I think this is the point at which Herb Stein's memorable aphorism comes to mind, because unless the medium-term prospects for Europe are a lot worse than most people think, there's going to be a reversal of negative rates at some point. Even if there's no near-term reversal resulting from sufficiently enhanced growth prospects or from sufficiently significant policy moves, a nontrivial number of investors might, over time, overcome their inertia and start seeking positive nominal yields elsewhere.

There are a lot of potential outcomes here, some of which are relatively benign. Others, though, are of potentially greater concern. For example, if enough investors were caught flat-footed by an unexpected change in ECB policy—and, paradoxically, an unexpected improvement in European economic prospects—there could be some pretty significant turmoil in relevant markets, although there we would have to ask ourselves how much the financial turmoil would be offset by the prospect of improvement in the real economy. I think of even greater concern to us would be a decision by those investors who did not initially move out of European sovereign debt that they couldn't take the uncertainty or the negative rates any longer. The natural destination for these investors is, of course, U.S. Treasury securities, and I think that some of the dollar strengthening we've seen this year has been attributable to the existence of investors who have already made such a move. And it is possible, though very hard to judge how likely, that many more could follow. If they were to do so, the recent modest retracing by the dollar could itself be halted and reversed pretty significantly.

On this last possibility, it's worth mentioning that, notwithstanding the notable spreads between bunds and Treasury securities, some European investors have apparently concluded that the roughly 80 basis point difference between German and U.S. two-year bond rates is insufficient to compensate for currency-hedging costs and other risks. And this calculus is, I think, what may be contributing to some of the otherwise-hard-to-explain changes in the yield curves of some of the stronger European sovereigns, since fundamentals are not really changing there but you're seeing some movement in those yield curves, which I take to be everybody repositioning, trying to figure out the best defensive place to be right now. So investors may be moving around within bonds that are either euro-denominated or effectively tied to the euro.

But if that spread between U.S. Treasury interest rates and rates on European sovereigns were to widen, either because we raise rates or because QE and other developments in the EU drove yields down even further there, then more European investors might be tempted to take the Atlantic plunge. And this, in turn, could cause some market dislocation in Europe, a renewed unwelcome strengthening of the dollar, or both. This is pretty speculative right now, but certainly in a context in which the trajectory of U.S. economic performance is at least in some question after the past few months, I think this situation is another reason for us not to be in a hurry to raise rates, at least not until we've had a chance to see how investors are adapting, and, most importantly, what their adaptation means for the dollar. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Powell.

MR. POWELL. Thank you, Madam Chair. The incoming data for the first quarter have been weaker, overall, than expected, including data for household and business spending, industrial production, and housing starts and permits—a little bit different but quite similar to the first quarter of 2014. In addition, the initial BLS report on the employment situation for March



was also much weaker than expected, and that's different from last year, when payroll gains continued to be very strong right through the first quarter. And the question, of course, is how much signal to take. One reason to discount these data somewhat are the transitory factors that are likely to reverse, including bad winter weather and the West Coast port disruption as well as the technical factors that have been discussed. Another is that GDP data may eventually be significantly revised and is a noisy signal—and I thought that the new exhibit in Tealbook, Book A, on prediction intervals was interesting and useful on that point. In any case, it makes sense to me to take some signal from this year's weak first quarter, both for labor markets and for GDP. I think the baseline staff forecast strikes a reasonable balance for the rest of this year by assuming higher GDP growth, but not a significant catch-up quarter like we had in the second quarter of 2014.

On inflation, I would tentatively say I feel a little better about inflation, which is now forecast to run at about 1½ percent for Q2, well above the Q1 readings. Survey expectations remain stable. Breakevens have moved up modestly across the curve since the March meeting, seemingly driven more by oil prices and liquidity rather than changing expectations. In light of all of the recent market readings that suggest concerns about low inflation, it's an improvement, for a change, to read stories that fixed-income traders are seeing a greater likelihood of inflation getting back to mandate-consistent levels and less risk of very low inflation. Of course, we may overread these market movements, and it may simply be that TIPS got a little cheap relative to nominals, and traders acted on that. The underlying story of a return to 2 percent inflation over the medium term, given GDP and labor market outcomes as forecast, continues to make sense to me. And I look forward to gaining more confidence from the incoming data on that. I would

worry more about lower inflation in the case that the economy does slip into a lower gear in growth and labor markets.

Looking forward, the positive narrative is that consumer spending will increase to healthy levels supported by low energy prices, high confidence, and much better labor market conditions. In fact, going back to Stan's basic equation, you could say that the U.S. economy has grown at about 2.7 percent over the last two years, with net exports at around zero. With net exports now contributing negative 0.7 to negative 0.8 percentage point, you have to ask, where is growth going to come from? It's not going to come from government spending, it's not going to come from housing investment, and it's not going to come from business investment in a world in which drilling is being significantly reduced. So it really has to come from consumption. And, in fact, in the medium-term forecast, PCE growth accounts for well more than 100 percent of the growth. That narrative, I have to say, makes sense to me, but it does amount to an airplane flying on one engine. So far, the combination of the weak spending data and high consumer confidence says that the consumer, in effect, is now ebulliently saving.

In terms of the risks, one, of course, is that PCE growth does disappoint. Another one, frankly, is that, in a world of still-slow growth, a return to stronger growth here could well lead to a tightening in financial conditions not so much through the rate channel as through the dollar channel—it may not be a rate tantrum that is really the threat this time. We will see, by the time of the June meeting, whether there is progress in addressing Greece's fiscal crisis or whether Greece, instead, is headed for controls on capital flows, sovereign default, and the like, with potential disruption for the U.S. economy. We'll see two more employment reports and a lot more data. And we'll know, I think, at that point, something about whether the first quarter's

disappointment is transitory and anomalous or, instead, marks some kind of real loss of momentum. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Brainard.

MS. BRAINARD. Thank you, Madam Chair. I wanted to reflect briefly on the quarterly assessment of financial stability and then turn to the outlook.

Although overall risks to financial stability in the United States remain moderate, one area that bears heightened scrutiny is the potential for spikes in volatility due to changes in market liquidity. In particular, we should be asking whether episodes of severe volatility, like the wild swings we saw in Treasury bond yields on the morning of October 15, are likely to become the new normal. Bond inventories held by broker-dealers have declined, in some part due to regulatory changes. Separately, and predating the onset of Dodd-Frank, changes in market structure may be at least as important in some markets, for which automated and high-frequency traders may now account for a majority of the activity. Coupled with the big run-up we've seen of investments in bond mutual funds, this raises the specter of amplification of volatility and fire-sale dynamics at times when investors looking to cash out could be surprised by lower-than-expected liquidity. Together, these changes to the structure of financial markets could increase the volatility of asset price responses. A modest increase in the average level of volatility shouldn't be a concern, particularly if market participants respond with more rigorous risk management. But a lack of liquidity that leads to large and self-reinforcing swings in prices and market freezes during periods of stress could pose threats to financial stability and would be especially concerning in the case of the U.S. Treasury market, with its traditional benchmark status.

I think it's premature to draw conclusions for financial stability. Some of the preoccupation with the decline in dealer inventories may, in fact, be misplaced, and I think focusing too much attention on the critical role of dealers as reliable providers of liquidity during severe stress episodes suggests a very high degree of amnesia. Moreover, bid-ask spreads are in line with historical norms. As we're learning from the investigation of October 15, we also do not yet fully understand the implications of the growing role of high-frequency traders in these markets. With heterogeneity across their size, business models, and trading strategies, some of their activities may, in fact, contribute to market liquidity, while some may be destabilizing. And, finally, it's unclear how much leverage or high-quality liquidity is embedded in bond mutual funds and how vulnerable they might be to liquidity mismatch and fire-sale dynamics. The Dodd-Frank requirement for mutual funds to undertake stress tests holds some promise, but only if deployed rigorously. In short, I am very pleased that we are putting intense focus on this issue, and I think it will only rise in importance as the date of liftoff approaches.

Now let me turn briefly to the outlook in the United States. The recent data on the labor market, aggregate spending, and industrial output have been disappointing. The key question that we are wrestling with around this table is how much of this unanticipated weakness represents a slowing in the underlying momentum of activity and how much is due to transitory disturbances? The preliminary conclusion I would draw from the surprises in the recent data is that the negative impulse to U.S. aggregate demand from the combined effects of the plunge in oil prices and the surge in the dollar seem to be at least as strong as we had expected, while the expected positive effects have not materialized so far.

Turning first to the positive effects, recent shocks were expected to be reflected primarily in stronger consumption growth, but the recent data have been disappointing. Some of the

preliminary indicators of consumer spending are often substantially revised, so we perhaps should not take too much signal from them. Indeed, auto sales—among the most reliable of indicators—rebounded strongly in March. Nonetheless, subpar data on retail sales have now persisted for four months, suggesting that temporary influences or statistical noise are not fully to blame. On balance, it's possible that the forces boosting consumer spending may not be as strong as we might have hoped. Weaker-than-expected consumption would be very unfortunate, because strength in other categories of aggregate demand remains elusive. The recent data on housing starts and permits, for example, suggest that this sector continues to struggle.

On the negative side of the ledger, the drop in oil prices was expected to curtail business investment related to drilling, while the dollar's rise was anticipated to reduce net exports. A broad variety of indicators suggests that these effects are materializing with greater force than had been anticipated. Drilling investment looks to have dropped at an annualized rate of 50 percent in the first quarter. And orders and shipments of capital goods, as well as business sentiment, have also been weak and suggest that overall business investment will edge lower over the first half of this year. A variety of indicators also suggest that the stronger dollar is weighing significantly on activity. Net exports subtracted 1 percentage point from growth in the fourth quarter, and the staff estimates a contribution of minus  $\frac{2}{3}$  percentage point in the first quarter. The national manufacturing purchasing managers' diffusion index of new export orders has been in contractionary territory for the past three months. Manufacturing production declined at an annual rate of 1 percent, and the outlook for internationally oriented firms has worsened significantly in recent days.

In parallel, the recent labor market data suggest a slowing in the take-up of slack. Average monthly payroll employment gains were 200,000, down about 60,000 from last year's pace, and all of the indicators of slack have moved sideways in the last month.

Of course, there's a danger in reading too much into this data. It's entirely possible we'll see the stronger trend in underlying activity that was apparent in the second half of the year reassert itself. But it's important to keep in mind the international context. On the one hand, we have seen some encouraging data from the euro area—data on retail sales and industrial production, in particular—which holds out some promise that aggregate demand will strengthen. And the dollar's sharp ascent seems to have stalled, at least for now. On the other hand, negotiations between Greece and its creditors remain challenging. And although the macro data are notoriously unreliable, Chinese GDP growth looks to have slowed noticeably in the first quarter. On balance, the foreign economic outlook suggests continued weak demand in some important advanced foreign economies and signs of faltering growth in some important emerging market economies. In this context, the threat to price stability from stronger demand growth in the United States seems quite limited.

Let me close by touching briefly on inflation. Recent data have provided some reassurance that underlying inflation is not moving lower. Oil prices have moved up somewhat further since March, and the 3-month moving average of core PCE inflation has increased from the very low level reached in January. Even so, current estimates of both the 3- and 12-month changes in core PCE prices point to an underlying trend rate of only 1.4 percent. And while it's reassuring that survey-based measures of inflation expectations are remaining stable, and there has been some improvement in market-based measures, the latter are still materially below the levels that prevailed until the middle of last year. The overall picture should suggest at least

some caution about attributing all of the recent softening to transitory factors and puts a high premium on incoming data as we assess the timing of liftoff, which is the topic for tomorrow's discussion. Thank you, Madam Chair.

CHAIR YELLEN. Well, thank you. Thanks to everyone for another interesting and thoughtful round of observations. As usual, I'll try to summarize a couple of main themes and add a few remarks of my own.

Starting with real activity and the labor market, everyone agreed that the news has been generally disappointing since our last meeting, although views differed about its implications. With respect to employment, the March employment report showed unexpected weakness in payroll gains, but many of you emphasized that one shouldn't make too much out of one month's report. And, still, average gains in the first three months of the year are running at about 200,000, which is a respectable pace, especially given how weak output growth looks to have been in the first quarter. Other labor market indicators during the intermeeting period were mixed but generally, I think, imply little change in resource utilization. The unemployment rate stayed at 5.5 percent. Broader measures of labor underutilization ticked down one-tenth, but the labor force participation rate fell one-tenth, and the employment-to-population ratio was unchanged. You noted that the JOLTS job openings rate ticked up slightly, but there was also a slight decline in quits and hires, and at least the Board's labor market conditions index was unchanged. I noted some reports from business contacts about increases in turnover and the fact, as President George mentioned, that people who are "turning over"—who are quitting—appear to be moving to jobs in which they're receiving wage gains.

On wages, I think everyone agreed that aggregate measures suggest very little pickup in wage growth, although some of you suggested that the reports you're receiving from your

business contacts are beginning to hint at a broader acceleration in wage gains and labor market pressures. That said, many of you noted that wage pressures are confined to particular regions and sectors, such as high-tech in Silicon Valley and San Francisco. But, as President Williams noted, the implications of movements in wages for inflation and for our criterion of wanting to have reasonable confidence that inflation will move back are debatable, and at least in recent years it doesn't look like there's that much of a close link between nominal wages and inflation.

With respect to spending, everyone remarked on the unexpected weakness we've seen in a broad range of spending and production indicators, including retail sales, housing starts, orders and shipments of capital goods, nonresidential construction, drilling, exports, and industrial output. And, of course, tomorrow morning we receive the first-quarter GDP preliminary estimate. The underlying cause of the Q1 slowdown and its implications for future growth is obviously very important and unclear at this point. Many of you mentioned, and cited evidence from your business contacts, of the importance of bad winter weather and the West Coast port dispute. A number of you mentioned the fact that we have a pattern here—over many years—of Q1 being unusually weak, suggesting some residual seasonality in the GDP figures. Views on the size of these transitory effects differ, but if they are substantial, then the prospects for a quick return to moderate growth should be good.

On the other hand, a number of you mentioned that other explanations for weaker growth that may be relevant in the first quarter could have implications for the remainder of the year. In particular, the dollar received a good deal of mention. It looks like the dollar may be having a significant negative effect and that many of your business contacts mentioned the negative effect they're seeing from the stronger dollar. In addition, the decline in oil prices does seem to be having a significant effect—maybe larger than we anticipated on business investment and



drilling activity, and we haven't yet seen—surprisingly, perhaps—much evidence of a positive effect on consumer spending. The anecdotes that you reported from your business contacts were somewhat mixed, but I interpreted those as being reasonably positive in terms of not seeing any really significant changes in business prospects.

On the international side, a number of risks were mentioned: Greece; China, whose growth looks like it slowed more than expected; geopolitical risks that bear on oil prices; and a very interesting discussion, I thought, of what's happening in global financial markets, with negative rates in Europe and the potential for a global reshuffling of portfolios that could raise volatility or could have very significant effects either on the dollar or interest rates and could be triggered by a shift in U.S. monetary policy.

On the inflation front, incoming data came in pretty much as the staff had expected. Core inflation was a touch higher than expected. Oil prices were up somewhat since our last meeting, and the broad dollar exchange rate actually fell a little bit during the intermeeting period. Some of you noted that these are welcome developments from an inflation perspective, as they indicate that the downward impetus provided by oil and the dollar to inflation is ebbing and shouldn't continue. We had a nice discussion of measures of inflation expectations, with survey measures generally remaining stable and market-based measures of inflation compensation moving up slightly, although they are still below where they were last summer. President Williams's discussion about the relevance of these inflation expectations to inflation forecasts was interesting. They don't seem to be very good forecasts of inflation, and it is interesting that we have, I think, repeatedly noticed that these measures are more heavily influenced by oil prices and movements in oil prices than, it would seem, is reasonable.

On the other hand, with respect to inflation and the outlook for inflation, a number of you suggested, I think, that we could be in for a period in which inflation undershoots our objective for many, many years to come and, crossing over into the policy domain, suggested quite a bit of concern that we may be in for a very long period of an inflation undershoot. That took us to some interesting observations on the question of what the equilibrium real rate is; the possibility that it may be persistently depressed or not, as some think; a debate about what's happening with the equilibrium real rate; and the possibility that if the equilibrium real rate really is depressed, what that implies for our monetary policy, and particularly for our inflation target, which is something that maybe we want to get back to and consider.

Okay. Let me just stop there as a summary of what I heard. Are there any comments or corrections anyone wants to offer? [No response] Then I'd like to offer some comments of my own, then we can quit and go to dinner. I, of course, was also disappointed in incoming data on employment, spending, and production. I recognize this may be just another soft spot, akin to what we saw last year and in a number of years past, and I definitely think we should be careful not to overreact to what is a few weeks' worth of news. I find it reassuring that indicators of consumer confidence remain pretty upbeat, and I really haven't altered my modal outlook for employment and output over the medium term. I guess if I were updating my SEP forecast now, I would mark down projected growth this year, but modestly. That said, I do find the widespread nature of the recent negative surprises disconcerting, and, at a minimum, I am more worried about downside risk and am more uncertain about the outlook.

In March my concerns focused on the external sector, and now I see question marks pertaining to the underlying strength of domestic aggregate demand as well. I find it particularly disturbing that the slowdown in business investment appears to have become more widespread.

In March the weakness appeared concentrated in drilling activity, and I think now we are seeing outright declines in real equipment outlays and nondrilling, nonresidential construction as well. The Tealbook assumes that investment in intangibles is still growing at a solid pace, but we actually have no idea what's happening there because reliable source data won't be available for some time. The broad weakness in business fixed investment may be partly explained by the slowdown in aggregate sales and output via an accelerator effect, but conceivably other factors that may prove to be more persistent may also be at work, and I worry about that.

I'm also concerned that we may not see a pickup in residential investment nearly as large as the Tealbook forecasts this year. Housing starts and permits have been incredibly weak even though mortgage rates are low, employment and income are rising, and demographic trends seem to call for a faster pace of building. According to staff calculations, if housing remains weak it could shave  $\frac{1}{4}$  percentage point or so off the Tealbook projection of real GDP in the second half of this year and in 2016.

I worry most about retail sales having been soft for several months now. Savings rates moved up 1 full percentage point since the fourth quarter despite large gains in employment, a sharp decline in oil prices, record equity prices, a solid increase in house prices, and low borrowing costs. I suppose one could explain this by saying that bad winter weather and other transitory factors are at work here. I suppose supporting such an explanation is the fact that we did see strong auto sales in March, and consumer sentiment, even though the Conference Board number fell today, is still pretty high. And I suppose, for those reasons, the Tealbook forecast seems reasonable to me, but I must say my confidence in the Tealbook forecast that projects that PCE growth is going to pick up to 4 percent really, to me, is a leap of faith, and I worry that we may not see a pickup that's that large. And as several of you have mentioned, at this point the

only real source of strength in the economy is consumer spending. If there are question marks associated with consumer spending, that puts a lot of question marks on the outlook overall.

I don't think the risks from the external sector have diminished. Maybe they have even increased to some degree. The staff has marked down estimates of export growth in the first quarter appreciably. It may well be that the drag generated by past dollar appreciation and slow foreign economic growth could be greater than previously assumed. I also worry about the Greek debt situation. If Greece were to put in place controls on capital movements or, worse, exit the euro, I think it's hard to know what effect that would have on the dollar. I'm not sure whether it would cause the dollar to appreciate or depreciate, and I think there are reasonable stories either way.

I certainly am hopeful that information between now and June will help us resolve some of these uncertainties. We will see, certainly, two more employment reports and a range of indicators on spending and production that could tell us whether we've been through a soft patch or if there's a more significant loss in momentum. But by June, the spending data for the second quarter will still be incomplete, and we shouldn't underestimate the possibility that new data will confuse rather than clarify our assessments of the state of the economy.

As for inflation, I don't really have anything to add to what's been said. Even though core CPI inflation came in a touch higher than expected, overall, the incoming data on wages and prices has been roughly in line with expectations. My own outlook is little changed. Both core and headline PCE inflation rates are running well below 2 percent and are likely to do so for the rest of the year, barring some major surprise in oil prices or a fall in the dollar. And the April Tealbook projects that headline inflation will be under 1 percent this year on a Q4-over-Q4 basis,

and that core inflation this year is only going to run at 1¼ percent. Those forecasts seem quite reasonable.

Given this inflation outlook, the likelihood that employment and output will expand at only a moderate pace in coming quarters, and uncertainties about the global economy, I personally think it's unlikely that the conditions we've set out for a firming of policy will be met by June, but I have an open mind. We've agreed to be data dependent, and that assessment could certainly change as we receive additional data on real activity and inflation in coming weeks.

So let me stop there. We should probably break for dinner. Tomorrow, Thomas will give his briefing. We may have to make some changes in the statement when we see what's in the GDP report, but I think we have enough time tomorrow morning to do that. We'll begin tomorrow at 9:00 a.m.

[Meeting recessed]

### April 29 Session

CHAIR YELLEN. Good morning, everybody. I guess we should get started, and I'd like to first turn to Bill Wascher to give us an update on this morning's GDP announcements.

MR. WASCHER.<sup>6</sup> Thank you, Madam Chair. I'll be referring to the handout titled "Material for Gross Domestic Product Update." You have a table that summarizes some of the key aspects of this morning's GDP data, and the first thing I would say is that it's nice to be lucky once in a while. [Laughter] As you can see from the first line of the table, the BEA's advance estimate of real GDP growth in the first quarter was 0.2 percent at an annual rate. That's one-tenth of 1 percentage point higher than our estimate in the April Tealbook.

Among the major spending categories, real PCE growth slowed from 4.4 percent in the fourth quarter to 1.9 percent in the first quarter, about as we had expected. Business fixed investment, which is labeled here by its official title, nonresidential private fixed investment, fell 3.4 percent, and residential investment edged up 1.3 percent. Again, both of those were close to our expectations.

The next three lines show some offsetting misses that turned out not to have much effect on the top-line GDP number. In particular, government spending fell by less than we were expecting, net exports fell by more, and there was a greater accumulation of inventories than we'd written down. In terms of their contributions to growth, net exports were estimated to have subtracted  $1\frac{1}{4}$  percentage points from GDP growth in the first quarter, while inventories added  $\frac{3}{4}$  percentage point to growth. I should note that, for these two categories in particular, the BEA does not have complete data for the first quarter. In the advance GDP estimate, inventories and net exports are based on two months of data and BEA's assumed values for the third month—in this case, for March.

Our staff had a chance to look at the monthly assumptions and other details of both of these components, and Steve mentioned to me that his colleagues in the Division of International Finance are inclined to discount some of the negative miss in net exports between their forecast and the BEA's estimate. Going the other way, it looks as though the BEA wrote down a very high assumption for inventories in March, and we might be inclined to discount a little bit of that. So I don't know that it would have much effect on the top line. But I believe our thinking at this point would be that net exports aren't quite as weak as the BEA has estimated, and that inventories may not be quite as large.

The bottom of the table shows the BEA's estimate of consumer price inflation. Total PCE prices fell 2 percent at an annual rate in the first quarter, the same as our

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<sup>6</sup> The materials used by Mr. Wascher are appended to this transcript (appendix 6).

Tealbook estimate, while core PCE prices rose nine-tenths of 1 percent, one-tenth more than we were expecting.

Finally, I'll just mention that real disposable personal income rose at an annual rate of 6.2 percent in the first quarter, while the saving rate came in at 5.5 percent. Both of those figures were also close to our expectations. Thank you.

CHAIR YELLEN. Are there questions for Bill? President Bullard.

MR. BULLARD. Bill, is the staff embarrassed that you missed this by 50 percent?

[Laughter] No, congratulations on this. This is a good call, and I think it was useful information to bring to the Committee. It's a tough job, and when you get something right, you should definitely take some credit for it.

MR. WASCHER. Thank you.

CHAIR YELLEN. Okay. Great. Then let's turn to Thomas, who is going to brief us on our monetary policy decisions.

MR. LAUBACH.<sup>7</sup> Thank you, Madam Chair. I'll be referring to the handout labelled "Material for Briefing on Monetary Policy Alternatives."

At previous meetings and, indeed, yesterday, several of you discussed the possibility of market turbulence in the run-up to, or following, the onset of policy tightening. Although the Committee now has communications tools, including the SEP, that it did not have at the start of previous tightening cycles, unexpected movements in yields and volatility, up or down, may nevertheless occur even if the expected policy rate path does not shift markedly. The upper-left panel of your first exhibit provides some perspective by showing the staff's estimate of the 10-year Treasury term premium over the past 25 years. The vertical bars highlight three episodes: the beginning of the tightening cycles in 1994 and 2004 and the taper tantrum in 2013. Within the shaded 18-month windows around these events, term premiums moved substantially. But they also did so at other times—and likely in response to factors other than monetary policy.

The upper-right panel isolates the episodes associated with the three shaded regions and, for reference, the current episode conditional on the staff's assumption of liftoff at the September meeting. As shown by the red line, in 1994, the term premium rose substantially in the months following the onset of tightening. By contrast, in 2004, in blue, it moved up several months before the federal funds rate in response to stronger economic data that moved up the expected timing of policy

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<sup>7</sup> The materials used by Mr. Laubach are appended to this transcript (appendix 7).

tightening. But the term premium then began to decline and continued to do so over the remainder of 2004—the well-known “conundrum” episode. Finally, in 2013, the term premium began to rise around the time of Chairman Bernanke’s JEC testimony in late May, apparently reflecting market participants’ reassessment of the outlook for asset purchases and possibly policy rates. As shown in the middle-left panel, these term premium movements may, to some extent, have reflected uncertainty about the future course of monetary policy. The panel shows the width of the 90 percent confidence interval for the federal funds rate 12 months ahead, derived from options on federal funds futures. The term premiums are highly correlated with this proxy for policy uncertainty in the 1994 and 2004 episodes, but less so in 2013, presumably because uncertainty in that episode was driven less by the path of the federal funds rate over the next 12 months than by the course of asset purchases and longer-term rates.

These experiences suggest that, even in a context in which the FOMC’s policy communications tools are more extensive than in the 1994 and 2004 cycles, it may be prudent for the Committee to consider its likely response to unexpected changes in term premiums that might occur around the time when it begins policy firming. A special exhibit in the “Monetary Policy Strategies” section of the Tealbook, Book B, provides some background that might be useful. As shown by the dotted black line in the middle-right panel, the staff projects that the 10-year term premium will rise at a modest pace after the Committee is assumed to start raising the federal funds rate. This slow projected rise in the term premium reflects in part the waning effects on longer-term yields of the Committee’s asset holdings. The magenta line presents the path for the term premium in a scenario, labeled “Tightening Tantrum,” that is similar in magnitude to, albeit less persistent than, the rise in the term premium that began in May 2013 (the green line). As shown in the lower-left panel, in the “tantrum” case, optimal control would call for a more gradual increase in the federal funds rate for several quarters, with the federal funds rate running, on average, 35 basis points below the optimal control path associated with the Tealbook baseline (the black line) over the four years following the shock.

Recent public discourse has largely focused on the specter of another market tantrum. However, a repeat of the 2004 experience, in which term premiums remained surprisingly low for a while, is also a possibility. For example, such an outcome might occur through the effects of the very large asset purchase programs that are under way in Europe and Japan. The yellow line in the middle-right panel shows a scenario for the path of the term premium that is similar to the 2004 conundrum episode. In this instance, optimal control would call for a federal funds rate path that is 40 basis points higher, on average, over the next four years.

The lower-right panel highlights a few caveats. The tantrum scenario abstracts from the possibility of widespread liquidity or solvency problems, a point worth mentioning in light of recent commentary about reduced liquidity in key markets, which Simon discussed in his briefing. More generally, the scenarios do not examine the consequences of term premium movements that are associated with other disturbances. If, for example, the term premium fell because of weaker economic



activity abroad and associated flight-to-safety flows, the optimal policy response could be to keep the federal funds rate lower, not higher, than in the baseline. Finally, the appropriate policy response to either scenario depends importantly on the persistence of the deviation of the term premium from its baseline path, which will be known only in retrospect. In response to such scenarios, policymakers may wish to emphasize that they will respond to financial conditions that are judged inconsistent with the achievement of the FOMC's objectives.

Turning to the draft policy alternatives, thanks to the excellent work of Bill Wascher and his colleagues, I can discuss the alternatives as distributed yesterday. A key issue for your decision today is how to convey the implications of recent and incoming economic information for the likely timing of policy normalization. First, as indicated at the top of exhibit 2, assuming that the Committee decides to remove time-based forward guidance from the statement, it will primarily rely on paragraphs 1 and 2 to speak to its assessment of whether its criteria for liftoff have been met or when they are likely to be met. In broad terms, with alternative B, the Committee would communicate that the conditions for an increase in the federal funds rate are not yet in place, while alternative C would suggest that those conditions will likely be in place in the near future. Alternative A would indicate that the preconditions for liftoff are unlikely to be met in the near future.

The second set of bullets summarizes how each of the three alternatives may shape expectations for the timing of liftoff. On the Committee's criterion that it would need to see "further improvement in the labor market," alternative B states that "underutilization of labor resources was little changed" over the intermeeting period, citing the moderation in the pace of job gains and the steady unemployment rate. Regarding the second criterion, that the Committee would need to be "reasonably confident that inflation will move back to its 2 percent objective over the medium term," alternative B updates the description of recent data in paragraph 1 and retains, in paragraph 2, the expectation that inflation will "rise gradually toward 2 percent over the medium term." Thus, alternative B does not signal a change in confidence about the inflation outlook.

In addition, the Committee noted in the March minutes that the timing of the first increase in the federal funds rate would also depend on the evolution of economic conditions and the outlook. In that regard, alternative B provides the judgment that the Committee sees the recent weakness in economic activity either "in part" or "at least in part" as transitory and indicates that, despite the first-quarter slowdown, the Committee still expects economic growth at a pace that will lead to further improvement in labor market conditions. Under alternative B, the Committee would remain fully data dependent and offer no time-based guidance about how soon the conditions for liftoff are likely to be met.

By contrast, alternative C would communicate the Committee's readiness to begin policy normalization in the near term. Paragraph 1 indicates that, despite a steady jobless rate, "some labor market indicators suggest that underutilization of labor resources continued to diminish." It expresses a more positive reading of recent news

on inflation and notes that, although inflation remained below the Committee's objective, "it was no longer declining." In addition, paragraph 1 of alternative C attributes this winter's economic slowdown largely to transitory factors. Paragraph 2 suggests not only that the Committee continues to anticipate moderate economic growth and further improvement in labor market conditions, but also that it now has become more (or perhaps somewhat more) confident that inflation "will rise gradually to 2 percent over the medium term." Having made those assessments of recent developments and the outlook, the Committee would adopt new guidance in paragraph 3. Rather than repeating the criteria for liftoff adopted in the March statement, the Committee would announce that "economic conditions may" or "likely will soon warrant an increase in the target range for the federal funds rate." While alternative C reintroduces a time dimension to the forward guidance, it also retains the more general data-dependent statement that the timing of the adjustment would depend on realized and expected progress toward the Committee's objectives of maximum employment and 2 percent inflation.

Finally, with alternative A, the Committee would express heightened concerns about the underlying strength of the economic expansion, downside risks to the outlook for the labor market, and possible persistence of below-target inflation. In paragraph 1, in alternative A, as in alternative B, the Committee describes underutilization of labor resources as "little changed," but it stresses that inflation "continued to run well below the Committee's longer-run objective." It does not offer any judgment on how much of this winter's slowdown may have been transitory. Additionally, in paragraph 2's assessment of the outlook, under alternative A it would be reported that the Committee now sees the risks to economic activity and the labor market as "tilted to the downside." And the statement would voice concern that "inflation could run substantially below" 2 percent for a protracted period, and possibly that "the pace of improvement in the labor market could remain slow."

Given these risks to the outlook, alternative A introduces a somewhat more stringent precondition for the initiation of policy firming, stating in paragraph 3 that the Committee would need to see inflation "clearly moving up toward" the Committee's 2 percent objective rather than being "reasonably confident" that it will do so. In addition, alternative A emphasizes concern about the inflation outlook by indicating that "the Committee is prepared to use all of its tools as necessary to return inflation to 2 percent within one to two years." All told, alternative A would communicate that liftoff appears unlikely for some time.

Thank you, Madam Chair. That concludes my prepared remarks, and I will be glad to take any questions.

CHAIR YELLEN. Are there questions for Thomas? President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. Thomas, I'd like to ask you about your thinking as you drafted alternative C. Specifically, I'm referring to the bracketed choices in

paragraphs 2 and 3, and I'm interested in how the staff is thinking about the choice of the "has become somewhat more confident" and "may soon warrant an increase" language, as opposed to the "has become more confident" and "likely will soon warrant an increase" language.

These two language options could be seen as a sequence of statements over, say, two meetings. They could convey increasing certainty on the part of the Committee or increasing probability of a liftoff decision. Alternatively, I can imagine choosing between these two language options at the meeting ahead of liftoff, with the choice depending on the probability of the liftoff decision. So I can see a case for both of these interpretations of the alt-C bracketed language as something we might consider in the future, and I wonder if the staff had either of these ideas in mind or if it's just providing an option for this meeting alone.

MR. LAUBACH. We also explored the choice between "may" and "likely will" in previous drafts of alternative C and in other materials that, if I remember correctly, were sent to the Committee ahead of the January meeting. In my view, just focusing for now on that, one key question is how the Committee wants to strike a balance between, on the one hand, sending some advance notice and, on the other hand, emphasizing data dependence. So I think one key question for you at some point will be, how firmly do you want to express that the next meeting might be likely for liftoff, and how do you balance that against the fact that, of course, over any intermeeting period, you will receive data that may change the course of policy? That's some of the thinking that went into the considerations about "may" and "likely will."

As to the "somewhat" in paragraph 2, you're right that you can see a pair between—"somewhat" in paragraph 2 could perhaps fit better with "may" in paragraph 3 because it still emphasizes a little bit more that you're reserving judgment. So that's certainly a possibility.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. Yes—thank you, Madam Chair. I had a question and a comment. The comment is on page 1 of the handout that you provided, “Market Expectations and Policy Issues.” I thought that was a very nice set of experiments, and I like the idea of having these three possible cases and laying them out. My own thinking is, focus more on the tantrum case, but, certainly, it’s useful for us to keep in mind the conundrum case as well.

My comment is about the use of optimal control as a way to evaluate the appropriate policy response here. When I think about what was going on in these episodes, it was really that there were uncertainties in markets about what the Committee was trying to achieve with policy—and you used the same language, I believe, when I was listening to you. But optimal control, of course, involves the assumption that what we were trying to achieve with policy is all pretty much common knowledge.

For example, in the tantrum case, we might want a more aggressive response in order to rebuild lost reputation, in some sense, about what we’re actually trying to achieve. In the conundrum case, the same is true—we might want to be even tighter than what’s built in here, because we’re actually trying to convince markets that we are really concerned about inflation getting too high. But in the tantrum case, we might be even easier than what’s described by optimal control, because we have this need to rebuild reputation in the eyes of the markets about the fact that we really care about getting inflation back up to 2 percent.

That’s a comment. The question I had actually builds, I think, on what Dennis was asking about alternative C. I’ll ask the same question about alternative B. As you described on page 2, which was a great way to summarize what’s in the various alternatives, we’re really relying on paragraphs 1 and 2 to speak to the Committee’s assessment of the criteria for liftoff. I

guess we're relying on the evolution of the data over time to allow the public to figure out what we think is relevant.

Another way to proceed is to actually be more explicit about, "Okay, we've had some incoming data—paragraphs 1 and 2. We just saw GDP now. How does that affect the likelihood of liftoff in, say, June?" So we could have provided more explicit guidance about that in the statement in alternative B. And I guess my question is, what were you thinking in not doing this?

MR. LAUBACH. I have two thoughts, perhaps, on that, and maybe Simon can also weigh in on at least one of them. Namely, as Simon showed you yesterday, there was a question in the primary dealer survey on which factors market participants view as most relevant for the achievement of reasonable confidence. So there is an indirect route in the sense that what you say in the statement will be evaluated even though you may not have a direct statement in there about how the Committee is now more or less confident than before. Presumably, market participants will look at your characterization of these various factors and draw conclusions from that about how your confidence has shifted.

I'm not quite sure how easy it would be to try to come up with a summary statement for the degree of confidence because, well, my guess is that various participants rank different criteria differently, and I think that's evident from your comments. Therefore, I believe this is a step that's left to market participants and the public in general to draw conclusions about this.

MR. POTTER. Prior to the GDP release, I think the dealers put an average probability of 13 percent on liftoff in June. Let's assume that's moved down to 8 percent or something right now based on the GDP release. If you felt that that 8 percent was way too low compared with the likelihood that you might lift off in June, then you might want to try to indicate something.

Before it was way too high, but it seems a little bit less likely that you would want to indicate something at 8 percent.

MR. KOCHERLAKOTA. That's helpful. Thank you.

CHAIR YELLEN. Are there other comments or questions? President Lacker.

MR. LACKER. Thomas, I wonder if you could, to help us understand these scenarios, refresh the Committee's memory about the extent to which overnight short-term interest rates that we influence directly through the federal funds rate target can affect economic activity in the FRB/US model independently of the values of the 5-, 7-, and 10-year interest rates, which appear to figure prominently in these scenarios.

MR. LAUBACH. Monetary policy transmission in the FRB/US model is largely through long-term rates, so I'm—let me think.

MR. LACKER. Entirely?

MR. LAUBACH. Largely—well, to varying degrees. For example, there are some rates in there, like the rate on auto loans, that arguably are not quite as long term. So they are not only a 10-year Treasury yield. But it's true that the funds rate, in and of itself, doesn't carry a whole lot of weight in monetary policy transmission, but only through its effects on longer-term yields. By implication, these shifts in term premiums that we are considering in the scenarios are actually quite powerful. So they do have a substantial macroeconomic effects.

MR. LACKER. Well, I have two follow-ups. One is, when I think about this, I have difficulty reconciling that structure with the impression that a sizable volume of bank lending among the bankers I talk to seems to be priced off LIBOR and other short-term interest rates.

The second thing is, what would this imply for Taylor rules? Have we been wrong for years? Should we have been including a term premium thing that we accommodate in the Taylor

rules? Should we think about policy differently now that we've got this transmission mechanism whose strength varies depending on what the term premium does?

MR. LAUBACH. There are two separate aspects to this. One is, what if monetary policy transmission also importantly works through term premiums? That means that term premiums systematically vary with the path of short-term interest rates. To some extent, that is actually the case in the FRB/US model—namely, that the term premium is an endogenous function of expected future output gaps. So to the extent that choices about the path of the funds rate affect the outlook for future output gaps, that has an added effect by moving term premiums endogenously as well.

A separate question is, should a Taylor rule also take into account other financial conditions more broadly? And there, arguably, a Taylor rule that responds only to current economic conditions may have a shortcoming because it responds only to current inflation and, say, the current output gap, whereas financial conditions that you observe today, like movements in the dollar and things like that, clearly affect your outlook in the future. So that is not an aspect that is captured by Taylor rules that just mechanically respond to current conditions. Of course, for example, if you look at optimal control, it obviously knows about these things because it's run under perfect foresight. Therefore, agents anticipate that changes in financial conditions today more broadly, including changes in term premiums, will affect the future outlook.

MR. LACKER. Let me follow up further. When I look at the plot in the upper-left-hand corner, if I took Taylor rules and incorporate this term premium, doesn't that mean that an augmented Taylor rule should now predict interest rates 2 percentage points higher for 1994 than would a Taylor rule without that augmentation?

VICE CHAIRMAN DUDLEY. That's assuming you have a time-constant equilibrium real rate, but the equilibrium real rate could be moving, too.

MR. LACKER. Yes, there's that. There's the gap. There's inflation. But now we add the term premium, and that's pointing in the other direction by 2 percentage points.

MR. LAUBACH. If you look just at, say, the lower-frequency movement, it now seems as though, on an almost secular or at least a highly persistent basis, the term premium seems about 2 percentage points lower than it was back then. That is an effect that arguably ought to be reflected already in current conditions.

MR. LACKER. Current conditions.

MR. LAUBACH. If you thought about a sudden drop right now—

MR. LACKER. What about the current Taylor rule? Shouldn't it be in the current Taylor rule, too? We should include it.

MR. EVANS. It's in the current Taylor rule through current conditions.

MR. LAUBACH. Well, I think the point I'm trying to make is that this is a secular downshift in the term premium from a mean of what looks like around 2 percent in the 1990s to about close to zero now. But that's not a recent development, that's been persistent since the mid-2000s. The decline in the term premium, in and of itself, arguably had, at some point, a stimulative effect. Assuming that this really occurred in isolation, as I referred to in my briefing, you could see—

MR. LACKER. So it's affected the current gap and the current inflation rate.

MR. LAUBACH. Exactly.

MR. LACKER. But your optimal control says that, even given the current gap and the current inflation rate, there should be some response of the funds rate to the term premium.



MR. LAUBACH. Yes, but those are projected future changes in the term premium, not where it is today. So my point is, if you had just observed in recent history a 2 percentage point decline in the term premium, then if that had happened in isolation, that should indeed affect your outlook. Your outlook should be stronger, all else being equal—again, with the caveat “all else being equal.” If the 2 percentage point decline occurred in the context of a flight to safety, that’s no longer so obvious. But if that had recently occurred, then, indeed, there is a little bit of a discrepancy in terms of your standard Taylor rule response only to current conditions. If these current conditions haven’t responded yet to that decline in the term premium, then there is a bit of a tension since you project that that decline in the term premium, in itself, actually is going to provide a boost.

If you think, for example, about the staff projection, it is, very importantly, driven by our assessment of financial conditions today and over the projection period. So the Taylor rule does take account of that over the projection period.

CHAIR YELLEN. Governor Fischer, do you have a two-hander?

MR. FISCHER. Yes, it’s a two-hander. What is the correlation between the term premium and the difference between the short-term rate and the long-term rate? Is it high?

MR. LAUBACH. The correlation between the term premium and the slope—sadly, I do not know this right off the top of—

MR. POTTER. It has to be high on a daily basis.

MR. KOCHERLAKOTA. It has to be high.

VICE CHAIRMAN DUDLEY. Yes, it would be high.

MR. POTTER. That’s because the short-term rate is not moving that much, because the FOMC is not moving it, but the 10-year is moving around every day.

MR. EVANS. Yes, arithmetic, I guess.

CHAIR YELLEN. President Williams.

MR. WILLIAMS. My question is related to President Lacker's topic, but I guess it's really more about how we think about movements in the term premium in general. As I understand the FRB/US model and the way you described it, Thomas, is that these movements have very powerful effects because they affect all asset prices. They affect mortgage rates, the stock market, and the exchange rate. These movements are really spilling over throughout financial conditions, and so have a very powerful effect on GDP, employment, and inflation.

The research on the effects of QE—I'm thinking of the work of Vissing-Jorgensen and Krishnamurthy—a lot of the research has looked at this and seems to have called into question whether there's this full pass-through of Treasury term premium effects onto private rates, such as corporate bond rates and mortgage rates, as well as asset prices in general. I guess the question is, to what extent are you buying into the story that maybe the term premium doesn't affect financial conditions as fully as the FRB/US model would tell you? Or how do we think about some of the more recent research in terms of these simulations?

MR. LAUBACH. I think the short answer to that is, what I have here on the handout and what is being shown in the "Monetary Policy Strategies" section of Tealbook, Book B, of course, buys fully into the FRB/US view that, to the extent that long rates matter for real activity, changes in the term premium are in long-term rates. So no distinction is drawn between whether the movement is in the expectations component or in the term-premium component.

We could certainly try to look at how the results will change. Broadly speaking, my expectation would be that the lines you see in the lower-left panel are based on 100 percent—that

is, term premiums are worth exactly as much as changes in expected future interest rates. Then you can shave that if you thought that a more reasonable estimate was, say, 50 percent.

MR. WILLIAMS. Thank you. The second comment is really to President Lacker. This is why you have a time-varying  $r^*$ . In my view, this is the argument for thinking about the fact that the term premium changes over decades. Other factors, such as risk premiums, the equity premium, and the sovereign risk premium—lots of things change in the economy, which is basically the argument not to have a constant  $r^*$ .

Your point is exactly right. On its own, the term premium going down would argue for a higher  $r^*$ . So what's really striking is that Laubach-Williams, which just tries to let the data decide, has  $r^*$  falling all of the way to zero, despite the fact that QE and other factors have pushed the term premium down. The way I view this is, there are these factors pushing  $r^*$  up, but the other factors, the headwinds and the other things, are just so much more powerful that, on net, they push  $r^*$  down. Through the lens of  $r^*$ , everything makes sense. [Laughter] Thank you.

CHAIR YELLEN. Okay. Why don't we begin our round now? Our first speaker is President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I'm looking forward to hearing President Williams's remarks through the lens of  $r^*$ . [Laughter] We'll see how that goes.

Madam Chair, I favor alternative A. My rationale for alternative A is based on the modal outlook for prices and employment, the risks to that outlook, and the zero lower bound. On the benchmark outlook in the Tealbook, Book A, you see that inflation does not return to the FOMC's target of 2 percent until 2019, which is four years from now. We should take steps to facilitate a faster return of inflation to target. These additional steps would also help boost

employment over the medium term. Our congressional mandate calls for us to achieve maximum employment and stable prices. If we are able to simultaneously create more jobs and improve our performance on the price-stability goal, we should do so.

That's the argument just based on the modal outlook alone. It provides a clear justification for the policy course described in alternative A. I think this argument is enhanced by consideration of the risks to the outlook. I agree with the Tealbook, Book A—the risks to the outlook for prices and employment are to the downside. The standard risk-management considerations that are often advanced by the Committee suggest that these future downside risks bolster the case for current accommodation.

When we think about the zero lower bound, as recent Brookings conference paper by President Evans and his colleagues makes crystal clear, these risk-management considerations are significantly enhanced by the presence of the zero lower bound. The past five years have taught us that when we're close to the zero lower bound, as we expect to be over the medium term, we will not be able to mitigate downside risks as effectively as we would like. As President Evans's paper points out, this means that we should make policy choices so as to strengthen the economy in advance of these shocks hitting. That, again, argues in favor of the kind of stance described in alternative A.

So I see three arguments in favor of alternative A—the modal outlook, the risks to the outlook, and the constraints on policy imposed by the zero lower bound.

As I've indicated in the past, I believe that it is important for monetary policy decisions to take account of the macroeconomic risks created by potential financial instability. My own reading of the QS report is that the main financial stability risk we face right now is actually

associated with higher, not lower, interest rates. This will build on some of the work that Thomas was showing us earlier this morning.

In May 2013, we began to tighten policy while we were still apparently several years away from achieving our macroeconomic objectives. Market participants lost confidence in the willingness of the FOMC to buffer the economy against adverse shocks, and we saw a rapid increase in the term premium. If we raise the target range for the federal funds rate when headline inflation and core inflation are both running so low, we risk sending the same message that we did in 2013, and, accordingly, we risk seeing the same rapid run-up in the term premium.

Madam Chair, the modal outlook for inflation is too low. We can best address this deficiency and simultaneously create more jobs by making clear, as alternative A does, that we are willing to use all of our tools to return inflation to target within one to two years, and that such a determined approach in the pursuit of our mandated objectives is also the best way to manage the risks we face, especially near the zero lower bound.

I'd like to conclude by suggesting a topic for a possible research briefing. It builds on President Bullard's comments yesterday and, actually, the conversation we were just having among President Williams, President Lacker, and Thomas. I think it would be really useful for us to understand the work going on in the System on  $r^*$ —what's determining it and what's moving it around. It plays, actually, a pretty critical role, even in the statement itself. So I believe exposing the Committee to the research going on in the System on this would be very valuable. With that, I'll conclude. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Mester.

MS. MESTER. Thank you, Madam Chair. Today's GDP report confirms what we already knew—that GDP growth slowed significantly in the first quarter. It's too early to

determine whether that slowdown will be persistent or whether it will be temporary, as last year's first-quarter slowdown turned out to be. With no decision on the table, we don't have to make that determination today.

June's decision is going to be data dependent, and we'll be receiving important information, including two monthly employment reports, to help come to a decision about liftoff in June. Thus, I think it's important not to signal anything today about a June decision.

I support the spirit of alternative B today because, at this point, I favor data dependence and the meeting-by-meeting nature of the decision of liftoff. I believe it is appropriate to acknowledge the slowdown in growth and employment in paragraph 2, but then to maintain the characterization of the risks to the outlook for economic activity and the labor market as nearly balanced. However, in my view, the tone of the first paragraph on intermeeting developments is too negative. I think some of that negativity comes from focusing too much on short-term changes in economic indicators instead of providing the Committee's assessment of changes in economic conditions that matter for a policy decision. I do appreciate some of the changes that were made between the first draft of statement language that was circulated and the draft on the table today that addressed this issue of tone, but we have to remember that the public doesn't see the evolution of our drafts.

The Tealbook, Book B, tells us that the intention of alternative B is to avoid any date-based guidance and retain the option of beginning policy normalization in June if the data and outlook justify it. My concern is that alternative B doesn't seem to achieve this. My concern is, it'll be read as our signaling that we've taken June off the table when that's not the case, and it would be inconsistent with our data-dependent approach.

Since our March meeting, market expectations have shifted to a later liftoff and a flatter policy rate path. In normal times, such a shift would be reflecting their assessment of the incoming data for the economic outlook, and we might want to take some signal from it. But as we prepare for liftoff, markets are particularly sensitive to our communications. The shift in the expected policy rate path may not be providing any independent assessment of the economy. Instead, it might be reflecting the market's view of the Committee's view.

As former Chairman Alan Greenspan once said when discussing how difficult policy communications are, "People hear what they want to hear." In such an environment, we must be even more careful than usual not to say things that could be misinterpreted, even if they're factually true. Of course, anticipating how the market might react to anything we do say is a difficult task.

Turning to language specifics, in paragraph 1, I would opt to say "growth slowed . . . , in part reflecting transitory factors," rather than "at least in part." And at this point, I understand that the rest of the language is pretty well locked down, but I would like to suggest one change. Instead of "Growth in household spending declined," can we say "Household spending continued to grow, although at a slower pace"? Thank you, Madam Chair.

CHAIR YELLEN. So you said that, instead of "Growth in household spending declined"—what did you want? Just review what you wanted to say instead.

MS. MESTER. Yes. "Household spending continued to grow, although at a slower pace."

CHAIR YELLEN. Okay. Thank you. President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. I support alternative B, including the statement and President Mester's suggestion concerning "in part."

I see the decision at this meeting on both policy and statement as straightforward. So I'd like to spend a few minutes looking ahead and thinking aloud about statement language possibilities in alternative economic scenarios, obviously evidenced by incoming data, and alternative liftoff decision scenarios.

I expect it will be evident in this round that there is some desire to keep June an active option. In any event, I think having various communication strategies in mind could help the Committee achieve as smooth a policy transition as possible and reduce the chances of avoidable and unwanted market volatility associated with liftoff. For my part, I'm not so optimistic that by June we will be able to make a clear and plausible case that the economy is on track in terms of our two decision criteria. Having repeatedly emphasized the data dependency of our liftoff decision, I think it's important that we not cause impartial observers to scratch their heads about the data on which we're basing a liftoff decision. I expect that the data picture will be sufficiently inconclusive by the time of our next meeting to justify waiting a bit longer.

As my earlier question to Thomas indicated, I'm trying to think through how communication might evolve in the coming meetings should we decide not to move in June. As I suggested in framing the question for Thomas, there are a couple of ways the language options in this meeting's alternative C might serve as a template. The "has become somewhat more confident" and "may soon warrant an increase" language option, combined with the "has become more confident" and "likely will soon warrant an increase" version, could be viewed as a sequence of statements over two meetings in advance of the liftoff decision. Alternatively, the two versions could be viewed as distinct choices, with one or the other selected depending on the degree of certainty or probability the Committee wishes to convey, presumably in a statement of the meeting just ahead of the liftoff meeting.



Having said all of that, my sense of opinion in the Committee is that there is not a lot of appetite for signaling liftoff two meetings in advance, even if couched in very tentative terms. I also doubt there's much support for a move to language along the lines of alternative C unless the liftoff decision is highly probable. So I have difficulty actually envisioning circumstances in which we might choose to use the softer "has become somewhat more confident" and "may soon warrant an increase" version in alternative C. Where this leaves me is the view that the most feasible approach to some amount of guidance in advance of a liftoff decision is the "has become more confident" and "likely will soon warrant an increase" choice. I apologize for walking everyone through my tortured thought process. [Laughter]

It's certainly possible that we will receive a string of data reports between now and June that is strong enough to justify pulling the trigger. If we were to move in June, the advance-signal decision will be moot, of course. In that case, the question becomes whether the June statement ought to address what comes next—that is, provide some more concrete guidance on what is the Committee's expected path of policy over the subsequent meetings.

As I said at the top of my remarks, I just want to air some communications considerations. I think it would be helpful to further discuss the question of whether to provide advance guidance and, if so, how to phrase it. And it's not too early to start thinking about ways to prepare the public for the path of policy after liftoff. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Madam Chair. I support alternative B. The data to date have not met the conditions we provided in the March statement for raising rates. I am very skeptical that these conditions can be met by June. With two quarters of weak real GDP growth,

we once again are faced with a forecast of improvement—the data reflect broader-based weakness.

In addition, international conditions since the March meeting have become more worrisome. The frustration among Greek leaders when talking with European policymakers is palpable, while the European policymakers I spoke with seemed to have more confidence that any problems associated with a Greek default could be readily contained. I am less confident that a smooth resolution will be achieved. Moreover, I worry that this misplaced confidence in the likely containment of spillovers arising from a possible Greek default may generate conditions that make default even more likely.

As I discussed yesterday, it is possible our inflation target is too low, given the accumulating evidence that we set the target based on research that underestimated both the likelihood and severity of being at the zero lower bound. If we are willing to entertain a higher target, then a later liftoff would be further justified. In part, this would also indicate a higher standard for moving, shifting from reasonable confidence that we are moving toward our inflation target to just plain confidence that we are moving toward our inflation target. As the data to date should not make us even reasonably confident, this distinction will become more relevant at future meetings, presumably in the fall.

In terms of language, I would take out the “at least,” and I would keep “in part reflecting transitory factors.” Thank you, Madam Chair.

CHAIR YELLEN. Thank you. First Vice President Holcomb.

MS. HOLCOMB. Thank you, Madam Chair. There’s no denying that the bulk of data on real activity released since our March meeting has disappointed expectations. However, a

review of what has happened and what may be revealed to have happened argues for maintaining flexibility with respect to the timing of liftoff.

Labor market conditions continue to improve, albeit at a slow pace. We've also seen the trade-weighted exchange value of the dollar fall slightly against other major currencies and the price of oil move irregularly upward. So we have some reason to think that the two main forces that have driven down headline inflation and which might pose a threat to long-term inflation expectations are abating. Measures of core inflation have ticked upward. In the University of Michigan survey, longer-term inflation expectations edged downward in April's preliminary report but remain within their recent range.

Between now and the June meeting, the information that we will receive may shed new light on jobs, retail sales, consumer sentiment, and the overall health of the manufacturing and nonmanufacturing sectors. We will also have two new reports on trimmed mean PCE inflation and household inflation expectations. Several of the current uncertainties hanging over the world economy may be at least partially resolved. It seems to me to be well within the realm of possibility that the information we receive between now and June will warrant a policy response. I believe it is important, therefore, that a June liftoff remain on the table.

While, technically, there is nothing in the language of alternative B that takes June liftoff off the table, I do have some concern. I can readily imagine people in the financial markets and business press drawing the conclusion that June action is all but impossible, given the lack of foreshadowing in alternative B. This move in market expectations could prove to be an impediment to Committee action. Therefore, the language in paragraph 3 of alternative C with the "may soon" option is attractive, as it more clearly indicates that June remains a viable option. On the other hand, alternative B states the Committee's intention to take timely action once its

criteria have been met. With the possibility of continued uncertainty on both fronts, I support alternative B. Thank you.

CHAIR YELLEN. Thank you. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. I support alternative B, although with a language change, which I will get to toward the end of my remarks.

I first wanted to say that I agree with people that once we have removed the forward guidance, as we've now done, every meeting should be a live meeting in which the possibility of a change in the federal funds rate can be on the table. Having said that, though, we still have different assessments as to how likely it is that we think we're going to want to raise the federal funds rate target range in the next couple of meetings. I, for one, don't think it's very likely at all. But I do believe that we should not do anything that formally takes it off the table.

I wasn't going to comment on this, but President Lockhart's thoughtful observations did provoke me to say a couple of things on how to begin moving forward. I think I'm coming out in a somewhat different place, although only in a tentative way, and would like to hear other people's views on this. I'd be reluctant to put back into paragraph 3 at some point an indication that, one or two meetings from now, we are more likely to move. The reason is, I think that becomes a form of calendar guidance of its own. Just as, when we put in the quasi-calendar guidance before, saying, "Well, this isn't really calendar—it's all data dependent," the markets all read it as calendar guidance, I think the same thing is going to happen now if we put in language such as that included in paragraph 3 of alternative C.

My preference would be that we use paragraph 2 as the vehicle for beginning to communicate a change in the Committee's collective view as to where the economy is headed, which, it's hoped, actually begins to, I would say, increase some volatility a little bit as people

begin to think liftoff is more likely but is not a done deal. That way, we don't have a surprise at the meeting in which we eventually lift the target range, but it is not de facto occurring just by the inclusion of language in paragraph 3 at a meeting before we've actually decided to lift the target range.

As I said, my current view is that June is very unlikely as an appropriate time to increase the target range. I thought that paragraph 1 as originally circulated a week or two ago actually hit about right the factual characterization of the economy. It's fairly hard to argue with the proposition that the data were rather disappointing and pretty bad, yet paragraph 1 began with something saying that it was "in part reflecting transitory factors." Most important, I think, the beginning of paragraph 2 communicates that "Although growth in output and employment slowed during the first quarter, the Committee continues to expect..." In other words, the basic direction of the Committee's expectations hasn't changed, notwithstanding the disappointing developments reported in paragraph 1.

Notwithstanding the fact that I thought the original paragraph 1 got it about right, I'm okay with most of the changes that have been made since the original language was circulated, although I wouldn't want to see us going too much further to try to look for the cheery in a way that would obscure what's actually happened. The one exception, Madam Chair, is the sentence on inflation, which is the second-to-last sentence in paragraph 1. Back in March, that sentence said "Inflation has declined further below the Committee's longer-run objective, largely reflecting declines in energy prices." So the phrase "largely reflecting declines in energy prices" was, in effect, explaining how the decline had gone further below. It was an explanation of the delta.

I think the language that was circulated originally to the Committee a week or two ago is now in alternative A, and the language is as follows: “Inflation continued to run well below the Committee’s longer-run objective, largely reflecting earlier declines in energy prices and decreasing prices of non-energy imports.” There, the way I read it when that language was circulated was that now this phrase “largely reflecting” in effect explains the “well” part—why it is “well” below. But as it’s been modified, the sentence now reads “Inflation continued to run below the Committee’s longer-run objective, largely reflecting earlier declines in energy prices and decreasing prices of non-energy imports.”

I don’t think it’s the case that all of the difference between the Committee’s target and where we are right now is explained based on the earlier declines in energy prices and decreasing prices of non-energy imports. On the contrary, as many people pointed out yesterday and a little bit today already, we haven’t been hitting the inflation target for quite some time now. And if you pull out housing inflation—which, of course, is largely a function of rents imputed to homeowners—then you have an awful lot of continuing questions about how much inflation there is.

As a factual matter, I think we should modify that sentence to say something like the following: “Inflation continued to run below the Committee’s longer-run objective, partly reflecting earlier declines in energy prices and decreasing prices of non-energy imports”—or something just making clear that that second phrase does not account for all of the difference between the Committee’s target and where we are right now.

Finally, like those who have gone before me, I would prefer removing “at least” in the first sentence. Thank you.

CHAIR YELLEN. Thank you. President Lacker.

MR. LACKER. Thank you, Madam Chair. Our March statement provided forward guidance only as far ahead as this meeting, and it effectively said we were going to go to a meeting-by-meeting, data-dependent approach to decisionmaking. From now on, that's the right thing to do, and I think that's important. This means we will not be in the business of telegraphing interest rate moves in the previous meeting's statement. I support the observations President Lockhart made on this. An important corollary of that is that we should not be encouraging people to believe we won't raise rates without having sent a telegraph on the issue in the previous meeting's statement.

Concerning alternative C as a stalking-horse for future statements, I don't feel the need to include language like that in paragraphs 2 or 3 at a meeting prior to liftoff. So I agree with Governor Tarullo—every meeting should be live, and we should, to the extent that we have the opportunity, condition people to expect that we could move without forewarning, perhaps.

A critical aspect is today's characterization of the economy, especially in the first paragraph. As I said in the earlier round, a substantial amount of data is scheduled to arrive between now and our June meeting. If those reports are reasonably close to what the Tealbook is forecasting, they're going to show a rebound in consumer spending growth, and they're going to show a firming in the monthly inflation figures.

In that case, there could well be a strong argument for raising rates in June. Now, we don't know for sure the data will come in that way, and we don't know for sure there won't be some looming concerns on the horizon that alter the outlook. We could find we've hit a more prolonged soft patch. In that case, we may be inclined to delay raising rates when we get to June, and I'm open to that possibility. But, in view of the information we're going to get, I think it's very important not to take June off the table.

As I said, the critical aspect is how the statement characterizes the data, and that focuses attention on the first paragraph. The revisions that were made between the beginning of last week and the end of last week in the first paragraph were good, important, and necessary. But I agree with President Mester that the first paragraph still has somewhat of a “glass half-empty” tone, emphasizing the empty half of the glass I guess you’d say. I support her suggestion for changing the characterization of household spending. I also support Governor Tarullo’s change of “largely” to “partly.” I think he’s right on there. But I believe that the inflation sentence in alternative C is more balanced and fair, as it acknowledges that inflation is no longer declining. It calls that out. Central bank communication is all about what you choose to call out, and I think it would be fair to call out that inflation isn’t declining. So I’d put that suggestion on the table.

Regarding the phrase “at least,” I’ve been wrestling with that in my mind. Certainly, in a broad-brush kind of way, you can see how including it might make things a little more dour than they ought to be, as President Mester argued. But, on the other hand, “at least in part” means that the amount that’s attributable to transitory factors is “in part” or “greater than in part.” From that point of view, “at least in part” seems to me like a more upbeat assessment than just “in part reflecting.” But I could be persuaded either way on that. Those are my comments on language, Madam Chair. Thank you very much.

CHAIR YELLEN. Thank you. President Bullard.

MR. BULLARD. Thank you, Madam Chair. I’m going to make three comments here. First of all, I support President Kocherlakota’s call for a symposium on  $r^*$ . We could probably benefit from getting a lot of views on the table about this important parameter in our models—



how we're thinking about it and how that thinking shapes policy choices. So that would be an excellent thing to do, if we could fit that in at some point.

That leaves me with two comments. One is about building credibility for data-dependent policy, and the other is about shading policy to prevent asset price bubbles. On the credibility question, as we all discussed yesterday, recent data have been relatively weak. We have been trying to build credibility regarding a data-dependent policy being the basis for rate decisions as we go forward. I guess my assessment so far is that we have indeed built some credibility, even considerable credibility, regarding a data-dependent policy rate for the period ahead, despite the fact that we haven't moved the policy rate for six and a half years. And that's an achievement.

Markets—appropriately, in my view—moved the likely date of liftoff back in response to weaker-than-expected readings on the U.S. economy during the intermeeting period. That's exactly what you'd expect to observe if policy is data dependent. If we can maintain this type of credibility as the data wax and wane during 2015, we'll be in excellent shape at the time of policy liftoff, whenever that should arrive, in the sense that there will be few surprises in the markets at that juncture.

The more we can do to convince people that we're going to react to the data and be clear about what data we're going to react to, the better off we'll be. I'm hopeful that the day of the first move will be an anticlimactic event because we have credibility that that's what we were going to do. Then we make the move, and it's pretty smooth. I think we're well on the way to that, but we probably have more work to do during the spring.

Let me turn to the second comment on the shading of policy. The staff's forecast is that there will be a smooth glide to the steady state. This forecast envisions unemployment only a few ticks lower at the end of the forecast horizon in 2017 than it is today. This is not my

baseline forecast. I envision unemployment falling well into the 4 percent range over the forecast horizon, barring any large negative shock to the U.S. economy. This is what happened in the 1990s and in the 2000s, and I think it's a good baseline forecast of what's going to happen again this time.

Simultaneously, the labor market conditions index, which takes into account all aspects of labor market performance, will continue to rise far above its average value. So we'll be talking about, in the years ahead, a very robust labor market performance when compared with metrics on past labor market performance in the United States. This is going to constitute a boom phase for the U.S. economy, notwithstanding this morning's GDP report, which I think is going to prove to be temporary.

The boom will be associated with about 3 percent growth, at least for a time, in the U.S. economy. That 3 percent growth, while not stellar, is still about 1 percent higher than the potential growth rate for the U.S. economy. This is very similar to the 1990s, when we had years in which we were at 4 percent in an economy that had a 3 percent potential growth rate. We'll be growing at 3 percent for a time in an economy that has a 2 percent potential growth rate. Inflation will rise, go through the inflation target, and be higher than 2 percent over parts of the forecast horizon.

During this period, interest rates will remain exceptionally low by historical standards. We've already committed ourselves to that by saying that, even when we start to normalize, it would be very small and very gradual. You could throw in that my view is that this policy rate, as we're envisioning it over the next couple of years, will be below the likely natural rate of interest, the  $r^*$  value. In this sense, we're going to provide accommodation as currently

envisioned all of the way through this boom phase for the U.S. economy. This is how I'm thinking about it.

Now, the boom period, combined with exceptionally low policy rate settings, is a recipe for asset price bubbles. Asset price bubbles have plagued the U.S. economy during the 1990s and 2000s and have been a major point of debate at this Committee over the past 20 years. These bubbles are not in our models. They were not in the past 20 years, they're not in our models today, and we don't see any component of this in our standard presentations on what we should do about monetary policy. So we do not have a good understanding of where these bubbles come from or how to control them when they occur. Furthermore, bursting asset price bubbles can have devastating consequences for the United States and the global economy. It's no small matter if this thing gets going and develops.

The basic strategy, in my view, should be to head off this kind of possibility. We've had boom-and-bust cycles during the 1990s and the 2000s. What you'd like to do this time around is not to have that boom-and-bust cycle. Then you'll get a longer expansion, and you'll get better outcomes for everybody.

It's true that we have an improved macroprudential stance today, and that will help mitigate some of the more severe consequences of a bursting bubble. But untested macroprudential tools alone are, in my view, insufficient to rely on, given the exceptionally dire consequences of bursting asset bubbles not just for the U.S. economy, but also for the global economy.

The prudent policy, in my view, is to combine our efforts on macroprudential policy with a sensible monetary policy that hedges our bets in the direction of prevention of the kind of asset price boom-and-bust cycles that we've experienced during the 1990s and 2000s. I think we

should be shading in the direction of slightly higher interest rates than we would otherwise have, on the grounds that an ounce of prevention is worth a pound of cure on this dimension. We don't have very good knowledge of what these bubbles are or how they form, so we should be hedging our bets on this. This is an important reason to get going on a modest normalization program when the opportunity arrives, which I expect it will later this year.

Let me turn just to alternative B for a minute. I support alternative B, as written, for today, without the "at least" phrase in the first paragraph. The "in part" covers the bases there, and I don't think we need to add anything more to that.

I do agree with President Mester's suggested change. The wording "Growth in household spending declined; households' real incomes rose strongly" is a little bit jarring, and I like President Mester's suggestion there that would smooth that out a little bit.

I agree with Governor Tarullo and President Lacker that we should not try to reintroduce calendar-dependent language as liftoff nears. We're trying to get away from that, so we should not try to do that. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Evans.

MR. EVANS. Thank you, Madam Chair. President Kocherlakota made a good case for alternative A, and I'm sympathetic to his view, but I can support alternative B. I continue to believe that economic conditions will most likely be consistent with an appropriate time for liftoff being sometime in 2016. I currently think, based on data, that it will take until then for me to be reasonably confident that we're on course to achieve our inflation objective within an acceptable time frame.

The information we've received since our March meeting has not changed my opinion on this. Indeed, I'm a little nervous over the latest data on activity and their implications for further

slower reductions in resource slack. The recent stabilization of energy prices and the dollar are positives. But, as I discussed yesterday, I need to see a good deal more broad-based, concrete evidence before being confident that underlying inflation trends actually are heading up with adequate momentum. But, having said that, we'll see how the data evolve.

Let me make a couple of comments about other things people have mentioned. I agree completely that we have moved to the point at which it's a meeting-by-meeting decision. They're all live decisions on the rate increase, so data conditionality, by itself, is all we need. I don't think we need special language, either, to signal our intent.

I agree completely with Governor Tarullo on the paragraph 1 language on inflation. I had noted that myself. The problem is that the previous iteration had talked about the gradient—inflation declining—and now it's a level concept—"continued to run"—but it leaves the same factors in place. So if you add, as I think you said, "partly reflecting earlier declines," that would take care of that. Alternatively, if you leave the language, you could also add "and resource slack" as part of the explanation, but the more minimal "partly" would probably be better there.

I'm indifferent on the language about household spending growth that President Mester indicated. I'm a little worried that it's going to sound like the message you communicate when you go out and say, "I support so-and-so 1,000 percent." When you say, "Household spending continued to grow," the alternative to that is a recession. If household spending doesn't grow, it's a recession, so I'm not quite sure—but, at any rate, that's fine.

On "consumer sentiment remains high," these are factually correct observations, but I'm a little worried that it might be risky. After all, we're thinking that the energy price declines are transitory. Gas prices are going to go up, and we know that sentiment goes down when gasoline prices go up. So we might be providing a different bright line for people looking for a bright

sign here. Then, if you see that one go down, it might have a little more of an implication than we intend. But otherwise, I don't have a problem with that. I support alternative B. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President George.

MS. GEORGE. Thank you, Madam Chair. I support alternative B and the latitude it offers the Committee to consider a change in policy at its next meeting.

In terms of guidance that we can glean from policy rules, the benchmarks in the Tealbook, Book B, continue to generally suggest that the funds rate should be higher than its current setting. Granted, the equilibrium real rate, or  $r^*$ , we've been discussing remains depressed and raises questions as to whether these benchmarks are providing appropriate guidance today.

At the same time, common frameworks used to estimate  $r^*$  also provide an estimate of potential GDP in which declines in  $r^*$  go hand in hand with lower potential. For example, the current Laubach-Williams framework indicates that the equilibrium real rate is negative, though it also implies that output is actually above potential. So, while policy should incorporate a lower equilibrium real rate into the appropriate setting of the funds rate, it also should not neglect the implications for potential GDP and the output gap. For example, using the lower  $r^*$  measure and positive output gap in the Taylor (1999) rule with inertia suggests a higher current funds rate. The Taylor (1993) rule indicates a setting above 1 percent, even with the lower equilibrium real rate. I don't take the positive output gap to completely reflect current conditions by any means, since some labor market slack remains. However, this example illustrates that taking on board a lower equilibrium real rate may also imply a smaller output gap.

Finally, although this is not a decision for today, I note increasing uncertainty about the timing and effects of ceasing reinvestments. I'm a bit concerned in looking at the market participant surveys and noting that expectations on the timing of when reinvestments will be ended are quite diffuse. For example, a slight majority of dealers expect Treasury reinvestments to end in the first quarter of 2016, but then expectations are spread over the next four quarters into 2017. This is somewhat concerning, especially given the risk highlighted in the QS report and recent IMF financial stability reports that longer-term rates could increase sharply approaching liftoff. Or the Committee could be facing another conundrum in which longer-term rates remain low. I think we should try to manage some of this risk by providing more guidance on the timing of reinvestment, perhaps incorporating it into the SEP or perhaps just distributing it on an internal basis for our own use, to think about expectations on when we anticipate ceasing reinvestments. Thank you.

CHAIR YELLEN. Thank you. First Vice President Prichard.

MR. PRICHARD. Thank you, Madam Chair. I view the evolution of the draft alternative B to finally contain entirely data-dependent language. This is a very positive development and, I believe, an essential step on the path to policy normalization. I also interpret the language in alternative B as leaving our options open for beginning normalization at any future meeting as we are informed by incoming data.

My biggest concern with alternative B is its overly weak interpretation of the current economic environment. As I mentioned yesterday, expenditure-side data for Q1 over the past 30 years appears to be suffering from poor and perhaps incorrect seasonal adjustment. An indicator that incorporates income-side data, GDPplus, which was posted to the website of our Real-Time Data Research Center this morning, indicates that the first quarter may not be nearly

as weak as many of the nowcasts being reported. GDPplus grew at 1.65 percent in the first quarter after growing 3.3 percent on a year-over-year basis in 2014:Q4.

Further, I suggest that the Committee consider, now or in the future, simplifying its assessment of the labor market. Many labor market indicators paint a relatively healthy picture of the labor market. For that reason, I would favor deleting the third full sentence in paragraph 1—again, either now or in the future—and simplifying it. That sentence begins with “A range of labor market indicators...” This sentence is fairly imprecise, and it adds little to the meaning that is already embodied in the preceding sentence. The idea would be to seek every opportunity to boil the FOMC statement down to its essence by eliminating sentences that don’t add particularly to meaning or understanding.

I am otherwise supportive of the suggestion to eliminate “at least” and of the other suggestions that have been made. Thank you very much, Madam Chair.

CHAIR YELLEN. Thank you. President Williams.

MR. WILLIAMS. Thank you, Madam Chair. I support alternative B. Let me respond to some of the language suggestions first. Like others, I would not include the phrase “at least” in the opening paragraph. That’s not needed. It’s even unclear.

On Governor Tarullo’s suggestion, I think he’s absolutely right. I would put “partly reflecting earlier declines in energy prices” in the penultimate sentence in paragraph 1. That’s exactly right. In the recent data, core is running about 1 percent. Overall inflation is running at around zero over the past couple of quarters, but it was obviously negative in the first quarter. There are a lot of factors going on—President Lacker made this point, too. That’s just accurate and, I think, better. Paragraph 2 is really the place in which we do the heavy lifting and explain how we interpret things. Paragraph 1 is really about the data.



I'll make a comment about data dependence in paragraph 1. This is part of life. We're in the data-dependent mode. Paragraph 1 is going to describe the data. We had only a month, really, of data here. This is a very small sample, but these are the data we have, and I think we have to just describe them accurately.

The part of the statement in which we try to explain how we interpret them is paragraph 2. In that respect, I thought paragraph 2 did a nice job of making the point that, yes, the data have been weaker. Yes, we've had these factors in terms of inflation. But, basically, our outlook hasn't changed much. I'm not concerned so much about the weakness or the signaling in paragraph 1 as currently stated, because I think that's the way the data have been. It's just a small sample, and, of course, we'll get a lot more data before our next meeting. So I'm fine with that.

In terms of Governor Tarullo and others who've commented on where the future statements should go, obviously President Lockhart started us down that road. I strongly agree with Governor Tarullo and, I think, President Evans as well as some others that we shouldn't be going back to trying to put some quasi-date-based guidance in there. That whole thing of how we have to take a couple of steps before we act is a kind of straightjacket we don't want to get ourselves in. We're in a good place now on our statements, and I wouldn't want to see us move back to that.

Now, my own view in terms of the outlook hasn't really changed based on the data we've seen in the past month, which is similar to what others have mentioned. First-quarter data seem to be distorted by some seasonal factors and other factors. We've been down this road before. In terms of the inflation data, I haven't changed my view there, either. I still have the view that inflation will come back over the next couple of years to our target.

But this is all forecast, and we're now in the data-dependent mode. When I'm asked when I think we'll be raising rates, I say, "I might have a view on this, but I don't know." I try to avoid talking about June, September, December, or whichever year because it really depends on how the data come in, how they influence our outlook, and what the right policy is.

That's a hard message for us to get across, because we've been focused on June versus September versus December or whatever. So I've been thinking a little bit outside the box here about how we can, beyond this statement, get to a more data-dependent approach. Madam Chair, I have a suggestion for you. I made you a special T-shirt [Laughter]. The message reads "Monetary Policy Is Data Dependent."

CHAIR YELLEN. How about one for everybody?

MR. WILLIAMS. I have a whole box of them. You wear this around, and then I think that'll make the point pretty clear. We won't have to worry so much about—

CHAIR YELLEN. Fantastic. Love it.

MR. WILLIAMS. Thank you.

MR. TARULLO. Have the softball team wear those.

MR. WILLIAMS. Another great idea. Oh, I have one last comment I want to make—sorry. [Laughter]

MR. KOCHERLAKOTA. You can't top that, John.

MR. WILLIAMS. No, I know. Actually, President Kocherlakota, I can—in this way. I would like to second the comments of President Kocherlakota and President Bullard about having more of a discussion regarding the natural rate of interest, with  $r^*$  estimates obviously being at the center of this. I get a lot of feedback, pro and con, about this, and there is some

literature developing on this besides just the Laubach-Williams model. So I really do think that having a further discussion about that would be helpful.

The basic logic of Laubach-Williams is actually pretty simple. Over the past five years, output growth has been averaging 2.3 percent—I'm picking up on President Kocherlakota's point yesterday about how Laubach-Williams works. The trend growth in our model is 2.0 percent. I think that's consistent with most people's views. So we're getting growth of 0.3 percentage point above trend over five years, while the real federal funds rate has been about minus 1.7. The only way you can interpret this statistically is to think that the real rate gap—basically, the amount of monetary stimulus—is very modest over the past five years, and this hasn't changed in our model.

What Laubach-Williams is telling you is simple. We've had negative real rates for five straight years. Output growth has been just a smidgen above potential. Therefore, there's really not much monetary stimulus relative to the neutral rate going on. This is something we should discuss further, but, basically, that's how the model interprets the data. If the equilibrium real rate really were 2, growth would have been a lot faster than 2.3. Thanks.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I had read about the T-shirt in the media, and I'm glad to see the real thing in front of us.

But the more serious thing is, President Williams summarized a number of people's comments that we want to get away from being date dependent. One challenge with regard to that is the way the Summary of Economic Projections presents our policy outlooks. That's very date dependent. In fact, that's what I'm often asked about: "Boy, it looks as though everyone's saying 2015. What do you think about that?" So it's something to be thought about. If we're

really trying to get away from date dependence, I think that says something about how we want to be talking about interest rates in the Summary of Economic Projections as well.

CHAIR YELLEN. That's a good suggestion. Thank you. Governor Fischer.

MR. FISCHER. Thank you, Madam Chair. I'd like to first discuss briefly the inflation target issue that arose yesterday, and then turn to the monetary policy decision and explain why I support alternative B.

Yesterday President Rosengren, supported by President Kocherlakota and one or two others, suggested raising the target inflation rate, a suggestion that's also been made by Olivier Blanchard. I believe that we should constantly be reexamining all of our assumptions about monetary policy and the behavior of the economy, but that, particularly in the case of targets, we need to be very careful about our public stance.

With regard to our public stance, we fixed a target inflation rate in 2011 and announced a 2 percent target in 2012. The setting of a target inflation rate was a major achievement and, to those outside the System, a major surprise. We need to be very careful indeed about reopening that decision and that discussion.

The argument for raising the target inflation rate is that the higher target would permit normal monetary policy to attain a more negative real rate of interest than is now possible. That is true, but there's not so far been public discussion of the negative aspects of a higher inflation target. The main cost, I believe, relates to Alan Greenspan's definition of the desired inflation rate as a rate such that inflation is not taken into account in routine economic decisions. In particular, at around 4 percent inflation, we very likely would see the return of indexation into relatively short-term contracts, including labor contracts. Monetary policy becomes much more difficult in heavily indexed economies, in part because the inflation rate typically becomes more

variable the higher the indexation rate and because the probability that the dynamics of inflation become unstable increases.

A second cost relates to the credibility of the inflation target and of the FOMC. It is possible that we should, at some future point, raise the inflation target. But if we go out now and start a public discussion about the inflation target, we will undoubtedly be asked why we're raising the target and what the effects of doing so are likely to be. There are answers to these questions, but the answers may well reduce our credibility precisely at a time when reasonable people regard us as the most credible and most professional of the macro policymaking institutions in the United States.

We—that is, the participants in this meeting—should not take that risk. We should not go public with any doubts that we might have about the goals of monetary policy. At the moment, we're in the middle of the process of trying to normalize monetary policy. We should always be reconsidering our policy framework, but there are times to go public and times not to do so. That is why our discussions of the target inflation rate should continue within the Federal Reserve System and within the Committee, and that is why it is fine that Eric raised the issue in yesterday's go-round, but we should not go public with that discussion.

Turning now to the monetary policy decision, yesterday's discussion, in which almost every participant said, rightly, that the key issue is whether first-quarter weakness is transitory or a signal of a longer-term weakening of growth, and this morning's announcement of the first estimate of first-quarter GDP growth make it clear that we should wait before making a decision to change the interest rate. I say that while bearing in mind an almost true maxim I once heard: "The situation is never clearer in the future. It's just unclear in a different way." [Laughter]

I support alternative B, in which the first three paragraphs do a good job of showing that we are watching the data carefully, and that the probability of a June liftoff has declined, but that June remains on the table. As weak as the incoming data have been and as threatening as the many black clouds that are out there are, it remains important to keep June as a possible liftoff date. How could it be possible? Well, we'll receive two more employment reports before the June meeting. If we see very high payroll gains in April and May and if the unemployment rate comes down to, say, 5.3 percent while the spending data firm as expected, it would be reasonable to argue for liftoff.

Some might suggest that we should wait just a little longer to be sure, since September isn't really that different from June, to perfect our communications about liftoff or to reexamine the tools we intend to use to raise the interest rate. That would mean that even in the face of very good data, the June versus September decision would be a close call. But in making that call, we need also to take into account the importance of our credibility, which would require us to act when the conditions for acting that we have set out are fulfilled.

Turning to the bigger picture, my views on when to lift off were influenced by the very helpful paper that was sent to this Committee in January by Oliver de Groot, Etienne Gagnon, and Robert Tetlow, whose results I quoted in the March FOMC meeting. In that paper, they compared the probabilities that policymakers might regret their decisions under early and late liftoff scenarios. Using random draws from historical shocks, they show that the probability that we would fall behind the curve and wish that we had tightened sooner was negligible if we go on the early side but was close to 10 percent if we wait a year longer. In contrast, the difference between the probabilities that we would need to retrace our steps if we go earlier, 10 percent, rather than later, 5 percent, was not as great.

Now, it's a very good paper, but it's not obvious where we are today relative to going early or going late. Nonetheless, all in all, I found that analysis very useful, and it helped persuade me that we should seriously be contemplating lifting off soon. It further helped convince me that "early and gradual" is a much better approach to raising the interest rate than "late and steep." Of course, in the event, we may have to raise the rate faster or slower than we anticipate, but, at this stage, we have to work with expectations.

I'd also like to relate to the argument that we're only in this relatively good position on employment and this potentially good position on inflation because the interest rate is so low, and that, therefore, we should not move anytime soon. It's undoubtedly true that the U.S. economy would not be in this relatively favorable position if the FOMC had not moved rapidly after Lehman Brothers to the zero lower bound and then undertaken three rounds of QE as well as Operation Twist. I believe history will show that the Federal Reserve—together with the decision to recapitalize the banking system, in which the Treasury and the Congress played critical roles—saved the United States from a second Great Depression. But we need to realize that, at some point, we have to put the interest rate back into action as a tool of monetary policy. In so doing, we'll not only begin to activate a more normal way of undertaking monetary policy, but we'll also be sending an extremely important signal to businesses and households that, after seven years, the American economy is ready to exit the Great Recession and begin the return to normal.

When should we do this? The answer is, we should do it when an interest rate higher than we have now is still consistent with the closing of the output gap. I believe that, on the inflation rate, the staff forecasts we heard yesterday from Bill Wascher are far less pessimistic than what I've heard around this table this morning. It's true we've got negative inflation in the

first quarter, but it's very important to note that forecasts of core PCE inflation are somewhere well above 1 percent, and that when you take the special factors into account, it's expected to rise not to 0.7 percent, but to 1.7 percent, which is very close to target.

We should also note that even the  $r^*$  in the Tealbook, Book B, is about 110 basis points above our current real federal funds rate, suggesting that a sooner liftoff would not be incompatible with further progress toward our goals if the situation improves. Or, to put the criterion in the words of alternative B, we should move when the Committee “has seen further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term.” And I expect that will happen reasonably soon.

Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Powell.

MR. POWELL. Thank you, Madam Chair. I will support alternative B. On the statement, I support taking out “at least” and changing “largely” to “partly.”

More broadly, paragraph 1 initially struck me, and continues to strike me, as fairly downbeat. But what saves it for me is this comment about how household real income is rising strongly, which I think really sets out our narrative for just how much we're counting on consumer spending and is a pretty strong statement in a context of weak spending. So, overall, it achieves a level of balance, and I'm fine with it with those changes.

In terms of forward guidance, I'll just add that I believe it's a very bad idea to surprise the market with liftoff. I would avoid calendar-based guidance. I would let the data speak. I would let the statement, the minutes, and the speeches speak. I do think the market will get it. It's very unlikely that the people in this room would be approaching a decision to lift off the interest rate, with all of the attention we're getting, and that this would be a surprise to the



market. That's incredibly unlikely. In fact, my guess is, as we approach that, it's not going to be a surprise to the market, in light of all of the transparency and all of the attention being paid.

More broadly, I think that policy is right where it's supposed to be—looking at incoming data to see whether the liftoff narrative still holds together, that narrative being reasonable growth that is strong enough to support further improvement in the labor market at a meaningful pace and inflation moving up to 2 percent in the medium term.

The sense I had at the beginning of the year was that the labor market would continue to heal fairly quickly in a context of moderate growth, and I think there's a better-than-even chance that something like that narrative will reemerge as we leave the first quarter behind, just as it did in 2014. So, as I said yesterday, I feel good about where the current Tealbook forecast is, and I consider that to be still on the same path we were on—a little bit slower, but a reasonable path.

I do have to admit I have a concern now, though, that the speed limit on U.S. growth may now be closer to 2 percent than 3 percent, because of the drag generated by the behavior of net exports, and that improvement in the labor market will also slow down as a result. Time—and data—will tell. Monetary policy can respond and really has already done so through expectations. It may limit further tightening but doesn't feel as though it can reverse the tightening in financial conditions that we have already experienced.

In the case of returning closer to the old path that had strong job growth, we're close to the natural rate. Monetary policy works with long lags. Zero isn't the right number. This remains for me a very satisfying approach if we do get back to that path, and, again, that's my modal case.

The lower path is just much tougher. We're still close to the natural rate. We're still eliminating slack, but at a much slower pace, and I think that, more important, the economy is

more vulnerable to an unwanted tightening in financial conditions and probably in a nonlinear way. I would still want to lift off, just a little bit later. But I would point out that the communication challenges and the risks are much less attractive.

I'd be very happy to see data come in that would justify liftoff in June or at any meeting subsequent to that. But, having resisted predictions so far for the most part, I'll continue to do so today. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Brainard.

MS. BRAINARD. Thank you. I support alternative B. It seems appropriate for the statement to recognize that incoming data have shown softness across a range of spending categories, in industrial production as well as in labor market conditions.

Although there is reason to believe that some of the weakness reflects transitory factors or statistical noise, my best guess is that some of it also reflects a more persistent slowing in economic momentum. In particular, the negative effects of dollar appreciation and weakness in activity abroad on net exports and business investment, as well as the negative effects of earlier oil price declines on drilling and mining, appear to be greater than expected, and the boost to consumption has not materialized.

This softness of recent data, along with the advance estimate of GDP, leads me to favor removing the bracketed “at least” language from the first sentence. I also support Governor Tarullo’s modification to the sentence on inflation. That is simply a more accurate statement.

By the same token, reflecting our uncertainty about the persistence of these effects, it is appropriate to include mention of some continuing positive economic signals, such as the relatively high level of consumer sentiment. For that reason, I support the additional words in

paragraph 2, which stress that, despite the weaker data, the Committee continues to expect the economy to expand at a moderate pace.

For those who worry that paragraph 1 is too downbeat, I would note this is significantly counterbalanced by the fact that alternative B makes few changes to paragraphs 2 and 3 of the March statement, including importantly reiterating that the risks to the outlook and the labor market are nearly balanced rather than emphasizing downside risks in light of recent data.

In my view, the incoming data, on balance, do not suggest we're appreciably closer to our two conditions for liftoff. The incoming data on the labor market do not provide evidence of further improvement. If anything, the softer tone of the aggregate spending data raises the possibility that labor market improvement may stall this year. My reading of the data on unemployment, labor force participation, and the number of employees working part time for economic reasons is that slack remains. Nonetheless, we'll have two additional labor market readings to help with our assessment before the June FOMC deliberations.

Meanwhile, the modest improvement we've seen in putting a floor under inflation falls short of our standard of reasonable confidence. We've seen some encouraging movement in core CPI, although core PCE remains persistently soft relative to our 2 percent target. The recent firming of oil prices and the recent plateauing in dollar appreciation raise the possibility that we might be seeing an inflection point, but further appreciation seems likely, accelerating wage growth has yet to materialize, and market-based measures of inflation expectations remain soft, although they've shown some improvement as the price of oil has firmed.

It's possible that the data we will receive in the coming months will reveal the weakness in the data to have been a temporary aberration, and that momentum in underlying activity is undiminished. It could also be that incoming data and economic developments abroad will show

foreign activity to be on more stable footing than now appears to be the case. If so and if price inflation and measures of inflation expectations show further signs of firming, then liftoff could be appropriate. On balance, my assessment is that, although June should remain on the table, the probability of liftoff has shifted from June to later in the year. Thanks.

CHAIR YELLEN. Thank you. Vice Chairman.

VICE CHAIRMAN DUDLEY. Thank you. I support alternative B. Given the slowdown in growth, the weaker payroll trend, and a host of other weak economic data, I think it's unlikely, speaking for myself, that I'm going to see sufficient news in the next seven weeks that'll cause me to want to lift off at the June FOMC meeting. That said, I wouldn't rule it out completely, because, as Governor Fischer makes clear, it's possible that we could see two strong employment reports and a big upturn in economic activity. So we could get there. I just don't think that's very likely at this point.

I hope the economy is going to cooperate and is going to make a September liftoff feasible, but I don't even really have that much confidence about that, either. The Tealbook forecast is actually interesting now in the sense of how flat the unemployment rate trajectory is. So modest shortfalls in growth could actually cause the unemployment rate trajectory to be completely flat or even tick up. In that case, we might not find ourselves yet able to pass the "further improvement in the labor market" test.

I think that "further improvement in the labor market" and "reasonably confident [about] inflation" are really good tests, and I feel very comfortable using those when speaking about my own views in terms of the timing of liftoff. We should talk about that in speeches and make those our criteria, and that will help the market participants think along with us.

In terms of language, I'm with everyone else. I would delete "at least." I'm not that confident that it's all due to transitory factors, so I think "at least" goes a little too far.

With respect to President Mester's suggestion to change the sentence about consumption, I believe the meaning is the same.

MS. MESTER. The meaning is the same.

VICE CHAIRMAN DUDLEY. Given that the meaning is the same, I guess I prefer to go with the more parsimonious number of words—a more direct approach. So I think I prefer what we have.

MS. MESTER. I think second derivatives are harder to understand.

VICE CHAIRMAN DUDLEY. In terms of Governor Tarullo's "partly" versus "largely," I think you really could go either way. You think about the gap between our target of 2 percent for inflation and where we are. My judgment would be that about two-thirds of that gap is due to lower energy prices and the stronger dollar, so about one-third is due to other things. You could call that "largely" if you wanted to, or you could call that "partly." It's really what the Committee wants to communicate in terms of how concerned they are about inflation being low that should drive whether you want to be "largely" or "partly." I would slightly favor "partly" because I'm not as concerned about inflation today as I was six weeks ago, but I'm happy to accept the judgment of the Committee.

With respect to the statement, I'm really glad that we're now in a data-dependent place, and I don't feel bad about that in the slightest. The market should be able to think along with us as they see the data, as long as they can interpret them through the prism of labor market improvement and whether we are becoming reasonably confident about the inflation outlook over the medium term. If the market starts to diverge from what our expectations are, there are

plenty of forums in which to remind people of what the data mean to us in terms of those two criteria. I think we can easily pull the market back.

Lastly, Chair Yellen opened the meeting by recognizing Chris Cummings, so I want to close my remarks similarly. I want to acknowledge Chris's service to the New York Fed, the Federal Reserve System, and this Committee. On several occasions during the crisis, Chris was forced to sit in this chair and provide the New York Fed's views on monetary policy, and she did that very ably. We hope that will never have to happen again.

In terms of Chris's contributions to the System, they're very large. She's been a great colleague to me and to many others throughout the Federal Reserve System. I've heard many people comment to me over the past few days and weeks about how much they're going to miss her and how important she's been in contributing to the Federal Reserve System writ large, as opposed to just the New York Fed. She embodies, in my mind, the modern central banker in that she has a very deep and broad portfolio, ranging from serving as product director for the Wholesale Product Office to chairing the Financial Stability Board's Cross-Border Crisis Management Group. That's a pretty wide span of responsibilities.

I want to thank her personally for her wise counsel and support during my tenure. And, of course, I wish you the best in all of your future endeavors. [Applause]

CHAIR YELLEN. Okay. Thanks, everybody. First of all, let me acknowledge that I heard the support for a Committee discussion about  $r^*$  and the factors influencing it, and I also think that's a good idea. We'll work with Thomas and others to see if we can put that together. It's a great idea.

I heard, in general, broad-based support for alternative B for today, and we have a few language issues to review. First, starting at the top of paragraph 1, we have the bracketed "at

least,” and I actually heard a large number of people who suggested we not include the bracketed “at least.” Let me give anybody who wants it in there an opportunity to say so. President Lacker, I heard you support putting it in there, but are there others? [No response]

CHAIR YELLEN. Okay. Then I will—

MR. LACKER. I could support deleting it.

CHAIR YELLEN. Okay. Great. So we will remove the bracketed “at least.” The next change suggested was President Mester’s recommended change in the language about household spending. Just to remind you, she suggested changing the words “Growth in household spending declined” to “Household spending continued to grow, although at a slower pace.” I heard a little bit of support, not a great deal, and a couple of people were opposed. Let me just ask—I think I heard two supporters in addition to President Mester. Is there widespread support for that change? If so, please indicate if you support that change.

MR. FISCHER. I do.

PARTICIPANT. I support the change.

CHAIR YELLEN. Okay. I see three people who are supportive. And how many are opposed? [Show of hands] Okay. I’m going to—

VICE CHAIRMAN DUDLEY. Chair’s prerogative.

CHAIR YELLEN. Chair’s prerogative. I think leaving it as is, rather than going with the suggestion, is, frankly, my own preference.

Finally, we have Governor Tarullo’s suggested change. That would be in the “inflation” sentence, the next-to-last sentence in paragraph 1, and the suggestion is to change “largely reflecting” to “partly reflecting.” I did hear quite a bit of support for that. Personally, I’m also

open to making that change, but let me see what people think who didn't weigh in on that. How many people would—President Evans.

MR. EVANS. Could I ask a clarifying question?

CHAIR YELLEN. Yes, sure.

MR. EVANS. Vice Chairman Dudley, you mentioned two-thirds of—

VICE CHAIRMAN DUDLEY. That would be my characterization.

MR. EVANS. Was that of headline inflation or core?

VICE CHAIRMAN DUDLEY. Headline is zero. Core is running about 1.3-ish on a year-over-year basis.

MR. EVANS. So you're saying two-thirds of the low headline inflation.

VICE CHAIRMAN DUDLEY. Yes, exactly.

MR. EVANS. Yes. That's fair. I agree.

VICE CHAIRMAN DUDLEY. It refers to inflation. It doesn't refer to core inflation. I think you can argue it either way, frankly.

CHAIR YELLEN. Inflation is running about  $\frac{1}{4}$  percent. Core is running about 1.4 or something like that.

VICE CHAIRMAN DUDLEY. Yes. So about two-thirds of the gap is in these transitory factors, and about one-third is—

MR. EVANS. When I say inflation, I'm thinking underlying inflation—something closer to core—so that's why I believe “partly” is important. But you're right. If this was nailed down and it said headline inflation, that would be okay. At any rate, I support Governor Tarullo's recommendation.



CHAIR YELLEN. Okay. Let me see support for Governor Tarullo’s suggestion. [Show of hands] I see broad-based support. Is there anyone who feels strongly opposed? Okay. So let us also make that change. We will change the word “largely” to “partly.” And those are all of the suggestions that we need to review, so I think we’re ready, Matt.

MR. LUECKE. The vote will be on alternative B as depicted on pages 7 and 8 of Thomas’s handout, with the changes of taking out the words “at least” in the first sentence and replacing “largely” with “partly” in the penultimate sentence in paragraph 1. It will also cover the directive on page 12 of Thomas’s handout.

Chair Yellen	Yes
Vice Chairman Dudley	Yes
Governor Brainard	Yes
President Evans	Yes
Governor Fischer	Yes
President Lacker	Yes
President Lockhart	Yes
Governor Powell	Yes
Governor Tarullo	Yes
President Williams	Yes

CHAIR YELLEN. Thank you.

VICE CHAIRMAN DUDLEY. You should have your gavel. [Laughter]

CHAIR YELLEN. Okay. We need to confirm the date of the next meeting, which is Tuesday and Wednesday, June 16 and 17. Thanks, everybody, for your participation. The meeting is adjourned.

END OF MEETING