Meeting of the Federal Open Market Committee on
April 29–30, 2014

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 29, 2014, at 10:30 a.m. and continued on Wednesday, April 30, 2014, at 9:00 a.m. Those present were the following:

Janet L. Yellen, Chair
William C. Dudley, Vice Chairman
Richard W. Fisher
Narayana Kocherlakota
Sandra Pianalto
Charles I. Plosser
Jerome H. Powell
Jeremy C. Stein
Daniel K. Tarullo

Charles L. Evans, Jeffrey M. Lacker, Dennis P. Lockhart, and John C. Williams, Alternate Members of the Federal Open Market Committee

James Bullard, Esther L. George, and Eric Rosengren, Presidents of the Federal Reserve Banks of St. Louis, Kansas City, and Boston, respectively

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

James A. Clouse, Thomas A. Connors,[1] Evan F. Koenig, Thomas Laubach, Michael P. Leahy, Loretta J. Mester, Samuel Schulhofer-Wohl, Mark E. Schweitzer, and William Wascher, Associate Economists

Simon Potter, Manager, System Open Market Account

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

Robert deV. Frierson,[2] Secretary of the Board, Office of the Secretary, Board of Governors

[1] Attended Wednesday's session only.
[2] Attended the discussion of monetary policy normalization.

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

Matthew J. Eichner, Deputy Director, Division of Research and Statistics, Board of Governors; Stephen A. Meyer and William Nelson, Deputy Directors, Division of Monetary Affairs, Board of Governors

Jon W. Faust, Special Adviser 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,[3] Assistant to the Board, Office of Board Members, Board of Governors

Ellen E. Meade and Joyce K. Zickler, Senior Advisers, Division of Monetary Affairs, Board of Governors

David Bowman[4] and Beth Anne Wilson, Associate Directors, Division of International Finance, Board of Governors; Daniel M. Covitz, David E. Lebow, and Michael G. Palumbo, Associate Directors, Division of Research and Statistics, Board of Governors; Fabio M. Natalucci[2] and Gretchen C. Weinbach,[2] Associate Directors, Division of Monetary Affairs, Board of Governors

Marnie Gillis DeBoer[2] and Jane E. Ihrig,[2] Deputy Associate Directors, Division of Monetary Affairs, Board of Governors

Brian J. Gross,[1] Special Assistant to the Board, Office of Board Members, Board of Governors

Stacey Tevlin, Assistant Director, Division of Research and Statistics, Board of Governors

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

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

[1] Attended Wednesday's session only.
[2] Attended the discussion of monetary policy normalization.
[3] Attended Tuesday's session only.
[4] Attended Tuesday's session following the discussion of monetary policy normalization.

Patrick McCabe,[2] Senior Economist, Division of Research and Statistics, Board of Governors

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

Randall A. Williams, Records Project Manager, Division of Monetary Affairs, Board of Governors

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

David Altig, James J. McAndrews, and Alberto G. Musalem, Executive Vice Presidents, Federal Reserve Banks of Atlanta, New York, and New York, respectively

Joshua L. Frost and Spencer Krane, Senior Vice Presidents, Federal Reserve Banks of New York and Chicago, respectively

George A. Kahn, Antoine Martin, Joe Peek, Keith Sill, Daniel L. Thornton, and Douglas Tillett, Vice Presidents, Federal Reserve Banks of Kansas City, New York, Boston, Philadelphia, St. Louis, and Chicago, respectively

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

John Fernald, Senior Research Adviser, Federal Reserve Bank of San Francisco

Sean Savage, Senior Associate, Federal Reserve Bank of New York

[2] Attended the discussion of monetary policy normalization.

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April 29 Session

CHAIR YELLEN. Good morning, everybody. Unfortunately, this is the last FOMC meeting for both President Pianalto and Governor Stein. I think you know that tonight we will have a joint farewell reception and dinner for our colleagues, as well as for former governor Sarah Bloom Raskin. But I would like to take this opportunity to thank them here as well.

Sandy began attending FOMC meetings in 1993 as a first vice president of the Federal Reserve Bank of Cleveland and then started attending as president of the Bank in the relative calm of 2003. [Laughter] All in all, she has attended 101 FOMC meetings, which is more than any other currently serving president. Sandy has always been a voice of reason, and her contributions have been much appreciated, particularly during some of the darkest days of the financial crisis.

Jeremy is one of our newest colleagues. He joined the Committee in June 2012 and has attended 16 meetings. During his time here, Jeremy has had to grapple with how to set policy in an economy that is still recovering from the crisis, and he has made very important intellectual contributions to the work of the Board and of the FOMC.

Both Sandy and Jeremy have been wonderful colleagues. Sandy and Jeremy, thank you both for your service. I want you to know you will be greatly missed, and we will have more words to say this evening. [Applause]

Bill, do you want to introduce your colleague?

VICE CHAIRMAN DUDLEY. Yes. I want to introduce Antoine Martin, who is at the table, from the research department in New York. Welcome, Antoine.

CHAIR YELLEN. Okay. And now let's turn to our first topic, which is monetary policy normalization. Let me say that this discussion will take place as a joint meeting of the FOMC and the Board. And with respect to our Board meeting, I will need a motion to close the meeting.

MR. TARULLO. So moved.

CHAIR YELLEN. Thank you. Without objection.

I would like to start off our session this morning with a few remarks on the objectives and timetable for our work on monetary policy normalization. Before doing so, though, I want to give special thanks to the staff for all their hard work on these complicated issues and for the excellent set of memos that they prepared for this meeting.

Let me begin by saying I am completely convinced that we have the tools to adjust the stance of policy as needed to meet our macroeconomic objectives. So this discussion is about how to deploy our mix of tools to attain these objectives most effectively in a way that balances other considerations appropriately. As the briefing materials make clear, however, there is quite a mix of subtle and intertwined issues to take into account, involving market functioning, the scope of our activities in the nonbank sector, communications, financial stability, and possible implications of our current choices for our longer-run operating procedure. I don't want to get into the substance of these issues at this point. I just want to make a few overarching comments that may serve to frame our discussion.

If the recovery proceeds broadly as we expect, we will likely begin to raise interest rates sometime next year. I believe it is important that we communicate our normalization plans to the public well before that time. I would see the press conference after the September meeting as potentially providing a good opportunity to lay out for the public some of our thinking on these

matters. If you agree with this timetable, we will need to make substantial progress in nailing down our approach over the course of this meeting and, then, the June and July meetings. There are difficult issues here, which we need to work through collectively, before we can be confident that we are ready to manage the normalization process and convey that confidence to the public. So I think a concentrated effort will surely be required to make the necessary progress by September.

Of course—and fortunately—we are not starting from scratch. Our deliberations will build on our earlier discussions of normalization and draw on the results from the ongoing testing of our tools. One lesson from our earlier efforts at spelling out our exit strategy, which is a topic we discussed at length in our meeting just a year ago, is that what may seem perfectly sensible *ex ante* may end up seeming much less attractive as conditions change in unforeseen ways. I think we need to accept the reality that we cannot know exactly what kind of market conditions and considerations we will face when the time comes to begin raising rates. And we cannot know with precision how well any particular strategy will work. So, while I don't want to prejudge any decisions on specific issues, I believe it is important that we create a framework in which we can deploy our mix of tools relatively flexibly to deal with contingencies that may arise.

But it is equally important that we agree on a framework that we can explain simply and clearly, so as to convincingly convey our confidence that we can adjust the stance of policy as appropriate to promote our macroeconomic objectives. I think we should also provide clarity, to the extent possible, about the mechanics of our approach in order to ease the transition for market participants, particularly in those markets in which we may be acting in new ways. And I think our success will depend in part on our communication strategy.

I want to end by encouraging everyone to be open to the range of possibilities before us and to keep in mind our overarching goals. Despite the timetable I indicated, there is no need to reach firm conclusions at this meeting. My hope is that over the course of today's discussion we can begin to locate, and then refine, our sense of common ground—that we can share frankly our individual perspectives and reservations, and, more pragmatically, perhaps, we can rule out at least some alternatives in order to narrow the field of our future decisionmaking. We have asked you to weigh in on a number of different questions to provide some preliminary feel for where common ground may lie. But at this stage, your answers to some of the questions may be that you just don't know and are open to different possibilities, and that is a perfectly fine answer.

We have a lot of time for today's discussion, so I hope you will use the Q&A period after the staff presentations to make comments and ask questions that will clarify for all of us some of the difficult issues involved in these choices and help us explore more fully how the available tools are likely to work in practice. As you all know, "two-handed" interventions are always welcome at FOMC meetings, but I would say especially so today. I would like to encourage active back-and-forth discussions with the staff and with one another as we explore the main issues. Of course, we do also want to have a go-round to hear at least your preliminary views and concerns.

So with that, what I'd like to do is turn the floor over to the staff for a set of presentations. Jane Ihrig is going to give the first portion of those presentations.

> MS. IHRIG.[1] Thank you, Madam Chair. I will be referring to the handout titled "Material for Briefing on the Monetary Policy Normalization." In our briefing today, we will review some key points from the memos on normalization that you received over the intermeeting period. The first exhibit summarizes information from the memo that outlined near-term approaches for conducting policy with a large balance sheet. As noted in the top-left panel, the Committee has a number of tools to use to

[1] The materials used by Ms. Ihrig, Messrs. Frost, Natalucci, and Martin are appended to this transcript (appendix 1).

raise rates. Increasing interest on excess reserves will likely, by itself, raise short-term rates, but these rates could potentially not increase one-for-one and could vary relative to IOER rate over time. The Committee has at its disposal several tools that could be used in various combinations to improve control over the level of short-term rates, including overnight repurchase agreements (which I'll refer to as ON RRPs), term RRPs, and term deposits.

As noted to the right, the memo considers five options for implementing normalization. Of course, the Committee is not constrained to choose a single option; it could choose a mix of options or adapt its policy approach over time, observing the effects of its policies and making adjustments along the way.

The key features of the five options presented in the memo are summarized in the middle panel. The first three options would combine IOER with a full-allotment ON RRP facility and would not use term draining tools. The ON RRP facility would likely help to set a floor under overnight rates, as investors with access to the facility rate would not have an incentive to lend to any counterparty below this rate. I should note at the outset that the Committee might want to impose limits on the allotment of its ON RRP facility in order to support financial stability; such limits could be used in any of the options.

In option 1, the ON RRP rate is set equal to the IOER rate, and these rates would be the center of policy communication. The next two options are similar to option 1, but with the ON RRP rate set below the IOER rate. In option 2, the spread would be small, with the Committee targeting an administered rate or possibly an alternative overnight market rate, such as the ON GC repo rate. In option 3, the spread between the ON RRP rate and the IOER rate would be larger, and the ON RRP rate would be adjusted to move the federal funds rate to the desired target rate or range set by the Committee. The spread between the ON RRP rate and the IOER rate is larger in option 3 than in option 2 in order to maintain incentives for the federal funds trading that we currently see.

Option 4 also uses IOER but introduces term draining tools along with an ON RRP facility. Here the ON RRP rate is set well below the IOER rate, to support trading in the funds market. Term draining operations would be used as necessary to hit the target funds rate or range.

Option 5 is the approach envisioned by the Committee a few years ago, prior to the introduction of the ON RRP exercise. Here IOER would be supplemented only with term draining tools to tighten the relationship between the IOER rate and market rates.

In options 4 and 5, the quantity of reserves needed to be drained would be uncertain and would depend on the level of the federal funds rate target chosen and the desired spread between the IOER rate and federal funds rate. It is possible that policymakers would judge the relationship between the IOER rate and the federal funds rate to be sufficiently stable after relatively little draining of reserves.

Alternatively, if a very large amount of reserves needed to be drained, the Federal Reserve might have to build a large book of term deposits and term RRPs.

The bottom panel lists six key policy issues that you may want to consider as you evaluate these alternative approaches. First, you may want to evaluate how the options differ in terms of their control of short-term interest rates. By increasing the IOER rate, all options can likely move market rates higher, but the degree of control is uncertain. The ON RRP exercise suggests that such a facility is likely to help set a firmer floor on market rates. Option 1, with the ON RRP rate set to the IOER rate, would likely result in the most control, because other short-term money market rates would probably trade at or slightly above these two administered rates. The other options, in which the ON RRP rate is set below the IOER rate, may see market rates trade between the two administered rates. Of course, use of the term tools, as under options 4 or 5, could help to improve control as well, though the extent of the required operations is uncertain.

Second, you may want to evaluate how efficient the options are in conducting monetary policy. It is difficult to determine each option's full range of effects on financial markets and financial intermediation. That said, if you prefer to have interest rates on similar assets set at similar levels, then you may prefer a relatively narrow spread between the IOER rate and other overnight administered and market rates, as in options 1 or 2. You may also want to take account of the effects of the different options on the level of reserve balances and the efficiency of financial intermediation.

Third, you will need to decide whether you want to have an active federal funds market, so you can continue to target the federal funds rate. In options that include no spread or a fairly narrow spread between the IOER and ON RRP rates, such as options 1 and 2, trading in the federal funds market would likely decline to a level that may lead the federal funds effective rate to become less tightly connected to other money market rates. Josh will talk about issues related to the functioning of the funds market and possible adjustments that the Committee could make.

Fourth, you will need to consider the potential financial-stability implications of these options and particularly of the introduction of a full-allotment ON RRP facility. As Antoine and Fabio will discuss in a few minutes, there are potential financial-stability benefits and costs to having such a facility, and there are steps that could be taken to mitigate some of the costs.

Fifth, you will probably want to assess the possible implications of extending the Fed's footprint in the nonbank financial sector. In particular, ON and term RRPs would increase the Federal Reserve's direct interaction with nonbank counterparties, and possibly substantially so. There are benefits to interacting with nonbanks, such as increasing competition among money market participants for the Federal Reserve's assets, which can enhance the Fed's ability to influence the level of short-term rates. But there are costs that must also be weighed, including the "optics" of relying heavily on GSEs and money funds to conduct policy. In practice, the extent of the

Federal Reserve's interaction with such counterparties would be influenced by the relative setting of the administered rates and any quantity limits associated with the operations.

Sixth, you should be aware of the potential consequences—both financial and political—associated with how these options would affect the Federal Reserve's interest expense and, hence, its remittances to the Treasury. Such effects would depend on take-up and the effect on market rates. It seems likely that term tools, with their relatively high rates, would be more costly than overnight tools, but of course it would depend on the volume of reserves drained. An option in which the ON RRP rate is set near the IOER rate would likely be the least costly option, because market rates would likely be closest to the IOER rate in that case.

Finally, I would note that one of the memos laid out options for additional testing of your tools. The specific plan for near-term testing of term deposits includes eight consecutive, weekly, seven-day term deposit operations starting in mid-May. The first four operations envisioned would incrementally raise the maximum individual award amount from the current $1.25 billion to $10 billion, with offering rates maintained at 1 basis point above the IOER rate. The subsequent four operations would gradually increase the rate paid on term deposits to a maximum of 5 basis points above the IOER rate. We would be interested in your views on this and other testing that you might find helpful as you consider these issues. Josh will continue the presentation with the materials shown in your second exhibit.

MR. FROST. Thank you, Jane. As outlined in the upper-left panel of exhibit 2, my portion of the briefing will start with a discussion of the current state of the federal funds market and briefly note how the effective federal funds rate is constructed each day and how it is used in financial markets. Then I will turn to a discussion of some of the contractual issues that could arise if the publication of the federal funds rate unexpectedly changed or ceased and highlight some of the risks that this may introduce. I will then discuss several options for preventing or mitigating the impact of these risks, including the possible consideration of alternative policy rates. I will conclude with a brief review of possible alternative target rates.

First, regarding the state of the federal funds market, prior to 2008, trading activity in the fed funds market was relatively robust, with about $200 billion in trades each day across the entire fed funds market, as seen in the upper-right panel. Roughly 60 percent of this activity was believed to comprise interbank borrowing and lending, with most of the remainder made up of lending by GSEs to banks. In the past few years, average daily volume has shrunk to about $60 billion, 30 percent of its pre-crisis level, with a substantial majority of the remaining activity representing one type of lending: Federal Home Loan Banks lending to foreign banking organizations.

Trading in the fed funds market is conducted in two ways: directly between holders of reserve balances or via a broker. The effective federal funds rate is constructed by the Desk each morning based on data received from four of the largest

brokers for all fed funds trades conducted through those brokers on the prior day. The effective rate is then published by the Desk.

In addition to its role in monetary policy, the effective federal funds rate appears in a number of financial products as a reference rate. Although it is much less widely used than LIBOR, the effective federal funds rate is referenced in a broad set of financial contracts and agreements, most notably fed funds futures and overnight indexed swap, or OIS, contracts. This widespread use could lead to complications if the publication of the effective federal funds rate were to unexpectedly cease or if there were a substantial change in its definition. These complications could lead to contractual disputes—most notably, claims of contract frustration. Under those conditions, the financial system could face a number of potential problems, including a reduction or elimination of liquidity and significant market uncertainty related to cash flows and valuations.

The scope of disruption is uncertain. For example, a change in the methodology or definition of the effective federal funds rate could create problems for existing contracts if the rate published by the Federal Reserve ceased to be viewed as consistent with the spirit of the effective fed funds rate. The relevant contract law doctrines are complex and their application is fact specific and uncertain, and so it is difficult to state the precise conditions under which changes in methodology or definition could lead to claims of contract frustration. However, on the basis of the limited set of contracts reviewed, the staff believes that the burden on a party seeking judicial modification or termination of its contract on such grounds would be high.

Broadly speaking, there are three developments, outlined in the middle-left panel, that could reduce the already limited volume in the federal funds market, possibly increasing the likelihood of encountering the issues that I have mentioned. First, regulatory changes could make banks less willing to borrow in the federal funds market in order to earn the IOER rate. For example, changes in regulations associated with Basel III could lead internationally active banks to find federal funds arbitrage trades unprofitable and, therefore, reduce these transactions. The second possibility is that the Federal Home Loan Banks could decide for a number of reasons to limit or even stop their lending in the federal funds market. Because nearly 90 percent of the brokered fed funds market is made up of FHLBs lending to foreign banks, such a decision could greatly reduce the volume of trading. Third, policies adopted during normalization could limit the federal funds activity that we currently see. For example, offering overnight reverse repos to a broad set of counterparties at rates near IOER, as is the case in some of the options that Jane highlighted, could further reduce fed funds trading volumes and lead the effective federal funds rate to become more volatile and less tightly connected to other money market rates.

There are several possible policy responses to these concerns, outlined in the middle-right panel. Policymakers could focus on near-term monetary policy frameworks that would not reduce the incentives for the federal funds trading that we currently see. Generally speaking, these frameworks contemplate the use of an overnight reverse repo facility at a relatively wide spread in relation to IOER or no

use of overnight reverse repo at all. Alternatively, the Committee could change the target rate it uses to communicate policy. There are a number of possibilities in this regard, as outlined in the lower-left panel. First, the Federal Reserve could publish and use as a target a broader measure of overnight bank funding costs that would include both fed funds and Eurodollar transactions. Such a rate would likely be more robust during normalization because Eurodollars trade in a larger market, as seen in the lower-right panel, with a broader range of participants.

Second, the Committee could choose to target a secured overnight rate, such as the rate on overnight Treasury general collateral repo. This market is substantially larger than either the federal funds or the Eurodollar market and has a broader range of participants. The Treasury repo rate is somewhat more sensitive to flight-to-quality flows than other money market rates, so if this rate were to become the policy target and the target were not reduced in the face of a flight-to-quality shock, it is possible that other money market rates could face greater upward pressure.

A third option would involve targeting a broad set of short-term interest rates. The target might be specified as a range or a weighted average, or it could be left undefined. An attractive feature of such a target is that it would encompass a broad range of markets and participants. It might therefore be an attractive alternative, as it would provide some flexibility around how tightly any one interest rate should move in response to a change in the target.

Finally, the Committee could consider adopting an administered rate as its policy rate. This could include, for example, the IOER rate or the rate on a standing overnight reverse repo facility. A key benefit of an administered rate would be that policymakers could control it with certainty, which could be helpful in cases in which it may be operationally complex or otherwise difficult to keep a selected market rate close to the desired target. If policymakers were willing to tolerate some deviation between the administered policy rate and market rates, using an administered rate as a target could provide more flexibility during normalization, while still providing clarity on the stance of policy. Administered rates are used by other central banks, such as the Bank of England and the ECB.

With that, I'd like to turn to Fabio for a discussion of some of the financial-stability implications of a fixed-rate, full-allotment overnight reverse repo facility.

MR. NATALUCCI. Thank you, Josh. In our remarks, Antoine and I will focus on the potential financial-stability implications of a standing fixed-rate, full-allotment ON RRP facility. As indicated in the top-left panel of exhibit 3, there are potential financial-stability benefits and costs to having such a facility. The provision of a new, risk-free liquid asset, possibly in very large quantities, could support financial stability by crowding out private, seemingly safe "money-like" liabilities created by financial and nonfinancial firms. During crises, however, rapid take-up at the ON RRP facility could magnify flight-to-quality flows and contribute to a rapid decline in the availability of short-term funding for a range of private firms.

As noted to the right, three recent episodes of widespread flights to quality—September 2008 and the debt-ceiling standoffs of July–August 2011 and October 2013—provide a useful illustration of the dynamics that may threaten financial stability and how an ON RRP facility might affect such flows.

During these episodes, investors ran from short-term vehicles that embedded liquidity and credit risk, although the timing and severity of runs on individual instruments varied considerably. For example, in the week of September 15–19, 2008, investors redeemed $310 billion, on net, from prime MMFs, while during the debt-ceiling standoffs in 2011 and 2013 run dynamics occurred, but on a more modest scale.

Safe-haven inflows were also quite large during these episodes, although destinations—which can include Treasury bills, government MMFs, and bank liquid deposits—varied. For example, government-only MMF assets and liquid deposits together increased about $300 billion in one week in September 2008. During the debt-ceiling episodes of 2011 and 2013, investors shunned some government securities and banks attracted large inflows.

As indicated in the bottom-left panel, the introduction of a standing ON RRP facility could amplify some of these flight-to-quality dynamics and alter the destinations of safe-haven flows. Cash that would have moved quickly into liquid deposits—particularly at custodian banks—could go instead into the ON RRP facility—for example, through MMFs that invest in ON RRPs. The sources of flight-to-quality flows, such as prime MMFs, could experience larger outflows than in past episodes, and the availability of short-term funding for broker–dealer and nonfinancial firms through instruments like repo and CP could decline more quickly. Moreover, it is possible that *additional* flight-to-quality flows might occur because of the creation of a perfectly elastically supplied risk-free asset. Some potential mechanisms for such flows include greater portfolio reallocations by MMF counterparties to the ON RRP facility, larger investor shifts from prime MMFs to government MMFs that hold ON RRPs, and larger inflows to these government MMFs or directly to the ON RRP facility from other sources, including from investors abroad. As discussed in the staff memo, such flows could potentially be very large.

The financial-stability implications of potentially altered flight-to-safety flows would depend in large part on the institutions and firms that lose short-term funding as investors shift to ON RRPs. For example, on average in the first quarter, MMF counterparties provided over $500 billion in private financing that matures within a week, primarily to large banks and their subsidiaries (such as broker–dealers). In addition, the redirection of cash that might have gone into liquid deposits in the past may have financial-stability implications, as the banks that received such cash would have had a broader range of options for reinvesting it than MMFs. Antoine will now examine some facility design features that might mitigate run risks.

MR. MARTIN. Thanks, Fabio. In the spirit of the discussion about funding flows, I will consider in my remarks the consequences of having an ON RRP facility once a run is under way. First, it is worth noting that central bank intermediation of money markets in times of acute stress, when investors are particularly risk-averse, may be desirable. But the question is whether the adjustments could be too large or occur too rapidly, and so be disruptive.

In the remainder of my presentation, I will discuss options to reduce the risk that an ON RRP facility could contribute to liquidity dislocations; specifically, lowering the interest rate offered at the facility and maintaining caps on the facility, or both.

As noted in the bottom-right panel, lowering the rate at the ON RRP facility in times of crisis would make it a less attractive option, as long as market participants remain somewhat rate sensitive. But it may not be reliable enough as a standalone tool. Lowering the rate preemptively would be difficult and could send a negative signal to market participants and unintentionally trigger a run. Waiting until after a surge of investment at the facility has been observed could mean that lowering the rate happens too late.

Instead, imposing permanent but adjustable caps on the facility usage, designed to rarely bind in normal times, could address the financial-stability risk effectively. The caps could be set for each investor, as is the case today, or at some aggregate amount. The cap could also be rigid, so that no investment is allowed above the cap, or flexible, with some investment allowed above the cap, but at a lower interest rate. The appropriate design would presumably depend on an assessment of the possible risks.

Let me start by discussing individual versus aggregate caps. For individual caps, all counterparties could have the same fixed limit on the amount they can invest. For example, today all counterparties can invest up to $10 billion, but no more. Or each counterparty could have its own individual limit—for example, based on historical usage of the program by the counterparty. One could consider average take-up over a recent period multiplied by, say, 1.5. A counterparty that has invested $6 billion, on average, in the past would, thus, have a cap of $9 billion. The main benefit of individual caps is that counterparties know exactly how much they can invest. In contrast, an aggregate cap would specify the maximum amount of total investment. For example, it could specify that total take-up at the facility cannot exceed $200 billion. In the rare instances in which the sum of the bids exceeds the cap, the bids would have to be rationed in some manner. The main benefit of an aggregate cap is that it would likely be tighter than the sum of individual caps.

Let me turn now to rigid versus flexible caps. A rigid cap could not be breached, as is the case today. A counterparty cannot invest more than $10 billion at the facility. A flexible cap could allow some investment above the cap but at a lower rate—conceivably, at a negative rate. For example, a counterparty could be allowed to invest more than $10 billion, but each dollar above that amount would earn 15 basis points less than the current rate of 5 basis points, or negative 10 basis points.

An aggregate flexible cap would work along the same lines. In all cases, the cap could be adjusted over time.

What is the best design for a cap? This could depend on what risk you are most concerned about. If your main concern is to have a tight cap, to limit the potential for very rapid increases in take-up, then a rigid aggregate cap may be appealing. If your main concern is allowing some flexibility for the provision of a safe asset in a crisis, then flexible individual caps may be appealing. It seems likely that a well-designed system of caps could significantly reduce the financial-stability risks posed by an ON RRP facility in a crisis.

The final page of your handout shows the discussion questions that was distributed with the cover memo for the normalization memos. You may want to address these questions in your comments during the go-round. Thank you, that completes our prepared remarks. We'd be happy to take your questions.

CHAIR YELLEN. President Rosengren.

MR. ROSENGREN. Thank you very much for a very comprehensive set of memos. It was really useful to get an idea of all of the various levers that we have. And one of the nice things is that we have lots of levers. One of the disadvantages is that, when we have so many levers that we can pull, it's a little hard to calibrate them.

The first question I had was if you could give me a sense of the magnitudes that we might expect under normal circumstances. If we were to raise the IOER rate to 50 basis points, I would be curious what you thought we would have as a take-up of the reverse repo facility for option 1, option 2, and option 3. I know it's a very rough estimate. I know there are a lot of things we still have to learn. But I don't really have a very good sense of magnitudes at this point, so getting a better sense of that would be useful.

The follow-up to that question is, given what you think we are going to be seeing on average, what is the likely volatility—not in a situation of great duress, but just the standard kind of things that we see around the end of the year and the end of the quarter. What kind of variation do you think we would see in the reverse repo facility as well? Can you give me some idea of magnitudes? I know it's a very rough estimate.

MR. ENGLISH. Sorry, just a clarifying point. You said "raise the IOER rate to 50 basis points," and then you asked about take-up at the overnight RRP facility. What is the rate that you would anticipate on the overnight RRPs?

MR. ROSENGREN. Option 1, option 2, and option 3 left that very vague. So perhaps you can give me some sense of your thinking on option 2 and option 3. I took option 3 as maybe a spread not that different from where we are, and option 2 as being maybe 10 basis points, or something like that. But if you have a different idea of what option 2 and option 3 implied, it would be really helpful just to give me an idea of the sensitivity or the elasticity of take-up from these various options.

MR. MARTIN. One thing to say first is that the estimate is going to depend on what you think the frictions are that are keeping market rates lower than the IOER rate. For example, if you think that the reason interest rates are low is predominantly due to balance sheet costs, then lowering the spread between the IOER and overnight RRP rates means that you are going to see an increase in take-up. And it is through the increase in take-up that markets really are getting closer to the IOER rate. If you think that the main frictions are bargaining frictions or limited competition frictions, then you should be able to see a reduction in the spread between market rates and the IOER rate without necessarily seeing any increase in take-up. And different people have different views on what is happening.

Depending on which of these frictions is most important—and there might be other frictions that would have a different effect—you would have different answers. If we just increased the IOER rate and the overnight RRP rate by the same amount today, I think that it's not obvious that we would see a large increase in take-up compared with what we have seen. One thing that could make a difference is that once the system becomes permanent, market

participants could decide to change some of their relationships. And we already saw that happening in January when the exercise was extended for one year; so this could increase to some extent. And then once you reduce the spread—say, going from option 3 to option 2—and you get the overnight RRP rate to be closer to the IOER rate, I think we would expect some increase in take-up, but that really depends on what we think the frictions are. Once we have made those two rates equal, so that there is no IOER arbitrage trade anymore, it is much more difficult to estimate what the take-up is going to be. But it's likely to be large.

MR. ROSENGREN. Just to follow up, if I may—

CHAIR YELLEN. Of course.

MR. ROSENGREN. —can you give me a little bit better sense of what "large" means? I know it's a very rough estimate—

VICE CHAIRMAN DUDLEY. Relative to $3 trillion?

MR. ROSENGREN. —but relative to the size of our balance sheet, it would be interesting to get an understanding of your best guess. I know that there's a big range around this.

MR. POTTER. President Rosengren, if it was Treasuries only, I think the maximum would be $2.5 trillion, which would be very large. And that—

MR. FISHER. $2.5—

MR. POTTER. Trillion, because that's what we would have to offer. I mean, we would have to shave that just a little bit.

VICE CHAIRMAN DUDLEY. We'd have to cap it there.

MR. POTTER. Yes. We'd have to cap it there.

MR. ROSENGREN. So you would hit the caps on a regular basis.

MR. POTTER. No, that's the largest feasible amount—if we could operate with Treasury securities-only, subject to some other considerations.

MR. ROSENGREN. I can understand that's the maximum. But under option 1, what is your best guess on average?

MR. POTTER. Well, we did $180 billion yesterday. That was a rather large take-up outside of quarter-end. My guess is, then, some of the banks are modeling this. You would be looking at somewhere from $750 billion to $1 trillion as the minimum amount of usage at the equal rate—this is at the start—depending on which is the most important, the balance sheet cost or the competitive aspect. If it's true that the foreign banking organizations just need a spread of 5 basis points, then you'd be at the lower end, I think, of that take-up. If they need a spread of 10 to 15 basis points, then the balance sheet cost would hit, as Antoine was saying, and you'd see larger take-up.

VICE CHAIRMAN DUDLEY. So the answer is we don't really know.

MR. POTTER. We know one thing—that the longer it's been there, even though it's in a testing phase, the more usage there is as people get more used to using it. And it's clear that usage has been quite high over the past week relative to the usual dynamics, we'd argue, which would be quarter-end. I was personally surprised that it was $180 billion yesterday. There are reasons why it was that high. The thing that we don't know is, if we move the rate up, how quickly we would see a large take-up. Right now it's not really taking flows out of the banks, and what the banks are trying to understand is what those flows would look like, as Antoine was saying.

MS. IHRIG. Can I add something? You asked about options 1, 2, and 3. So in option 1, the IOER rate and the overnight RRP rate are equal. In options 2 and 3—especially 3, in which

you could have the federal funds market—then you have to think hard about not only the IOER rate and the overnight RRP rate, but also the federal funds rate because, as Simon said, foreign banks are the ones that are arbitraging the fed funds market with the money funds who may be using the overnight RRP rate. So it actually does get somewhat complicated when we try to think of how much the take-up is going to be—because there are a lot of different rates, a lot of moving parts in there. In option 3, it's not just those two administrative rates you asked about, but there would also be other market rates that are going to help determine the take-up.

CHAIR YELLEN. President Bullard has a two-hander.

MR. BULLARD. Thank you, Madam Chair. Just to follow up on this a little bit, give me the pros and cons of the case in which you would pick option 1. You'd set the repo rate equal to the IOER rate. Take-up is unpredictable, as you just discussed, but you put a cap on at some fairly large size that the Committee is comfortable with. Is there anything wrong with that case, or are there good and bad aspects of that case?

MR. MARTIN. To the extent that we think that banks are really facing balance sheet costs and that you put a cap in so that these balance sheet costs don't get eliminated, then you have different costs that different financial institutions are facing, and you would imagine that banks are going to take some kind of evasive actions in order to reduce those costs or in order to be more competitive. And so you're likely not to have a level playing field, and I think we would be concerned about that. So to the extent that you think that different kinds of institutions are facing different costs, I think we would like to not disadvantage banks in a way that would create potentially very large inequities.

MR. BULLARD. You'd be mitigating their situation, but by putting a cap on, you wouldn't be fully mitigating it. It would be fully mitigated if you let the take-up be full.

MR. MARTIN. That's right, yes. In addition there are some costs—for example, the FDIC assessment fee—that would remain present and the banks would have to pay, but that the extended set of counterparties would not necessarily have to.

MR. BULLARD. But still the Committee could make a judgment that there's a limit on how much of this we want to do, and some inefficiencies are going to be left in the market, and that's the way it's going to be.

MR. MARTIN. That's exactly right.

MR. ENGLISH. If I could follow up for a moment, I think there are two issues that the Committee would have to trade off in that case. One is that if the rate on the overnight RRPs were the same as the IOER rate, for the reason of the FDIC premium costs and other costs the banks face, you might end up with a whole lot of overnight RRPs and not a lot of reserves. If you put a cap on, then you'd have to ration who gets the overnight RRPs and who doesn't because the rate would be at a level that would lead to extra demand for the overnight RRPs.

The other factor that you'd have to think about is that if you set a high cap—if you had a whole lot of overnight RRPs—you'd be doing a whole lot of transacting and a whole lot of your policy implementation through the nonbank part of the financial sector. I think some parts of the Committee might be unhappy with that—operating so much with money funds and with GSEs, and not operating in the traditional arena, which is the banking sector.

CHAIR YELLEN. Two-hander?

MR. STEIN. Actually, it's a direct follow-up to this, if I might. On this issue of discomfort with or aversion to doing too much quantity with the nonbank sector, with the money fund sector—I understand it, and I think it's more than just an optical issue. There are financial-stability considerations as well. We had a very, very interesting suggestion in one of our staff

discussions, if you'll recall. In principle, you could imagine restricting our counterparties not to money funds broadly, but to money funds that invest only with us or money funds that invest only in Treasury securities, in which case some of these inequity issues go away, and I think some of the financial-stability issues potentially go away. I am interested in whether folks who know about this think that's a feasible option and what its operational challenges would be.

MR. POTTER. It doesn't have any operational challenges.

MR. ENGLISH. I have two reactions, and I think Simon may have others. One is that a lot of our money market fund counterparties that we've signed up now are not government-only money funds. You would have to exclude them. The other is that simply because we are not transacting directly with the prime money funds doesn't mean that they're not going to be affected by what we do.

MR. STEIN. Sure.

MR. ENGLISH. Funds will move from the prime money funds to the government-only funds with which we're transacting. So, for example, to take the financial-stability issue of what would happen when there are runs, it's not clear to me that you'd actually be better off in that case. You'd still have people running from the prime money funds to the government-only money funds, and it just isn't obviously an improvement in terms of the financial-stability implications.

MR. NATALUCCI. Essentially, you have the channel I was discussing before. It might take care of one thing, which is the portfolio reallocation, because you would restrict the portfolio holdings of these money funds that we'd be facing, but it's not obvious we'd be addressing the second piece, which is the outflows from the prime money funds to this facility, which appear likely to occur at a higher speed than the portfolio reallocation.

MR. STEIN. Oh, absolutely. It's not a substitute for the capping mechanism. It's an *ex ante* comfort issue.

MR. POTTER. But the clearest answer is that, operationally, it's very easy to do. Just take them off the list.

MR. MARTIN. I have one quick follow-up on President Bullard's suggestion. One of the things that we discussed in the memo that discussed caps is the idea of having a single-price auction as a way of implementing the cap. So you can imagine the situation in which you'd set the IOER and overnight RRP rates equal. You'd set a cap, and you'd design the overnight RRP as a single-price auction, and then you would get a wedge between the IOER rate and the effective overnight RRP rate, but that would be a market-determined spread. So that would be one way of running option 1.

CHAIR YELLEN. President Fisher, did you have a two-hander?

MR. FISHER. I just want a clarification here. As I recall, we're dealing with 94 or so money market funds. How many of those are government-only?

MR. POTTER. Thirty-two.

MR. FISHER. But the fungibility issues are germane. We should bear in mind what happens in a panic. You'd have flows that end up running into the government-only fund, right?

MR. POTTER. That's been the previous pattern because they're trying to get access to—

MR. FISHER. I have a related question later, but I just wanted to clarify that. Thank you.

CHAIR YELLEN. Yes. We're still with President Rosengren. [Laughter] He's still got the floor, but we're encouraging follow-up.

MR. POTTER. To President Bullard's point, one of the advantages of option 1 is there's just one rate that's been chosen, and Antoine gave you a way that the market would determine this other rate. That has some clarity attached to it, as compared with having more than one rate.

MR. ROSENGREN. I have just one last follow-up, and then I'll cede the floor—a follow-up to Jeremy's question. To the extent that a lot of the prime money market funds are invested in European bank debt instruments and Europe is presumably not raising rates at the time that we are—if we followed up on Jeremy's suggestion, one possible outcome would be that prime money market funds would no longer be feasible, and we would move to a money market fund industry that's primarily focused on government-only funds. In some sense, from a financial-stability standpoint, that might be an optimal solution. Do you think that is a likely outcome if we followed up on Jeremy's suggestion, assuming that Europe is not going to be in a position of raising rates at a time that we're raising rates?

VICE CHAIRMAN DUDLEY. Remember, it's dollar rates that we're talking about. So despite the fact that they're European, they're still borrowing to fund their dollar assets. So it's the dollar rate that really applies.

MR. ROSENGREN. But as our rates get expensive relative to theirs, they may not decide to have as big a dollar exposure as they had before, right?

VICE CHAIRMAN DUDLEY. Well, they have to finance their dollar book of assets. That's really what's motivating their borrowing here in dollars. It doesn't really matter what the European rates are.

MR. ENGLISH. President Rosengren may have in mind that the European banks would reduce their dollar asset holdings and therefore their need for dollar funding.

MR. ROSENGREN. So my question is, is that a likely outcome or not—do you think the prime money market funds would continue to exist the way they are?

MR. ENGLISH. Nobody knows; it's just not clear.

MR. POTTER. I think it certainly cuts both ways, in the sense that they might reach for yield even more in that world, in which they don't have access to the overnight RRP facility. So you'd want some way of controlling that.

MR. KAMIN. European banks might also be doing more business in the States, as our economy picks up, and so that is an offsetting factor, too. So their demand for dollar funding might not fall.

CHAIR YELLEN. Okay. Thank you. President Fisher.

MR. FISHER. Thank you, Madam Chair. I will confess that I'm one of the dimmer bulbs at this table, so I have a very basic question. Right now we have excess reserves, and to me, what that means is, if you look at what the demands for reserves are to meet reserve requirements, if you look at what is required for liquidity requirements—which is changing—or for clearing needs, we agree that right now we have excess. Is that correct?

MR. POTTER. $2.3, $2.4 trillion.

MR. FISHER. So when we say "normalization," I want to make sure we're all talking about what normalization is. Normalization, to me, is not just stopping large-scale asset purchases and controlling short-term rates. To me, normalization is that banks find their end-of-day positions closer to their demands for reserve requirements, liquidity requirements, or clearing needs. Is that what we are talking about? I just want to make sure we have a common understanding. Ultimately, and we don't know what those numbers are, but my question was going to be: What is that? It's not $2½ trillion, or $2-point-something trillion.

MR. ENGLISH. I think we would make a distinction between two things. One is normalizing rates—that is, beginning to raise interest rates. We're going to raise interest rates when reserve balances are still large.

MR. FISHER. I understand that. But the ultimate goal should be what I just mentioned, I would think.

MR. ENGLISH. In the long run, it will mean normalization, if you like, of our balance sheet. That takes longer; in the Tealbook projections, it takes five years or something like that. And, exactly what that normalized balance sheet is, I think, is subject to discussion by this Committee. Do you want to go back to a long-run regime with a very low level of excess reserves, implementing policy the way it used to be done? You could also go to a long-run policy implementation regime that's a floor regime with a much higher level of reserves and a bigger balance sheet. It has been suggested that we might want to go to a long-run regime in which we'd be supplying a lot of short-run safe assets, and so we'd be running with a bigger balance sheet if we did that. So I think the long-run balance sheet normalization raises a number of additional questions that the Committee would need to consider.

MR. FISHER. This is my point. By the way, with my personal priors, it's going to take more than five years. Let's set that aside.

MR. ENGLISH. Simon, I think that's yours, too.

MR. POTTER. It's a little bit longer-term than five years.

MR. FISHER. It's a long term.

MR. ENGLISH. Yes.

MR. FISHER. But I think that's where you start and you back your way down. I'll make this point in the go-round, but just to make sure you understand, I realize it is going to take a

very long time. This is an issue we created; and now we're trying to solve it and do so in a thoughtful manner. Unless you know what the endpoint is, I don't think you can decide what the intermediate points are. Otherwise we're going to get into trouble along the way. So to me that's an important definition, Madam Chair, and Bill just framed the questions very well. That's what we need to determine first, in my opinion, and, as you mentioned earlier, we have a long time between now and September, but it's actually a very short period of time given the complexity of this issue. And I might add—and forgive me for saying this—but due to the complexity of the tools that we have, which the economic literature did not prepare us for, we have to achieve a level of understanding that I don't think we have yet.

I appreciate the presentation. Exhibit 2 was particularly helpful just in terms of dimension—or "dementia," whichever you wish to use. [Laughter] But we'd better figure out what our long-term definition of normalization is, and then we back in from there. That's the point I wish to make. If it's one of those several options, then that gives us a sense of direction.

MR. ENGLISH. I want to push back a little against that, because I think no matter where the Committee wants to be in the long run, no matter what the policy implementation looks like in 2030, you're going to be raising rates—I hope, if everything goes as we think—next year with a level of reserves that's going to be around $3 trillion, and we have to think about how we can successfully, efficiently, and effectively do that. And I think you could do that in a variety of ways, and it wouldn't necessarily have implications for where you want to be in 2030. There are some links there, and we provided a memo that talks some about that, but I think there's a fair amount of flexibility between what you choose to do in 2015 and where you want to be in 2030.

MR. FISHER. Bill, we have a lot of liquidity that we have to deal with. I don't dispute that. But I'm just saying we need to at least keep that in the back of our mind. We are not at

odds here. We're just trying to figure out and, again, bear in mind the endpoint, define it. And we're still going to have to deal with the fact that, one hopes, things go well, the economy strengthens, and we are going to have to raise rates. But the toolkit that we use for that has to be kept in line with longer-term principles. That's my point. So it's not a difference of opinion—it's just really trying to get a definition on the table.

CHAIR YELLEN. President Rosengren?

MR. ROSENGREN. I have a two-hander on that. I just think we should be agnostic about what the endpoint is, because if we decide to go with a reverse repo facility, until we have some idea of magnitudes and volume and how much it is going to vary, I have no idea whether the reverse repo facility would be a feasible solution in the long run or not. But if it is, then that is going to imply a much larger balance sheet than we would have if we go with a federal funds rate, and I don't think we have to decide that until we know how successful the reverse repo facility will be. I actually think the opposite. I don't think we know the endpoint until we know how some of these other tools work.

So I would be more interested in taking the approach that in one or two years we learn which of these options are really feasible, and then we have the discussion about what we think is the right solution in 2030. But I don't think we should prejudge it in September—I think that prejudging it would be dangerous until we have a better understanding of how the tools work.

MR. FISHER. Well, clearly, we need to get a better understanding of how all the tools work. And we are testing. Again, there is no dispute here.

CHAIR YELLEN. Vice Chairman Dudley.

VICE CHAIRMAN DUDLEY. I would like to land slightly between the two of you [laughter], in the sense that I think it is relevant to have a path back to the long-term framework.

If we pick a certain path that then rules out a path back to a given framework, that's relevant. So you have to be comfortable that whatever path we pick in the near term doesn't rule out a path that you might prefer in the long term. And as long as you're comfortable that you're not ruling out a path for the longer term, then I think you can really try to optimize over the short term. That's how I would look at it.

MR. POTTER. I think our view was that it's pretty difficult right now to rule out any path with the options that are there, because the way the tools will work will change as the balance sheet starts to fall anyway, and we will learn quite a lot. There is nothing in any of the five options that prevents you from either going back to the old system or going to a new system.

VICE CHAIRMAN DUDLEY. I think there is a path back to any longer-term framework. So that would suggest that you should optimize over the short to medium term, recognizing that you do have a path back.

MR. POTTER. Yes. There are costs, obviously, of switching frameworks frequently, and we should bear those in mind.

MR. FISHER. Thank you, Bill.

CHAIR YELLEN. President Evans, two-hander.

MR. EVANS. Thank you. I'm sympathetic to the flexibility that has been described right here. One thing that I think I heard somewhere in the presentation or in the questions and answers was that the take-up by money funds is going to depend in part on the perceived permanence of this facility. So in the testing of this, at some juncture we are going to have to either make a representation that we haven't figured that out or we are going to have to commit to permanence—aren't we?

MR. POTTER. We have it through January 2015 based on the resolution that you passed last time.

MR. EVANS. I'm sorry—I interpreted the permanence as a money market fund's willingness to actively, with both feet, go in and recruit customers for this, thinking "I want to make sure I've got 10 years of this."

MR. POTTER. People will be looking at the choices that are made over the next few months to think about how permanent the overnight RRP is. If some of those choices are announced at the September meeting, and if the choice is to keep the overnight RRP facility, we will learn more about what some of those flows would look like in the current situation. If they feel it is going to be part of the permanent framework, that will allow them to think about the counterparty relationships they have right now and some of the other relationships they might want to get to use that facility.

CHAIR YELLEN. Okay. Seeing no further two-handers, President Bullard.

MR. BULLARD. Thank you, Madam Chair. I want to return to the financial-stability issue. We had a panel in exhibit 3, on the lower left, on possible amplification effects. And then for potential mitigants, on the lower right, the first one is to lower the overnight repo rate. And it says, "probably not a reliable stand-alone tool." So I'm going to ask Mr. Martin, why is that not a reliable tool? It sounded to me like the description that you gave was that maybe the policy decision wouldn't be the right one in that circumstance. To me, that's maybe not a good description, because you are talking to the policy committee. [Laughter]

MR. MARTIN. What I meant to say was that even the most enlightened policymakers might have a hard time getting the timing exactly right. One thing you could consider doing is to say, "Well, we're going to monitor the situation. And when we think that there is going to be a

run, we'll lower the rate." I think that's difficult to do, and there is this worry that if you do indeed lower the rate, people might say, "Oh, my God. These guys know something that we should know, too." And you create a run.

MR. BULLARD. Okay. But that's a problem in any kind of crisis situation.

MR. MARTIN. But one of the nice things about a cap, if I might say so, is that you have the ability to stop the initial onboarding, the initial surge. And then you can manage that cap and manage that rate. So you can lower the rate after the cap has been reached, or you can decide that you keep the rate fixed but you maintain the cap at its existing value, or you increase it. You have a lot more flexibility. But what you're worried about—and this is what I meant by saying that it might not be a sufficiently robust standalone tool—is that if you need to always have the interest rate at a facility exactly right, you might just be off by a day or two, and that could be damaging.

MR. POTTER. Also, it might be very difficult to find a rate that prevents people wanting to put their money with the Fed. It's safe; the Fed can return the money to them. In some severe states of the world, their private counterparty might not be able to return the money to them.

MR. MARTIN. And people become very rate insensitive.

MR. POTTER. —which we saw in September 2008.

MR. ENGLISH. One point that was in the memo and that, in my view, is important is that you want these mitigants—whatever they are, caps, rates that move because of auction approaches or whatever—to always be in place. You don't want there to be a switch that somebody has to turn because that is then very bad news, potentially, for market participants. So you want it to be part of the furniture. Maybe these things hit at the end of every quarter, when

we know that usage of this thing is going to go up. So it just becomes something that we are used to and isn't that big a deal.

MR. BULLARD. Okay. But, still, what I would think of is a policy rule that reacted partly to a financial crisis–type variable, and, in principle, that policy rule would be exactly the right one, and then that would all be possible. And then, in that case, lowering the rate would be a sufficient mitigant, and you would offset any probability of crisis. You are just saying there is some noise around that, and in a crisis situation that might be a problem.

MR. MARTIN. Yes. That's right. In normal times, we should expect that adjusting the rate of the overnight RRP facility would be a very effective tool. Specifically, in times of crises and when people become interest-rate insensitive, it might not be enough just to change the rate, and you might want to have something else, like a belt and suspenders. But, in general, if you lower the rate enough—if you can turn it negative—it is going to reduce flows.

MR. BULLARD. Okay. Thank you.

MR. POTTER. And we can turn it negative if you want to.

CHAIR YELLEN. Governor Stein.

MR. STEIN. I think, Bill, what you were just describing sounds like an auction in which you are basically, on every single day, auctioning off something like 120 percent of what you expect the demand to be, and you have a reserve price. So on a normal day, you are just hitting the reserve price. That is the rate that we set. And if the demand at the auction turns out to be bigger, then the market sets the price. So you just seamlessly move back and forth between us setting the price with the market setting the quantity, and us capping the quantity with the market setting the price. And, as you said, if you did this on a regular basis, you wouldn't have to change tools.

MR. ENGLISH. I think something along those lines is probably right.

MR. STEIN. It seems quite seamless.

MR. ENGLISH. You may want also to have some sort of overall cap. You said, I think, 120 percent of some moving average or something. You may also want to say "and no more than" something. I think the mechanism design is a question, but something like that seems right.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. When I thought about these mitigants for financial crises I tried to put myself in the position of being in this room or on a videoconference call in the middle of one of these crises. And I wonder to what extent things like caps and a commitment to lower the rate in the time of crisis would be credible when you're reading stories in the newspaper about money market mutual funds with people's savings, et cetera, looking for safety, looking for a place to put their money, while the Federal Reserve has the ability to offer that and it is choosing not to—and in fact it is penalizing people for seeking safety. I think it would put us in a very challenging situation at that point in time.

MR. LACKER. Madam Chair?

CHAIR YELLEN. President Lacker.

MR. LACKER. I'd like to follow up on President Kocherlakota's comments. There is a rich irony to this discussion. As some of you have heard me point out before, we were founded to provide a monetary instrument for people to use when the supply of that instrument was inelastic—when they wanted to get their deposits out and have hand-to-hand currency to carry around. It was well known at the time that there were structural, legal impediments to the elastic supply of currency under the National Bank Act. We were founded to provide that elastic supply

of currency to people panicking who were taking their money out of banks. So I agree with President Kocherlakota that it's just odd and a bit dissonant to be thinking about limiting that flow.

Thinking about the parallel with our founding caused to spring to my mind a question about why you would restrict a flight to safety. The broad philosophy here seems to be that we can help financial stability by taking off the table or limiting the size of one of the array of options that fleers have to flee to. They have other options to flee to. And I'm wondering what information you have about those other options, and their inferiority to us, that leads you to want them to come in at a certain point. I'm just confused about the analytical framework for these limits being a good response.

MR. POTTER. I think Antoine set it up quite nicely in the way he described what you were trying to do. You weren't trying to limit the supply of the safe asset over the longer run. You were trying to limit, over one to five days, say, a very disruptive effect from people rushing to safe assets. That's the financial-stability cost that we see if the overnight RRP facility really is a perfectly elastic supply of that safe asset. And that's the way you tried to pose the issue, I think.

MR. LACKER. Are there going to be no other assets they could disruptively flee to at the time?

MR. POTTER. They could flee to Treasury bills, which are in fixed supply. One of the thought experiments we did was to ask, would we ask the Treasury not to supply more Treasury bills at this time? And it's sort of surprising for them to declare a new Treasury auction. This is a standing facility, in theory that they have used, which is available, and one day a big shock

might come, and you get a very disruptive funding change from the facility being there, which is based on the genuine desire that we should be providing a safe asset over the longer run.

MR. ENGLISH. Can I tell you how I'm thinking about this? I kind of feel your pain. In the traditional world, we would, in effect, lend against risky assets that banks have—provide them with currency, say, that they would then satisfy depositors with. We could do something similar in today's financial sector—it's a much more complicated financial sector—by basically intermediating money markets across our balance sheet. People want safe assets; we give them safe assets with the overnight RRPs. But this disintermediates a bunch of borrowers, and we could use tools—the TSLF, PDCF, CPFF, whatever—to provide the funding. Again, we would be taking, in some sense, risky collateral and providing a safe asset. I think that's the equivalent of the traditional procedure of providing currency to banks during a crisis. The problem is actually getting the funds out to the appropriate parties quickly and efficiently. And actually doing that, because the Congress has said through the Dodd-Frank Act that it is not that happy with us doing that anyway, seems like something that the Committee may not want to do. So you may not want to set up a structure for implementing monetary policy that would require you to intermediate a bunch of money markets across our balance sheet in a way that requires these tools you may not be comfortable with.

MR. LACKER. You're combining two things. You're combining credit and money policy. We could do this across Treasuries, right—holding Treasuries? So if there had been a huge supply of Treasuries outstanding in 1914, we could have increased the supply of money elastically without holding private assets. And the assets we took from banks were the safest things they had. They weren't the riskiest things. They were the safest things. They were risky, but they were the safest things banks had.

MR. ENGLISH. But traditionally the central bank provides liquidity against illiquid assets. That's the point.

MR. LACKER. Well, one can read "tradition" many different ways. But at the core we supply liabilities, and when we choose to pick up a private asset when we could have bought a Treasury, we're doing fiscal policy. We're issuing a Treasury to the market and using the proceeds for a private credit instrument. But I separate those two, and I don't think we have to do them both.

MR. ENGLISH. So you might think that it would be possible in a crisis for us to provide safe assets through the overnight RRP facility and then do RPs to get the reserve balances back out. So at the end of the day, Simon goes in and he does a lot of RPs to get the reserves back out again. That might work, but I think you'd end up with a lot of would-be borrowers who were unable to get funding because folks came to our overnight RRP facility who didn't have OMO-eligible collateral. Then you've got a choice. You can lend against the non-OMO-eligible collateral or not.

MR. LACKER. You're well aware this is a broad philosophical discussion. Lending decisions are difficult in normal times. They're even more difficult in times of stress.

MR. ENGLISH. Absolutely. That's why we're trying to avoid that, right? That's exactly why we're saying caps or something like that may be necessary, to avoid having to make lending decisions as part of your monetary policy implementation.

MR. LACKER. But we didn't have private-sector instruments in the discussion until you brought them in here. We were talking about Treasury securities and a flight to this overnight instrument collateralized by Treasuries.

MR. ENGLISH. But as the memo said and as Fabio said, it's flight from something. There was a time money market funds were funding banks, were funding broker-dealers, were funding, say, Caterpillar Tractor, and now they're not. Now they're coming to our overnight RRP facility. And so there are those out there who need funding.

MR. LACKER. It's a classic thing. I mean, you're interposing your judgment about who deserves funding on day 1, day 2, day 3.

MR. NATALUCCI. There are three channels in some sense, right? One is just portfolio reallocation—given the size and shape of the industry, how they would reallocate the existing portfolio. This is an issue of flows out of, say, prime money funds, so the money comes into these government-only funds that face the ON RRP facility. There's the issue of where they have taken money away from, and this could be when they are funding, they are doing other assets. Some of them could be nontraditional collateral, for example, so it would need to require other funding.

Another issue has come up with a bunch of market participants, which is that, should a facility become permanent, some asset managers could essentially set up funds that focus entirely, 100 percent, on overnight RRPs. That could be a new tool that would be in their suite of liquidity management for clients. That's a new channel in which money would move. And I agree that it's unclear, but the dynamic is different. In some sense, in the dynamic you were describing, in which people go to Treasury securities, the Treasury yield responds, as Antoine was saying. So you get the price action that make the flows into safe assets more costly without any sort of mitigants, either caps or moving the overnight RRP rate. In this case, there is this infinitely elastic supply with a fixed rate that becomes higher than market rates. So that will attract even more flows just by differential spreads.

MR. POTTER. But I think President Lacker's point is that we can let the private sector solve that problem, and—is this correct, President Lacker?—our role, if we think it's welfare-enhancing, is to provide a safe asset. The private sector knows it's there. It's their problem to solve. Is that fair?

MR. LACKER. Yes, I'm questioning the premise that that wouldn't work effectively.

MR. POTTER. Yes.

MR. LACKER. And I also have questions about the premise that, to the extent that we see that as problematic, depriving people of an option is relevant, because there are so many other ways they can flee from a given fund or a given credit instrument.

MR. POTTER. Correct.

MR. LACKER. I just don't see us as being critical to their ability to flee.

MR. POTTER. The private-sector participants, when we spoke to them, did think that a perfectly elastic supply in this form did raise this risk more. It's one of the reasons we focused on it.

CHAIR YELLEN. Two-handers. Vice Chairman Dudley.

VICE CHAIRMAN DUDLEY. Let me give you my take on this, which I hope will clarify things a little bit, at least for me. I agree with President Lacker that, if people want safe assets and we provide them with those safe assets, that's probably utility enhancing as opposed to utility reducing. But if we supply them safe assets at a fixed price, what's going to happen in this new regime is that the prices of risky assets are going to go down, interest rates in the economy are going to go up, and financial conditions are going to tighten as a consequence of this flow. The difference between the old regime and this new regime would be that in the old regime yields on risk-free assets fall and those on risky assets go up, but they both move. In this

new regime, the yield on risk-free assets doesn't go down, and so the yield on risky assets goes up by more. So you get a tightening of financial conditions.

That's the financial-stability negative that we have to think about. Now, you could respond to it by living with it. You could respond to it by adding reserves through doing repurchase agreements. You could respond to it by lowering your interest rate structure. But I think that the initial reaction, relative to the current regime, would be a tightening of financial conditions, and that's really the consequence on the other side.

MR. LACKER. But, Bill, we always cut rates when something like that happens.

VICE CHAIRMAN DUDLEY. Well, that would be an option.

MR. LACKER. And besides, Treasury rates are going to be strong anyway. Open market rates on Treasury securities are going to be strong.

VICE CHAIRMAN DUDLEY. I actually agree. I think the financial-stability issues are really quite complicated because there's a good, in the sense that you're offering an asset that they want to hold, which is utility enhancing, but there's a bad—there's a temporary tightening of financial conditions that you would be concerned about. And the question is, what's the best way to address that?

MR. POTTER. And particularly over one or two days, you don't want to magnify some of these flows that people don't understand. I think that's what we're trying to avoid with the capping.

CHAIR YELLEN. Okay. For two-handers, President Kocherlakota, then President Fisher, then Governor Tarullo.

MR. KOCHERLAKOTA. I'm going to restate the point I was making earlier in the hope of being clearer. I understand the financial-stability concern that Vice Chairman Dudley

outlined. It's good to put mitigants in place that are perceived, at least ex ante, as defraying that risk. But I think it's useful to war game it. Think it through, and if we're actually in this situation, will we live with these caps? Will we live with having to lower the rates on these facilities to possibly minus 5 or 10 percent in order to deter investors from seeking that safety? I think it will be very tempting for us to try to rescue the money market mutual funds in that situation by providing that safety and then to save the institutions that are being disintermediated through other facilities that we used to great effect in 2008. I think we just have to war-game it in our minds and realize that these mitigants might—in this room right now, in the calm that we're sitting in right now—sound very attractive, but I doubt their credibility and effectiveness in the time of crisis.

CHAIR YELLEN. President Fisher, two-hander.

MR. FISHER. I want to address Jeff's point. Whatever we do, obviously we don't want to heighten financial-stability concerns. Forgive me, Jeff, but you're a fundamentalist.

VICE CHAIRMAN DUDLEY. You can take that as a compliment. [Laughter]

MR. FISHER. When the System was created, we were the credit system. Banks were the credit system. Today, banks and depository institutions are 25 percent of the credit system. Again, Madam Chair, forgive me, but this gets to the whole root of our franchise, how we proceed along this path. If we operate through traditional tools, working with just depository institutions, we represent one-fourth of the credit system. In 1914, it wasn't like that. So part of this discussion is about the adaptation of our franchise and I think we have to continue to bear that in mind.

SEVERAL. That's true.

MR. LACKER. Madam Chair? Richard, I think you meant "originalist." [Laughter]

MR. FISHER. I come from a Baptist part of the country.

MR. LACKER. I'm not an originalist.

VICE CHAIRMAN DUDLEY. You are one of a kind.

MR. LACKER. I try to be original.

MR. FISHER. You're faithful to our franchise.

CHAIR YELLEN. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. I think I'm asking a question, but maybe I'm making a comment as to how much of the past 15 minutes of what I found to be a very interesting discussion is actually critical to resolve before making the decisions on what we're doing between now and September. I think there is going to be a theme that is going to continue in this and subsequent discussions, which is that, as President Fisher suggests, it is hard not to have an eye to what we think we may prefer as the indefinite monetary policy regime. But I do think it unlikely that this group is going to come to a consensus on that before September. So it's pretty important that we, wherever we can, try to figure out a bit more rigorously what we need to decide in order to enable the Chair to go out in September or sometime later and explain what it is that we're doing.

The only other comment I'd make, and this is consistent with what Richard just said, is that one way or another the financial-stability dynamic that Vice Chairman Dudley explained a minute ago is going to be with us. One of the things I think that people are taking into account—that everybody sitting on the other side of the table from us took into account—is that we are increasingly mindful of financial-stability concerns, and this potential reorientation of the monetary policy regime might help to address them. But, one way or another, some combination of the Board's regulatory authority, other U.S. government agencies' regulatory authority, and

the FOMC are going to have to address them for exactly the reason that President Fisher cited—that so much of the activity of short-term intermediation is not running through the commercial banking system anymore. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Let's see. Now I'm going back to the original list of questions, and I have Vice Chairman Dudley.

VICE CHAIRMAN DUDLEY. I had a question for Antoine. Maybe it's more of an observation. It seems to me that individual caps have one important difference from aggregate caps. With aggregate caps you presumably would have to have a submission of a schedule of what your demand curve was and what your prices were, while if you had a system of individual caps it would just be a quantity-based system. So my question is, it doesn't seem like the individual-cap-based system has the benefit of being operationally a lot simpler. That's a leading question, obviously. [Laughter]

MR. MARTIN. I think the individual cap is simpler for the participant, but more complicated for us to implement, and Josh might have something to say about that. The aggregate cap is going to require a little bit more thinking on the part of the participants. I think it's easier for us to put into place.

MR. FROST. That's right. In today's world, we could implement individual caps tomorrow if we needed to, but to do it in a robust, automated fashion would take us a fair amount of time.

MR. MARTIN. And let me just add something in terms of why the sum of the individual caps might be less tight than an aggregate cap. There are a couple of things. First, we have a number of participants that just don't use the facility very much. They would likely have a *de minimis* amount.

VICE CHAIRMAN DUDLEY. I understand that. It just seems to me, though, that people are going to have to submit a schedule of what they want at different prices, which seems like a much more complicated process to do every day than just saying, "I want this much."

MR. ENGLISH. It does have the advantage that then the overnight RRP is allocated across participants more efficiently, whereas if you have an aggregate cap and some way of allocating through an auction or something, as Jeremy was talking about earlier, it's a more efficient system.

VICE CHAIRMAN DUDLEY. But it also seems to me a question of how often you think that this cap is actually going to be binding. If you thought it was once every five years, you probably don't want to have them submitting all these prices for the once-in-five-years event. If you think it's going to be binding every quarter, then maybe—

MR. MARTIN. It also means if they believe it never binds or almost never binds, and if we have a rule that says whenever the cap is not binding everybody gets the maximum bid rate, then they really don't need to make any of these complicated decisions. They would just say, "We're just going to bid the amount we want because in all likelihood it's not binding." So the complicated part really comes about when they think it is going to hit, but that's precisely when we want them to think about how much they need that liquidity.

CHAIR YELLEN. President Evans.

MR. EVANS. Just because I heard the term "caps," and I'm curious about whether the caps are likely to be important from option 1 all the way to option 4? I'm thinking of Governor Tarullo's question about whether we need to have this discussion about caps in order to get to a September agreement, but the overnight RRP facility is in options 1 through 4. So I think we need a point of view on this.

VICE CHAIRMAN DUDLEY. It depends on how important the financial-stability issue is.

MR. EVANS. So in option 4, is it important? Because there, presumably, the funds rate is more important, and it's a smaller ON RRP.

MR. POTTER. No, it would still have the same issue.

MR. EVANS. So caps are always important.

MR. POTTER. Also, in option 5, if you have the term RRP, and you just happen to be auctioning on that day, depending on how you do it, it would still be a problem.

MR. MARTIN. I think you want to think of the caps as being able to adjust over time. So that, again, in normal times, even if we tied them to the spread between the IOER and overnight RRP rates, it would still not likely bind. In all normal situations, you would have these caps in place; and, in all likelihood, they wouldn't bind. In that sense, all these options have them in place, but they are not affecting the way you implement monetary policy, except in times of acute stress.

MR. EVANS. Let me restate, perhaps, Governor Tarullo's question on a different topic. It strikes me that caps and so many of the subjects here have a greater level of complexity by an order of magnitude compared with so many of the other monetary policy institutions or things that we talk about. Are we going to have to sort through that level of complexity by a September timeframe? That's the question.

MR. POTTER. I don't think that's quite right. We have caps in place right now. The two countries that run floor systems basically have caps. And if you go above that cap, you get a lower rate.

The choices we have here are engineering-type choices that would be pretty easy for us to work on over the next three months. Operationally, it might be difficult to make it completely robust in three months, but we have a lot of capacity to get it rolling quite quickly. The deeper issues regarding financial stability and how you should interact with the nonbank sector—it would be surprising if you solved those matters in three months.

CHAIR YELLEN. Let's see, we are back to further questions, and I think I see President Lacker on the list.

MR. LACKER. Yes. Thank you, Madam Chair. I have questions for Josh and Jane. In your presentation, Jane, exhibit 1 says that rates "probably" won't go up one-for-one when we raise the IOER rate, but you said "potentially." And then, Josh, when you were talking about these regulatory balance sheet costs—the FDIC charge and Basel III—I thought you said that they'd make them unprofitable, but I assume you meant unprofitable at certain rates, and there would be rates at which they were profitable. So for the federal funds rate–IOER arbitrage, do you have a sense of what the magnitude of those costs amounts to for a bank? What would a typical large commercial bank find to be a breakeven spread?

MR. FROST. I think what we've heard from some of the foreign banks that are not subject to the FDIC fee has been about 5 basis points. So if you factor in an average FDIC assessment charge, which, I think, for the past few quarters has been 7 to 10 basis points for most of the larger banks—

MR. LACKER. So you get 12 to 15.

MR. FROST. Yes, 12, 15, something like that.

MR. POTTER. And then you have to add in how the leverage ratio might affect some of the large banks within the United States. That was discussed in the cover memo in which we

reissued the framework discussion from last year. And that, you know, could be quite large when you talk to some of the banks. They view that as a pretty big constraint. It could just be the banks talking to us in the way they tend to when there are new regulations.

MR. LACKER. Right, right.

MR. POTTER. But it is also possible that, if it's binding for a large bank, it will be quite expensive, at the ratios that we're talking about.

MR. LACKER. So here is the question. Those costs would drive a wedge between the funds rate and the IOER rate. It doesn't seem to me like they are going to vary when we raise the IOER rate. Does it? Do you think they would? Would they go up, or would that be just a constant, you know, *X* number of basis points wedge?

MS. IHRIG. That could be the case, that it's just a constant spread. And so if you're happy with that spread, then you could increase the IOER rate. You might not actually have to drain very much, even in option 5. But the point is, we just don't know.

MR. LACKER. You don't know of any reason why those wedges would widen, right? I mean, the FDIC thing, that doesn't widen when the rate goes up, right?

MS. IHRIG. Well, if you look over, say, even the past year, the IOER–federal funds rate spread does vary from day to day. So I don't want to say the spread is going to be a constant as of what it is today. Over the past year, I think the average spread has been 15 basis points, but it has moved up and down.

MR. POTTER. And the year before the spread was much lower. So it has varied quite a lot.

MR. LACKER. Okay.

MR. ENGLISH. But to be fair, as you say, we don't know for sure. There are a lot of things that we don't know for sure here, and it could be that raising the IOER rate would be sufficient to raise the funds rate more or less along with the IOER rate. It would be a brave decision by the Committee to do that, I think, because if you announced, "Okay—we're tightening, everybody; here it goes; we're raising the IOER rate to 50 basis points," and you raised the IOER rate to 50 basis points, and the funds rate went up much less than 25 basis points, that would be a problem.

MR. LACKER. I understand that the future is uncertain, but the arbitrage is a reason we have to believe that the spread might remain constant.

MR. ENGLISH. Yes.

MR. LACKER. And I was just probing to see if there was any reason to believe it might not, besides the general uncertainty that clouds all of us when we think about the future.

MR. POTTER. Well, because it has varied quite a lot.

MR. PLOSSER. The funds rate varied quite a lot, too, from day to day.

MR. POTTER. No, I'm talking about just the average level over a certain period of time. That seems to vary in a way. It is possible that this would be a pretty predictable relationship, and I think all the staff think that you could raise rates by raising the interest rate on excess reserves. It just won't be as controlled as using some of these other tools.

MS. IHRIG. To add to that, you know, you don't have to specify a federal funds rate. You could specify a federal funds range.

MR. LACKER. Right, you could maintain a range.

MS. IHRIG. And so the range can help you with that worry.

CHAIR YELLEN. President Evans.

MR. EVANS. Wow. I just put that question in. The list is short.

Thank you, Madam Chair. I have a sort of longer-term-perspective question. If we have a vibrant overnight reverse repo program, if money funds develop these special short-term safe investment funds, and if they draw in funding on a large scale there, I'm assuming that, alternatively, those funds were going to go somewhere else. Somebody else isn't going to have a fund available for that, and that fund is providing some funding for certain types of activities. What types of activities are going to be diminished by this? Is there a sense in which credit intermediation to nonfinancial enterprises might be affected adversely? I would hope not. That would be a big issue. Is the shadow banking system going to somehow look smaller if we have something like that? Or will it be unchanged? More broadly, who are the losers in a development like that? How loudly will they be talking to other people—vested interests, political lobbies—about that? Can you paint a little bit more of a picture of what that looks like?

MR. POTTER. This would be with a reasonably large take-up of the overnight RRP facility?

MR. EVANS. Yes. Let's go that far.

MR. POTTER. The first-order effect will be that fewer reserves will be held overnight by the banking system with the Fed. So it will change the composition of the liabilities of the Fed, and the Fed might have a view about that. I don't think it should have a direct effect on credit formation. The first-order effect will have to do with which rates you are setting around here on credit formation. There are versions of option 1 in which it's a little bit mysterious to us exactly what would happen in the financial system, because instead of having \$300 billion to \$400 billion of reserves move into the overnight RRP facility, you could have trillions of reserves move into the overnight RRP facility. That might have some effect on banks, in the

short run, definitely, as they deal with deposits that leave them. And that could be a structure that makes it harder for them to provide credit in the short run.

MR. ENGLISH. I just wanted to clarify something, President Evans. The first-order effect, leaving aside all sorts of other stuff, would be as follows: What you have now is depositors holding deposits at a bank and the bank holding reserves with us. And what you'll have instead is depositors putting funds with a money market fund, which is holding overnight RRPs with us. There is no necessary implication for flows of funding to other folks in that structure. As long as it happens smoothly—as long as it happens in a way that isn't disruptive—I don't think there is a reason to think that there are big losers. I mean, there are losers because rates are higher, and people who used to issue CP at 20 basis points are now issuing CP at 50 basis points or something.

MR. POTTER. The FBOs could lose out, depending on if they're making arbitrage trades.

MR. ENGLISH. Fair enough.

VICE CHAIRMAN DUDLEY. The person that was getting IOER is not going to be getting IOER anymore.

MR. ENGLISH. Fair enough. That's right.

MR. EVANS. Thank you. I appreciate that, because I can't say I have a great picture of exactly how simple or complicated this is. And so if it's actually a rather trivial type of thing and there isn't really a scenario in which there could be some kind of dislocation of funding or something like that, then maybe it's easy. But you might think that for a new innovation proposal of this sort of magnitude you normally would have some type of reports or hearings—I

don't know the right term—to hear from people who are affected, and you'd get some comments or something to help understand it better.

MR. POTTER. About 54 percent of the reserves are held by foreign banking organizations. And large banking organizations outside of those hold the vast majority of the rest of the reserves. And they are holding them in a particular way. I don't view that as a particularly powerful interest group that would object to some of this, but it's possible that they could.

MR. EVANS. Okay. Thank you.

MR. PLOSSER. I have a two-hander.

CHAIR YELLEN. Yes. President Plosser.

MR. PLOSSER. I'd like to follow up, because I think I have a similar question to what President Evans was asking. I had asked Simon, I think at the previous meeting, if where we saw a lot of the volume in these overnight markets, we were just replacing other traders in some of the volume.

MR. POTTER. Just a little bit.

MR. PLOSSER. But what I'm worried about is, as President Evans suggested, as this gets to be a very big program—if this is the way it goes—what are the potential unintended consequences for market structure, how the money markets are working, who the players are, and where the trades are going to be coming from? Are some people going to be exiting from this business of supplying overnight funds of various kinds? And will we just be replacing a market with what we do?

I don't quite understand how this is going to work. I'm a little bit nervous because I think going into the discussion of IOER and the funds rate we thought the IOER rate would

provide a pretty solid floor for the funds rate. It turned out it didn't, and we now understand better why. And now we're talking about something that is much more complicated, and the ripple effects, in terms of unintended consequences on the market structure, are something I don't feel like I understand, and it makes me a little nervous.

MR. POTTER. I'm not sure it's much more complicated.

MR. PLOSSER. Well, it seems to me it's much more complicated. But that's just me.

MR. POTTER. I would say that the testing—and I'll talk about this later—has given us more confidence that it is forming a floor. It would have been nice to have done some testing with interest on excess reserves in advance. I think we could have come out with a slightly different version of that. It is helping functioning in repo markets right now, and I will also talk about that later.

In terms of the unintended consequences, I think one of the consequences that we understand is in the federal funds market, in which 90 percent of these trades are from the FHLBs to the foreign banking organizations. Under certain options—I think option 1 and option 2—we're not sure whether that trade would survive. But I think if you chose option 1 or option 2, you would be intending something like that to happen. It's harder to see in option 3—what we've said there is we would basically use the margin of adjusting the overnight RRP rate to make sure that the federal funds rate survived in the current form, in which this arbitrage activity was a large part of the market. And we feel that that would give us control over the federal funds rate. That could have some strange consequences, because it's a good way to get control over the federal funds rate, but it looks a little bit strange to be using the foreign banking organizations—effectively, their relationship with the FHLBs—to do that.

There could be other unintended consequences. I think we did a pretty good job of trying to think through some—the issue of the perfectly elastic supply of the safe asset is one we spent, I think, the past six or seven weeks trying to understand really carefully, and we're still working on that. And there might be other things we find, but the memo tried to cover that for you.

MR. ENGLISH. If I could add just one thing—I think it's correct that we should be worried about unintended consequences, and at least in my mind the risk of the unintended consequences is larger, the larger the use of the overnight RRP program is. So in option 3 or in option 4, in which we're keeping a bigger spread, and in which we're in some sense intentionally setting things up to have a smaller footprint in the nonbank financial sector, one would hope those unintended consequences would be less likely or would be smaller. In option 1, in which you've potentially got a very, very large overnight RRP program, we can't think of something in particular that would go wrong, but the risk of unintended consequences is presumably larger.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I have a question that I think follows on what President Lacker was asking about in terms of the arbitrage, but I'm going to pose a hypothetical scenario in which the arbitrage doesn't work very effectively, and then I want to know what that means for the effectiveness of monetary policy. Suppose the interest rate on excess reserves is 200 basis points at the end of 2016, but the overall level of short-term rates is considerably lower—say, only 100 basis points. How do we think that gap is going to be influencing our macroeconomic objectives, the unemployment rate and inflation? Should I be thinking that I've got the IOER rate at 200 basis points, but actually the unemployment rate is going to be somewhat lower and inflation is going to be somewhat higher than what I would get out of the FRB/US model if I just plugged in that 200 basis points? I guess the point of my

question is, there are lots of spreads in the world. Monetary policy is a blunt tool that has lots of differential effects—savers remind me about this all the time when I'm speaking—and we don't worry about that. Our objective is to fulfill our goals in terms of unemployment and inflation. And if these spreads aren't material for our ability to achieve our goals, then it's harder for me to get worked up about them.

MR. MARTIN. One point that Jamie McAndrews has made, which was very useful for me in thinking through this, is that it used to be the case that the fed funds rate was both the hurdle rate for banks to make loans and their cost of funding. That's no longer the case. Right now, the hurdle rate for banks is the IOER rate. The cost of funding is the market rate. And so you might be worried about that spread because banks are going to be looking at the IOER rate when they're thinking about making loans, and their funding cost is going to be closer to market rates. That is just a very different situation from the one we used to be in, and you have to think through what the effect of that is.

MR. KOCHERLAKOTA. So what will be the effect of that situation on unemployment and inflation?

MR. POTTER. You are not going to have the most efficient set of overnight rates there. It's going to be confusing to price term rates as well in that world, because people will be trying to understand, is that wedge going to stay at 100 basis points? Is it going to move to 50? Is it going to go to 25? So the effect you'll have in trying to explain what future policy will be like will also be weak. Overnight rates at 100 basis points is a significant gap in instruments that should be trading pretty close to each other, and that would suggest that we had messed up in some pretty big way, I'd say. That's 100 basis points for an overnight rate on something that, in

normal times, should be pretty close to a perfect substitute—that's a big wedge we put in the financial system.

MR. ENGLISH. Clearly, we haven't modeled this at all, but I would have thought one way to think about this is that market rates—the commercial paper market, bond markets, Treasury markets, and so on—would basically be coming off short-term market rates, which in your example were around 100 basis points. So those sorts of effects would operate more or less as usual. It would be as if monetary policy were just targeting a rate of 100 basis points. However, I think then—to bring in the point that Antoine made—banks may be feeling a little differently than if they were facing a short-term funding cost of 100 basis points, because they can get IOER at 200 basis points. So you have to worry a little bit more about what banks are doing, what bank lending behavior is relative to what's going on in markets, and try to somehow map that into what it means in terms of modeling for output, for inflation, and the things we care about.

MR. KOCHERLAKOTA. I guess I'm confused. I'm not following this. How is it that the banks have access to this 100 basis point funding, and they have a 200 basis point investment opportunity and they're not taking advantage of it?

MR. MARTIN. The way I think of it is that if you're a bank and now you're trying to think, are you going to make this loan? And what you're comparing it with is the fact that you could just hold the reserves and earn the 200 basis points. And so your threshold for making a loan is much higher.

MR. KOCHERLAKOTA. Sure.

MR. MARTIN. And that means that we would be worried about banks not making as many loans as they would, given that funding rates are so low.

MR. KOCHERLAKOTA. That sounds like the IOER rate is a relevant rate. So what makes the short-term rate the relevant rate?

MR. POTTER. Well, that's what you can fund at. So you can attract deposits or wholesale funding.

MR. KOCHERLAKOTA. Who is "you" in this?

MR. POTTER. That's the bank. It's trying to attract funds to expand its balance sheet, and it can attract at 100 basis points.

MR. KOCHERLAKOTA. It would seem like it would want to attract even more funds at 100 basis points.

MR. POTTER. —to put it into the 200 basis points.

MR. ENGLISH. But presumably there's some limit to that arbitrage because of the leverage ratio or whatever regulatory issues they face.

MR. KOCHERLAKOTA. Then its cost of funds isn't 100 basis points.

MR. POTTER. The argument you're making is—you were just trying to close the wedge by saying the arbitrage had to close that wedge. If it doesn't close, there's either a cost or some other imperfection in the financial system. And 100 basis points is still a really big overnight wedge.

MR. KOCHERLAKOTA. I'll let Governor Stein explain what I'm to say more clearly than I was planning to.

MR. STEIN. I think in your example you've just strongly segmented the market.

MR. POTTER. Yes.

MR. STEIN. There are going to be some players, nonbanks, who are funding at 100 basis points. There are going to be banks for whom, given that they've used up their

leverage ratio constraint, they're funding at 200 basis points. None of this means that you can't achieve your macroeconomic objectives. It's just about which way you achieve your macroeconomic objectives with the minimum of microeconomic distortion. There are many, many ways we can get rates up and slow the economy if we need to. There's no shortage of those. It's just that some of them will have less good microeconomic properties—I think we're trying to optimize on the microeconomic dimension, not the meeting-our-mandate dimension. We have ample degrees of freedom to do that.

MR. KOCHERLAKOTA. I have to think about the losses that I'm suffering as a monetary policymaker. I mean there are many microeconomic distortions in the world, and I want to be able to somehow quantify the losses associated with these gaps in terms of my objectives for unemployment and inflation. I'm having a hard time seeing how that would be material. We've talked about the consequences for financial stability—those could be material. I think I agree with you, but I agree with Governor Stein's description of what I would see as the market. It's really a segmented market, and the banks are in one segment and the nonbanks are in another.

MR. POTTER. What will tend to happen as the balance sheet gets smaller is that that friction will start to change the effect, and people will have to think through, if the wedge is that big, how is that going to affect where rates will be? They'll have to understand two things. We will have to think through what we're going to do as that wedge changes. That is quite complicated, to transmit your policy intent over the next one to two years. You're going to have to be thinking about who's hitting the leverage ratio as the market will become less segmented over time. It would seem to me a difficult situation for the transmission of policy in terms of your intent.

MR. EVANS. In this discussion we're talking about macro and micro, and just to remind at least myself, the context of why we'll be raising rates is that we think the economy is doing better. Inflation might be a risk taking off. We want to be adjusting that. So if this wedge is larger, and it's disrupting how a bank thinks about making good loans in an environment in which the economy is doing well, that's already something of a headwind. Does that suggest that, depending on the size of the wedge, we might not need to raise rates as much because there's already something clogging things up?

MR. POTTER. Yes. That was Governor Stein's point.

MR. EVANS. Oh, is that what you said? Oh, my gosh, I thought he said "micro stuff." [Laughter]

VICE CHAIRMAN DUDLEY. Or we could make regulatory changes to make the wedge smaller, too. It's not like we have to just accept the wedge for what it is. We could change the regime to make the arbitrage more efficient.

CHAIR YELLEN. President Rosengren.

MR. ROSENGREN. So this is a one-hander. Am I on the one-hander list or the two-hander list?

MR. TARULLO. One finger. [Laughter]

MR. ROSENGREN. I just wanted to go back to financial stability for a minute, because I thought it was a very good discussion. But as I think about the reverse repo facility, we have an administered rate, and we have administered caps, whereas in the segregated balance accounts you have more market-determined rates and more market-determined caps. If our concern gravitates on the financial-stability side, the segregated balance accounts do have more flexibility because the banks presumably would be lowering rates as we get into this situation.

So if we were to go down the road of being really worried about this, it seems like there's a stronger argument for the segregated balance accounts. But could you just perhaps describe thinking about the reverse repo facility and the segregated balance accounts, both from a financial-stability standpoint and with regard to other things we should be thinking about in terms of the tradeoff between those two options? We discussed the segregated balance accounts at some length at a previous meeting, but they got a little less attention so far in these memos.

MR. POTTER. They were called reserve collateral accounts at that time, but we changed the name of them. You might just want to describe quickly what they are, Antoine.

MR. MARTIN. Right. A segregated balance account is a specific kind of account that can be created between a bank and essentially any counterparty, pending a legal opinion by the Board's General Counsel. This allows the investor to lend to that bank, and the reserves that correspond to that loan are segregated in a way that the bank cannot use them, and it protects the investor's loan so there's no counterparty risk And automatically the next day the loan is sent back so that the investor gets his funds back. The intent of that construct is to eliminate counterparty risk so as to create more competition. That way current investors who are only looking to lend to FBOs and large domestic banks would be more willing to lend to a wide variety of banks. And it does, as you suggested, create a competitive rate because banks are competing with each other in order to offer these accounts, and we would expect that to lower the wedge between market rates and the IOER rate.

We haven't completely thought through all of the financial-stability implications. In many ways, at a high enough level, they look a lot like an overnight RRP construct, but we would not be direct counterparties, and the rate would not be set administratively. So I think you're right to suggest that banks would want to lower the rates in times of crisis. We might also

want to think about whether there are possibilities, or it's desirable, to have other mitigants, like caps, to avoid surges. But these would be private-sector arrangements, so banks and their investors would decide, maybe constrained by some limits we impose on them, how much you can increase your investment in a segregated balance account from one day to the next, or some of these considerations.

MR. ROSENGREN. So we would avoid some of the problems that President Kocherlakota was worried about in that earlier discussion, in that it would not look like we were limiting the ability of people to move into an account. Really, the cap becomes the amount of excess reserves at any one institution and that institution's ability to find a counterparty.

MR. MARTIN. Right. We need to think more about this because we didn't get a chance in this set of memos to really investigate the segregated balance accounts. It would be worth doing. It would eliminate the concern that policymakers have to make these decisions. If you are worried about very rapid increases in take-up, you would want to think through what private-sector institutions would do and whether there would be appropriate brakes on a run to SBAs in a way that there are on a run to an overnight RRP facility, but presumably there are similar ways to address these issues, and certainly it would eliminate a lot of the political-economy concerns about policymakers having to make these decisions.

CHAIR YELLEN. President Fisher, a two-hander.

MR. FISHER. You had a footnote in the short-term policy memo that wasn't clear to me. Were you asking for permission from the FOMC to develop this concept? As I recall, you were saying it would take about 6 to 12 months or whatever to understand the infrastructure. Are we taking this tool off the table? Are you asking us to put it back on the table?

MR. POTTER. I think that was just a description of what the tool was and how it might deal with this particular issue. It's definitely one of the tools that you could think about over the next few weeks.

MR. FISHER. As I recall, the footnote said, "if the FOMC instructs us to proceed."

MR. POTTER. Yes.

MR. FISHER. So are you asking for that, or not yet?

MR. POTTER. I don't think anyone asked for it just yet. That would depend on everyone at the table here. If that's something they wanted to invest in, it would definitely be good to know early rather than late, because there's a lead time for that.

CHAIR YELLEN. Okay. Last question—oh, President Kocherlakota.

MR. KOCHERLAKOTA. Yes, I was going to follow up with President Rosengren. I appreciate the point you're making. I think that the SBAs would offer some safety against some of the risks that I was mentioning earlier. At the same time, we might worry that the private sector in these instances might not fully internalize all the costs associated with having a run at one institution. That might have contingent effects across the whole system in a way that may not be fully internalized by that given institution. But I agree with you, though, that this offers some mitigants against some of the risks I was pointing to.

CHAIR YELLEN. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. I have a narrow question about some of the other interest rates that were suggested in the staff memo on the target for the federal funds rate, but actually I invite the staff, if they want, to at the same time offer more comments on the need more generally to fix the federal funds rate. You note the volatility of Eurodollar transactions—the standard deviation is about 40 percent higher than for the current effective federal funds rate.

And I am looking at chart 2 in what I labeled as memo 5, "The Target for the Federal Funds Rate and Alternatives." I note the rather substantial spikes in both directions. Are those spikes that vary from the federal funds rate more a function of something technical in Eurodollar markets that's equivalent to a shortage of certain runs of Treasuries in the Treasury GC market, or is it something about the character of some of the participants in Eurodollar markets who don't participate in the federal funds market, or something else?

MR. POTTER. We're all looking at you, Josh. So have a go.

MR. FROST. Yes. Thanks. [Laughter] I think there is definitely a quarterly pattern, but is your question why the volatility is sometimes more pronounced in Eurodollars than in fed funds and other times vice versa? There's definitely a calendar effect.

MR. TARULLO. Yes, there seems to be, although this is a pretty big scale. So I really couldn't tell exactly where these spikes were concentrated.

MR. POTTER. I think at the last year-end the effect was really big. I can't remember—Eurodollars went negative, didn't they, or something weird? Something like that, because the banks were trying to change what their balance sheets looked like. So there's some effect from the holders of the Eurodollars that might be part of this, but, overall, I think that in terms of the effective rate, these are pretty close over the period that we show. They did definitely diverge more in 2007–2009 because of the funding issues of some of the foreign banks.

MR. TARULLO. That's what I wanted to ask, Simon—is that period of divergence of particular relevance in thinking about incorporating this into our targeted rate?

MR. POTTER. The thing we don't know is whether the Desk would have operated in a different way if it had been targeting, say, a blended Eurodollar–fed funds rate, and that could

have had some effect on some of these wedges that we saw. It seems unlikely because of the timing issue that Bill faced when he was the manager.

VICE CHAIRMAN DUDLEY. We lost a little bit of control over the federal funds rate in the crisis. So I don't know if the Eurodollar–fed funds distinction would have created much more difficulty.

MR. POTTER. But it would have had more weight on the trades that were difficult for us to push against—the ones that were early in the morning—which were causing the problem. That's an issue of the operating regime we're in, at which times we would operate, and how we could measure what was happening at the end of the day.

MR. TARULLO. And to try to continue on the theme of specifying what it is that we would need to address in the shorter term, are the six of you essentially of the view that even in the short-to-medium term—unless we were to, for example, go with option 1, which I don't think we would—some addressing of the federal funds rate is an important part of what we do over the next few months?

MR. POTTER. That's a pretty general question.

MR. TARULLO. Well, no, it's not. It's meant to be quite specific—which is to say, as we go forward with whatever plan, under some avatar of one of these options, we eventually hit on, is it in your view an important part of that plan that we do something about the current federal funds rate, which seems to elicit a fair amount of concern because of the degree to which it has been narrowed?

MR. POTTER. I think there are some tradeoffs. Under some of the options you'd be more confident that the fed funds market as it is today would stay in place. However, you'd have more focus on the fed funds market. That means that you'd have a risk if anything goes wrong

in using that as your policy rate. So that would argue for making it more robust against those risks. Under the options in which the federal funds rate is less of a focus, I think you'd still want to have some solutions in there, because it's a relevant rate—is it about $11 trillion in contracts, OIS plus the futures? And we wouldn't want to give the impression that we were indifferent to how the federal funds market was reacting, given that people have already entered those contracts. So there would be two sets of reasons why you would want to "robustify" it, and Bill, I think, is going to say this, but one of the things that we think is a reasonable thing to come out of this meeting is to think about robustifying among all of these options.

MR. ENGLISH. Yes, I was going to say that. I think that, particularly for the options in which we'd continue to target the funds rate, it would be sufficiently awkward later on to say, "Oops, we can't target that. We have to target something else," that I'd be inclined to make a change sooner rather than later to make the rate more robust.

Everything raises communications issues and is complicated, but I think it would not be that complicated to say that we're going to continue to target overnight bank funding rates, we're just going to use a broader overnight bank funding rate, which would be a mix of the fed funds and Eurodollar rates. We think from the broker data that the Eurodollar transactions are three times what the fed funds trades are. That gives you a fair amount of trades to use for calculating the rate that you would target. As you can see in the chart that you pointed us to, aside from quarter-end, these things track very closely together. Look at the scale on the right-hand side—this is 1 basis point or something, other than at quarter-end. So really it's not changing things in a big way. We'd be targeting, in effect, something very similar to what we targeted before, but it would just be more robust as we normalize, and I find that pretty appealing.

MR. TARULLO. Thank you.

MR. FISHER. And really quickly, Josh, could you talk to us about the contractual aspects of it? If we went to the format Bill mentioned, can that deal with our contractual obligations—the $11 trillion in contractual obligations?

MR. FROST. Right. Just to clarify—

MR. POTTER. We're not lawyers.

MR. FROST. Yes, that's a good caveat to start with.

MR. FISHER. Not being a lawyer, let me ask you the question.

MR. FROST. So I think we don't have any contractual obligation. We, the Fed, have no contractual obligation.

MR. FISHER. No, no, but they exist in the marketplace.

MR. FROST. In terms of the market contracts, I think it really depends on the scope of the change. Generally speaking, the smaller the change, the safer it is. I think the conclusion that the staff came to was that including transactions that were quite similar in nature—something like Eurodollars and the fed funds rate—or changing the source of the fed funds rate from brokered data to the FR 2420, this new data collection we've started, are generally seen as being on the safer side of change.

MR. POTTER. This is partly because the contracts aren't well constructed. The main source for the federal funds effective rate is the rates posted on the New York Fed website, and then it appears in the H.15, and we are not very clear about where that comes from. It's just put up there, and it says the ones printed, I think. Governor Stein has been dealing with this issue on the reference rates. There's a lot of work that needs to be done to make reference rates more robust. We have a little bit of a margin in this world, because it wasn't that clear what the effective federal funds rate is.

MR. ENGLISH. With that said, let me fall back to saying that we're not lawyers. I think we would want to think more about this—

MR. FISHER. But Governor Tarullo is a lawyer. [Laughter]

MR. ENGLISH. —with our legal colleagues.

One possibility, for example, is that we could continue to publish the old fed funds rate on the old basis. It might become noisy for a while, but there would still be a rate that contracts could point to, and people could settle on that basis. Alternatively, maybe we could get away with making this change as Josh suggested. I think we'd want to think hard about that choice: what the legal issues are, what are the policy issues are, and what we want to do. But I think we could, if the Committee wanted to, target a broader overnight bank funding rate, and we could sort out one way or another how we would handle the existing outstanding contracts.

MR. FISHER. Thank you.

CHAIR YELLEN. Let's see. I've got two-handers. President Rosengren.

MR. ROSENGREN. Just a quick follow-up to Governor Tarullo's question. As long as the fed funds is 90 percent driven by the Federal Home Loan Banks, it seems like an odd market to be very focused on. So it seems like if we're going to include the federal funds market as an important component, it would be contingent on coming up with a strategy in which there was a very different composition of who was trading in the federal funds market. Clearly for option 1 and option 2—but when I get between option 2 and option 3, it's not clear to me how broad the fed funds market becomes. There will be some trades, but if this light blue is still predominantly coming from the Federal Home Loan Banks, the rate is not indicative of anything other than Home Loan Bank borrowing demand. And that seems like a very odd thing to target in monetary policy.

MR. POTTER. It's the FBOs' part. It's the arbitrage by the FBOs.

MR. ENGLISH. Because FBOs can pick up funds anywhere to arbitrage into IOER, it moves very closely with other short-term funding rates. It's not as if it has become idiosyncratic. It has not. It's still moving closely with other short-term funding rates. These trades are curious trades, and as Josh described, there are situations in which these trades might become much less frequent and the rate could become much more idiosyncratic. But, for example, if you moved to a broader overnight bank funding rate that included Eurodollar transactions and these fed funds transactions, I don't think that mix of transactions would look particularly peculiar.

MR. ROSENGREN. So if you generalize it, I agree, but if you were to just use the fed funds rate as what you were focused on, I'm worried it could be very idiosyncratic in a number of instances, and I question whether we want to be highlighting an idiosyncratic rate until we're more confident about how it's going to move relative to other rates in the various regimes.

MR. ENGLISH. So that's the reason to move to the more robust rate.

MR. ROSENGREN. Yes.

MR. POTTER. The interest on excess reserves rate is really what's driving this, and that's why it's got a tight relationship to the other rates. It's not because of the target we have for the federal funds rate, obviously, because the Desk hasn't done any operations for 5½ years.

CHAIR YELLEN. President Bullard.

MR. BULLARD. Thank you, Madam Chair. On this issue of the $11 trillion in contracts tied to the fed funds rate, would it be possible to say, or to hazard a guess—if we decide to deemphasize the federal funds rate and we advise people that maybe you shouldn't be tying your contracts to the federal funds rate, even though we're going to continue to print it for a while—about how long would it take for those contracts to run off and start being tied to something else?

MR. ENGLISH. The longest OIS contracts are pretty long.

MR. BULLARD. They're long?

MR. ENGLISH. They're clearing contracts out 30 years.

MR. BULLARD. Isn't there such a thing as renegotiation?

MR. ENGLISH. They could renegotiate, I agree, but the existing contracts are not short.

MR. POTTER. The futures could be shorter, but that's a pretty active market.

MR. BULLARD. I think it's a natural thing that, in the past, because the FOMC has focused on this rate, contracts were tied to this rate. But now we'd be saying that we're going to phase this out. And then, naturally, the private sector is going to react, and they're going to tie it to a different rate. That would be a fine way to go, and it wouldn't happen immediately, but it would happen over time. Is that a reasonable way to think about it? Otherwise, you've got to keep this market alive.

MR. FROST. Certainly new contracts would likely migrate to something else, but on the legacy contract issue, your point is well taken. There would be renegotiations taking place, but I think that's where the devil is in the details—how those renegotiations happen.

MR. POTTER. And this is a case in which the long-term framework is reasonably important. Making people migrate contracts to a rate that we then switch from would probably not look too good, if it made them switch twice.

MR. BULLARD. Okay. Just one more follow-up on this: We have examples of other central banks that have switched their target rate. So they must have also had this situation in which there were existing contracts based on their previous target rate, and then they switched to repo or something else. That must have caused a lot of renegotiation in all these contracts.

MR. POTTER. The euro area is an example, in the LIBOR cases we look at. There clearly you had to switch because you went from, let's say, 18 different countries to one rate, and there they would post the old rates if they were market rates. You could definitely do that. I do think that other countries are probably less important than the Federal Reserve in their effect on financial markets.

CHAIR YELLEN. President Lacker, did you have a two-hander?

MR. LACKER. Just a small comment. In the briefing documents, I learned some of the institutional details about the construction of the effective federal funds rate. No matter what we do, we need to do some work to bring that up to speed with regard to transparency and the relationship we have with the brokers, which I understand is purely voluntary. We don't have any agreement with them.

MR. POTTER. Over the past year and a half, we've been trying to improve that so it will be closer to an IOSCO-compliant rate. We're not there yet. We've made significant progress. We do have backup data from the FHLBs, as you saw in the fed funds memo. But you're correct. That is one of the things that we would definitely have to robustify. The FR 2420, which we started collecting at the start of the month, over the next year or so will provide us a pretty good way of producing a more robust overnight rate.

MR. LACKER. Would you switch entirely to that?

MR. POTTER. That's still to be decided. I think there's a lot of attractions in doing that because of how the data is collected.

MR. LACKER. So the other path you described that's taken a year, are there impediments you've had?

MR. POTTER. Yes. It's a voluntary submission by the brokers. We don't regulate the brokers. If you look through how you make a rate IOSCO compliant, it's definitely anchored in actual transactions, which is good. But for some of the other governance aspects of how you get oversight in the process and check that what the brokers are sending us is the correct data, it's going to be harder for us to put that framework in place.

MR. LACKER. I see. So what you're saying is that you'd have to ask them voluntarily to submit to an oversight regime, and you're not sure you want to do that? Or you've asked and they've said "no"?

MR. POTTER. One of the concerns we had at the time, particularly when this came up last year in regard to LIBOR, is that they might want not to produce the data because of the legal risks they might face.

MR. LACKER. Have you discussed it with them? Have you gotten to that point?

MR. POTTER. We have codified with them in writing what they're sending to us, and we feel more confident right now that this is going on the right path to be more robust.

CHAIR YELLEN. Okay. We're at the end of the list of questions. I would suggest at this point that we take a break for lunch for 25 minutes or half an hour and then come back to begin our round of discussion with respect to the questions.

[Lunch break]

CHAIR YELLEN. Why don't we now begin our go-round, and I'd like to start with Vice Chairman Dudley.

VICE CHAIRMAN DUDLEY. As the last SOMA manager to miss the target, I thought I'd start. [Laughter]

The staff has done a great deal of really high-quality work. I thought it was very balanced, and I really do appreciate that you got it out in a timely way, so we actually had some time to digest this. What I want to do is to summarize my own thinking after digesting all of this material. These remarks are going to be tentative, and I emphasize the word "tentative" for two reasons. One, I think we're going to learn a lot more as we continue with the testing program and as we start to go down this path, and, two, I don't think I have all of this figured out. As the discussion earlier today made clear, there are a lot of complicated tradeoffs here, and deciding exactly where you strike the balance, I think, is very difficult. So I also want to hear what all of you say because I'm sure there are things that I haven't thought of that you're going to point out to me, and that are going to change my own thinking about where that balance should be struck.

In thinking about the appropriate monetary policy framework over the next few years, I think it's important to start with what our key objectives are and then look at the potential tradeoffs between those objectives. Once you have the objectives well specified, then it's easier to see how one formulation might be better or worse relative to achieving the objectives or how you could make adjustments to minimize the cost of those potential tradeoffs. As I see it, I would frame the issue slightly differently than the staff in the sense that I think there's one main goal and then there are four subsidiary goals. The staff, I think, had six goals overall. I only have five. I combined two of theirs into one of mine.

The main goal—and this is the thing that I think we really want to stress as we go through this discussion—has to be good control over money market rates, both in fact and in terms of market participants' expectations. Now, I add that second piece about expectations because the expectations that our proposal will work well might be important in the early stages to keep inflation expectations well anchored before we actually demonstrate that we do have control in

fact. So I think it's important that it's not only good control in fact, but also expectations of good control as we're rolling this out.

Now, control over money market rates has to be the most important objective because it's most directly relevant to how monetary policy can be used most efficiently to achieve our dual-mandate objectives. So the focus should be on how we achieve the tightest linkage between our policy instruments onward to financial conditions and the ultimate outcomes that we seek in the real economy. Greater control implies less volatility and risk, and that should be consistent with a more efficient system of financial intermediation. Also, I think we have to be very careful not to lose sight of the fact that the instruments of monetary policy and the monetary policy framework itself are means to an end, generating a desired set of financial conditions to achieve our dual-mandate objectives, rather than the ends in themselves.

Beyond this main goal of control, I think there are a number of other subsidiary considerations, and I may not have thought of all of them, but the ones that strike me as the most important are: First of all, we want a regime that's most consistent with financial stability. I think that, in this respect, reliance on the overnight RRP facility is tricky. Does it add to financial stability, or does it diminish financial stability? We already had a discussion on this, President Lacker and I and others. On the one hand, it would seem useful to have an elastic facility that would provide safe assets in the time of crisis. This would seem to be utility-enhancing to those who are seeking to increase their holdings of safe assets. So that's the positive of the overnight reverse repo agreements in terms of financial stability. On the other hand, though, availability of such an asset might during times of crisis tend to tighten financial conditions as money flowed into the RRP facility from less-safe short-term assets. As we discussed, this could be ameliorated by cutting the target interest rate or adding liquidity by other

means. Also, we could address how elastic the RRP facility is in times of crisis by putting caps on usage, which we also discussed earlier.

The second subsidiary concern, I think, is minimizing changes to market structure and practices. The reason to put weight on this goal is that there are transition costs to any new institutional framework, and these costs are likely to be higher if the transition is deemed likely to be temporary rather than permanent, because then there will be two transitions rather than one. One important aspect in terms of the issue of changes to market structure and practices is the question of the federal funds rate as the FOMC's target. If the FOMC placed a heavy reliance on the overnight RRP facility, this might further undermine the stability and reliability of the federal funds rate, and that's a potential cost that needs to be considered and evaluated.

A third consideration is minimizing the interest costs to the Fed to achieve a given set of financial conditions. We didn't really discuss that up to this point. For example, if the term deposit facilities and the term RRP facility drive up the Fed's interest expense compared with the expense under an overnight RRP facility, this argues for relying more on the overnight RRP facility. Let's say the RRP facility is 10 basis points cheaper than term deposits. That doesn't sound like very much, but we have $3 trillion of reserves outstanding. So it's $1 billion dollars per 10 basis points per trillion. A billion dollars a year is real money. So I think we should put at least some weight on that goal. I wouldn't want to go to the Congress and explain why we didn't care about $1 billion in our decision.

The fourth issue is minimizing the amount of disintermediation activity that occurs outside the core banking system. I think there's a residual discomfort with encouraging a lot of disintermediation flows. I have to say I'm not really sure how much weight I want to put on this goal, but I do accept that, everything else equal, I probably prefer the money coming from the

banks to us rather than through money market funds to us. It's just hard to know why I feel that way, exactly, and how high a cost I put on that. I think the case for eliminating these flows through the money market funds is also enhanced if you expect to move back to a system with a smaller balance sheet, so that these flows from money market funds would turn out to be temporary rather than permanent. Say we make the overnight RRP facility with a very narrow spread, so we got a lot of take-up, but then we knew we were going to go back to a much smaller balance sheet in the future—it seems to me we would be generating a set of institutional changes for a few years that we were then going to ultimately undo in the longer term. And so that might be relevant to how we think about this.

So how do I balance out all of these objectives, which often conflict? On balance, my initial bias is to rely on the overnight RRP facility, subject to there being no big surprises from our testing, to set a floor under money market rates, and then to take steps to lessen the negative subsidiary cost from relying on the overnight RRP facility. I favor relying on the overnight RRP facility because I think that's the best tool to maximize our control over money market rates at the lowest cost. So far the tests have shown that this facility puts a firm but not ironclad floor under money market rates, and that it saves money relative to the IOER because it's set at a lower level.

In contrast, for term deposits and term RP, we would pay up more, but it's not obvious to me what the benefit of us paying more is. We're locking up reserves for longer periods of time at higher rates—that doesn't have any value to us. To me, the only benefit from a term deposit facility is that we get to show that there are fewer excess reserves in the banking system. But this seems to me mostly an accounting convention rather than substantive, because term deposits and overnight reserves must be very close substitutes. If they're not close substitutes, then we

have to really pay up to generate them moving from one to the other. The other advantage, of course, of the overnight RRP facility is that the governance would lie clearly within the province of the FOMC, and that may be a consideration for some.

So what about the costs associated with relying on the overnight RRP facility? I think these can be addressed in a number of ways. First, if one's worried about the potential degree of disintermediation out of the banking system, then the overnight RRP rate can be offered at a spread below the IOER rate, with the spread set at the level that best trades off control against the amount of desired disintermediation. Also, with a spread between the overnight RRP and IOER rates, existing money market rates would tend to trade mainly between the overnight RRP rate and the IOER rate, and I think this has the advantage of being consistent with how we've been conducting policy to date—with the money market rates trading generally between 0 and 25 basis points—so this would reduce the communications difficulties associated with liftoff. If the overnight RRP rate were set equal to the IOER rate, then the federal funds rate would likely trade above the IOER rate. I think it would be hard to communicate that shift.

So what would the spread be? There was a lot of discussion earlier about what the right spread is. I don't think we know what the right spread is today. This is something that we could decide after gaining more experience with this tool. Presumably it would be somewhat narrower than the current spread of 20 basis points, because the current spread results in a very low take-up of the overnight RRP—at only about the $180 billion mark that you cited as the high point for non-quarter-end and non-year-end periods. That's about 7 or 8 percent of the total reserves outstanding. So you would probably want it at a somewhat narrower spread than that. But the current spread could work just fine if we want to place more weight on not having a large

amount of disintermediation. It's really a question of whether we think we would have adequate control at a 20 basis point spread between the RRP rate and the IOER rate.

My view is that we shouldn't decide today what the spread should be. We should be deciding what kind of outcome we want in terms of the amount of disintermediation and the amount of control, and then we should set the spread most consistent with that set of objectives, because we don't really know the answer *a priori*. I would prefer that the discussion be about what outcomes we want, and then we find the rates that generate those outcomes, rather than that we discuss today what spread we want, not knowing what outcomes that spread would actually generate.

Second, if one's worried about the financial-stability risk of an overnight RRP facility, I think the staff has made it very clear that one could address this by imposing a cap. The cap wouldn't be binding during normal periods but would limit the volume of inflows during periods of market turbulence and stress. I think this cap could be an aggregate cap or it could be per counterparty. I am a little bit biased toward the limit on the counterparty because I think it means that you don't have to submit a schedule of rates that you're willing to take. You just say, "This is how much I want and this is how much I get." It also allows the counterparties to plan. They'd know exactly how much capacity they would get in a crisis situation. But I don't feel strongly about that choice.

The third thing I would say is that I would not rule out any option on the basis of transition costs, especially as there are steps that we could take to minimize those costs. So take the federal funds rate as an example. We have two issues with the federal funds rate. The first issue is, if our decisions on the monetary policy framework impair the federal funds rate, what happens to all the outstanding contracts that reference the effective federal funds rate. And the

second question we have is whether the federal funds rate is the right rate for monetary policy to target.

Now, I think the staff has made it pretty clear that the federal funds rate right now is pretty fragile. The federal funds market is not very big, and it's not very deep. The calculated rates rest mainly on the activity of the Federal Home Loan Banks. So my own view is that it would be better to address the federal funds rate problem independent of the decisions we make on the monetary policy framework, rather than hold the monetary policy framework decision hostage trying to keep the sickly federal funds rate market alive. So my preference would be to assess whether we could fix the federal funds rate by redefining the federal funds rate as representing banks' overnight wholesale borrowing, including overnight Eurodollar transactions. Initially we could do this by relying on the broker data—there are broker data for both overnight Eurodollar transactions and the federal funds rate—if we needed to do this quickly, and then over the longer run we could use the FR 2420 data to do this. My understanding is that if we defined the federal funds rate as this rate, it would be very close to the current federal funds rate—within less than 1 basis point over the past few years—and I think that the risk of contract frustration in this case would be *de minimis*. The rate would almost be the same rate. The changes that have happened to the federal funds market over the past few years would be far greater than what this change would represent in terms of what rates people would actually be receiving and paying.

With respect to what should be the target rate in the new regime, I think you could either switch to an overnight RRP–IOER corridor or you could continue to target the new, improved federal funds rate. Targeting the old, sickly federal funds rate is not something that I would suggest is appropriate. As long as the federal funds rate does not behave idiosyncratically and erratically, I think it would be okay to target the federal funds rate in this formulation. Then the

overnight RRP facility would just be a tool to manage the federal funds rate objective. But if the federal funds rate turned out to be idiosyncratic—jumping around, into and out of the range—then I think you'd want to reexamine that conclusion because you don't really want to be moving the overnight RRP rate and the IOER rate around to capture wherever the federal funds rate is moving if the funds rate is moving independent of other money market rates.

For the longer term, I don't see the decisions we make about our monetary policy framework over the next six months as ruling anything in or out. The fact is we're going to have to conduct monetary policy with a very large balance sheet for quite a while. So my view is, why not pick the most effective regime for that period, learn by doing, and have that drive the ultimate decision about the long-term framework—a decision that won't be made until much later and probably by very few, if any, of the people in this room.

I admit that I do see the attractions of a floor system for the longer term because it's easier to implement. There's no need to add or drain reserves each day. Shifts in money demand show up in quantities, not price, so there's less short-term interest rate volatility. And a floor system may, by supplying more safe liabilities to the financial system, add grease to the payment system and enhance liquidity. But I'm completely happy to defer discussion about where we're going to go in the longer term to future Committees. I am confident that if we did use the overnight RRP–IOER rate corridor for several years, it would still be relatively easy to move back to an old corridor-style system with limited reserves. As the balance sheet normalized, the overnight-RRP-to-IOER spread could be allowed to widen, where the cap on RRP usage could be lowered, and as you did that you could just gradually move back to a corridor regime.

Summing up, how does this translate into the seven questions posed by the staff? The first question was, should the Committee continue to target the federal funds rate? I'm agnostic

about whether the funds rate should be targeted or not as long as the funds rate is stable and not idiosyncratic. If it's idiosyncratic, I don't want to target the federal funds rate. I think the important decision is that we need to fix the federal funds rate so that it's robust to whatever decisions we make with respect to monetary policy.

So the second question is, if we shifted away from the federal funds rate, what would I prefer? Well, I strongly prefer to fix the federal funds rate. That's what I'm for.

Third, what do I think about relying on the overnight RRP facility? Well, as I made pretty clear, I think the overnight RRP and the IOER rates in tandem, with a spread, is an attractive option, and how wide that spread is depends on how much take-up we want for the overnight RRP facility.

The fourth question was, how much divergence do we think would be acceptable between the targeted rate and the IOER rate, and how much volatility would be acceptable? I don't think the issue is so much about divergence. I think it's really about control and volatility. So if you told me that the divergence was 20 basis points but it was really stable at 20 basis points, I would find that completely acceptable. I think it's really more of a question of how much you're moving around, because if you're moving around a lot, then you're probably losing control over financial market conditions. As long as volatility is contained within a range, that's certainly adequate control in my opinion. I don't think you need much greater control than, say, 10 basis points because, you know, look at how monetary policy has been conducted for a long time. We move the federal funds rate in 25 basis point increments. It's sort of hard to argue why you need greater control than 10 basis points. You change the monetary policy setting in much greater increments.

The question on higher net interest expense, I think it's a definite negative. I think if you're going to spend more, you've got to justify what you're getting in exchange for that additional expense. So if we're spending $1 billion more per year, I want to know what I'm getting for that.

The sixth question was, given the testing that's been done to date, what should we eliminate? I would eliminate options 1 and 5, probably 4 as well. Right now, I sort of land between 2 and 3. That said, I do support further testing. While we're still buying assets, I think we can test with very low risk that market participants will misconstrue this as foreshadowing liftoff.

Seven, I don't really favor using the term deposit accounts and term RRPs as draining tools, but I'm perfectly happy to do the test to see how they work and to see how much the take-up is for the term deposit accounts—the elasticity of demand with respect to changes in interest rates. Thank you.

CHAIR YELLEN. Thank you. President Lacker.

MR. LACKER. Thank you, Madam Chair. Let me begin by thanking the staff for a marvelous set of memos. They were very informative about the mechanics of controlling short-term interest rates.

I particularly like memo 4, on alternative interest rate targets. It reminds us that in the past the FOMC implemented policy by managing "the general level of interest rates," and that no particular interest rate is etched in stone as the only appropriate target instrument. It also shows how the process by which we came to adopt the effective federal funds rate was an evolutionary one. Sometime in the 1980s, it just evolved as the conduct of policy evolved. Nonetheless, the

FOMC over that period managed successfully to set monetary policy on a course that led to a long period of low and stable inflation.

The memo lays out a number of overnight interest rates the Committee might target, recognizing that each is subject to its own shocks. But, nevertheless, it is striking how closely the various overnight interest rates track each other over time. The memo also notes that monetary policy arguably works best not through overnight rates directly, but through their effect on medium-term interest rates, and I think this is important to keep in view as we discuss these issues. So the expected path of overnight rates over an intermediate horizon is more important than the level of overnight interest rates on any given day. And because of this, in the past we have conducted policy in a way that has tried to make the federal funds rate target persistent and changes persistent and predictable, even though the effective rate could be volatile, to a great degree, from one day to another.

So with this as background, my working hypothesis is that day-to-day variation in the spreads between various overnight interest rates is of secondary importance for the conduct of monetary policy. This is consistent with our experience prior to the crisis, when the spread between the effective federal funds rate and the overnight repo rate was quite volatile. For example, from 1991 to 2006, the spread was below negative 19 basis points 10 percent of the time and above positive 15 basis points 10 percent of the time. And that did not appear to cause any problems for the implementation of monetary policy. I don't recall it being remarked upon at the time or the Committee considering any steps to try to address that issue. More broadly, when we raised the federal funds rate target under our previous operating regime, we were very confident that a wide array of short-term market interest rates would fall in line. That confidence

rested on experience, but it also rested importantly on the logic of arbitrage by market participants.

So the question is, can we have confidence that arbitrage will similarly limit variation in spreads between overnight money market rates in our current regime? My sense now is that we can. Many large domestic banks are ideally positioned to carry out this arbitrage. They have substantial portfolios of unencumbered, high-quality assets. They can use these as collateral to borrow in the RP market and leave the proceeds on deposit with their friendly local Reserve Bank. For sure, there are incremental costs associated with this arbitrage—for example, the FDIC insurance premium and the shadow cost associated with the leverage ratio. But these are finite and relatively well defined. They don't seem likely to vary with the level of interest rates, and so it doesn't strike me as likely those spreads are going to widen as we raise interest rates. I think they are likely to remain stable, and I think they are likely to be what pins down the general relationship between market rates and the interest rate on excess reserves.

Conversations my examiner staff had with a large bank in our District indicate that, for them, there is a breakeven spread between the overnight RP rate and the interest rate on excess reserves, and it's about 15 basis points. So at a repo rate of less than 10 basis points, this large bank would find it very profitable to borrow in the RP market in order to earn the interest rate on excess reserves. It turns out they used to do this trade in large amounts, but they don't anymore, and they don't because of supervisory pressure. Over the past several years, the System has been discouraging banks from engaging in so-called matched-book repo trades in which they borrow in the overnight RP market and lend, sometimes at term, in the form of reverse RPs to enable their private-sector clients to fund asset positions. These operations involve counterparty risk and maturity transformation, and, thus, our supervisors rightly discourage them. But this

discouragement seems to have been taken by examiners in the field and by the banks themselves as applying more broadly to arbitraging the RP market and the interest rate on excess reserves.

Now, it's not clear that this makes any sense at all, because counterparty risk on Federal Reserve Bank deposits is, arguably, negligible. And if the bank lost access to RP funding, then its Fed deposit would simply roll off, and that would be the end of it—there wouldn't be any other damage. I'm not aware of any serious discussion about this at the System level. There could have been some discussions I wasn't privy to. But as part of our learning process this summer, I think we should be talking about this, because we might have inadvertently discouraged some arbitrage that would make economic sense and would help us implement monetary policy more effectively. In any event, absent this supervisory consideration, it looks as if the fundamentals are consistent with a spread in the neighborhood of 15 basis points, and that is something I think we surely could live with. As Vice Chairman Dudley pointed out, it's a large spread, historically speaking. But if it doesn't vary much, I think that that would be a perfectly suitable mechanism to rely on.

Because of this, I don't think we are going to need an overnight reverse RP facility on a routine basis to keep the RP rate moving in line with the IOER rate. I just don't think we are going to need it. So my preferred policy option, as we begin to tighten, would be to rely on the IOER rate. We would accompany this by providing a relatively wide target range for interbank rates chosen by the FOMC with the tacit agreement that the Board of Governors would then set the IOER rate at the upper limit of that range. The IOER rate is the most important determinant of the opportunity cost of short-term lending for most banks. We have complete control over it, and I think the policy changes would be easy to communicate in such a framework.

I would expect the overnight RP rate to generally trade between 15 and 25 basis points below the IOER rate, depending on how we correct this seemingly perverse supervisory guidance. Movements in short-term interest rates more broadly should closely track movements in the IOER rate, even if there is substantial day-to-day volatility. For influencing the medium-term rates that are important to us, I don't think that day-to-day volatility is going to cause a problem. Now, this relies heavily on the expectation that arbitrage of the type I described is going to be effective. I would just point out that we already depend very heavily on the presumption of the forces of arbitrage to keep interest rates on one-month Treasury bills, for example, in line with expected overnight rates, to keep interest rates on two-month Treasury bills in line with expected one-month rates, and so on. So this isn't some daring foray into mysterious science. This is something that is a part of how we do business around here and have for a long time. And as I've tried to probe the staff, I haven't seen any concrete reason to believe there is going to be an impediment to that arbitrage. Sure, we know about some balance sheet costs that will imply a wedge similar to the wedge between Treasury rates and municipals that people understand, the tax clientele effects. As President Kocherlakota points out, the financial system is rife with such spreads, but I don't think they are going to impede our future effectiveness.

Now, I can understand that while we all believe arbitrage is important and is likely to keep spreads stable and low, there may be some worrywarts out there with less than 100 percent perfect confidence in this notion. And so we don't want to be caught flatfooted, if spreads do end up, for some reason we don't foresee, widening more than we are comfortable with. One easy way to mitigate that risk would be to maintain the overnight reverse RP facility for a time as a deep backstop—say, 75 to 100 basis points below the IOER rate. This would make it analogous to the discount window on the opposite side of the rate. When we first raise rates, we

could keep the overnight RRP rate where it is now and just see what happens. There is a really good chance, I think, market rates are going to rise in tandem with the IOER rate, and we won't need to intervene actively in the RP market at all. And then we just let that RP facility sit there 75 basis points behind, or whatever it is, and trail. If that doesn't happen—we should know in a meeting or two, right? It should take a meeting or two to figure this out, and we'll know whether we have to raise the RP rate or not. And then we can bring this facility into action as an additional tool to manage short-term interest rates. But otherwise, it would be held in reserve as a cheap insurance policy in case of unforeseen developments.

So the point here is that we are going to find out pretty quickly whether we need this facility or not. And we don't need to make a decision now to commit to a permanent, once-and-for-all or for-the-indefinite-period change in our operating procedures. We don't need to pick the overnight RRP spread to the IOER rate right now, or before we make our first move. We can make a move in the IOER rate and see how it plays out. And if that spread is going to stay under 25 or 30 basis points, we should know in a couple of weeks, but certainly after a meeting or two, and then we could adjust accordingly. Let me emphasize one more thing. If the RP rates become divorced from the IOER rate, the question is whether the IOER rate or the RP rate is in the cul-de-sac. So we wouldn't need to intervene immediately. If the RP rate became disconnected from the IOER rate and if other market rates rose with the IOER rate, then it's not clear we should worry about it. That's worth keeping in mind.

Regarding the specific questions posed by the staff, for the first two, I'd support developing a more robustly defined interbank rate along the lines that Vice Chairman Dudley outlined.

Regarding question 3, about full allotment, given the IOER rate, I see no need to use the overnight RRP facility on a routine basis. I just don't think we are going to need it. I don't see a reason now to commit to heavy reliance on it. When we raise the interest rate on excess reserves, I think we should keep rates where they are now and see how it goes.

Regarding question 4, about how large a divergence would be acceptable, I'd be comfortable with a spread that fluctuated as much as 30 or 40 basis points from the IOER rate.

Regarding question 5, about net interest expense, as long as we have a large balance sheet, I think large interest expenses are inevitable as we raise short-term rates. I'm uncomfortable with a large balance sheet, for that and many other reasons, but I'm not concerned with the particular form that interest expenses take.

Regarding question 6, I would eliminate options that call for a narrow spread between the rate on full-allotment overnight reverse repurchase agreements and IOER rate. I think this would generate large, unpredictable flows back and forth between reserves and overnight RRPs. And the flows might be innocuous, but I don't think we have a good enough understanding to assert that or rely on it.

Regarding question 7, about additional testing, more testing of term deposits seems reasonable, but I'm not hopeful that they are going to prove to be, for reasons Vice Chairman Dudley alluded to, that much different than overnight deposits and, thus, that meaningful a reserve drain.

For the overnight reverse repurchase facility, what we really want to know is how the RP–IOER spread behaves in the absence of an active RP facility. That's what we really want to learn. I think we've learned enough about how this facility works. What we want to do is find out what happens if we raise the IOER rate and don't raise this facility rate. So I don't think we

need to do any more testing with the overnight RRP facility. I would keep the per-counterparty caps unchanged and retain the limit on rates for now.

There is some obvious further field research to pursue, and that has to do with whether other large banks that have significant portfolios of unencumbered collateral are positioned to arbitrage RP rates and the IOER rate; what they view as the plausible, breakeven rate at which they would be interested and at which it would be profitable to do that; and whether they feel dissuaded by supervisory guidance relevant to matched-book repo trade and the like. That's the kind of further research I'd like to see. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Fisher.

MR. FISHER. Thank you, Madam Chair. As you may remember, I was raised by Robert Roosa, and so I'm steeped, from back in the '70s, in the evolution of the operating system from Roosa to Volcker and the continuum on to Potter. So I'm not going to answer the 11 questions or 7 questions or whatever they may be. But I want to basically state some principles because I found today's discussion immensely illuminating. This was a bit of a document dump to me, and I appreciate very much the memos, but I think the way we illuminated it now with the discussion, we're all—at least I'm—much better informed. I appreciate very much the tutorial that you have provided us.

I'm not going to rule out anything at this juncture, although I must say, options 1 and 5 seem the least appealing to me, but I'm not going to signal that at this point, and options 2 and 3′ are seemingly preferable. But I think we need to have some basic principles, and I want to list five that I think we should be mindful of here. The first is that the FOMC's monetary policy influence should not be diluted. I think the FOMC's decision should be the main policy influence on the level of short-term rates. The operating system should give us—that is, the

FOMC—the tightest possible practicable control over the overnight money market rate. The New York Desk should follow our instructions. At the same time, I must say that I'm a little uncomfortable in trying to micromanage the New York Desk, and I'm not sure how easy it is going to be to find the right balance. That's just a personal insecurity on my part.

The second is that I think that whatever operating system we choose—and I mentioned this before—has to be consistent with the eventual normalization of policy implementation, and with the size and composition of the SOMA balance sheet. By the way, I don't think we're going to go back to a small balance sheet. As Mr. Lacker said, I wasn't in favor of one this large, but I think the dynamics have changed in the marketplace and we're not going to go back to the $900 billion balance sheet. We're going to have a substantially larger balance sheet, and, therefore, it is germane that we are focusing on the operating system.

A broader principle is that we need to be sure that the operating system does not heighten financial-stability concerns. The idea of caps on the ON RRP was discussed. Again, as I said earlier, I think we have to constantly be mindful of the fact that we're about one-fourth of the short-term funding market. We have to keep that in mind, and we have to make sure we don't exacerbate any financial instability instincts of the marketplace.

And then two very broad principles that are probably obvious to everybody else, but that I feel very strongly about. Narayana, in a way, raised this; I'm going to rephrase it. The operating system should not benefit the few—the FBOs, for example. It always has to be the handmaiden to this Committee's obligation to work for the benefit of the people and to keep in mind our dual objectives. That may be an obvious point, but I think we have to always bear it in mind, which leads to my last point of principle: However we handle this, we need to manage the political risk here. This is why it's important that we vet this fully during the summer—by the

way, I would be in favor of additional discussions, not just at this table, so that we all fully understand where we're going. Whenever you go through a transition, you raise questions, and it wasn't very long ago that we were in the Klieg lights and our independence was seriously threatened. I don't want to raise that risk again. I don't think it's completely settled out of the system, and while no one has mentioned this yet, I think we need to be deeply mindful of the fact that there is political risk here just because we're changing and we're evolving. And there's nothing wrong with evolving.

So I would like us to have further discussion on the subject. Again, coming from a markets background, I'm good at being stale. I did find these memos interesting reading, but until today's discussion, there were a lot of questions I had that I think needed to be filled in. I don't think it would hurt us at all to have some intermediate sessions and tutorials on this subject matter. We have to be absolutely confident in what we're going to do because we're going to put you on a stage in September, and I'm serious. This is a serious matter. Those are my basic principles, and again, I'm leaning toward variations of options 2 or 3, but right now I think we ought to keep as much on the table as we possibly can. Thank you, Madam Chair.

CHAIR YELLEN. Thank you, President Fisher. President Rosengren.

MR. ROSENGREN. Thank you, Madam Chair. Thank you very much to the staff for all the memos that you provided. It certainly has been thought-provoking, and I think this morning's discussion as well as the memos have probably answered some of our questions and then raised a few more, but thank you very much for that.

Like Vice Chairman Dudley and President Fisher, I'm starting with some guiding principles and then I'll answer the questions. The first principle, I think, is very similar to theirs. We should choose an option in which we are highly confident we'll be able to raise short-term

rates when we view that as appropriate. The reputational risk to the Federal Reserve from adopting a new instrument that does not have the desired relationship with short-term rates would greatly complicate exit strategies.

The second one that President Kocherlakota kind of alluded to, which I don't think was as emphasized in the memos, is that we should remain focused on achieving the appropriate macroeconomic outcomes. When we choose to tighten policy, we should choose our policy instruments in large part with an eye toward how effectively they influence the broader financial conditions we care most about.

Third, we should realize that we will still be learning by doing, because we have never before had such a large balance sheet. This would argue for a cautious approach when we initiate the first tightening, recognizing that the size of the take-up of the reverse repo facility, the volatility of that take-up, and the market reaction to our action are all quite uncertain. I was ready to cross that out if I had gotten a different answer to my question, but it stayed in.

The fourth one is that we should remain open to changing our tactics as we learn more about operating with a large balance sheet as the balance sheet evolves. Our previous exit principles evolved significantly as our strategies evolved. Hence, an important part of the exit strategy should be an acknowledgment that it may change, not only as economic situations change, but also as we learn from implementing the new policies.

Fifth, we have used the size and composition of the balance sheet as important tools for generating appropriate macroeconomic outcomes. We should maintain the flexibility to continue to use these tools.

And, sixth, whether or not the federal funds market is robust in the short run seems less important than our ability to effectively influence short-term rates more generally.

In terms of the questions that were addressed to the Committee—first question, during the period of normalization, I would focus on how effectively our policies raise short-term rates generally rather than focus on the federal funds market. As long as we have a sizable balance sheet, the federal funds market is likely to be somewhat idiosyncratic, and the behavior of the federal funds market will likely be sensitive to the size of the reverse repo facility, which will be quite uncertain with an open allotment.

For question two, I would initially focus our discussion on the interest rates we control, the interest rate on excess reserves and the reverse repo rate. Because these are new tools, there's a high degree of uncertainty about how market rates will respond to our setting of these administered rates. Once we have some experience with how market rates respond, we should revisit this issue.

On the third question, we should have an open mind about how we utilize the fixed-rate, open-allotment, reverse repo facility in the long run. We may find it to be an effective and important permanent tool depending on what our experience is through the normalization.

And for question four, I would initially begin with a very large spread between the reverse repo rate and the interest rate on excess reserves, similar to the spreads we currently see between short-term rates and the interest rate on excess reserves. As we develop a better understanding of how the size and volatility of the take-up is affected by the spread, we may want to narrow the spread over time. I would want to keep the spread large enough to minimize the likelihood of hitting the caps we are likely to need when we set the program. As we gain experience with how the size of the take-up is related to risk-on periods and the term structure of interest rates, we'll be able to determine the appropriate spread.

Regarding question five, our focus should remain solidly on achieving appropriate macroeconomic outcomes. Concerns about the financial costs of the various options in terms of the interest cost for the Federal Reserve should remain secondary to concerns about our ability to influence key short-term rates that are linked to households' and firms' economic decisions and, thus, to our ability to achieve our fundamental macroeconomic objectives.

Sixth, while I have an open mind, my preferred options would not be options 1, 4, or 5 during the normalization period. I currently prefer an option somewhat between options 2 and 3, though I could obviously change that preference as we learn more through the next year. As I said a moment ago, I would keep an open mind as to the appropriate operating procedure in the long run and wait to make any long-term decisions until we have a better understanding of the normalization process.

Finally, for question seven, while it is essential that we do some testing of the reverse repo facility to better understand its effects on short-term interest rates, I would wait to do large-scale testing of the facility until we have finished the taper. My concern is that such a large-scale testing could be interpreted by market participants as signaling a tightening before we intend to do so. I suggest that at the end of the taper, we gradually raise the reverse repo rate above the current level of the federal funds rate, but still below the IOER rate, possibly up to 10 basis points, to obtain a better understanding of how the facility works. After that, we might want the first restrictive rate increase to be small. For example, we could move the interest on excess reserves to 35 basis points, leaving the reverse repo rate at 10 basis points, to obtain a better understanding of the relationship between the interest rate on excess reserves and the reverse repurchase facility. So I would start off pretty tentative, get a better understanding of some of

the uncertainties that we still have, and once we learn from doing that, then I would proceed depending on what we learned from that exercise. Thank you, Madam Chair.

CHAIR YELLEN. Thank you very much. President Williams.

MR. WILLIAMS. Thank you, Madam Chair. Well, over the intermeeting period it seemed that winter finally arrived on the West Coast in the form of a blizzard of memos. [Laughter] Still, I, too, really appreciate the staff's hard work on these important issues, and I'm actually going to give a principle-free discussion of this topic, and I'm going to answer the questions as part of my discussion. So Simon, you're going to have to take careful notes.

I have two bottom-line takeaways. The first is that we should continue to target the federal funds rate, appropriately modified to include the broader set of transactions in the overnight interbank lending market during normalization. And the second is that we need a much better understanding of the issues before committing to a longer-run operating framework. I think I've already heard this said many times. But that implies that we should not take any near-term action that forecloses options in the future. I'm going to elaborate on each point.

First, by continuing to use the federal funds rate as our headline policy instrument, we will greatly facilitate policy communication during the normalization period. The federal funds rate may not be perfect and isn't perfect, but it is familiar, and before we can consider safely shifting to a new instrument, we need further experimentation and a greater understanding of the consequences, both intended and unintended.

In particular, the discussion today has made it clear that although we've made substantial progress in testing alternative tools, there are still many important unresolved issues. The overnight reverse repo facility has worked fairly well at putting a floor under short-term money market rates, and I support further testing, particularly with an eye toward learning how the

reverse repo facility affects the functioning of the interbank lending market. There is some worry that the fed funds rate will decouple from other short-term interest rates, potentially in a nonlinear fashion as the reverse repo rate rises toward the IOER rate. That would pose a potential risk to our communications strategy. More experience with testing that tool can help clarify this risk. While I'm in favor of additional reverse repo tests, with the goal of using this tool actively during the transition period, I'm inclined to put the Term Deposit Facility and term reverse repos on the back burner. I think the IOER rate and the overnight reverse repo facility will give us plenty of control over short rates for implementing monetary policy. The term tool should only be needed as a backup to be called upon if our other tools fall short.

Looking ahead over the next couple of years, I'm confident that we will quickly learn to fine-tune our approach once it's implemented. The control of interest rates will rapidly improve as we gain experience with adjusting interest rates in the context of a large balance sheet and learn to calibrate our procedures appropriately.

One practical path forward would be to continue to set a target range for the fed funds rate using the overnight reverse repo and IOER rates as implementation tools. The calculation of the fed funds rate could obviously be modified to include Eurodollar rates to reduce the sensitivity to idiosyncratic factors, as described in the memo. With experience, we'll learn the best procedure for setting the overnight reverse repo and IOER rates or spreads to keep the new, improved fed funds rate near the center of the target range. Over time, as our understanding of this new approach improves, we could narrow the target range for the federal funds rate or move back to a single value for the target rate.

My second point is that we don't need to commit to a long-term operating framework today. The corridor system has served us well in the past. All short-term interest rates have

moved together very closely, especially if you look at them on a monthly-average basis, which is enough for effective policy control. It's possible that the floor system could work even better at some point in the fairly distant future, but both the political and financial-stability risks could be sizable. Again, we'll be able to gather some useful information on these issues during the transition period over the next several years. Importantly, as I said at the start, because we'll be learning over time, we should not take any near-term action that closes off our options in the future. To my mind, this rules out the adoption of option 1 and perhaps option 2 because they could irrevocably damage the federal funds market. Thank you.

CHAIR YELLEN. Thank you. President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. Like everyone else, my thanks to the staff for a very impressive spectrum of memos that were very helpful. I thought you framed the discussion well as a starting point in a process of refining the Committee's approach, laid out the considerations and the tradeoffs, and pointed out the need for further testing, all of which I agree with.

Due to the preliminary nature of today's discussion, I am not going to present hard-and-fast conclusions on the questions raised. Rather, I would like to share how I'm framing my thinking and how I'm leaning on the key tradeoffs. In effect, what I'll present are my priors ahead of the Q&A discussion that just took place.

In reaction to the material in the staff memos, I am organizing my thinking by applying three tests to the five policy implementation approaches. The tests are control of overnight and short-term interest rates, communication ease and effectiveness, and serviceability of the approach over time. Let me flesh these out a little bit.

I favor approaches that seem to convey a high certainty of control over the policy rate and establish a relatively hard floor, especially in the first stages of normalization. The underlying principle is: Don't take a lot of risk with FOMC and policy credibility in the beginning. With regard to communication, I favor approaches that I can envision explaining without excessive contortions, both as an approach and in the particulars of Committee decisions, to both financial practitioners and the general public. With regard to serviceability over time, the chosen approach should be durable to the extent possible. I think we can probably preserve needed tactical flexibility or optionality within a scheme that varies the emphasis on tools, as contingencies dictate or conditions change, including the scale of the balance sheet. In that respect, I think it's important to communicate at the outset that we're not changing the theoretical framework of policy implementation and that our approach continues the focus on the usual transmission mechanism of influence over a broad array of market rates through direct influence on short-term rates. I think it's possible that the federal funds market might become more viable as a monetary control mechanism as the balance sheet shrinks. It might make sense, in my thinking, to de-emphasize the federal funds rate at the outset, for reasons that are well described in the staff memo, but to try to preserve its functioning with the idea of returning it to a more central role later on. However, I don't envision us holding to the centrality of the fed funds rate target in the early stages of normalization.

Now, to get a little bit more specific regarding the options, I lean toward options 1, 2, and 3, versus options 4 and 5. I think it's advisable to establish a hard floor through emphasis on administered-rate setting through the IOER rate and the overnight reverse repo rate. I think there is something to be said for the simplicity of option 1 with the IOER and reverse repo rates equal, as they are basically equivalent assets, but I don't dismiss the concerns about financial stability.

I am inclined to think that some sort of allotment-cap approach might reasonably address this concern. I would like to see further work done on the financial-stability concerns before we decide the very important question of differentiated or equivalent IOER and reverse repo rates. The balance sheet may stay quite large for quite some time, so I'm skeptical about the effectiveness of the term draining tools as a way to exert complete enough direct monetary control. As I read them, with their reliance on draining operations, options 4 and 5 may present challenges.

Longer term, a viable federal funds market that provides a daily market signal of demand for reserves seems to me to be worth preserving. In that sense, option 3 is attractive. The viability of the funds market is a still-open and pivotal question, in my view. What are the control risks inherent in running a policy with emphasis on a small federal funds market dominated, at least in the beginning, by the Home Loan Banks? Would a policy change by the Home Loan Banks throw a wrench into option 3? Is the control risk associated with trying to maintain the fed funds rate as having a central role worth accepting? I would appreciate more staff work and discussion on these subjects.

It does seem to me that the staff has tried to set out distinct options for the sake of discussion, but combinations that involve mixes and matches are feasible. It is not clear to me that some use of the term draining tools could not be in the mix while implementing something like options 1, 2, or 3. So I do not object to further testing of the Term Deposit Facility. Overall, in response to the exercises presented, I settle mostly on option 2, maybe option 3, with more confidence that the fed funds rate won't behave idiosyncratically. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Bullard.

MR. BULLARD. Thank you, Madam Chair. I'm going to divide my comments into two parts. The first part will be about how the exit strategy is related to the tactical issues discussed in the staff memos, and the second part will be to walk through the questions posed and give my perspective on those questions.

So let's start with relation to the exit strategy. As many of you know, I have advocated in the past a different exit strategy than the one that is outlined in the Committee's statement of exit principles. In particular, I have suggested that a LIFO exit strategy may be preferable for the Committee. LIFO means last in, first out. I suggested that the Committee's more controversial and experimental policies could be reversed first, as they were attempts by the Committee to provide accommodation after the zero lower bound was encountered in December of 2008. In particular, the balance sheet should first be allowed to shrink, but at a carefully controlled pace, and the pace of balance sheet reduction would become, for a time, the primary tool of the Committee, just as the pace of balance sheet expansion is at the present time. Even before revising the size of the balance sheet, LIFO would call for the reversal of the Operation Twist program put in place by the Committee in 2011.

The LIFO policy would have the great advantage that the Committee could take action to remove accommodation without raising the policy rate. The policy rate could stay much lower for much longer. At some point in the distant future, under a LIFO approach, the balance sheet would approach a more normal size and further removal of accommodation would have to come from increases in the policy rate. However, with the balance sheet back to a normal size, the Committee would then be able to resume targeting the federal funds rate, if it so desired, or it could turn to targeting another short-term interest rate, such as the repo rate. But the

complications of trying to maintain the large balance sheet and still influence the federal funds rate would be eliminated.

An open question, then, about what we're talking about today, is what are we doing with balance sheet policy as we are thinking about raising the fed funds rate? Is the balance sheet staying constant, or is it being reduced? If it's being reduced, isn't that tightening policy? If it's not tightening policy, then was balance sheet expansion not easing policy? I think there are some logical difficulties with some of what we're thinking about here in trying to deal with the policy rate issue separately from the balance sheet question. The Committee may wish to reconsider some aspects of the LIFO exit strategy in light of the discussion in the staff memos concerning normalization of a large balance sheet. In general, the LIFO exit strategy has much to commend it in view of the many technical issues the Committee now faces in trying to eventually raise the level of short-term nominal interest rates in the United States. The logic of first returning to our original pre-crisis, pre-unconventional policy situation before eventually attempting policy rate liftoff seems quite compelling to me.

If we wish to remain with the current strategy, which calls for attempting to raise the policy rate before any balance sheet reduction has been attempted, then the long list of questions posed at the end of the first staff memo becomes relevant. Let me now turn to those questions. As a general remark, I think that the questions posed refer to issues that are of only second-order importance relative to the principal macroeconomic issue, which is control or substantial influence over short-term interest rates in the U.S. economy. As the staff memo states, "Policymakers can be confident that they will be able to raise money market rates when the time to do so arrives, and that they will subsequently be able to exercise reasonable control over

rates." There is, however, one issue that may be of first-order importance, which is the financial-stability question, and I will refer to this question in just a moment.

Let me turn to question 1: Should the Committee continue to target the federal funds rate during the period of normalization? With a large balance sheet, I do not think the federal funds rate is a practical option as a target policy rate. The federal funds market is essentially meaningless as it exists today. Nor is it likely to gain economic meaning in the medium term. I see it as somewhat detrimental to the Committee's credibility to claim that it is this particular short-term nominal interest rate that we are most concerned about. I have also been influenced by the arguments that the Committee should try to influence a short-term nominal interest rate with more economic meaning, such as repo, which is decided in a thicker market with many more players trading.

I like the following analogy. Suppose we are trying to influence the general price of fruit by intervening in the market for apples. One way to do this would be to buy apples from, or sell apples to, a particular grocery store at a particular location in the country until the desired level of general fruit prices was obtained. Given the way economic theory works, in principle, by arbitrage this would work to achieve the objective. But in practice, I think it would work much, much better to trade apples with a wide variety of grocery stores across the country. Something similar is going on with repo rates versus the federal funds rate, and to some extent with respect to the interest on excess reserves, which applies only to a limited set of institutions itself.

Question 2. In shifting away from the federal funds rate, would you support the development of a more robust measure of the overnight, unsecured bank funding rate to serve as a target? I think that this may be a difficult road to go down. Suppose we wanted to create an index of three different rates. If the three different rates move in lockstep due to a robust

arbitrage environment, there would be nothing to gain from aggregating the three rates. But if the strength of arbitrage were variable among the three rates, then the changes in the strength of arbitrage would show up as variability in the index, creating an undesirable barometer of the stance of policy. The index may move because the strength of arbitrage has changed and not because the policy stance has changed. For these reasons, I think that the creation of such an index may be problematic.

On the sub-question of "an administered rate versus a market rate," my staff questioned the meaning of these terms. We should be thinking in terms of the policy rule associated with a particular rate—that is, how the rate will be adjusted in reaction to economic developments—not whether we can label a particular rule as a market rate or as an administered rate. My staff said that a Taylor rule is really an administered rate—or is it a market rate?—because you are setting the target in reaction to developments in the economy, and that is informing the equilibrium of the economy. So they found this distinction to be moot.

Question 3. Are you supportive of a fixed-rate, full-allotment, overnight RRP facility? I'm generally supportive, although I'm anxious to hear the views of others on the Committee. I like the arguments about broader coverage, as I just mentioned. I see the IOER as covering an increasingly narrow segment of the U.S. financial intermediation sector, as President Fisher was talking about earlier today. I will consider arguments about the appropriate spread, but in general, I think the spread of zero would be a good place to start. That would be option 1. And then we could use caps if we are concerned about the uptake issue. I think if repo came to be seen as the main focus of policy, FOMC communication would be sharp and effective. There would be little doubt in the markets about where the FOMC stands.

Question 4. How much of a divergence between the IOER rate and the federal funds rate should be allowed? I saw this as a second-order issue if the federal funds rate is not a meaningful rate. We should be thinking in terms of reducing focus on the federal funds rate.

Question 5. Large net interest expense may be associated with some options. How comfortable are you with this? I'm definitely not comfortable with the expense aspect of several of the options. I would like sharper estimates of these costs. Because I am willing to simply sell assets, if necessary, I question the idea of incurring substantial costs in order to be able to keep the large balance sheet. If it is expensive to keep the large balance sheet, why keep it?

Question 6. If all approaches work equally well, which would you prefer? If they all work equally well, one differentiator between the various approaches may be the financial-stability issue. I have already mentioned that this is a first-order concern for the Committee. I certainly agree that we do not want to be encouraging or exacerbating financial instability through the adoption of an operating regime during the normalization process for monetary policy. However, I see existing theories and ideas on this matter as insufficiently developed to give us clear guidance as to whether a particular operating regime during the normalization process is likely to enhance or reduce the probability of entering into a financial crisis in the future. In such theories, much would depend on other actions the Federal Reserve might take to reduce the probability of a crisis or to mitigate a crisis once one develops, quite apart from the choice of a temporary operating regime itself. My judgment is that we should not make choices on operating regimes based on the possible implications for financial stability, even though this is a first-order concern for the Committee generally.

And finally, on question 7, additional testing. In general, I am comfortable with additional testing as suggested in the memos. Thank you, Madam Chair.

CHAIR YELLEN. Thank you, President Bullard. President Plosser.

MR. PLOSSER. Thank you, Madam Chair. Like everyone else, I want to thank the staff for the outstanding memos. It was a lot of reading, but they were very informative and useful. And thanks to you, Madam Chair, for our discussion this morning; I thought it was a great opportunity to have people talk about a lot of different things. I thought it was very helpful and a productive session.

As I said last meeting, my gut reaction tells me that it's very hard to talk about tactical adjustments when we don't know where we're going. I used the phrase "Yogi Berra" last time, when I said that you've got to be careful if you don't know where you're going because you might end up somewhere else. And I think we have to be careful about that, but, unfortunately, it's pretty clear that the Committee isn't ready to make that kind of long-run decision about where we end up, and I understand that. So that means my guiding principle in the meantime, much as I think Vice Chairman Dudley suggested, is that as we decide among these options on the table, we don't want to pick options for the near-term tactical decisions that would preclude our options in the future. So we need to keep our options available to us. I think our goal today should be to try to eliminate some of the options that have limited support, so we can focus more exclusively on those that are feasible and perhaps promising and do more study on those.

I will give my own preference for the long run. My own long-run preference is for us to return to something that looks like a corridor operating framework, with some market or interbank interest rate as our target in the corridor, and with the Federal Reserve holding a relatively small portfolio comprised mostly of short-term Treasuries. This framework is consistent with the exit strategy principles we laid out in June 2011. So I don't really favor any option in the short run that would preclude us getting to that as our long-run operating

arrangement, because as I said, that sort of corridor system worked well for us in the past. Yes, during the crisis and with our large balance sheet, things have changed. But there is no reason that that system couldn't work well for us in the future as the balance sheet shrinks.

I think the other thing to keep in mind is that, as President Lacker made clear, monetary policy is more than just control over the precision of the short-term interest rate. Monetary policy decisions tend to look like a path of interest rates, and so we could become too obsessed with movements in the short-run rate, if we're not careful, and let that guide our decision. I think we need to keep that in mind; that was a good caution on his part.

With these caveats in mind, my own assessment is that I rule out option 1, which involves a full-allotment, overnight reverse repo facility rate that equals the IOER rate. Even if we choose to rule out option 1 now as a tactical step in the short run, it doesn't preclude us moving back to that sometime later if we decide that some of our options that we do pursue turn out to be less attractive for one reason or another. Yet if we adopt option 1 now, we may eviscerate the interbank lending markets, whether it be the federal funds market or other interbank lending markets, to the point that it would be hard to go back to them once we started targeting an administered rate. It would be hard to go back to a market rate. I think going with option 1 now does not preserve our options in an attractive way to me. I am concerned about some of the financial-stability issues that were raised about option 1 and the implications that facility might have. During a period of financial stress, a run of investors in the market to this facility seems like a real possibility that could create serious funding issues for some borrowers. More generally, I am not entirely convinced that the Federal Reserve should be the market's primary supplier, maybe even its sole supplier, of risk-free overnight assets other than currency. That is a big step, from supplying currency, to every other sort of risk-free asset that might be created.

And to make that argument simply on financial-stability grounds—that it makes it easier, as President Kocherlakota said, to do some things—I think we'd probably do those things anyway, and we'd figure out other ways to supply liquidity if we needed to.

The other thing that worries me a little bit in some of our discussions is some of the political risk, given the sizable expansion of our dealings with non-bank institutions that is required in these markets, such as money market mutual funds. I'd like to understand the consequences of that more broadly. I'm concerned about the implicit scale of these operations in a full-allotment system and the potential unintended consequences on the plumbing for the short-term money market. I think there are just a lot of ramifications we probably don't understand as of yet.

I have similar concerns about option 2, which is a lot like option 1, except with a very narrow spread below the IOER rate. So I kind of rule out option 2.

That leaves me with options 3, 4, and 5. Options 3 and 4 set an overnight rate of reverse repos far enough below the IOER rate to preserve the federal funds market or perhaps another interbank market of some kind. I think that's something reasonable to explore. Option 4 adds term deposits and term reverse repos. Option 5 relies on other term tools as well. I have to confess, I'm a little nervous with the term instruments. I would really prefer to stick with a market rate in overnight interbank markets or a reverse repo type-rate. Therefore, I have a little more attraction to options 3 and 4 than to 5.

As I said, I am open to redefining the federal funds rate or how we define the interbank market rate. I'm open to different ways of thinking about that, whether it be Eurodollars or some other construct. But I'd like to know more about the types of traders in this market. What's the scale of it? How much would we have to intervene? What would the size of our balance sheet

have to be in order to effectively function in that market? Can we identify trades by different types of traders? The staff acknowledges that there are some legal ramifications here to redefining the fed funds rate. We talked about those. I think we can get over those in a reasonable manner.

The Federal Reserve and other regulators have raised serious concerns about money market mutual funds. And yet, as we broaden our definition of the market rate or administered rate and the counterparties we have to deal with, we are beginning to rely on money market mutual funds as the primary transmission mechanism of monetary policy. Can we square our two views of regulation of money market mutual funds with using them as our primary transmission mechanism? I don't know the answer to that, but I think it's something we should give some thought.

More generally, I'd like to know more about the evolution of the Federal Reserve's balance sheet under each of these options, in terms of its size and its composition in terms of short-term versus long-term assets that would be implied. What would be the path of remittances? I do have concerns about the Federal Reserve's exposure to interest rate risk under some of these options and what it entails for our remittances. And I think we could be exposing ourselves to considerable political risk in this process.

Indeed, I found all the memos a bit strange in that the reason we are engaged in this activity is that we have created a very large balance sheet. I mean, we did it, and so we are dealing with those issues, and in all of these memos we didn't talk about what's happening to the balance sheet and how it would be affected and how we want to manage that. I think President Fisher alluded to this, and President Bullard alluded to this. Thinking about our short-term strategies, without thinking about how we are going to manage the balance sheet in the future,

seems to be breaking this up in different pieces that may not be very productive. I think we need to think about our balance sheet more. We need to think about how we envision shrinking it. And, by the way, as the balance sheet shrinks, the kind of problems we are dealing with become less of an issue. So that is another way to deal with these issues.

Regardless of which of these options are adopted, we need to start thinking about how to reduce the size of our balance sheet and how we can return it to a more normal size, sooner rather than later. Does that mean doing things like beginning to either slow or eliminate reinvestment policies? I suggested at an earlier meeting that, when we get to that stage, maybe one of the things we do is reinvest in short-term Treasuries rather than MBS and long-term Treasuries, as a way to create a more flexible structure of the balance sheet in terms of its composition, which might be helpful as well. So we need to think about some of those things in conjunction with our operating framework.

Finally, before I get to the quick answers to the questions, I am open to setting a range for the fed funds target. I think in the near term—several people have mentioned this—we can stick with a range; the markets have kind of gotten used to that for the time being. Let's experiment with how big the spread becomes as we raise the IOER rate. Do we need reverse RRPs to set a firmer floor under the lower part of that range? I think those are interesting things that we can learn in the short term as we begin to move forward. We may find that we don't need to do it. Maybe the spread doesn't widen as the IOER rate goes up. I don't know the answer to that. So I think those are things that are important to get a better handle on, and I think proceeding in that direction might be very, very helpful.

I've answered most of the questions, but I'll give a quick summary of the answers to the questions. As to the fed funds market versus a more robust interbank market rate, I'm all for

exploring different definitions of a robust interbank market rate as a market rate that we could target. I think that's something worth exploring. I am not in favor of going to the full-allotment overnight RRP facility at this point. I think we can always revert to that later on, but once we revert to that it's going to be very hard to move back to anything else. And I think I still have just too many questions and concerns that.

The fourth question. What's the spread that is tolerable? I don't have a real strong view about that. I think that, as I pointed out earlier—and as I think President Lacker pointed out—what is really important for monetary policy is not what the size of that spread might be, but whether it is a useful signal for the path of monetary policy and whether other market rates are moving more or less in tandem with that.

Regarding net interest expense issues and remittances, I think the stuff talked about in the memos are sort of peanuts compared with the fact that we've got this huge balance sheet. We've got $3 trillion of reserves. We get the IOER rate up to 200 basis points, and that's $60 billion we are giving to banks, not giving to the U.S. government in some accounting sense. Whether or not we are using an RRP facility versus the Term Deposit Facility is going to be peanuts compared with that number. That is where our political risk arises, I think, not in the different methods we're talking about here. That's really all about our balance sheet, and nothing in these memos really talks about that. I think we need to think more about the balance sheet.

With regard to further testing and the different spreads, I'm all fine for options 6 and 7, which is more testing. I do not want to go to the full-allotment test. I don't think that's called for at this point; I think that's something that we reserve. If other things don't work out, that's something we may want to consider, but I wouldn't want to go there yet. Thank you, Madam Chair.

CHAIR YELLEN. Thank you, President Plosser. President Evans.

MR. EVANS. Thank you, Madam Chair. And thanks to the staff for a lot of hard work on the memos. We have known for some time that our eventual policy normalization would be challenging. As our discussion revealed just now, there are several ways to proceed. I expect that we will continue to narrow our proposals over the next several meetings until we arrive at a workable and effective consensus approach.

I have just a couple of comments at this point. I think our monetary policy task is relatively straightforward. We want to preserve our ability to adjust a short-term policy rate when it comes time to impose more restrictive financial conditions. As Vice Chairman Dudley mentioned, this is really the most important objective, and I think most everybody around the table has echoed that.

I personally believe that the time for tightening is not near. My submission for the March Summary of Economic Projections had the first policy rate liftoff in the first quarter of 2016—if anybody didn't already know that. But of course, we do need to plan. We have a variety of interest rates that we could employ: the IOER rate, the overnight reverse repo rate, the fed funds rate or its next generation, the GC repo rate, and others. As long as these candidate rates remain relevant for the pricing of other market interest rates in the U.S. credit and intermediation process, any of them might work as the primary focus of our policy actions, it seems to me. I agree with President Lacker's comment that the volatility of the funds rate and of the other rates are really of secondary importance relative to our policy objectives. So until we have more discriminating evidence on the relative efficacy of the various approaches on the table, I remain relatively open-minded as to the best way to proceed on this front.

Now, that said, I found the briefing documents helpful for pointing out that some of these new tools could have a bearing on altering financial instability risk for the U.S. economy. Although the creation of overnight reverse repo assets—can we find a shorter way to describe that, please?—has some appealing properties for supplying much sought-after short-term safe-instrument assets, these new financial products may change the industry landscape, and maybe by a lot.

I'm quite sympathetic to President Plosser's point that we need to be thinking about the endpoint—others have said that, too—of where we want to be. And once I started thinking about what the long-term landscape of the financial industry might be because of the introduction of these nice, safe assets, I couldn't stop thinking about it, really. And I don't know how to disengage from that or finesse it. I mean, maybe we don't need to have a firm opinion about that just to make a decision in September. But I think we have to have that endpoint in mind.

It's not clear to me how this will work. For example, how would money market mutual funds that specialize in overnight reverse repo assets affect other money market fund assets and the credit instruments that are associated with them? Maybe this is trivial and negligible. That was sort of the commentary I got from the questions that I tried to pose. But I was focusing on the longer term; I'm not sure we engaged on that quite enough. I would want strong assurances that no unintended credit crunch could emerge for any important nonfinancial enterprise. I think that as we try to normalize policy, we are going to want to make sure that we don't somehow create some kind of mistake that affects the credit process. I'm also not sure how I feel about the possibility that our choice of monetary policy tools could significantly alter a large financial services industry segment. Perhaps this industry evolution is inevitable, but it does seem a bit far removed from our normal monetary policymaking considerations, as well as the more immediate

task at hand of ensuring our ability to raise short-term interest rates when the time comes. There is a lot we need to understand about these choices. But, again, I remain open-minded on the use of overnight reverse repo assets as an important element of our policy toolkit.

Now, regarding the seven questions, I am extremely pleased to say that I am in complete agreement with President Fisher. I don't really intend to answer those questions. [Laughter] I am open-minded. I will say that I don't think we should pay too much attention to the interest expenses that we are going to incur with these different programs. That's just not something that we normally think about when making tough monetary policy decisions, and I don't think we should start doing that now. I am sensing from other commentary so far that option 3 seems to be at the intersection of many participant views expressed already, and that could be fine with me. Although I have to say very seriously that I'm not sure I could pick option 3 out of a police lineup. [Laughter]. Thank you, Madam Chair.

CHAIR YELLEN. Thank you, President Evans. President Pianalto.

MS. PIANALTO. Thank you, Madam Chair. I was hoping that my last FOMC meeting would be fairly straightforward and would be on the shorter side. But once I started to receive the staff memos and the agenda, I realized that wasn't going to be the case. Indeed, this may end up being one of the longest meetings I will have attended. But, on a positive note, I have benefited from the learning gained by reading the excellent memos that were prepared by the staff and listening to today's rich discussion, and the longer meeting gives me the opportunity to spend more quality time with my FOMC colleagues. [Laughter]

On a more serious note, the number and length of the excellent background memos circulated to the Committee and today's discussion make it clear that the issues surrounding the normalization of monetary policy are among the most complex the Committee has addressed in

my 11 years of service. As an aside, only Chair Yellen, President Lacker, and I were here the last time the FOMC began policy normalization, back in June of 2004 when we raised the fed funds rate, and it was a lot simpler back then. But at the time, it didn't seem very simple.

I know that today's discussion is just a first step in a sequence of discussions that will be needed to eventually decide on a framework and to implement it. And because these discussions and decisions will rest with all of you, and with my successor, Loretta Mester, who will be sitting at this seat at the next meeting, I am going to be brief in my comments today. Rather than trying to give direct answers to the detailed questions put to the Committee, I will instead offer a few high-level comments that I hope will be of help to you when the time comes for the Committee to make some decisions.

There are two principles that I find to be helpful in evaluating the options for policy normalization. First, I believe that in the long run the policy instrument should be the federal funds rate, or an augmented federal funds rate or a similar market rate should the federal funds rate not prove to be viable. In my view, I think that the policy instrument should be one that is set by this Committee rather than just by the Board of Governors. We have discussed the related governance issues before, and I continue to believe that they are important. Basing policy on a rate like the federal funds rate clearly puts the responsibility where it is supposed to be, and that is with the FOMC. And such a framework helps with public accountability and transparency. Now, this doesn't mean that the longer-run framework cannot use rates that are administered by the Board of Governors to support a target for the Committee's policy instrument.

The second principle that I find helpful is that the best course of action will be one that does preserve a high degree of flexibility, as others have commented today. As the staff memos point out, there are many uncertainties surrounding normalization. As one example, we don't

know if the market behavior we observe in the small-scale testing of some of our tools will change in larger-scale implementation. Broadly stated, the Federal Reserve has never been in these circumstances before, and preserving the ability to adjust tools and approaches is likely to prove important.

So using these two principles, I have just a few comments to make on normalization. For one, during policy normalization, I believe that the Committee should continue to target the fed funds rate or a similar market rate. If that rate is going to have a role in the longer-run operating framework, I think that it should have a role in the normalization period. As the background memos describe, normalization approaches that make little or no use of the federal funds rate could kill off trading in the federal funds market, which would likely make it difficult to revive the market in the future.

My second comment is that it is desirable to draw on a range of tools during normalization to support the target for the federal funds rate, including overnight RRPs, the IOER rate, and the reserve draining tools. The memos make it clear that each tool has limitations, but a combination of these tools should be useful when the time comes.

And finally, I would recommend proceeding with caution. Over time, the staff has been able to develop a range of tools, and careful, gradual testing has taught us much about the efficacy of the tools. The Federal Reserve will need to continue with cautious testing of both reverse repos and the Term Deposit Facility, while at the same time clearly communicating that testing does not bear on the likely timing of policy tightening. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President George.

MS. GEORGE. Thank you, Madam Chair. I, too, want to thank the staff for setting up today's discussion. I found it very helpful this morning as we did the Q&A. And I, too, am

going to answer the seven questions in summary fashion and be brief, given the discussion we have had already.

From a practical standpoint, the elevated size of our balance sheet is likely going to preclude targeting the fed funds rate in the early stages of policy normalization, so I agree that we should be prepared to lean on the overnight RRP during this phase of the process. That said, at this stage, I would prefer not to abandon the federal funds target completely in a long-run strategy for steering short-term rates, because my own preference is for gradually returning the balance sheet to a more normal level. At this point, however, I am open to enhanced testing across a range of tools to provide optionality with respect to our framework.

I would also be interested in testing strategies for facilities that could support highly competitive money markets by encouraging a broad range of depositories, including smaller banks, to transact in short-term money markets along the lines of the segregated balance accounts. Testing a number of these tools may also provide some insight into how they interact with one another and affect short-term money markets. My preferred approach right now is to eliminate, as others have noted, the extremes presented in the memos, as we will likely need to do some learning as we undertake normalization. So, like others, I would focus primarily on options 2 and 3 at this stage.

In terms of the spread on the overnight RRPs during the normalization process, I would prefer to take an approach that maintains a wide spread to the IOER rate and move cautiously toward full allotment, and continue to utilize counterparty caps for the time being. I would support taking steps toward moving the overnight RRP toward 15 basis points by the end of the year, simply to ensure we have a reasonably well-developed sense of how well it acts as a floor. And after liftoff, I could also see even a wider spread between the overnight RRP rate and the

IOER rate, perhaps as much as 25 basis points, to assess how well this rate acts as a floor. If it's effective, then we can possibly continue targeting the federal funds rate via a floor system. If, however, it fails to act as a floor because of idiosyncratic reasons within the funds market, then we may want to consider expanding the use of term tools or reassess the use of the federal funds rate for implementing monetary policy.

CHAIR YELLEN. Thank you. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. Like others, I want to thank the staff for their hard work and thoughtful analysis on the various memos. I thought this morning's discussion was very enlightening for me, and I'll echo President Fisher: I think that I, at least, would benefit from having further, possibly intermeeting, conversations about these issues as we move forward to a decision point, I guess in September.

Before I launch into my prepared remarks, I just want to make one comment that there has been a lot of talk about learning by doing and learning as we go along. And I think this is, of course, going to be really important whatever we end up doing in terms of exit. But I do think we have to have a framework for thinking about exit that is robust enough to deal with the possibility that inflation risks might arise that would require us to raise rates relatively rapidly. And whatever we end up doing, whatever framework we set up should be robust enough to deal with that possibility. I'm not saying that we are there right now, but I think the idea of just groping along might not be possible given the macroeconomic objectives that we are trying to achieve.

I'm going to begin by making three high-level comments about the deliberations and communications. These first three high-level comments are relatively firm, and then I'm going to be a little more speculative and tentative in suggesting a way forward. I haven't said this for a

while, but it's a pleasure to be able to say it. A lot of my comments are going to agree with much that President Lacker had to say. It's a pleasure to be able to say that after a long time. [Laughter]

In terms of my high-level comments, the first comment relates to the 2011 exit-strategy principles. In June 2011, the FOMC enunciated a set of exit-strategy principles with the support of all but one FOMC participant. Those principles emphasize the role of the federal funds rate target during exit, the likely role of asset sales during exit, the FOMC's desire for a small long-run balance sheet, and the FOMC's desire for an all-Treasury long-run balance sheet. I do think that when we communicate about our desired operational framework and, really, as we talk about it, we should be more connected back to those June 2011 principles. I think our new communications about exit are less likely to be viewed as credible if we are not able to provide a convincing or compelling rationalization for why we are deviating from the June 2011 principles. That is my first comment.

My second high-level comment is about communication, more generally, and monetary policy is fundamentally about expectations management. I think that the FOMC needs to be able to communicate effectively about the likely evolution of its policy stance. I think effective communication should be viewed as an important criterion for our choice of operational framework. I don't think we should be thinking about this as let's get the operational framework that will do the best job of reducing, say, the volatility of money market interest rates. I think, really, we should be thinking about what is going to be the best framework that will allow us to be able to communicate effectively about the future arc of policy. A complicated framework with multiple administrative rates and targets may well hinder that effective communication.

And my final high-level comment is about the possible risk to financial stability. As I mentioned in some of my questions this morning, I found the memos to be especially useful in my thinking and highlighting how an overnight RRP facility could increase the probability and severity of a financial panic. It is true that there is some upside with this facility as well, potentially mitigating these risks. But I see it as very asymmetrical. If the Federal Reserve's creation of a new overnight facility was seen as being responsible for fostering a financial panic in any way, I think that, first of all, that would be bad from a policymaking point of view, but it would also, of course, be bad from a reputational point of view. Before we were to go forward with implementing such a facility, I would like to have in place very strong safeguards to mitigate adverse side effects of financial instability. As I hinted at this morning in my questions, I am not convinced, at this stage at least, that the caps alone represent such a strong safeguard.

Those are my three high-level, relatively firm comments. I think we should be tying our discussions and communications about exit back to what we said in June 2011. We should be ensuring that our new operational framework is carefully designed to facilitate effective communication about the evolution of policy. And we should not adopt an overnight facility unless we have a great deal of confidence that we are not fostering the risk of financial instability.

Now I am going to be more tentative and turn to a suggested approach to exit and, as I said earlier, it is going to be similar to what President Lacker had to say. It's a relatively simple version of option 5: The FOMC specifies our interest rate target; the Board sets the interest rate on excess reserves equal to that target, and the Desk makes transactions in the federal funds market only to ensure the federal funds rate does not exceed the target set by the FOMC; and we don't use draining of any kind to ensure that the federal funds rate does not fall below the target.

That's the approach, and I'll state it again in a second. But why is this appropriate? My starting point is that the FOMC achieves its goals of maximum employment and price stability by influencing the incentives of banks to make loans. Operationally, before 2008, the FOMC shaped banks' incentives to make loans by varying a specified target for the federal funds rate. The crux of my argument is going to be that, given that we can pay IOER, the operational equivalent is now for the FOMC to specify a target for the maximum of the federal funds rate and interest on excess reserves. Now, we are always about shaping banks' incentives, and there are always gaps that emerged. If you look at the data, and President Lacker did a good job of talking about this, there are always gaps that emerged between our target rate and what was going on in money markets. Those gaps moved around, but it didn't get in the way of our ability to influence aggregate demand, which is ultimately what we're about.

Why is it the right thing to be doing, the operational equivalent now, to specify a target for the maximum of the federal funds rate and the interest of excess reserves? Well, right now, at any point in time, banks have a choice among selling federal funds to other banks, holding reserves, and making loans. That means that the bank will only make a loan if its return is higher than both the fed funds rate and the interest on excess reserves. Before 2008, the interest on excess reserves was zero, so you didn't have to worry about it. The only relevant alternative for the bank was the federal funds rate, and that's why you could shape banks' incentive to make loans by changing the target for the federal funds rate. After 2008, the Federal Reserve was allowed to set the interest on excess reserves to be above zero. Now, there are two rates that can be relevant: the federal funds rate or the interest on excess reserves. The key point is when the interest on excess reserves is higher than the federal funds rate, as it is now, banks then decide

whether to make a loan by comparing the loan's return with the IOER rate. The federal funds rate is irrelevant because it's dominated by the interest rate on reserves.

Now, I want to be clear about one thing here. We do see banks borrowing at rates that are lower than IOER, but that's their average borrowing cost. On the margin, their financing costs are going to be equal to the IOER rate, because otherwise they would have an incentive to make that marginal increase in their borrowing to invest in the high IOER. On the margin, they have to be indifferent between how they're financing and IOER. There might be other borrowers that are able to get that low money market rate, but the banks themselves are marginally indifferent.

That's what I see as a very simple exit strategy for the FOMC. At each meeting, the Committee should specify our desired target interest rate. The Board of Governors should set the IOER rate equal to that target interest rate, and then the Desk should conduct operations in the fed funds market, if necessary, to ensure that the fed funds rate does not exceed that target interest rate. There is no draining in this approach. Basically, when the federal funds rate is lower than the IOER rate, it is just not influencing banks' decisionmaking, so we can ignore it.

There are going to be gaps that are going to emerge between various short-term interest rates under this approach to monetary policy. Right now, the low federal funds rate means that the Federal Home Loan Banks are earning a very low overnight return on their investments relative to the IOER rate. More generally, not all loans in the economy come from banks. Borrowers who have access to the commercial paper market may well be able to obtain loans at more favorable terms than those offered by banks. But, as President Lacker pointed out, arbitrage considerations will limit such gaps. I will add that we do not have a theory to indicate to us whether such gaps are efficient or inefficient. And, finally, whether we did or not, that's

not the job of monetary policy. It is not to eliminate all gaps between short-term interest rates. The job of monetary policy is to shape aggregate demand by influencing the overall tightness of credit conditions, and we can, I believe, do that in an effective fashion by influencing banks' incentives to make loans. I am proposing a change to the June 2011 exit principles, which emphasize the role of the federal funds rate target. I think we can rationalize reorienting to the IOER rate by pointing out, as I have, that the federal funds rate is essentially irrelevant for bank decisionmaking when it is as low as it currently is. And so the relevant margin is the IOER rate. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. A number of people have characterized their remarks as tentative, and I will go a step further and say that mine are very tentative, particularly with respect to the final shape of an intermediate strategy.

I'll begin with a process point in which I actually have considerably greater confidence, and in some ways this picks up on a couple of President Kocherlakota's introductory remarks. I guess because of the desire that most people have to maintain optionality, on the one hand, and, on the other hand, the fact that we all acknowledge there's incomplete knowledge of a lot of what might happen as we begin to exit, I would suggest that for the next iteration of this exercise, as the staff generates materials for us, they try to generate them in a pretty concrete fashion that gives us a timeline in the following respects. One, what we would expect the Chair to say in September or shortly thereafter, which is both a matter of communication, as President Kocherlakota was suggesting, and an indication of what we have to decide by then. Two, an understanding of what kinds of decisions we would subsequently need to make before we're in a position to raise whatever the target interest rate would be at that time. The reason I suggest

doing it in that concrete way is that it will both let us see how the optionality and incomplete knowledge issues play out over time and test whether we feel comfortable going forward, or do we need to think this through more first. It might also allow us to agree that we can put off some decisions that are interesting and otherwise might divert us along the way.

Now, having just made that suggestion, I will—mindful of what Richard suggested earlier, which I think is absolutely right that we should bear in mind where we each think we may want to go—make a couple of comments about that potential final destination, particularly as it affects these intermediate decisions. I guess I would note first what some of you have alluded to, which is that the Federal Reserve has shifted its monetary policy regime a number of times over the course of its history—largely, presumably, in response to the changing circumstances of the financial system and the economy. One would think that a particularly appropriate time for doing so again would be in reaction to a major financial crisis and a huge recession that followed, that were themselves connected, I think, to shortcomings in the combination of monetary and regulatory policies that existed in the period preceding the crisis.

I mean, it does seem to me that the public policy framework had never taken account, ultimately, of the increasing integration of capital markets with conventional lending that occurred in the roughly 30 years preceding the crisis. And, again, echoing something President Fisher said earlier, the decreased amount of intermediation by banks meant both that there were questions about the effectiveness of monetary policy transmission, but, quite apart from that, that it was possible to build up substantial risks to financial stability in a fashion that was outside the embrace either of monetary policy as then pursued or regulatory supervisory policy as then pursued. As we sit here today, we've changed some of those circumstances, but not all. Unless one has enormous confidence in the ability and authority to develop time-varying

macroprudential instruments that could fully compensate for a lot of the shortcomings of the pre-crisis period, I think we do want to consider, at least intellectually, the possibility of a shift to a monetary policy regime that takes account of that increasing integration of capital markets and traditional lending and that gives us another option in connection with financial stability.

I'm thinking of the fact that as we have talked about financial stability from time to time over the last year or so, a number of people have made the very salient comment that they don't want to be put into a situation of tightening when there's such a macroeconomic problem, and so they've sort of raised the threshold for the amount of financial-stability risk that they want to see before doing so. It seems to me that if we can develop a monetary policy regime that allows for a more nuanced reaction to financial-stability concerns without a general tightening of interest rates that we will have progressed substantially beyond where we were a decade ago when, as President Pianalto mentioned, the FOMC was engaged in its last exit.

That leads me to the overnight reverse repo facility. I have to say it seems to me that it's highly desirable to have that tool and to continue to develop it and use it in the normalization process. I guess one could do without it, but it seems to me kind of clunky to try to proceed very far without using it. But I do think that it has some potential—and this was most obvious in the memo that Governor Stein helped the staff with, or the staff helped Governor Stein with, one way or another [laughter], a collective process—and there are a lot of questions around the net impact on financial stability of the particular approach to the use of the facility and the idea of creating a huge amount of safe assets. But I do think those are the kinds of questions that we need to tackle, and we have to think about things like the effect of our actions on risk premiums, particularly term premiums, and whether there is some way of pursuing a monetary policy that

can, in a calibrated fashion, affect, for example, term premiums without resulting in just increases in short-term rates.

In a moment I will—notwithstanding the tentativeness—try to give a few provisional preferences on instruments or ideas that are or are not worth pursuing. I did want to say something, though, in response to President Lacker's comments on supervision and matched books. It is the case that we've been pursuing a set of regulatory and supervisory initiatives designed to constrain the development and maintenance of very large matched books with private actors on all sides because of the potential for runs that then result in cutting off funding to the other side of your book. I am unaware of—unless the Federal Reserve Bank of Richmond is doing something they're not telling us about—any supervisory decisions within the LISCC to discourage the use of arbitrage with the IOER rate. And I will say I think the fact that the FBOs are doing it and the domestic banks are not is kind of a good real-world experiment because the FBOs don't have either the leverage ratio or the FDIC fee. The FBOs do have our supervisors, and particularly the Federal Reserve Bank of New York supervisors, crawling all over them on the liquidity problems and liquidity issues that have existed. I actually think the explanation that the memo suggested is probably more likely to be correct.

In concluding, as I said, I don't have a good sense at all, even a structure of a sense, of what our plan should be, but—I think this is probably what Bill English is looking for—in the interest of being able to say that some things are less worth pursuing and others more, I'll at least state a couple of preferences. I have already talked about the overnight reverse repo. Like many other people, I think we should try to fix the federal funds rate, and I'd echo what President Pianalto and others have said along the way. In terms of options, it doesn't feel to me as though either option 1 or option 5 are really viable, but I do want to be tentative on that. Like Vice

Chairman Dudley and President Lockhart, I've been having trouble seeing the utility of the Term Deposit Facility. Again, I don't want to say I'd rule anything out, but that's one that I find to be a less productive path to follow. I think I have already exceeded the number of useful things I have to say now, Madam Chair.

CHAIR YELLEN. Thank you, Governor Tarullo. Governor Stein.

MR. STEIN. Thank you, Madam Chair. Let me also thank the staff not only for the memos but for the many, many helpful conversations that we've had in the run-up to this. I won't try to answer all the questions. I'll just try to venture some general thoughts. I also kind of had the same reaction that President Fisher did, which is I know we don't need to be trying to answer the long-run question now. Nevertheless, I found it useful to start by thinking about the long-run question.

To me, the long-run question boils down to this: In the long run, what kind of money do we see ourselves being the provider of? I think there are basically two possible responses. One is, we go back to the old world in which we saw our franchise as providing currency and reserves. That's it. Alternatively, there's a world in which we see our job as providing not only currency and reserves, but also some kind of safe asset that's conceptually like Treasury bills—namely, our RRPs. These are two pretty different mission statements, and they involve potentially different balance sheet sizes, obviously quite a bit larger in the case in which you take on this other thing. Let me start by just trying to think about the pros and cons of these two different tasks for the Fed.

I actually think there's a good argument to be made—obviously provisional at this point—for broadening the way we see doing our job, and it's quite close to what Dan articulated in terms of financial stability. Think about our efforts on the regulatory side with the leverage

ratio, we thought about the idea of doing capital surcharges for short-term wholesale funding, and so forth. We're basically, in various ways, trying to lean against the private sector's efforts to create very, very short-term money-like claims, which they do when they basically hold long-term assets and fund them with repos. We sort of don't like guys doing that. Well, you might want to step back in all of this regulatory effort and say, "Why in the world are they doing it?" Well, they're doing it because it's cheap. It's cheap to fund at the very, very short end of the yield curve. Why is it cheap? Because somehow the world has not supplied enough of the sort of assets that money funds like: very, very safe short-term money-like assets. So they trade at a premium in price or, let's say, they have very, very low yields. If we don't do it, the private sector will. We can fight that with regulation, but, as Governor Tarullo says, doing it all with regulation is a heavy lift.

An alternative is to try to crowd it out by providing more of that stuff ourselves, and there's some empirical evidence that in fact when, for example, the supply of Treasury bills goes up, the specialness premium goes down—that is to say, the yields go up and the private sector backs away and does less of that maturity transformation stuff. The big, big picture here would be if we provide more repo-like stuff to the world, that eliminates some of the scarcity. We're saying to the private sector, we're going to do some of the maturity transformation and you're going to do less.

Now, is this a radical thing to do? Is this a radical way to think about what we're doing? I sort of thought about it like you guys did, like both President Fisher and Governor Tarullo did. The world is really changing, and it's more of a capital markets world, and so what is money has changed in some fundamental sense, and that would be the theory of the case. President Lacker pointed out—we had a conversation offline about this—that, back in the day, we didn't provide

currency. The private banks provided bank notes, and at some point the decision was made that that wasn't all that good for financial stability, so we took that job away from the private sector. This, in some ways, would be a bit of a modern-day analogue to that. That would be sort of the big pitch for doing this at some point.

Obviously, there are a bunch of cons. It's a serious expansion of what we do. There are political issues. There are all of the issues that we had earlier in the discussion about expanding the role of money funds, which I think are serious. I do think this idea of restricting our participation to purely Treasury-only or repo-only money funds changes the calculus somewhat. While I would be averse to expanding our footprint in the conventional money fund sector, I might be less averse to doing it this way.

By the way, I've always been kind of fond of the segregated balance accounts, and actually doing this thing with the riskless money funds is just another, and maybe a more elegant, legally and kind of operationally, way to do it. I mean, think about it from the perspective of a corporate cash manager. We're just trying to find something that corporate cash managers who are dying to have a safe asset can put their money into without having a subsidy. If they put it into Citibank, we worry that there's some kind of a subsidy there. If they put it into a money fund that's commingling risky and riskless stuff, we worry there's a subsidy there. But if they put it into something that's really riskless, maybe that's actually not a bad outcome.

There's the financial-stability flip side. *Ex ante*, it's good to take maturity transformation away. *Ex post*, if you are really the elastic provider at a fixed rate, there's this run risk, which seems like a very serious thing. But I think that seems tractable. I mean, you basically cap it. There are many ways to cap it, but then it's back to just being like a world with more Treasury

bills. At any point in time if there's a run, the price goes up, the yield goes down, and you have the same mechanism that you have normally.

Anyway, this is all long-run stuff. Based on what I know now, which is pretty limited, I would be sympathetic to thinking about this. There's no reason to try to do anything that particularly marches in this direction right now. I just would hate to see it fall off the table as well. I think we want to preserve optionality. I don't think that optionality goes away as long as the balance sheet is big, because as long as the balance sheet is as big as it is, we're very likely to be doing some repo funding and learning about how that works, learning about how our counterparties behave and all of that. We only really get to a fork in the road when the asset side starts wanting to go down, and we could go back to a world in which basically we don't need the repo funding. But, I think, for the next few years, there's really no choice on this dimension.

In terms of short-run stuff, let me start by just pruning the tree a little bit, and I think very much in the same spirit that many others have said. I don't see any reason to go to option 1 in the short run. Maybe in the long run, this view takes you somewhere close to option 1, but we don't know enough now to want to set this. That would be a pretty aggressive thing to do. We don't have any idea of how much quantity we would get by putting the RRP rate all the way up with the IOER rate. I don't see why you'd want to do that.

I don't particularly see why you'd do option 5 or even really option 4. I think Vice Chairman Dudley and a number of others have made this point. I'm not a fan, based on what I understand about the Term Deposit Facility. I do think this sort of maxim that we should try to fund ourselves cheap is not because we care per se. It's because it's the Friedman rule. Funding yourself cheap often is associated with good, normative properties. I think the TDF is a leading example. We would fund ourselves expensive to the extent that we get traction over the fed

funds rate by doing it with a TDF. My instinct is, it's because we've made the federal funds rate some really odd thing; we've managed to make them get rid of all their short-term overnight reserves by putting it in the TDF. Then some poor bank did too much of that, and they're scrambling for reserves at the end of the day. You manage to print the high funds rate, but fine, we've got the funds rate up, but it's now a rate that's pretty divorced from other market rates. I don't see the appeal of that.

What does that leave us with? Actually—and this is very much to Dan's question—what do we actually need to do between now and September? I think we're likely to be doing something quite a bit like what we're doing now, but just a little bit more—in other words, probably raising incrementally the rate on the RRP, increasing the quantity, tightening up the link. At some point we could be doing this literally between now and September or between now and liftoff. We'll start seeing that the range is whatever we think is an acceptable range, and at that point there will be some comfort in going out and talking about the range.

I actually think the biggest decision that needs to be made by September is not a decision about how it's going to operate but how we talk about it. In other words, here there's a fork in the road. You can say one of two things. One thing you can say once we've gotten enough tightness in the relationship is, "The Committee today in the statement announces the following target range for the federal funds rate." That's what goes in the statement; that's what gets talked about. Behind the curtain, Simon and New York are moving around the repo rate to make it tight enough, but that doesn't have to be talked about so much as a central policy thing. An alternative option, if we feel less comfortable focusing on the funds rate, would be to make the statement about, "Here's the IOER rate. Here's the repo rate." That's what we'll communicate. I don't have a strong view yet as to those. I understand there's sort of a conservative appeal in

the former. Maybe I will lean in the most gentle of ways at this point toward the former, but I think that's the kind of decision that does not have to be made now.

And, finally, I just would strongly endorse, whichever of those two one does, the virtue of robustifying the funds rate is an "unalloyed good" irrespective of those, and I think that's certainly something worth pursuing. Thank you. Thank you, Madam Chair.

CHAIR YELLEN. Thank you very much. Governor Powell.

MR. POWELL. Thank you, Madam Chair. First of all, let me say, I did not know until today that "robustify" was actually a word.

MR. TARULLO. It is not, it's a neologism. [Laughter]

MR. POWELL. So, a great set of memos, very interesting discussion, and thanks for that. My answers to the questions are buried in my remarks, and I'm going to start with, really, the practical short-term alternatives, and then come back a little bit to the more interesting longer-term issues in the end.

The practical need is to announce after the September meeting a plan for the mechanics of liftoff and for the foreseeable future, during which the balance sheet will be very large. And for that period, there are two approaches that seem to me to be pretty workable. First, I do find some attraction in a floor system in which the Committee uses the IOER rate and RRP rate to set a rough floor for short-term rates and doesn't set a specific policy rate. That is our option number 2. A floor system would give the Committee the best control over short-term rates at the lowest cost. We are going to be in a de facto floor system anyway for a while, due to the high level of reserves. What this approach does is it just kind of accepts that reality and doesn't complicate matters by adding a target rate.

For now, I would want to size that RRP facility at the lowest level that would achieve a reasonably tight floor and enable a clean liftoff. Part of that, I have to admit, is the cognitive dissonance that Charlie Plosser mentioned—simultaneously noting that money market funds are a grave threat to financial stability as well as a principal conduit for our monetary policy. Now, the idea of limiting our contacts to government money funds does have the attraction of addressing that problem. How large would that be? I'm not sure, but for me, at the beginning, it would be in the hundreds of billions, not the trillions. And what I would do is gradually move the RRP up closer to the IOER rate to achieve the desired size. What would that spread be? I don't know. It would be narrower than the current 20 basis points. I am not inclined to move to a full-allotment RRP, which would be a promise to supply a new risk-free asset to the world. There is little doubt in my mind that the world would take us up on that in a crisis. I would, as we discussed earlier, experiment with size caps and with using the price mechanism—for example, by switching to a single-price auction if demand exceeds the quantity limit. These would be appropriate subjects for testing.

I see two main objections to this explicit floor system during normalization. The first is that the federal funds market, already highly idiosyncratic, would lose further liquidity under a floor system and maybe cease to be a useful benchmark. There would be problems of contract frustration, and it might be difficult down the road, it is said, to return to a corridor system based on the federal funds rate. It seems to me that we could meet the first set of issues by broadening the federal funds rate to include Eurodollar rates, maybe other unsecured interbank borrowing rates. It also seems to me that if a future Committee wanted to return in the longer term to a market-based target, like the federal funds rate or the broader overnight bank funding rate, or, for that matter, to a secured rate like GC repo, I believe it would be straightforward to do so. So I'm

not too worried about preserving options down the road. I think that they are going to be there for us if we want to use them.

Actually, the more difficult objection for me is that the size of the balance sheet is a matter of choice under a floor system. It's not that I'm particularly in a rush to shrink the balance sheet now, but I'm just not yet comfortable with the idea today that we should permanently and massively enlarge the balance sheet. Fortunately, I don't think we're making that decision now. I don't see the use of a floor system during this interim period as implying a longer-term choice to do so. I would be comfortable with this explicit floor approach during normalization.

Second, during liftoff and normalization, I could also get comfortable with a corridor system in which RRP sets the floor, the IOER rate sets the ceiling, and the Committee targets something in between, either the federal funds or overnight bank funding rate. There would be perhaps less-precise control, which I don't see at all as a fatal flaw. This would be a natural extension of the current practice, as Governor Stein just noted, and more familiar to the markets. It probably represents the easiest, least risky, least surprising thing to do, and that actually recommends it quite a lot to me.

If this system is to work, there would need to be a fix to the federal funds rate, and there would be some mechanics to work out, but there is just about enough time to do that. I have to admit, this approach seems slightly less elegant to me and less well-linked to the evolution of the credit markets. Intermediation is moving outside of the banking system, and it is moving to secured rates. There is a feeling that we would be going back in time to a comfortable old system rather than allowing our policy framework to evolve to suit the markets of the future.

The second approach is also more expensive. If the spread remains about 15 basis points on $3 trillion in reserves, that is $4½ billion per year in unnecessary cash payments, mainly to large foreign banks that hold one-half of the reserves and growing. So I am concerned about the remittances, and I would really want to see the best estimates we can come up with to talk about this. It could be significant, and it could actually make it more likely at the margin that we have a period of zero remittances, which would not be a positive thing.

But I think either of those two approaches could work pretty well. I would leave the other tools on the table without emphasizing them. The idea of testing term deposit facilities seems okay. I also don't look at the draining tools, as such, as particularly useful or important. I see them as expensive and principally cosmetic at this point, when we have $3 trillion in reserves. I wouldn't have any urge to use them. I guess I would use them if I had to, which would take me into option 4, if the repo floor turns out to be too leaky.

Finally, let me turn to the longer-term issues. And, again, these are not things we need to decide today, but they're on the list of questions, so I'll go ahead and talk about them. And I would include in this group such questions as, what is the ideal system? Floor system, corridor system? Should we target a large balance sheet or a small one? What kind of rate? How will we handle the governance questions around IOER at the end of the day? And, finally, should we be using the policy framework to do things other than implement traditional monetary policy in a narrow sense, specifically to improve financial stability?

On the first, I do think that over the longer term, in our financial system, an administered floor approach may be simpler and cheaper than a corridor with a market rate. At the same time, I kind of think that a large balance sheet might prove to be a magnet for trouble over time, and those two considerations pull me in opposite directions, I admit. So I tentatively land on a floor

system with the smallest possible balance sheet. But that brings you to the really interesting question, I think, that Governor Tarullo and Governor Stein were all over, and that is the use of the balance sheet for financial-stability purposes. Very, very interesting questions, and I don't have a lot to add on them here today, but I think those are the things we are going to be talking about for years to come. Thank you, Madam Chair.

CHAIR YELLEN. Well, thank you, Governor Powell, and thank you to everyone. I think we've had a great discussion of this. We have really dug into the issues. I'm not going to try to provide a summary, but, listening to the go-round, I will work with the staff to try to see if we have found some common ground here. While I know a wide range of views were expressed, I think I can begin to see where some common ground lies. We will think about how best to structure the presentations and decisions at our next meeting in June, when we can hopefully move further in a practical direction of finding a way forward. But I think for today we have had a great discussion.

Let me also note at this point that the Board meeting, which was operating simultaneously with the FOMC meeting, now concludes. I suggest we take a 10- or 15-minute break, grab some coffee, and we'll come back and proceed with Simon's regular report.

[Coffee break]

CHAIR YELLEN. Simon, do you want to begin the financial developments briefing?

MR. POTTER.[2] Okay. Thank you, Madam Chair. Federal Reserve communications and economic data releases led market participants, on net, to expect an earlier liftoff and slightly higher target rate path. As shown in the top-left panel of your first exhibit, shorter-dated interest rates rose sharply following the March FOMC meeting, as market participants reacted to an unexpected increase in the SEP's target rate values and to other policy communications. While the March meeting minutes and some speeches over the period tempered this rise, shorter-dated rates ended the period moderately higher. In contrast, the 10-year Treasury yield increased only

[2] The materials used by Mr. Potter are appended to this transcript (appendix 2).

modestly around the March meeting and moved in a very narrow range over the period.

Expectations for a slightly earlier liftoff were also evident in the Desk's dealer and buy-side surveys. As shown in the top-right panel, averaging across respondents' probability assessments, each group now places higher odds on liftoff in 2015 and lower odds on liftoff in 2016 or later than they did at the time of the March survey. In addition, the mean of expectations for the level of the target rate over the period from 2015 to 2017 shifted up a bit for both dealers and buy-side participants.

As I just noted, the 10-year Treasury yield has been moving in a very narrow range. This stability against a backdrop of rising shorter-dated forward rates was the result of a similar-sized fall in longer-dated forward rates over the period, as shown in the middle-left panel. The declines in the five-year, five-year forward nominal and real rates and rates further out on the curve continued a downward trend seen since the December FOMC meeting. Longer-dated nominal forward rates in other major developed economies have also declined notably since December, and have been highly correlated with corresponding U.S. rates.

To better understand the moves in longer-dated forward rates in the United States, the Desk's surveys asked respondents to decompose the roughly 75 basis point decline in the five-year, five-year forward nominal Treasury rate that occurred between the end of 2013 and mid-April into three components: the expected average future real policy rate, expected future inflation, and term premium. As shown in the middle-right panel, buy-side participants generally cited lower expected average policy rates as accounting for the largest portion of the decline. A change in the economic outlook, presumably for longer-run growth, was rated the most important factor driving this move on average. The dealers, on average, attributed a greater portion of the decline to the term premium component, and placed a bit more weight on changes in perceptions of the Committee's reaction function and "market-related factors" such as portfolio reallocation into fixed income at pension funds or safe-haven flows potentially stemming from tensions between Russia and Ukraine. Taken together, the survey responses suggest that a substantial part of the recent declines in forward rates may be due to reduced prospects for economic growth over the medium and longer term, consistent with recent market commentary on the declines in longer-dated forward rates.

Alongside the declines in the five-year, five-year forward rates, the corresponding measure of interest rate implied volatility has declined in recent months and, as shown in the bottom-left panel, is back to levels seen just prior to the May 2013 JEC testimony. Other measures of implied volatility on longer-dated interest rates have also fallen. In contrast, implied volatility on shorter-dated tenors has increased, which is consistent with the recent slight increase in the expected target rate path.

Declines in broad measures of implied volatility have extended beyond U.S. fixed-income and have also been seen in equity and currency markets, as shown in the bottom-right panel. All of these implied volatility measures are near their post-

crisis lows, with broad fixed-income and currency measures near the lowest levels of their respective histories. In explaining these low levels of implied volatility, market participants have pointed to a range of factors, including low *realized* volatility over recent months, greater certainty that the eventual normalization of U.S. monetary policy will be gradual, and the belief that global monetary policies will remain accommodative well into the future. Some have also described increased confidence in a moderate growth outlook with limited inflation pressures. Finally, despite the ongoing tensions in Ukraine, others have noted lower so-called tail risks as contributing to the moves, including reduced fears of a euro-area breakup or a hard landing in China. Of course, in the past, periods of low volatility have at times been associated with an accumulation of financial imbalances and subsequent periods of higher volatility. Dan will provide an assessment of vulnerabilities in the financial system in his briefing.

The top-left panel of your next exhibit shows that the S&P 500 was little changed over the intermeeting period, though there were continued sharp declines in sectors that had previously outperformed the broader index, including the biotech and Internet sectors. Market participants did not cite a single catalyst for these declines but instead noted stretched valuations and overweight positioning among speculative investors as contributing factors.

U.S. corporate credit continued its recent strong performance, as shown in the top-right panel. Market participants attributed the narrowing of investment-grade and high-yield spreads to an environment of subdued market volatility, low levels of actual and expected corporate defaults, and ongoing investor demand for higher-yielding fixed-income assets.

Now, shifting abroad, market attention focused on official ECB commentary that discussed ways to address risks of low euro-area inflation for a prolonged period. At the April ECB meeting, President Draghi noted that the Governing Council was "unanimous in its commitment" to utilize both unconventional and conventional instruments to combat the risks of persistently low inflation, including through quantitative easing. Thus far, this and other ECB commentary does not seem to have materially affected market-based measures of near-dated euro-area inflation compensation, shown in the middle-left panel. These measures have been declining over the past year, particularly following the much lower-than-expected October euro-area inflation print.

Evidence of increased expectations for further ECB easing is somewhat mixed across other euro-area financial markets. While increased expectations for ECB asset purchases are consistent with the narrowing of peripheral euro-area sovereign spreads, shown in the middle-right panel, these spreads have been declining for some time amid a reach for yield by investors in a low volatility environment, as well as gradual improvement in the periphery fiscal and banking sector outlook. Partly reflecting these factors, Greece recently reentered international funding markets for the first time since 2010.

Emerging market asset prices also increased over the period, as shown in the bottom-left panel. Market participants have noted increased demand for higher-yielding assets and attractive valuations as volatility has receded after the sharp price declines earlier this winter. Incoming economic information appears to explain little of the moves, given that economic growth was uneven across emerging markets and there was deterioration in the fundamentals of some countries whose markets outperformed, especially Brazil. Despite the recent abatement of market pressures, some market participants have cautioned that vulnerabilities remain elevated, heightening the need for broader reforms to reduce imbalances and lift growth prospects. Tensions between Russia and Ukraine remain an additional source of risk.

Incoming economic data provided further evidence of a moderation in China's growth trajectory, which Steve will discuss in greater detail in his briefing. Chinese policymakers responded to this first-quarter growth deceleration through a slight easing of policy. Over the period, Chinese money market rates remained below the average level of the past year and authorities lowered reserve requirements for rural commercial banks. In addition, a new small-scale fiscal stimulus package was announced, although authorities downplayed the potential for any larger-scale action. These statements were interpreted as underscoring Chinese policymakers' intention to accept slightly lower economic growth without pursuing significant countercyclical measures.

The official Chinese exchange rate fixing continued to depreciate and both on- and off-shore renminbi traded at weaker levels in relation to the fixing, as shown in the bottom-right panel. It is unclear whether the continued depreciation has been driven by official sector intervention aimed at countering the moderation in Chinese growth, which would be consistent with other attempts to ease policy slightly, or if it reflects an abatement of external financial inflows and speculative positioning following increased currency volatility over recent months.

Your final two exhibits review Desk operations. Our continued testing provided further evidence that the overnight RRP exercise is acting as a floor for overnight rates. The past few weeks were a useful case study, as Treasury bill supply declined significantly because of seasonal patterns associated with federal tax receipts. In past years, these declines in bill issuance have coincided with notable decreases in GC repo rates. As shown in the top-left panel, the recent decline in bill issuance is larger than it has been in recent years, yet overnight rates have been fairly stable so far, suggesting that the operations may be offsetting some of the downward pressure on market rates.

Usage of the operations has picked up during the period of declining Treasury supply, as shown in the top-right panel. High take-up tended to occur on days that GC repo traded at or below the overnight RRP rate, in line with the prior staff analysis showing that this take-up is sensitive to the spread between the operation fixed-rate and market rates. Usage was also heavy at the end of the first quarter, when take-up reached $242 billion.

Despite the downward pressure on market rates from the decline in Treasury supply, in recent weeks more repo trades have occurred at or near the overnight RRP rate than earlier in the testing period, as shown in the middle-left panel. However, we continue to see trades below the overnight RRP rate even for counterparties with access to the overnight RRP. Market participants suggest that one reason firms may choose to invest at a lower rate is to ensure continued access to dealer balance sheets.

On a related note, over the intermeeting period, the Federal Reserve System began receiving daily transaction data for federal funds, Eurodollar deposits, and CD markets as part of the FR 2420 data collection. The data should help us better understand depository institutions' unsecured funding activity and may be used to support calculation of the effective fed funds or new reference rates. Initial analysis of the FR 2420 data confirms that the majority of fed funds borrowing is done by foreign banking organizations at overnight tenors. Importantly, the FR 2420 data also provide a more complete sample of federal funds transactions than the brokered data that is currently used in the calculation of the effective fed funds rate. As shown in the middle-right panel, the effective fed funds rate broadly corresponds with the comparable fed funds rate calculated from FR 2420, and the daily distribution of rates across the two data sets is also similar. Average overnight Eurodollar rates derived from the new data set also generally correspond with rates received from brokers, although the volumes are notably lower as the FR 2420 data exclude many offshore entities that are active in this market. The staff will continue to study the data and assess potential enhancements to the collection in the coming months.

Next, I would like to mention a couple of recent developments in the MBS market. First, option-adjusted spreads on current coupon MBS—shown in the bottom-left panel—have increased only slightly in recent months even as the pace of Federal Reserve asset purchases has declined, consistent with the view that MBS prices are affected by expectations for the total stock of purchases. However, many market participants think that the daily rate of Federal Reserve purchases also affect MBS spreads. They argue that spreads have remained stable amid declines in the pace of Fed purchases because gross issuance of MBS has continued to decline notably in response to higher mortgage rates since the middle of last year. As shown in the bottom-right panel, some of this decline in gross issuance is expected to reverse in coming months, largely because of seasonal factors, while market participants expect the Committee to continue decreasing the pace of MBS purchases. As a result, the size of Federal Reserve purchases relative to the size of gross issuance is expected to decline significantly, and many market participants believe that spreads may widen some over the remainder of the year in response to this decline in our footprint.

As shown in the bottom-right panel, under the Committee's current policy regarding reinvestments, MBS purchases will likely remain large for some time. As shown in the top-left panel of your final exhibit, which pools responses across the recent dealer and buy-side surveys, respondents have varied views about the Committee's likely future reinvestment policy. Dealers' responses on the likely timing at which some or all reinvestments would end ranged from 9 months before liftoff to 12 months after liftoff, while buy-side views ranged from 9 months prior to

liftoff to 30 months following liftoff. Given the projected size of reinvestments, the relative dispersion of views around the timing of any change in policy, and the importance that market participants place on those purchases, many are becoming increasingly focused on the Committee's communication and intention on its balance sheet policy.

Over the intermeeting period, the Desk began purchasing MBS on our proprietary FedTrade platform. So far, the operations have gone well: Systems are working as expected, pricing is competitive relative to market quotes, and dealer participation is strong, as reflected in the high offer-to-cover ratios shown in the top-right panel. While large-scale auctions are not common in the MBS market and it is too soon to determine how the market will respond to a full transition to FedTrade, we are encouraged by the operations to date.

In Treasury markets, operations continue to proceed smoothly and are well-subscribed. If the Committee chooses to decrease the pace of Treasury purchases at this meeting, the Desk will conduct fewer operations each month, while leaving the maturity distribution of purchases unchanged. If purchases are reduced, we would release a Desk statement at the same time as the Committee statement, the same approach as taken at prior meetings. Lorie and I will have copies of the statement available for review tomorrow.

Finally, as explained in the memo that Steve Kamin and I sent to the Committee on April 22, we are requesting votes to renew the liquidity swap lines and NAFA arrangements. As shown in the middle-left panel, the use of liquidity swap lines recently has been minimal, and as communicated in a memo earlier this year, the foreign central banks plan to phase out their auctions of dollar liquidity by the end of July. Even though planned dollar operations could end soon, we believe that the standing arrangements are an important liquidity backstop, helping to maintain stability and confidence in global funding markets. Additionally, liquidity swap and NAFA arrangements are tangible and constructive signals of central bank cooperation. Thank you, Madam Chair. That completes my prepared remarks.

CHAIR YELLEN. Thank you. Are there questions for Simon? Governor Powell.

MR. POWELL. Simon, on panel 19, how much do we have in the portfolio that actually matures in 2014 and 2015? So how much does it really matter when we stop reinvesting?

MR. POTTER. Lorie has the numbers there, and she can read them out for you.

MS. LOGAN. With alternative B's planned purchase path, we'll have $220 billion maturing in two years.

MR. POTTER. That's the Treasuries?

MS. LOGAN. That's for Treasuries.

MR. POWELL. That's in 2014?

MR. POTTER. 2015 and 2016.

MR. POTTER. That's partly the result of the MEP, because we cleaned out all of them. And then, for the mortgage-backed securities, the red bars here show you what the reinvestments could look like. What we did here for what the paydowns would look like was split the difference between assuming that you reinvested in 2015 and assuming that you didn't reinvest.

MR. POWELL. So on the decision of whether you stop reinvesting, the back half of 2015 probably doesn't have much at all in the way of maturing securities, right?

MR. POTTER. In the Treasury market. But for the mortgage market, we will get principal paydown. And the current policy is to reinvest those principal paydowns. Also, the agency debt is $30 billion to $40 billion of that. We'll get some—I think it's maybe $20 billion of paydowns in that.

MR. PLOSSER. I'm sorry. Could you repeat what you think the pace of reinvestments for MBS and Treasuries will be over the coming years? I just didn't hear the answer.

MR. POTTER. Over the short run the Treasury reinvestments are very small. I think it's under the order of $1 billion this year, and it might go up to $2 billion next year. And then it gets substantially larger, because under the MEP we basically sold everything that was less than 3¼ years. And that ended at the end of 2012, so it takes you into 2015 to get the larger amounts. For the mortgage-backed securities, it will depend on what the principal paydowns are. Chart 18 shows you one estimate of that. One of the strange little issues is the paydowns on the portfolio partly depend on what the reinvestment policy is, and you can get different measures. So we

took the average of assuming that you reinvested all the way through 2015 with one in which you didn't reinvest in 2015 to show the paydowns.

CHAIR YELLEN. President Lockhart is next.

MR. LOCKHART. My question was answered. Thank you.

CHAIR YELLEN. Vice Chairman Dudley.

VICE CHAIRMAN DUDLEY. I have a question about the uncertainty about the reinvestments. Are we being asked about when we are going to clarify this? Is this something that people are anxious about? Are they clamoring for more information, or are they very comfortable having this uncertainty sort of sit out there?

MR. POTTER. I think people in the mortgage market would really like to know, and other people would like to know because it tells them something else about what we might be doing. But definitely, a reason to focus on the mortgage market, if you look at chart 18, is that we haven't really seen the effect relative to issuance yet. So many of the mortgage traders do believe in the flow effect. It is possible that they are correct, and we will see some increase in the mortgage spreads as we go through the year and the share of the issuance that we are purchasing goes down. And they are obviously interested whether it's the case that the reinvestments would end early.

VICE CHAIRMAN DUDLEY. I have a general question for the Committee, then. Is there any reason why we shouldn't clarify this?

MR. POWELL. It seems like it's getting to be about time to do it, right?

VICE CHAIRMAN DUDLEY. Well, or certainly you might want to do. If we're going to roll out all of this stuff in September, we might want to also clarify what the total package looks like, including what is happening with the reinvestments.

CHAIR YELLEN. Are you agreeing maybe that's something we can discuss in the next meeting, next two meetings? Other questions for Simon? President Bullard.

MR. BULLARD. Thank you, Madam Chair. I am looking at exhibit 1, items 3 and 4. How reasonable is that decomposition of the decline in the nominal five-year, five-year forward rate since the December FOMC meeting? Are you going to say that the run-up from the JEC testimony to the FOMC meeting would sort of be the opposite graph of this, in which market players thought that expected average real rates were much higher, expected average inflation rates are much higher, and term premiums were much higher?

MR. POTTER. I think if we had asked this question—and we did ask questions like this—the term premiums explanation and uncertainty of the reaction function of the Fed were the leading answers. We did ask that question after the June meeting, and there was a lot of uncertainty over the reaction function of the Fed following the confusion market participants had, particularly with the press conference. To me, it is unusual to see so little weight put on the term premiums as an explanation. This has not been a very sharp move, which you'd usually associate with the reversal of term premiums that were too low. This has been just a gradual move, and it has kept the 10-year in this very narrow range for many months now. There are a lot of market participants talking more and more about why this is happening, and they are focusing more on the dark blue type of explanation rather than the red. If you look at the real and nominal, inflation compensation hasn't changed that much over this period.

MR. BULLARD. When I look at this picture, you're talking about five-year, five-year forward. So this is five years out from now. I guess the way I'd like to interpret this picture is, there was some steady state before the JEC testimony last May, and then there has been some

backing off in the latest quarter or more from the rise that occurred during the summer. But this is stuff that is supposed to happen five years from now; it's incredible.

MR. POTTER. The thing that's interesting is, most people thought that the 10-year would be around 3.25 percent. It's around 2.75 percent, and we're trying to understand, given where short rates have been and the fact that the asset purchases are actually going down, why we haven't seen the 10-year move up, and it's interesting that one of the stories people are telling is that long-run growth will be lower. They could definitely be wrong on that.

MR. BULLARD. Lower, but evidently not as low as what they thought before the JEC testimony last May.

MR. POTTER. Most of us would think that that was a term premium effect rather than a real growth rate effect. If you look at the question we asked about the long-run growth rate on the dealer survey, it has been moving down, and it has been moving down with their estimates of what the long-run fed funds rate will be, and that's happened over the last year or so. That has been going on while we saw between April and July a big repricing of fixed income, when you saw both short and long forwards move in the same direction.

MR. BULLARD. So you don't want me to just interpret this as some kind of backing off of the peak that was hit in December of 2013?

MR. POTTER. That is a very valid way of interpreting it. I was just pointing out it's quite interesting that the 10-year has been quite becalmed around 2.70 percent despite everything else that's been going on.

CHAIR YELLEN. Other questions for Simon? [No response] Okay.

Seeing none, we need a vote to ratify domestic open market operations. Without objection. We also have a proposal to renew the NAFA swap arrangements with Canada and

Mexico, and a proposal to renew the liquidity swap arrangement. Let me first ask whether there are any comments or questions on these proposals. [No response] Seeing none, I would like to first ask for an FOMC vote on the renewal of the NAFA swap arrangements. All in favor. [Chorus of ayes] Any opposed? [No response] Okay. That passes. And, second, I'd like to ask for a vote on liquidity swap arrangements. All in favor. [Chorus of ayes] Any opposed? [No response] Okay. Thank you.

What we're going to do is next turn to the economic and financial situation and financial stability. We have a series of briefings, and Bill Wascher is going to kick off the briefings.

MR. WASCHER.[3] Thank you, Madam Chair. I'll be referring to a one-page handout entitled, "Material for Forecast Summary." The data on real activity and inflation that we have received since the March Tealbook contained relatively little in the way of material surprises, and thus we made only small revisions to our economic projections in the April Tealbook. As you can see from the top two panels of your forecast summary exhibit, the incoming spending data resulted in an upward revision to fourth-quarter real GDP growth and a downward revision to the first quarter. The fourth-quarter surprise was concentrated in consumption services, while the first-quarter surprise was mostly attributable to an unexpected decline in exports. I would note as an aside that given how low our point estimate now is for first-quarter growth—and taking account of the sizable error band that surrounds even a forecast on the eve of release—it would not be particularly unusual from a statistical point of view if tomorrow's advance estimate were to show a small decline in first-quarter real GDP. Despite the downward revision to our Q1 estimate, we continue to think that GDP was held down last quarter by several transitory factors, including unusually severe winter weather and the aforementioned decline in exports. Hence, we continue to anticipate that real GDP growth will step up to a 3½ percent pace this quarter.

Much of the higher-frequency data that we received during the intermeeting period seems consistent with this near-term picture. In particular, both retail sales and motor vehicle sales picked up sharply in March. Likewise, after a sharp decline in January that was largely weather induced, manufacturing production rebounded in February and rose further in March. And, after the Tealbook was closed, we received the advance report on durable goods, which showed increases in orders and shipments of nondefense capital goods last month that are broadly consistent with the modest step-up in business investment we are projecting this quarter.

[3] The materials used by Mr. Wascher are appended to this transcript (appendix 3).

One component of demand that *has* fallen short of our expectations is residential construction. Specifically, single-family starts last month were softer than we had projected in the March Tealbook; building permit issuance, which we generally view as a better indicator of the underlying pace of construction, also surprised us to the downside and remains noticeably below the levels seen last year. It is possible that bad weather depressed starts and permits in the early part of the year to a greater degree than we had anticipated. Nevertheless, as shown in the middle-left panel, we took some signal from the incoming data and marked down our forecast for residential investment growth in the first half and, to a lesser extent, for the year as a whole. Our view that there might be more underlying weakness in the housing sector than we had previously thought was reinforced by the softer-than-expected data on March home sales, though here too our uncertainty regarding the effects of bad weather—and the usual month-to-month volatility of some of these measures—make us hesitant to mark down our outlook too drastically at this point. Moreover, given the continued rise in house prices, it seems likely that at least some of the slow pace of sales and construction reflects supply constraints, a hypothesis supported by evidence of rising input costs as well as anecdotes from builders. Taking a broader view, however, we still see the fundamentals for the housing sector as favorable, and thus we continue to project a noticeable acceleration in residential construction as the effects of bad weather unwind, the overall economy improves, and as supply-related constraints gradually diminish. But we admit to being somewhat nervous about that projection.

Turning to the labor market, the March employment report came in about as expected. On the establishment side, the average pace of job gains for the first quarter as a whole was in line with our March projection, and we continue to anticipate a modest rise in job growth over the near term. On the household side, the March unemployment rate was one-tenth higher than we had expected, while the labor force participation rate was 0.2 percentage point higher. For the near term, we have taken on board the small upward surprise to the unemployment rate but are inclined to attribute some of last month's improvement in the participation rate to noise. Combined, these revisions leave our current assessment of labor market slack about unrevised, with an employment-to-population ratio that is in line with our previous forecast.

Our medium-term GDP projection is also little changed from March: As noted, the incoming data seem consistent with our view that the weakness seen in the first quarter was mostly transitory, and we made only small and offsetting revisions to our conditioning factors this round. We therefore continue to project that real GDP growth will pick up to an average pace that is just above 3 percent per year as some of the forces that have been restraining growth in recent years—such as federal fiscal policy—start to fade. With a rate of potential output growth that is expected to average a touch below 2 percent over the next few years, this pace of actual output growth implies a steady reduction in the unemployment rate, to just over 5 percent at the end of 2016. This path is basically identical to our previous forecast and leaves the unemployment rate at our estimate of its natural rate at the end of the projection period.

Finally, the bottom two panels of the exhibit summarize the inflation outlook. As shown on the left, we have marked up headline PCE inflation a little through the middle of this year. Our near-term path for the price of crude oil is slightly higher relative to March, as is the level of natural gas prices; both of these factors contribute to a bit more consumer energy price inflation this year. We have also boosted our near-term forecast for food price inflation, as recent increases in crop and livestock prices appear to be passing through to consumer prices more quickly than we anticipated. In contrast, core inflation (shown on the right) has come in as expected. With projected slack, inflation expectations, and core import prices all little revised relative to March, we made no change to our core inflation forecast; likewise, our projection for headline inflation is basically unrevised after this year. In particular, we continue to expect a gradual rise in core inflation over the medium term as margins of labor- and product-market slack tighten further, as some of the transitory factors that depressed inflation in 2013 are not repeated, and as core import prices return to a moderate rate of increase following their decline last year. Meanwhile, headline inflation is projected to run a bit lower than core in 2015 and 2016, reflecting the slight downward tilt in crude oil prices in our forecast.

Steve will continue our presentation.

MR. KAMIN. I will not be referring to a handout. Like many cars driving on Washington roads following our unusually harsh winter, the foreign economy ran into a pothole early this year. After averaging 3 percent in the second half of last year, foreign growth slowed to only 2¼ percent in the first quarter, ½ percentage point below what we wrote down in March. Much of the slowdown was concentrated in China and its emerging market neighbors, and importantly reflected a drop-off in exports. As I'll discuss shortly, our best guess is that Chinese growth will regain some of its earlier momentum in the next few quarters, while Latin America's economy, which has also languished of late, will pick up too. Accordingly, we see foreign growth clambering out of the pothole with its hubcaps still on, reaching 3¼ percent by the second half of this year and maintaining that pace for the remainder of the forecast period.

Notably, as Bill discussed, the U.S. economy also hit a pothole in the first quarter, in part reflecting the same factor restraining many foreign economies: contracting trade. The contribution of net exports to U.S. GDP swung from positive 1 percentage point in the fourth quarter to an estimated negative 1 percentage point in the first, as exports plunged at a 5½ percent rate. Because the export decline chiefly reflected contracting shipments of oil and agricultural products, which had enjoyed outsized gains the quarter before, we are inclined to view it as transitory and project exports to resume growing in the current quarter, erasing the drag on U.S. GDP. By the same token, the export slowdown in the EMEs, which included a step-down in shipments of high-tech goods, also follows a strong fourth quarter. This gives us some optimism that trade and economic activity will also pick up in the EMEs, supporting global growth.

However, this outlook for renewed global growth is hardly assured, and China represents the biggest question mark. Based on the GDP data released by the Chinese authorities, we estimate that the pace of expansion dropped from 8 percent in the fourth quarter to only 5½ percent in the first. Industrial production, investment, and exports all weakened significantly. The causes of the slowdown are murky. Over the past year or so, the authorities had taken actions to rein in credit growth, boost interest rates, and generally rebalance the economy away from investment and exports, and we were expecting some moderation in growth, but nothing this abrupt. Moreover, China's exports appear to have fallen considerably further than those of most other Asian economies, raising questions as to whether some of the reported decline may be due to statistical problems. All told, our best guess is that at least some of the slowdown was due to transitory factors and Chinese economic growth will move back up to over 7 percent in the second half of this year as exports strengthen and domestic policy turns more supportive. To be sure, China's authorities have been quite outspoken that they are not planning substantial additional stimulus, but they will probably either deliver that stimulus or at least ease off their earlier tightening if economic growth continues to perform much below their current 7½ percent target. As Chinese growth recovers, it should support a more rapid expansion in other EMEs, especially in Asia, that have also underperformed recently.

This outlook is reasonably benign, and in putting it together, we considered whether we might be seeing the beginnings of a financial crisis in China, with shortfalls in activity eventually triggering sharp downdrafts in property and financial markets. Notwithstanding some isolated corporate defaults and a localized run on a rural bank, however, we've seen scant evidence of more generalized disruptions, and we continue to view a significant surge in financial volatility as a downside risk rather than a feature of our baseline outlook. Two other risks bear mention. First, the situation in Ukraine is deteriorating, and as noted in the Tealbook, a substantial escalation of geopolitical tensions could boost oil prices, depress sentiment, and weigh on U.S. and global growth. Second, as Simon discussed earlier, although financial stresses in EMEs eased further since your last meeting, some EMEs continue to harbor significant vulnerabilities, and a renewal of stresses, perhaps as we and other major central banks start to raise rates, remains a possibility.

Assuming these risks do not materialize, our outlook for the advanced foreign economies is also reasonably benign, though hardly ebullient, with economic growth averaging 2¼ percent over the forecast period. This is a little higher than their estimated potential growth, so resource slack diminishes over time. Economic indicators in the euro area have been reasonably upbeat, and growth looks set to edge up over the forecast period—reaching 2 percent by 2016—on the back of further reductions in financial stresses and fiscal drag. The Japanese economy will likely contract this quarter as a result of the hike in consumption taxes on April 1, but some offsetting government spending and continued asset purchases should support above-trend growth, on average, even given a second tax hike scheduled for the end of next year. Perhaps reflecting some lack of imagination on our part, by the end of the forecast period, we see the situation in the advanced foreign economies as broadly similar to that in the United States, with output close to its potential level, inflation

approaching the 2 percent target, and policy interest rates still well below their likely long-run levels.

Although continued monetary policy accommodation abroad seems nearly assured, policy rate paths will likely diverge considerably across the major central banks. In the United Kingdom, continued brisk GDP growth along with continued weak productivity pushed the unemployment rate down to 6.9 percent, below the 7 percent threshold announced last August. The Bank of England is expected to start raising its policy rate in the first quarter of 2015, even before the staff's projection has the FOMC starting to tighten. At the other end of the spectrum, we see the Bank of Japan continuing its heavy asset purchases through the end of 2015, a year later than specified in the BOJ's initial announcement of its program last year. That said, we've abandoned our earlier assumption that the BOJ will substantially step up the pace of its purchases, as BOJ officials have signaled greater comfort with the progress of inflation and output, despite the fact that both of them have come in weaker than we'd expected recently.

Prospects for monetary policy are especially uncertain in the euro area. The ECB continues to grapple with whether or not to provide additional stimulus. Although the economy is now in its fifth quarter of recovery, unemployment remains stuck near 12 percent, and 12-month headline inflation has continued to decline recently, falling to 0.5 percent in March. As Simon noted, ECB officials have signaled their interest in various options—ranging from providing further liquidity to lowering interest rates, all the way to purchases of asset-backed securities or government bonds—depending on whether and to what extent the risks of disinflation become more pronounced. However, beyond relatively modest actions such as providing additional LTROs, more-aggressive measures would all have their drawbacks. Accordingly, we do not see the ECB starting asset purchases unless a significant deterioration of the outlook forces its hand. At this point, that seems unlikely. Much of the euro area's recent disinflation has been driven by falling retail energy prices, while core inflation has run higher at almost 1 percent. For the period ahead, we anticipate that a bottoming out of energy prices and narrowing of output gaps will push inflation up to 1½ percent toward the end of next year, hardly rapid progress, but enough to keep the ECB on hold until 2016, when we expect it to start raising rates.

That concludes my prepared remarks. Dan Covitz will now continue our presentation.

MR. COVITZ.[4] I'll be referring to the three exhibits with the cover page entitled, "Material for Financial Stability Assessment." My briefing is based on our recent QS Assessment of Financial Stability. As in previous reports, we focus on vulnerabilities, where vulnerabilities are aspects of the financial system that could amplify shocks and in doing so impose negative externalities, such as fire sales and other forms of contagion, on the financial system. Our bottom line is that, overall,

[4] The materials used by Mr. Covitz are appended to this transcript (appendix 4).

vulnerabilities remain moderate, although some appear to be expanding relative to the December assessment.

Our overall assessment is predicated, in part, on the aggregate level of maturity transformation we see in the financial system, which appears low relative to pre-crisis levels. As shown in panel 1 of your first exhibit, the ratio of net short-term wholesale funding to gross domestic product has remained at the lower end of its range over the past several years, reflecting, in part, a reduction in total triparty repurchase agreements (not shown). In addition, as illustrated in panel 2, the level of triparty repurchase agreements backed by relatively illiquid collateral, the area above the dark blue region, has changed little over the past several quarters. Moreover, the flow of assets being securitized, charted in panel 3, has picked up only a bit from moribund levels in 2008, driven primarily by increases in CMBS and CLOs. Securitization was the first step in large volumes of maturity transformation chains in the shadow banking system that proved unstable during the financial crisis.

In addition, leverage in the financial sector appears relatively low. Panel 4 shows that regulatory capital ratios at bank holding companies are at their highest levels in over a decade. In addition, as outlined in panel 5, all of the domestic systemically important banking firms (G-SIBs) reported they had met their minimum required Basel III Tier I Capital Ratios, including the firm-specific G-SIB surcharge. Further, the Federal Reserve's Dodd-Frank stress tests showed that all of the 30 largest bank holding companies were projected to exceed their minimum capital requirements under the adverse scenario, which included a large interest rate shock, and all but one of the 30 largest bank holding companies was projected to exceed their minimum capital requirements under the severely adverse economic scenario. Moreover, as shown in panel 6, dealer responses to the most recent Senior Credit Officer Opinion Survey indicate the use of leverage at REITs has declined in recent quarters, while the use of leverage at hedge funds has moved sideways, although staff estimates of hedge fund leverage indicate that such leverage is high relative to its range over the past couple of years.

Finally, rapidly expanding credit in the nonfinancial sector (not shown)—a typical precursor to financial instability—has been limited. Household borrowing has been held down, in part by uncertainties about risks to making mortgages in the current regulatory environment and the ongoing effects of lending restrictions in the Credit Card Act. Debt growth of the nonfinancial business sector has been robust, but many firms have continued to take advantage of low rates to refinance existing debt and reduce their interest expenses.

Now the bad news: As discussed in your next exhibit, pockets of vulnerabilities have persisted and in some cases appear to be expanding. Beginning with panel 7, valuation ratios—that is, forward P/E ratios—of small capitalization stocks, the red line, remain high by historical standards, notwithstanding the recent sizable correction in biotech and social media stocks. In addition, margin credit on equity investments has increased notably relative to market capitalization. Even so, valuation ratios for larger firms, the black line, continue to appear moderate. Moreover, staff measures of

the equity risk premium for S&P 500 firms are still wide by historical standards and so do not suggest, broadly speaking, that the stock market is overvalued.

For Treasury securities, valuation pressures remain evident to some degree. As plotted in panel 8, staff estimates of the term premium on 10-year nominal Treasury securities are at the lower end of their historical range, despite the jump last summer, suggesting that term premiums could move up further. Elsewhere in the fixed-income sector, spreads on corporate bonds have continued to decline, with the high-yield spread, the black line in panel 9, moving toward the bottom of its historical range. Nevertheless, the low level of spreads suggests that potential exists for the price of credit risk to rise; indeed, historically narrow corporate bond spreads are empirically associated with subsequent mark-to-market losses on corporate bonds.

In the leveraged loan market, excesses have continued to build since the December QS assessment. As indicated by the combined height of the bars in panel 10, the pace of leveraged loan issuance increased further this year, surpassing the pace in each of the past 10 years. Moreover, most of the increase is attributed to deals with debt exceeding six times EBITDA, the blue bars. In addition, spreads have remained narrow and covenants have reportedly weakened further. Of course, the pressures in the leveraged loan market are not new. Supervisory guidance was issued early last year, followed by letters pointing to Matters Requiring Attention (MRAs) in the fall, to address the evident deterioration in banks' leveraged loan underwriting practices. However, we have yet to see a noticeable effect of the guidance or the MRAs on loan volumes, credit terms, or deal structures. We will know more about the efficacy of the guidance after this summer's SNC exams. However, even if the MRAs succeed in curtailing unsound practices at banks, leveraged lending activity could migrate to nonbank lenders such as private equity firms and hedge funds—indeed, some deals reportedly have been done recently without bank participation.

A related vulnerability is the liquidity risk posed by the rapid growth in business debt held by mutual funds over the past few years. As illustrated in panel 11, outstanding assets under management at mutual funds totaled roughly $2½ trillion in 2013. These funds offer daily liquidity to investors, even though most of the underlying assets are fairly illiquid. To be sure, bid-asked spreads (not shown) on corporate bonds are not high right now. However, the role of dealers in providing liquidity to corporate debt markets has diminished. As shown by the black line in panel 12, the ratio of outstanding corporate debt to dealer holdings, at over 12, is near its highest level in several years, as dealers are reportedly moving toward intermediating trades only when they already have a buyer and a seller lined up.

Your final exhibit summarizes an alternative simulation in the April Tealbook, Book A, entitled "Liftoff Tantrum," which uses the FRB/US model to capture the potential economic effects from triggering some of the pressures that I just highlighted. In that simulation, term premiums are assumed to rise by 120 basis points more than expected over the first half of 2015, and investment-grade corporate bond spreads widen by 70 basis points. The triggering event is presumed to be a pull-forward by investors of the eventual tightening of conventional monetary policy and

> the depressing effects on the market values of fixed-income portfolios. In this scenario, the effect on the unemployment rate peaks at 0.3 percentage point in 2016 and moderates to about 0.2 percentage point by 2018, while the effect on the level of GDP peaks at 80 basis points and also ebbs a bit through 2018. In the simulation, households and investors anticipate that the turmoil, while intense, will be transitory, which limits the effects on permanent income. In addition, there is a modest policy offset.
>
> However, it is not unimaginable that the pockets of vulnerabilities in high-yield debt markets could be more disruptive than in the simulation. For instance, negative returns on high-yield bonds could cause dealers to pull back, and, as a result, the broader corporate bond market could become highly illiquid, perhaps disrupting the primary issuance market as well. Such an event would be more consequential for the real economy, although effects would be mitigated by moderate leverage in both the financial and nonfinancial sectors, and by the subdued amounts of assets funded with short-term debt relative to levels leading up to the financial crisis.
>
> I'll conclude by noting that while financial vulnerabilities remain modest overall, we cannot rule out the possibility that the financial system would become impaired from a large and adverse shock, such as a resurgence of instability in Europe, or a marked deterioration of the situation in Ukraine. Thank you, Madam Chair. That concludes our prepared remarks.

CHAIR YELLEN. Thank you. The floor is open for questions for any of the presenters. President Lockhart.

MR. LOCKHART. I'd like to ask a question about the trends in leveraged lending, and I know something but perhaps not enough about this. But can you put the debt multiples in the context of total transaction valuation? It's one thing to say that debt multiples are exceeding six times when there's a very thin equity layer in the transaction. It's another thing to say there is default risk when there's a cushion of 25 to 35 percent equity in the deal. So the total evened-out multiple of the transaction is relevant because it tells you about the equity cushion in the deal. Can you talk about those trends, total valuation trends?

MR. COVITZ. I don't know the ratios that you're talking about, but my understanding is that these are very, very risky deals, particularly the bottom bar in this chart. I think—I'm not sure. Maybe you're hearing something different than I'm hearing.

MR. LOCKHART. In the late 1980s, total transaction EBIDTA multiples got to around 11, and with debt exceeding in many cases 9 times or 10, so that the equity slice in the deal was less than 5 percent. It's another way of saying leveraged buyout folks were buying companies almost totally with debt. In response to the financial crisis, equity in deals went up to 40 percent of the capital structure, and all I have heard is that they remain around 25 percent. So you have transactions that are valued at, say, 8 times multiple with 6 times debt. That leaves quite a significant amount of equity to burn through before you have a potential default. That's the thrust of my question, and I just want to make sure we're not misconstruing the danger associated with slightly over 6 times debt multiples.

MS. LIANG. President Lockhart, we can come back to you on the full transaction multiples, but these are debt multiples post issuance. So it's for the whole thing, not the particular transaction. And then the other piece is that if you look at debt multiples of nonfinancial firms in the universe, like the corporate sector, the 75th percentile on debt multiples usually ranges between like 3 and 4.

MR. LOCKHART. In nonleveraged deals. And 75th percentile would be 3 or 4 times cash flow in nonleveraged deals.

MS. LIANG. In nonleveraged, just firms—not deals, not transactions, but firms. So if you look at the corporate sector, the 75th percentile has fluctuated over the recent years between, say, 3 and 4. So 6 gets you close to a higher tail of the distribution. So it is high.

MR. COVITZ. President Lockhart, I guess even though you don't have the ratio you're looking for, presumably the rating agencies when they rate the deals are thinking not just about the amount of debt relative to earnings but also about any equity that's available to burn through for the corporation. In this case, what we're seeing is the share of the deals rated single-B or

triple-C has gone up quite a bit in the past several months. We're also seeing just a deterioration of the ratings distribution as well.

CHAIR YELLEN. Vice Chairman Dudley.

VICE CHAIRMAN DUDLEY. I guess I have two questions. When you think about financial stability, do you think about financial stability from the perspective of "things happen"? Financial institutions break, they become impaired, and therefore, credibility in the economy suffers. Or do you also think about financial stability if you have just big movements in asset prices that tighten financial conditions? Do you think about the former or both? That's my first question.

MR. COVITZ. I think of it mainly as requiring some sort of dysfunction whether it's institutions or markets. The simulation that we've presented from the FRB/US model is not a financial-stability event.

VICE CHAIRMAN DUDLEY. It's a financial conditions event.

MR. COVITZ. Right. It's a financial-conditions event. There's no dysfunction, and it's even a particularly narrow financial-conditions event because it's only affecting one particular market. That's one of the reasons why the effects are relatively modest.

VICE CHAIRMAN DUDLEY. I guess my reservation is I just hope we don't think that if nothing is going to break we shouldn't worry about it. I can imagine a situation in which you can have big movements in financial asset prices with nothing breaking, but it is still actually very hard for us to keep the economy on the trajectory that we want. It's just my preference.

The second question I have relates to Simon's chart that showed the volatility numbers for equity, bonds, currency. They're basically where they were late 2006, early 2007, and presumably when you're in a low volatility environment and where we are in the business cycle,

inflation is low and the economy is growing, that sort of supports asset valuations that are probably going to be above average. I guess the question that I have is what happens if something changes that volatility environment? It's something that you didn't really highlight in your briefing per se, but it seems to me like we're living through this incredibly low volatility environment, which I think could change at any point in time. How do you think about that?

MR. COVITZ. One way to think of it is, yes, asset prices would likely respond. When I think of that simulation that we presented, it was kind of a proxy or metaphor for a volatility event. If you wanted a full volatility event that affected all markets, you could think of that as a risk-aversion shock in FRB/US, and I asked the staff to do that for me—not just shock the spreads in the corporate bond market, but also let that shock to term premiums and spreads feed through the equity market, and you get something like a 35 percent drop in the equity market just in that simulation. I think it's roughly double the effects on the real economy. Very significant.

VICE CHAIRMAN DUDLEY. I'd love to see something like that at a future briefing. Just what happens if there's a big shock to volatility and how does that feed through markets and then into equities. I just think that would be useful for the Committee.

MR. COVITZ. Yes, and I think FRB/US is set up well to do that. It's not set up well to think about things breaking.

VICE CHAIRMAN DUDLEY. Okay. Thank you.

CHAIR YELLEN. President Lacker.

MR. LACKER. I'll follow up on Vice Chairman Dudley's first question. I was glad he was asking it because I was curious about it as well. Your answer used the word "dysfunction." I don't think of that as an economic term. How do you define dysfunction?

MR. COVITZ. The inability to trade at any price or an indiscriminate pullback in risk-taking, in which markets no longer are distinguishing between different types of institutions but are just saying, "I want out completely." I think I had this conversation with you before, right when the asset-backed commercial paper market fell apart, and we were probably at the same place. [Laughter]

VICE CHAIRMAN DUDLEY. Déjà vu all over again.

MR. LACKER. The obvious observation is that it's not a terribly crisp point.

VICE CHAIRMAN DUDLEY. I think you and I've had this conversation. [Laughter]

MR. COVITZ. I think the answer I gave you—it may have been seven years ago—was something like, I don't view it as anyone being irrational. And some of the movements we saw in commercial paper spreads and the reaction of investors in the commercial paper market in the financial crisis were not necessarily irrational. That's not the way I was describing it. But I would describe what happened in the asset-backed commercial paper market as dysfunction, because it was wholesale, widespread pulling back, even if the assets being funded were probably just fine.

MR. LACKER. No, this is a serious question. You folks are doing great work to help prepare us for things that could happen, and, for my money, I think it would be useful for us to also invest some of our good staff with thinking resources into this question. What should warrant an intervention and what shouldn't? I think that your folks' research on the asset-backed commercial paper market developments of August 2007 was extremely useful and valuable. It's, as you acknowledge in your paper, open to alternative interpretations.

MR. COVITZ. Absolutely.

MR. LACKER. "Dysfunction" is a word, and I always ask you about it because it carries with it this connotation of medical intervention. If you're sick, you need to go to a doctor, right?. Yet your paper provided evidence that investors were discriminating on the basis of public information about the degree to which various portfolios were exposed to subprime mortgage-backed risk. And your paper has been cited as evidence that, indeed, the asset-backed commercial paper market was functioning pretty well, even though the function it was performing was to inform some issuers of paper that they didn't deserve credit.

MR. COVITZ. I take your point. It's a loaded word.

MR. LACKER. I'll remind you again should you slip [laughter].

VICE CHAIRMAN DUDLEY. We'll find another, neutral word.

CHAIR YELLEN. Thank you. President Fisher.

MR. FISHER. Thank you, Madam Chair. I have just a couple of points. I do think it is helpful to consider that, after talking about all of these various risks that seem to be building in the marketplace—I speak about this a lot, and I'm deeply concerned about it—it's not enough to point it out. The question is, might it have an impact? I do think it would be helpful to go back and study or adjust the model. We had a correction in 1962 that had almost no effect whatsoever on economic growth. There have been others—in 1987. So I think that is worth exploring.

I'll make a couple of comments. First—I've mentioned this before, and it's a very important point—when you talk about low spreads on triple-C or junk credit, bear in mind that it's a low spread over an extremely low historical nominal yield. And if you're an investor in those instruments, as I used to be, that's what you care about—in other words, the payback feature. I think that adds extra tension in the marketplace. Just to talk about the spreads is insufficient. It's noteworthy, but it's insufficient.

Second, with regard to your comment on panel 10 and leveraged loans, the way the private equity groups work—and, again, you know more about this than I do—basically, one-fourth of their dry powder now has been erased in the past year. Typically, the mindset is, you have to put it to work within a two-year time frame, or else your clients are going to ask for it back. Now, that indicates to me that we could have an extension, but there are certain things that they seem to be shying away from—for example, commercial real estate now and some of the buyout activity. You're seeing more merger activity because of what is now known as the "Botoxification" of balance sheets. They've taken the wrinkles out. They all look rather artificially pretty, and they're going after each other. So I think we just need to bear that in mind. There's a time frame here in which money has to be put to work—that's the mentality of a private equity group.

And then getting to the international side, the one thing you didn't mention was Spain, and the reason I am linking the two is, if you fly first class from London to Madrid, there is the Oaktree section, there is the Blackstone section, and there is the Carlyle section of the airplane. Five-year Spanish credit trades through the United States. And Spain is now viewed as the onshoring of what was occurring in Morocco as the offshoring. As a production center, Europe has had a quick turn. A lot of this private equity money is now looking not just in the United States, but also elsewhere. That may be a positive thing, or it may be a negative thing, but I think we need to start looking at that as well in terms of whether or not this indicates some potential risk. Or maybe it represents no risk whatsoever, but I just want you to broaden your perspective a little bit here. That's my suggestion, respectfully made.

MR. COVITZ. I agree. The $600 billion worth of dry powder in the private equity industry is definitely something to pay attention to.

MR. FISHER. It could extend this period of what I consider significant, if not hypervaluation. So we may still have quite a window. But it comes back to the issue mentioned before by both Vice Chairman Dudley and President Lacker. What do we do about it? Does it matter, or does it not matter? You mentioned margin requirements. We do have the power to move that. Should we? Should we touch that tool or not? When do we touch that tool? We haven't touched it in a jillion years. These are the kinds of things I would like to see developed over time. I am concerned, personally, about excesses in the marketplace. It's unnatural. Money burns a hole in a CFO's or a dealmaker's pocket just as it does in anybody else's, and we're seeing some holes being burned in pockets. I want to know what the risks are to the real economy and, by extension, to our mandate. That would be helpful.

CHAIR YELLEN. Governor Powell.

MS. LIANG. May I comment on that?

CHAIR YELLEN. Yes, please.

MS. LIANG. As you know, as the Federal Reserve has issued guidance on leveraged lending; it's in train. Maybe it's taking longer than we would like, but that is in place. SNC exams will be coming along in the next couple of months. Banks may well be fixing their own processes, and it's not going to slow down the market as long as investor demand is strong, and therefore, we may want to be thinking about it. We did actually included this in last year's stress tests so that firms were expected to think through whether, if their leveraged loans were to go bad, they would have adequate capital for that. We obviously can do that again. I believe we're starting up the stress tests again—it's almost a year-round event. We're starting to think through that. There's the thought of a countercyclical capital buffer. Again, you may not be able to slow it down, but you can make your banks stronger in case this happens.

I'll say a couple of words on margin. Some of the margin credit for equities is old Regulation T. Some of it is these new portfolio-margining debits, which are not in our authority. Regulation T, the 50 percent on equity loans, is our authority. We have not changed it since 1977. We've had a view that it's very easy to circumvent with derivatives—that it wasn't useful. The portfolio-margining debits are something for which the SEC or FINRA has the authority. Certainly, it's something we could raise in the public discussions. We have raised the issue of small-cap stocks. Because we generally don't think the broad market equities look that rich, we haven't raised this broad issue. These are policies that we have been thinking about but just have not put in the public discussion.

MR. FISHER. Again, I don't want to beat this horse to death, but it also shows the limitations of our franchise, because the credit system is much broader than the depository institutions. So we do what we can with the depository institutions, but the question is, if you have disruption and infection that comes from the nondepository side, how might it put at risk what we try to do?

MS. LIANG. Absolutely.

CHAIR YELLEN. Governor Powell.

MR. POWELL. As long as we're talking about private equity, I do keep in reasonably close touch with what's going on out there. I would say that prices are high, leverage is high, and equity is low—in all cases, not as bad as it was in 2007. Prices might be in the mid-9s. We talked about leverage. Equity contributions are in the low 20s. So, again, not as bad as in 2007, but, in all cases, it's getting stretched. The difference is that expected returns now are very low by historical standards. You're looking at returns in the mid-teens with all of this leverage, and that puts pressure on the size of the equity contribution as well. The other really important

difference is that rates are incredibly low. They swap out a lot of the floating-rate debt anyway at very low rates. You put all of this into the mix—I'm not at all sure that there's a big wave of defaults being cooked up here because coverage ratios are pretty good. Certainly, the equity returns are under a lot of threat. But there are no covenants. It's going to be really hard to default or fail to pay. So, again, it's a mixed picture to me.

MR. LACKER. No dysfunction to worry about.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. Yes. Thank you, Madam Chair. I'm looking at exhibit 3, "Liftoff Tantrum Simulation," and I guess I want to get back to this question of, what do we do about this? Some of us have talked about the need to tighten policy as a way to mitigate potential risks. Vice Chairman Dudley has parsed this more finely than I have, between financial stability and financial events, but this seems like a financial conditions event that is actually being caused by the prospect of tightening. What's the prescription for this particular illness?

MR. COVITZ. You're right. It is caused by the prospect of tightening. And then there is an endogenous response of monetary policy, which, I believe, is to push liftoff back one quarter, but the panic has already happened. It's your choice—you could overshoot in the other direction to offset it, but, again, these effects aren't that big. If you believe the prescriptions of the inertial Taylor rule, you should just push liftoff back one quarter.

MR. KOCHERLAKOTA. Right. I guess my question was, if we're thinking about the amplification of this risk that's described in the fourth bullet—or is that not an amplification of these first three bullets? That's a separate risk?

MR. COVITZ. It's separate. It's going outside the model and asking whether the shock could actually be bigger in its effects than the FRB/US simulation is telling us. And I think the answer has to be "yes."

MR. KOCHERLAKOTA. So, confronted with this possibility of a large adverse event, what ex ante policy prescription is there, or do we just wait, have the shock materialize, and deal with it ex post?

MR. COVITZ. It's tough, because if you don't precipitate the shock, then vulnerability could build and then the shock is ultimately bigger.

MR. KOCHERLAKOTA. Thanks.

MS. LIANG. If I could add to that, this last bullet point, which is the amplification beyond the term premiums and pulling forward by investors, is the tough part. Part of this is thinking about negative returns to corporate bond investors that are over a horizon of the next year or two, which could amplify this. Our model suggests that high debt growth and big junk shares are predictors of negative excess returns. So our strategy has been that we should be trying to reduce the risky debt growth, and that is a little bit of what is behind our thinking. That's one possibility.

Another part of this—and this gets to Vice Chairman Dudley's and President Lacker's comments—is what I would call negative externalities. Maybe I'll use those words instead of "dysfunction." It might survive. I'm not sure. [Laughter] But those are often generated when a lot of leverage is in the system and a lot of maturity transformation is in the system. To the extent that we can be tracking leverage so we can take actions to reduce leverage, the result should be that when there is a price decline, it doesn't force fire sales and it doesn't force actions on the parts of different investors and institutions, and we limit the effects. So we are thinking

about leverage in the system and the short-term funding in the system. Those are two other channels to consider.

MR. KOCHERLAKOTA. Madam Chair, can I follow up? As a regulator, I think the questions that President Lacker was discussing with Dan and with you are really challenging ones. As a monetary policymaker, I think the issues are a little bit simpler because we have our goals identified for us, which are to keep inflation close to 2 percent and unemployment low. We'd want to have ways of mapping potential problems in the financial sector into risks to those goals—and then treatments for those risks, either ex post or ex ante. *Ex post* is hard, but we know what to do. Ex ante, I think, is more complicated. Sometimes it seems as though the right treatment is to raise rates, and sometimes it seems as though the right treatment is to lower rates. So if you start to filter this through the lens of a monetary policymaker, we can get away from the loaded words like "dysfunction," *et cetera*. It's just about risks to our goals and how you respond to those risks to our goals.

MR. LACKER. Madam Chair? If I could follow up on that, I think that's a good point. Sweden is going through a major dilemma on this because they've got a housing expansion in train—I'm not saying "boom." It's arguably an expansion conditioned by market participants' beliefs about bailouts due to what happened in the early 1990s and the precedent set there. So, arguably, risk-taking is going too far in the housing mortgage market. As a central bank, what do you do? It's a genuine dilemma.

CHAIR YELLEN. President Rosengren.

MR. ROSENGREN. A quick observation is that, when you look at our scenarios, they almost never generate negative GDP. And, given that recessions occur roughly once every 10 years, it does seem as though we don't get to the tail of the distribution using our models. As

an example of that, thinking of the most severe of the scenarios that you have here, "Escalating Geopolitical Tensions," I was curious—you mentioned that the unemployment rate in Europe is just under 12 percent. They're worried about deflation. In Europe, what kind of unemployment rate and what kind of inflation story do you have? The way I could imagine a scenario that gives you a more negative outcome is, if that unemployment rate gets pretty high and if you have a deflationary economy in Europe, is it really plausible that we get only as mild an outcome globally, including in the United States?

MR. KAMIN. I should mention that for the United States, in this particular scenario, the outcome is "moderately" benign in the sense that GDP falls 2¼ percent below baseline. So, given that we're projecting somewhat higher growth, we just avoid that negative GDP that you referred to. But that's not true for the other parts of the global economy. Not to put too fine a point on it, the rest of the world's economy falls around 4 percent relative to their baseline, which, for the EMEs, puts them, again, perhaps just north of the zero line but, for the advanced foreign economies, actually puts them into negative territory. And, although we don't have it broken down per se, that's mainly going to be concentrated in Europe, in part because not only does Europe suffer the usual downdrafts that the rest of the world experiences—declines in sentiment, increases in financial stresses, and the higher oil prices—but it also gets the effect of Russia cutting off natural gas exports. Basically, this event puts Europe back into a moderately deep recession. But, again, the United States—we just skate by. On the other hand, taking into account the large confidence intervals around these—it's based on science, but, nevertheless, you could imagine a situation in which this generates, indeed, a recession in the United States.

CHAIR YELLEN. President George.

MS. GEORGE. My question, I think, was answered by Nellie. It was on how our supervisory guidance is affecting leveraged lending. So, it's taking longer than we expected, maybe, but we think that after the SNCs, we'll have a better sense of that.

CHAIR YELLEN. Thanks. Well, now we've had a round of questions on the briefings. We also have an opportunity for individuals to comment on financial-stability concerns—not a full go-round by any means. But if there are people who would like to do that, please just indicate it. President Rosengren.

MR. ROSENGREN. I have a quick comment. I found the discussion of the leveraged lending market very interesting, particularly when I think of the scenario that was occurring last spring. We had the tantrum in financial markets, so, according to the 10-year rate, the rates went up very appreciably. We had a bunch of supervisory interventions with the intent of slowing down that market. As was noted in Dan's briefing, the result was that we actually had more leveraged lending occurring. And so I think it's an interesting observation, which is similar to what President Lacker was saying about the Swedish example. As we think of the ability of exuberant markets to be slowed down, either with monetary policy or with supervisory policy, at least if you look at that spring as an example, it indicates that relatively large movements in both supervisory policy and monetary policy didn't do much then. It might be interesting—not today, obviously, being so late, but at a future FOMC meeting when we have the time—to think a little bit more about this, because some of us have been giving speeches about financial stability. If we were in a Swedish example or one of these other kinds of scenarios, what kinds of tradeoffs would there be, and what would be the magnitudes, between using primarily interest rates to try to slow down a section of the economy? Alternatively, what are our options for supervisory and

regulatory policy, and do we have sufficient tools to actually address this kind of exuberance with what we have now?

CHAIR YELLEN. Thanks. Would others like to comment? President Bullard.

MR. BULLARD. To follow up on President Rosengren's comment, I was recently in Hong Kong, and practically all anyone talked about was housing prices in Hong Kong. They've tried a lot of things—monetary policy and nonmonetary policy things—to try to stem what looks like a very exuberant housing market in Hong Kong, and it's not clear that they're having very much effect. It is a sobering example of what you just talked about in which they have the power to do other things, they are aware of the problem, and they are trying to do a whole bunch of things, but prices still go up. So it's very sobering.

CHAIR YELLEN. President Lacker.

MR. LACKER. I have one final thought. And it's to separate concern about what we've been discussing—some markets are getting ahead of themselves and maybe expansion going too rapidly in some areas—from the question of what we would do if dysfunction, or whatever we want to call it, emerges and the extent to which we'd get involved programmatically to insulate some creditors from the consequences. We all have different views about that, but I think it's a separate question from having to take on board the macroeconomic issues. We want to do that in a way that doesn't imply something about our willingness to backstop private markets that we don't intend to convey. Thank you.

CHAIR YELLEN. President Evans.

MR. EVANS. On President Bullard's comment, I want to say that Hong Kong is a very interesting case, but, of course, they're importing U.S. monetary policy because they're pegging to the U.S. dollar. It's wholly inappropriate for their own economy, I would say. So they have

to do all of these macroprudential tools, like increasing equity in housing and whatnot. That's a big challenge.

CHAIR YELLEN. Okay. We have about 25 minutes before we have to break for dinner. So I suggest we begin our economic go-round. We may not be able to get too far, but I think we'll have plenty of time tomorrow. You may recall that, in the old days, we actually used to have one-day meetings and do everything in a day, so I think we'll have plenty of time tomorrow to finish. Why don't we begin the economic go-round and start with President Williams?

MR. WILLIAMS. Thank you, Madam Chair. The ongoing recovery appears to be back on track, with the severe winter weather that was talked so much about and the accompanying hiccup in economic growth now behind us. So, like the Tealbook, I have not materially changed my projections for growth or inflation from what I wrote down at our last meeting. In fact, in the "Forecast Summary," I was struck by how nearly identical the forecast lines for March and April are for unemployment, GDP growth, and inflation.

In March, consumer and business spending posted solid gains, and my business contacts are generally optimistic about the rest of the year. Even in real estate, which hasn't yet rebounded from the winter slump, the mood in my part of the country is decidedly upbeat. A member of our Economic Advisory Council says the San Francisco real estate market is the strongest he's seen in his entire life. Now, right after he said that, another member of the council asked, "But is it a bubble?" He responded, without even pausing, "Of course." [Laughter] And a contact in door and window manufacturing is very bullish about remodeling and homebuilding nationwide.

In terms of labor market conditions, a wide range of indicators continue to improve. Payroll and household employment have both shown solid gains, and the unemployment rate,

though still high, has fallen briskly over the past year. One important labor market indicator that has yet to show signs of life is wages. I will spend the rest of my time—I'll just spend the rest of the afternoon [laughter]—discussing why the muted wage growth we've seen so far is consistent with a strengthening labor market.

In a healthy economy, with inflation near our target, broad measures of nominal compensation—wages, salaries, and benefits—should be rising about 3½ to 4 percent per year to keep up with inflation and productivity growth. In contrast, for the past three years, we've seen an increase in compensation that has fallen well short of that pace, with most measures centering around 2 percent. Average hourly earnings is one indicator that hints at a desirable acceleration in wages. Even there, the rate of increase is still well below normal levels. Now, the slow recovery in wages is confirmed by my contacts. They report limited pressures to boost compensation, except in a few selected hot markets. And they expect wage increases to remain modest in the coming year.

How should we interpret the muted pace of wage growth? Namely, is it a sign that the improvement in the labor market may have been more modest than these other indicators suggest? My staff looked into this question and found that the current pattern of relatively weak wage growth during the early and middle parts of a recovery is not actually unique. In fact, the recoveries in the early 1990s and early 2000s displayed a similar pattern, in which wages lagged the cycle. In those episodes, unemployment gaps, though never as large as in the current episode, narrowed significantly before the pace of wage increases picked up from low levels. To explain why a pickup in wage growth lags a strengthening labor market, research by my staff emphasizes that wages don't adjust as quickly as we might think. In particular, they find that

nominal wage cuts are very rare. This downward nominal wage rigidity turns out to imply that wage growth remains low until the recovery is pretty well advanced.

The constraint on wage cuts was particularly binding after the Great Recession, due to the severity of the economic shocks, along with low inflation. As a result, a very high share of workers reported that they earned the same wage as they had earned a year earlier. Early in the recovery, the share of workers with essentially unchanged wages reached the highest level since the day the series began in 1980, nearing 17 percent in 2011. That compares with about 11 percent in 2007. This pattern of a rising share of workers with unchanged wages was also seen in the recoveries of the early 1990s and 2000s.

Earlier studies—including those by James Tobin, George Akerlof, and others—highlighted the importance of downward nominal wage rigidities. My staff extended this research to study the response to recessionary shocks. In their DSGE model, many workers should see wage cuts in a downturn but do not, because of the zero lower bound on wage adjustments. That means that wage growth falls by less during the recession than it would otherwise, and, as a result, once the economy starts to recover, a stock-up of pent-up wage cuts needs to be overcome before the pace of wage increases can return to normal. This occurs only slowly as inflation and productivity growth bring real wages back into balance. The key takeaway is that muted wage growth, both in this model and based on historical experience, is entirely consistent with an improving labor market in a low-inflation environment. In the model, wage growth lags the cycle and picks up only as we get closer to full employment. Again, this theoretical result matches what we saw in the 1990s and 2000s, two other periods in which downward nominal wage rigidity appeared to be binding for many workers.

Finally, as we close in on full employment over the next year or two, a return to more normal patterns of wage growth should reemerge. Indeed, we are seeing incipient signs of this normalization in the wage process, with the share of workers experiencing zero wage adjustments having already started to come down, albeit only slightly. Thank you.

CHAIR YELLEN. Thank you. President Rosengren.

MR. ROSENGREN. Thank you, Madam Chair. The first quarter looks to be a disappointment, with real GDP growing close to 1 percent, much lower than what we'd expected at the time of the December FOMC meeting. Despite the setback, the economy does again seem poised to grow above potential over the course of this year. My own forecast is for real GDP growth over the next three quarters to be around 3 percent, a little slower than the Tealbook forecast.

One of the key issues in the forecast is the path of the labor force participation rate. About half of the decline in labor force participation since the onset of the Great Recession is a result of an aging population. There is an ongoing debate about how much of the other half of the decline—which reflects declines in participation rates within specific age cohorts, including prime-age working cohorts—is bound to be reversed as labor market conditions improve further.

Work done by the Boston staff has looked at the Panel Study of Income Dynamics, or PSID, which provides longitudinal data on individuals' work history. These data can be used to analyze the behavior of individuals who drop out of the labor force during stressful economic times—in particular, whether they've later been successful reentering the labor force. The study pooled individuals not in the labor force during the previous recessions and recoveries who had previously worked to try to better understand the extent of reentry by age group. The results indicate that 78 percent of the individuals between the ages of 25 and 44 who left the labor force

during periods of economic stress were working again within four years. This drops to 40 percent for individuals in the 45-to-54 age cohort who exit the labor force during periods of economic stress. This indicates that roughly two-thirds of individuals in the 25-to-54 age cohort who historically left the workforce during the stressful economic period later reentered the workforce. Note that there are differences across time periods, and this period could be different than the historical average. However, during periods of tight labor markets, such as the late 1990s, the data show significant reentry, even by workers who had previously left the labor force by retiring. This research highlights that labor force participation is likely to improve as labor markets tighten, as past experience suggests that a substantial portion of the decline in labor force participation within age-specific cohorts during a recession and the early stages of a recovery is temporary.

Both my somewhat slower real GDP growth projection compared with the Tealbook and my expectation that there is likely to be reentry into the labor force as labor markets tighten make me somewhat less optimistic than the Tealbook about how quickly we will reach full employment. With PCE inflation well below our target and many advanced economies also experiencing unusually low inflation rates, we should be particularly attentive to whether incoming data are consistent with our inflation forecast. Low inflation and unusually low compensation growth give us the flexibility to try to more quickly normalize labor markets. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Fisher.

MR. FISHER. Thank you, Madam Chair. Our District continues to perform in an unusual fashion. As you may have seen with the latest releases of our manufacturing survey, service-sector survey, and retail-sector survey—which run through April 23, so they’re as recent

as you can be—we're seeing continued strong employment growth and longer workweeks. I have asked our analysts to look at our unemployment rate, particularly the denominator, because our unemployment rate is 5½ percent—just a little bit less than in the nation as a whole, where the rate is about 100 basis points more. It turns out that the denominator—that is, the availability of employable workers—has grown 10.3 percent since October 2008. So, even though our unemployment rate is high for us, it's not North Dakota or Minnesota.

MR. KOCHERLAKOTA. That's a good point.

MR. FISHER. But you haven't had growth in the denominator like we've had. Anyway, I found that of interest.

So we are seeing—and we reported it in the Beige Book—some labor shortages in energy, IT, construction, auditing—don't ask me why—and some of the financial services, although they're good growth sectors for us. We are beginning to see and hear reports anecdotally of some wage-price pressure in those sectors. And, of course, as we've talked about at this table, in almost every District that is experiencing growth, there is a mismatch of skills. It ranges from the IT sector and engineering down to the truck drivers. In that sense, we're not unusual. We're just growing at a strong pace.

Just to comment very quickly on my interlocutors, I talked previously about what I call the growth muscle. I am beginning to detect a shift across the board of all of the 50 or so CEOs I've talked to around the country—big and small as well as public and private. The shift is toward changing the mentality of their management to think about growth and not just be in a defensive crouch and worry about their bottom line. There's been an enormous emphasis on cost containment during this period, particularly when the tail risks seem rather large. I did note the comment on Ukraine. Among my corporate contacts, there's almost no concern about Ukraine.

So you're beginning to detect it, and you see it in some of the reports you're getting. I'm going to draw somewhat from President Evans's District—his chairman, the CEO of Manpower. If you looked at their permanent recruitment activity for the first quarter, it was up 9 percent—not insignificant. If you look at AT&T's activity in terms of large enterprise, for the first time in almost six years, they're actually seeing an increase in activity. They have been reporting small business activity in terms of their connections with those companies since last December. We've seen that in the reports from the small business reporting groups. But you're beginning to see a shift now with large enterprise as well. I do think that a change in mentality is beginning to occur. Before, it was completely cost containment and selling, general, and administrative expense, or SGA, containment. It was really driving margins and thinking about managing their bottom lines. For the first time, I'm beginning to hear that, in a broad swath of businesses, they're trying to think now about how they're going to restructure their management mentality, their teams, and their budgeting—very importantly—toward growth.

It's just beginning, and I would say one last thing. We talked a great deal about leverage and people using debt, of course, to buy back equity. My sense is that that has, at least in the high-quality companies, almost run its course. Now, I would have been more firm about that if I hadn't read into the Apple transaction that just took place, but that's an odd transaction. Just parenthetically, it's the first seven-for-one split in 35 years, and he picked the number seven because it's a lucky number in China.

CHAIR YELLEN. Thank you. President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. If I play my cards right, I'll get the last word.

CHAIR YELLEN. It's possible. [Laughter]

VICE CHAIRMAN DUDLEY. Moral hazard.

MR. LOCKHART. March data indicate that the economy has experienced a rebound following the weather-influenced, weaker numbers of December through February, the exception being the housing data. Overall, however, I'm encouraged by early indications of a resumption of activity levels that are consistent with the thesis that the economy will grow at an accelerated pace compared with the close to 2 percent average of the recovery through midyear 2013. And that accelerated pace would be around 3 percent, as President Rosengren suggested.

In our recent District conversations with directors and contacts, we sought anecdotal support for that working assumption—that the first quarter was heavily influenced by weather, and that there is a rebound under way and an outlook assuming a run rate of growth closer to 3 percent is realistic. Most of the feedback received was consistent with this view. Business activity has clearly picked up across my District, and, while better weather has bolstered the near-term outlook of our contacts, sentiment about the balance of 2014 and beyond seems more positive than at the time of the last meeting. As one contact put it, there seems to be less reluctance to move forward. According to the country's largest auto retailer, sales in late March and through April were exceptionally strong, and there is confidence that the current strength of sales can be sustained. A major utility in the Southeast reported that industrial power usage has picked up across 13 of 15 industry categories. Residential power demand as measured by both consumption and new home hookups has also been rising at a pace that appears to be greater than weather fluctuations would account for.

We did hear of constraints to moving forward in some industries. Home construction is facing labor shortages and building materials cost pressures. Developed lots are said to be in short supply in a number of metro areas. The anecdotal inputs on the housing sector were not

dire, however. Transportation firms are facing capacity constraints—principally, driver availability. That said, we did not hear reports that indicate a more generalized experience of growth constraints, wage pressures, or cost pressures.

Based on March data and these anecdotal reports, I'm holding to an outlook of medium-term real GDP growth around 3 percent. This is the same outlook I presented at the last meeting. I'm expecting this growth to be sufficient to keep net monthly job gains in the neighborhood of 200,000, even as productivity growth improves. My outlook projects unemployment reaching 5¼ percent by the end of 2016 and inflation converging to our 2 percent objective about the same time. With this baseline scenario, I have liftoff for the fed funds rate occurring late in 2015, followed by a gradual process of normalization of the policy rate.

In its essentials, my outlook doesn't deviate significantly from that of this meeting's Tealbook. My staff has proposed to me a monitoring and validation framework with a number of indicators but three bellwethers in particular: industrial production growth, demand for capital goods, and consumer spending. Interestingly, we saw improvement in all of these categories in the March data.

The main point I want to make in this round is that it will likely be very challenging over the coming months to see clear validation in the data of an assumed outlook of 3 percent economic growth. We may not know for several quarters whether the economy is on a stronger sustained growth path. Given normal monthly variability of readings, distinguishing between a 3 percent and a 2 percent growth path may take a while. Certainly, there are risks around my outlook that are well captured by the range of alternative scenarios presented in the Tealbook. The one I find most plausible is the "Weaker Household Demand" scenario. Because of the murkiness we may be dealing with as the data come in, I would counsel caution about projecting

a funds rate liftoff too early and running risks in the Committee's communication of the market pulling forward the date. Thank you, Madam Chair.

CHAIR YELLEN. Thank you, President Lockhart. Why don't we do one last presentation? [Laughter] Sorry to disappoint.

VICE CHAIRMAN DUDLEY. We've got to talk more slowly.

CHAIR YELLEN. President Lacker.

MR. LACKER. Knowing I was next?

MR. FISHER. We'll be out of here by 10:30.

MS. GEORGE. Yes. You're between us and dinner. [Laughter]

MR. LACKER. I'll cooperate with my friends here. Reports on economic activity in the Fifth District have become more favorable, on balance, in recent weeks. The manufacturing index came in at plus 7 after two straight months of negative readings, and the services measure remained in positive territory. The strongest reports are coming from the Carolinas, where automotive and aerospace companies are expanding operations, particularly BMW and Boeing. Anecdotes from the northern half of the District are less favorable, with much of the difference reflecting restraint in federal spending, it seems. District housing markets are quite uneven. Some areas are showing a modest rebound; others appear to be languishing. We hear a lot about rising costs of home construction due to the limited availability of lots, the rising cost of inputs, and a scarcity of construction workers, which some attribute in part to tougher enforcement of immigration laws. On the other hand, retailers attending the High Point Furniture Market, which claims to be the world's largest annual furniture trade show, reportedly had an upbeat attitude.

Turning to the national scene, the Tealbook made few changes. I've made few changes as well. I think the intermeeting reports haven't been really informative enough to alter the outlook, so I'm still forecasting fairly tepid growth.

I'll join my colleagues from the 1st and 12th Districts by providing a research report on labor markets. We've often discussed whether the unemployment rate is a reliable measure of resource underutilization. I want to talk about—this is something I mentioned last time—a generalized index of labor underutilization that our folks have constructed. The project starts from the premise that there's substantial underutilization beyond what's captured in the standard unemployment rate. That's motivated by the significant flows you see from out of the labor force directly to employment rather than spending time in unemployment. There are a lot of differences across nonemployed workers in the rate at which they transition to employment. The index is essentially a weighted average of everybody who's not employed full time, but the weights have to do with the rate of transition to full-time work. And the differences are pretty significant. Here's an interesting observation: The short-term unemployed, those unemployed less than 26 weeks, have the highest probability of transitioning to full-time employment. It's about 0.3. For the long-term unemployed, the probability of transitioning to full-time work is roughly half that—about 0.15.

The striking feature of the data is that workers who are classified as out of the labor force by the BLS, meaning that they do not report having engaged in active search activities in the past four weeks but say they want a job, have virtually the same probability of transitioning to full-time employment as the long-term unemployed. It's about half the rate of the short-term unemployed. That's true whether they've searched in the past year or not, and it's true whether they say they're discouraged by economic conditions or not. This suggests that the traditional

distinction between discouraged workers who want a job and workers who aren't discouraged but say they want a job isn't as economically meaningful, in my opinion. Workers who tell the BLS they do not want a job have a markedly lower transition rate, as you'd expect, but, nonetheless, some of them just pop into the labor force. Holding aside the retirees and the disabled, who have really low transition rates, if you don't want a job and you're not in those groups, it's about one-fourth of the rate of the short-term unemployed.

The relative size of these employment probabilities seems pretty consistent over time, and that motivates what my researchers did, which was to take the weighted sum of the different nonemployed groups. The weight is the sample average of the employment probability relative to the sample average employment probability of the short-term unemployed. So the short-term unemployed get a weight of 1, and everyone else gets weights of less than 1. As you'd expect, the resulting index behaves very much like the unemployment rate, rising in recessions and falling in expansions. But it's somewhat smoother and more persistent than the unemployment rate. The unemployment rate has fallen more rapidly than the nonemployment index since 2009.

It turns out, though, that that always happens in recoveries. And it turns out that both rates of decline seem consistent with the past recoveries for which we have data. Plus, if you line up the level of any one nonemployment index—they have four or five versions—it's about where it was when the unemployment rate last got to where it is now, if you understand what I'm saying. So in the previous expansion, when did the unemployment rate get to where it is now? Well, the nonemployment index is about where it was then. Relative to the unemployment rate, these nonemployment indexes are at about the same level as they were in past expansions. They even have a version that takes into account part-time employment, although there are some nuances there that they're still wrestling with. So, yes, there's substantial underutilization in the

labor market, beyond what is captured in the standard unemployment rate, but, at least according to these measures, no more than is usually associated with this level of unemployment.

VICE CHAIRMAN DUDLEY. Can I ask a question? How does this weigh into the short-term versus long-term unemployment rate distinction? You seem to be saying that the unemployment rate is a pretty good summary statistic. So, by inference, you'd then be saying that this distinction between short-term and long-term unemployed doesn't have a lot of value.

MR. LACKER. No—it does.

VICE CHAIRMAN DUDLEY. Well, it does, but adjusting for that—

MR. LACKER. But, in terms of employment probability, being in the labor force and long-term unemployed, you look exactly like a discouraged worker.

VICE CHAIRMAN DUDLEY. I'm asking a slightly different question. You're basically saying that the unemployment rate today is a good summary measure of unemployment. Some people are arguing that the unemployment rate today is not a good summary statistic, and that you want to look at the short-term unemployment rate.

MR. LACKER. Oh, that? Ah—gee, I don't know what it says about that. That's a good question.

VICE CHAIRMAN DUDLEY. But you are saying this—that the unemployment rate is a good summary statistic based on that work?

MR. LACKER. Yes.

CHAIR YELLEN. Okay. President Lacker's got the last word. Sorry, President Lockhart. Let's take a break, have a nice dinner, and see everyone tomorrow at 9:00.

[Meeting recessed]

April 30 Session

CHAIR YELLEN. Okay. Good morning, everyone. We're going to start with Bill Wascher. Bill is going to tell us about the GDP figures.

MR. WASCHER.[5] Thank you, Madam Chair. We received several data releases this morning, and I'll start with the BEA's advance estimate of first-quarter GDP growth. According to that estimate, real GDP edged up one-tenth of 1 percent in the first quarter. That was a somewhat weaker reading than the 0.7 percent increase we had projected in the Tealbook. A good bit of the surprise relative to our forecast was in inventories, which subtracted 0.6 percentage point from GDP growth last quarter. Final sales rose 0.7 percent. That was a touch weaker than our forecast of a 0.9 percent increase. Within final sales, consumer spending rose 3 percent. That was about ½ percentage point more than we'd forecast. In contrast, business fixed investment fell about 2 percent. That was versus our forecast for a 2 percent increase. Residential investment fell 5.7 percent, and we had projected a 2 percent decline—so a bigger decline in residential investment than we'd projected. As expected, exports fell sharply and net exports subtracted nearly 1 percentage point from GDP growth in the first quarter. The net export numbers are pretty close to what Steve had reported yesterday.

Given that a lot of the miss was in inventories, I don't think we would take much signal from this report for the trajectory of GDP over the rest of the year. In fact, given that the level of inventory investment was so low in the first quarter, we would probably be inclined to forecast it to step back up over the next few quarters. So I think that at this point, we would still write down something for GDP growth in the neighborhood of 3½ percent over the rest of the year.

There weren't any material surprises in the price data. Total PCE prices rose 1.4 percent in the first quarter, while the core PCE index was up 1.3 percent, and both of those were very close to what we were expecting.

Regarding other releases, the BLS published the employment cost index this morning. Total compensation for private-industry workers rose at an annual rate of just 1 percent in the first quarter. That was well below our forecast for a 2½ percent increase. Increases in both wages and benefits came in lower than we'd expected. On a 12-month change basis, compensation costs over the year ending in March were up 1.7 percent; we had about a 2 percent increase over that 12-month period in the Tealbook.

Finally, ADP released its estimate of payroll employment for April. Its measure showed an increase of 220,000 in private employment this month after an upward-revised increase of 209,000 in March. Our Tealbook projection assumes that the BLS

[5] The materials used by Mr. Wascher are appended to this transcript (appendix 5).

will report an increase of 215,000 for April when they release the employment report this Friday, so today's ADP figure is obviously right in line with that. Thank you.

CHAIR YELLEN. Thank you. Questions for Bill?

MR. PLOSSER. I'm sorry. What was the ADP number again?

MR. WASCHER. It was 220,000.

MR. PLOSSER. I just didn't hear. Thank you.

MR. LACKER. I didn't get consumer spending.

MR. WASCHER. Consumer spending rose 3 percent in the first quarter. That was about ½ percentage point stronger than we had forecast.

MR. LACKER. Thank you.

CHAIR YELLEN. Okay. Why don't we proceed with our go-round? President Bullard.

MR. BULLARD. Thank you, Madam Chair. Eighth District contacts indicated during the intermeeting period that the economy continued to advance at a modest pace in the first part of 2014. On net, key District data also suggest modest improvement. The District's unemployment rate, however, moved up slightly during the quarter and remains above the national rate. We continue to watch District labor market conditions closely, as the trends in the District have diverged somewhat in recent quarters relative to the nation as a whole.

While national data on housing have been soft in recent reports, District contacts in the housing industry remain optimistic, and, in this respect, my report mirrors that of President Williams. Many real estate professionals in the District cite a low supply of existing homes as a key concern. They also cite a substantial increase in multifamily housing coming into the market in 2014. That means actually built and ready to occupy. They surmise that this is putting downward pressure on rents and may deter new home sales on the margin.

District firms with global presence are reporting strong results from Europe relative to a year ago. Firms seem undeterred by unrest in Ukraine. In this respect, my report mirrors that of President Fisher. While this event could certainly develop into a more important macroeconomic drag, at this point, I agree with my business contacts that the situation seems too far removed from the center of the European or the U.S. macroeconomy to have a significant effect.

ECB policymakers appear to be much closer to a major step into unconventional monetary policy than they have been at any time since the financial crisis. This may include a sizable quantitative easing program, depending on how the European economy develops in the coming months. In my view, a significant step by the ECB would dramatically alter the mix of policies among major central banks. If the ECB does make a move, I believe it will come as a surprise to financial markets, as the ECB has been very reluctant, for good institutional reasons, to cross the line into unconventional policy. I believe the possible ECB action would be a game changer for the global economic outlook should it occur.

For the U.S. economy, I continue to hold the view, notwithstanding today's GDP report, that the unexpected slowdown in first-quarter GDP growth is a result of unusually severe weather, and that the second quarter is likely to show sharp improvement. In this respect, my outlook is the same as the Tealbook's. My District contacts concur with that assessment, and many can cite weekly or daily sales and related data showing marked improvement as temperatures warmed and weather-related events receded. One logistics company said it had hundreds of tractor-trailers snowbound during the first quarter, far above average for this company, causing a dramatic increase in costs and a deterioration of firm performance. Yet underlying demand measured by volume seemed to remain on track. In fact, many firms report

upwardly revised plans for capital expenditures in 2014, reflecting considerable confidence for the remainder of the year.

Inflation continues to run low but has stabilized, and I think it will now turn upward in coming reports. We need to watch these developments closely. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Pianalto.

MS. PIANALTO. Thank you, Madam Chair. The incoming economic data have been consistent with my prior assumption that most of the first quarter's softness was due to severe weather. My staff estimates that weather effects depressed GDP growth by a bit less than 1 percentage point in the first quarter. My forecast for economic growth for the rest of the year remains near 3 percent, and, while progress on the unemployment rate has stalled in recent months, I continue to expect that unemployment rates should resume their decline in coming months.

While most of the incoming data have been reassuring, unfortunately the same cannot be said for the recent news on the housing market. The data on new and existing homes, permits, and mortgage originations for purchases have all been weaker than expected. Construction bottlenecks; a pullback by potential homebuyers after a run-up in prices over the past few years; and, of course, some weather effects could all be factors that are holding back the housing recovery. Another potential factor that we should not ignore is credit availability. That is, tight lending standards might still be holding back the housing recovery. Some recent reports suggest that mortgage lending standards have fallen sharply, which might be expected to give the housing recovery a lift. However, analysis done by my staff indicates that the decline in the average FICO score of mortgage borrowers since the beginning of 2013 has been driven by refinancings. By contrast, FICO scores for newly originated purchase mortgages through

February of this year have essentially been unchanged since mid-2012, and they remain at historically high levels. I still think that the housing market should see a pickup in growth in coming months, supported by job growth, by demographic demand for housing, and by interest rates that remain historically low. That said, I believe it's important for the Committee to keep an eye on the sources of recent weakness in the housing sector.

Turning to inflation, unlike the Tealbook, I found the latest price data a little surprising, and, for a change, it was a pleasant surprise. The headline, core, and median CPI all increased 0.2 percent, month over month, in March—more than I expected. Price gains were notable in the categories of food and shelter, but there was a general move toward higher monthly inflation rates across the distribution of components. Because this is only one data release, it is difficult to distinguish trend from noise, but it does raise the welcome possibility that inflation might be on a firmer trajectory. As a result, I have slightly edged up my forecast path for inflation, and I now anticipate that headline PCE inflation will be approximately 2 percent by the end of 2016.

In general, I see the risks to my projection as being broadly balanced. A persistent slowdown in housing does pose a downside risk to my outlook for the real economy. But it is also possible that severe weather has weighed on economic activity more than I estimate, and the economy could be poised for an even larger rebound. Depending on whether future price data are more like the March data or those of the preceding months, there are also upside and downside risks to my inflation forecast. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Plosser.

MR. PLOSSER. Thank you, Madam Chair, and good morning, everyone. Economic activity in the Third District has rebounded from the disruptions caused by the severe winter

weather. Returning to a moderate pace of growth, it looks a lot like it did in the last three quarters of 2013.

Business contacts are generally quite optimistic. After contracting in February, our regional manufacturing activity increased in March and improved again in April. Our Business Outlook Survey's indexes of general activity, new orders, and shipments all showed sizable increases in April. The general activity index, which fell to minus 6.3 in February, moved up to 9 in March and 16.6 in April. One firm that both manufactures and sells latches and other types of equipment worldwide indicates very strong sales growth around the world—particularly in Europe, which I thought was quite interesting—and a very strong pipeline. It is looking for a very strong year this year.

The employment index in the Business Outlook Survey also moved up in April, perhaps signaling that we will see a turnaround in employment for our three states in April. So far, this year's payroll employment is down slightly in our three states—that is, just since January—falling at an annual pace of 0.1 percent. My staff believes that much of this weakness is weather related. The region's unemployment rate has fallen 0.2 percentage point.

District retailers, especially auto dealers, saw strong sales growth last month, as consumers apparently emerged from hibernation. Our contact at one firm that sells recreational vehicles said that, in the month of January, he did zero sales—zero. Yet in March, he sold so much that his overall quarter results are back to where he thought they were going to be. Basically, all of the zero sales in January and weak sales in February were made up in the month of March. So he's, as he says, back on track.

Bank lending has actually moved up in recent weeks, particularly in the categories of service activity and other retailers. Bankers have noted somewhat stronger demand for C&I

loans, something that's a pleasant surprise to them, and they're pleased about that. And the bankers tend to be more optimistic about lending than they have been in several months.

Not surprisingly, though, construction has been more mixed—still feeling the effects of the winter, I believe. Local builders continue to report weather-related disruptions to new home sales, but they did say that consumer traffic and contract signings have improved in March, and most expected a strong spring sales season. Commercial real estate contacts said that nonresidential real estate activity has turned around and is now back to normal levels after the rough winter. Indeed, as I'd mentioned last time, several major office building constructions are going to break ground in Center City, Philadelphia, this summer.

Overall, spring has sprung in the District, and our contacts are optimistic about the pickup in activity in coming months.

My medium-term outlook for the national economy is little changed since our last meeting. The rebound in national economic activity since the severe winter is consistent with my outlook that economic growth will return to a little bit above trend for the rest of this year, around 3 percent, before returning to what I believe is a steady-state growth of about 2.4 percent in 2016. Although the indicators on the housing market were a bit mixed, I believe the bad weather is responsible for much of this recent softness. I expect to see some rebound in coming months, and that's consistent with our contacts.

The labor market continues to improve steadily. Payrolls rose 192,000 in March after an upward revision to February, which now stands at 197,000. The unemployment rate remained at a steady 6.7 percent, partly because the labor force expanded, which I think is probably good news, not bad news. I expect the unemployment rate to decline to 6.2 percent or lower by the

end of this year and below 5.8 percent by the end of 2015, which I believe is roughly our natural rate.

Inflation remains low, but recent figures, as others have indicated, suggest that it certainly seems to be stabilizing and perhaps drifting up a bit. I think that's good news. I continue to forecast that inflation will gradually move back to our target over the forecast horizon.

In my view, economic performance and the outlook indicate that it still is appropriate to continue our pace of reduction in asset purchases into this fall. However, I do believe we will need to consider raising the federal funds rate sooner than in the Tealbook. My modal policy rate path calls for a slightly more gradual increase in rates than implied by traditional policy rules. However, the economy has shown itself to be quite resilient, and solid employment gains, coupled with a reduced drag from fiscal policy and improvements in the household balance sheet, make it conceivable that this growth rate may become stronger than we are forecasting. Rates may have to move faster and higher than we are currently anticipating.

Our policy discussion yesterday underscores, I think, the challenges that our very large balance sheet poses for normalizing our policy framework. If our balance sheet provides the type of accommodation that this Committee has repeatedly claimed, then our reluctance to shrink our balance sheet in a timely manner is likely to require rates to rise faster than they otherwise would. But, as I said, there are other reasons to desire shrinking our balance sheet as well, and I've talked about those in the past. Therefore, I think it would be prudent to begin shrinking our balance sheet before we start raising rates. A step in that direction could begin shortly after our LSAP program ends, as we begin to slow the reinvestment process. That should be on the table for us. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Evans.

MR. EVANS. Thank you, Madam Chair. The incoming data on the real economy support the view that the first-quarter weakness in activity was largely transitory. My business contacts and directors are more upbeat than they have been in quite a while. That's in line with my forecast expectations. We're still looking for economic growth to average 3 percent or so over the remainder of the year. By the June meeting, we should have a better sense of whether the pickup in activity in the March numbers represents the beginning of a more solid and sustainable step-up in growth or whether it's just a transitory bounceback from the weather and other factors that depressed January and February activity. But, with what I know right now, I'm feeling somewhat more confident about growth prospects than I did at our last meeting.

On the inflation front, I continue to be worried that inflation is much too low. Perhaps one could look at the past couple of quarters of core PCE inflation and say that the transitory factors are behind us and inflation is running a bit higher, but the Tealbook's estimate over the past six months is still just 1.3 percent. That's really not much to get excited about. A 1.3 percent run rate is still well below where inflation ought to be.

My business contacts continue to report no significant pricing pressures. For example, at a manufacturing roundtable we held a few weeks ago, no one talked about input cost increases. The steelmakers were grousing about low prices. Manufacturers didn't seem worried about any cost pressures in the pipeline, either. Some of my auto contacts are concerned about softer pricing. They've seen a buildup in car inventories that's holding down prices, and they tend to talk about the decline in the yen and the weakness in China as reasons to expect further downside pressure on prices, both on autos and on overall pricing more generally.

Finally, no one expects any broad-based wage increases. I guess this morning's ECI was in line with that thought, wasn't it? I only hear more of the same talk about shortages of certain

kinds of skilled workers that we've been hearing for years, which have not shown through into any meaningful pickup in aggregate measures of labor compensation.

In sum, I have not seen any developments since our March meeting that alter my thinking about the macroeconomic backdrop for our policy decision today. We appear to be seeing a welcome and long-overdue pickup in economic growth to a more solid pace—it's always unfortunate when we get that 0.1 percent, though, on the day that we have this meeting—but this economic growth needs the continued support of highly accommodative policy in order to be sustained. And there's nothing new on the inflation front to suggest we're making anything more than painfully slow progress, at best, back toward our inflation target. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President George.

MS. GEORGE. Thank you, Madam Chair. Throughout most of the 10th District, labor market conditions continue to tighten. Four of the seven District states have unemployment rates below 5 percent, and, in our manufacturing survey, the number of firms reporting wage pressures has again reached levels last seen prior to the crisis. Nearly one-half reported some kind of wage pressure, and about two-thirds were reporting labor shortages. Some of the most pronounced labor shortages are in the transportation sector. One Colorado trucking contact reported that a seasonal upswing has allowed him to name his price in many cases.

In the agriculture sector, spring crop planning is well under way, although drought remains a significant concern in parts of the District. Currently, large swaths of Kansas and Oklahoma are classified as being in severe drought, which could affect agriculture production in the region. On the other hand, there is evidence that energy activity is providing some offset to the effects of the drought in those areas.

Turning to the national economy, my outlook is little changed compared with January, with a soft first quarter due to swings in inventories and net exports and a stronger second quarter, leaving my overall outlook for 2014 near 2½ percent. Looking ahead, I continue to expect above-trend growth of 3 percent starting in the second quarter and lasting into late 2015. This is slightly below the Tealbook forecast, though I see the risks to economic growth around my projection as broadly balanced, whereas the Tealbook notes some downside risk.

I think the improvement in labor markets and household finances is becoming more apparent. The employment-to-population ratio for prime-age workers has increased 0.8 percentage point over the past six months, close to its fastest pace of improvement at any point in the past 15 years. And the probability that households attach to an increase in personal income in the year ahead, based on the Thomson Reuters/University of Michigan Surveys of Consumers, reached a post-recession high.

Finally, inflation seems poised to move gradually higher and reach 2 percent by the end of 2015. Temporary factors that have been weighing on inflation are subsiding, while other factors, such as food and shelter costs, are strengthening. The USDA projects the food component of the CPI to rise about 3 percent by the end of this year, compared with its current pace of 1.7 percent, and shelter costs in the CPI are up 2.7 percent on a year-over-year basis, the fastest pace in over five years.

While construction of new single-family homes has been proceeding at only a modest pace, multifamily construction has been more rapid. And research by my staff has highlighted that the aging of the population is likely to require still substantially more investment in multifamily units as baby boomers downsize. As a result, it seems unlikely that a marked

slowing in shelter costs over the forecast horizon will occur from a substantial rise in available housing.

Taken together, these factors, along with the continued stable longer-term inflation expectations and diminishing labor market slack, suggest to me that inflation will move higher and likely reach 2 percent by the end of 2015. Thank you.

CHAIR YELLEN. Thank you. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I'll discuss my national economic outlook, I'll talk about some information from the Ninth District, and I'll talk about some interesting econometric analysis my staff has done using cross-MSA data.

My national economic outlook has changed little since the last meeting. The critical feature of that outlook is that, under the assumptions about monetary policy in the Tealbook, Book A, I see inflation running below target until 2018.

The situation in the Ninth District supports that low-inflation outlook. As we talked to local contacts, we spent a considerable amount of time trying to elicit information about wage pressures. The unemployment rate is extremely low in parts of the Ninth District. In the Bakken oil counties of eastern Montana and western North Dakota, the unemployment rate is 1.5 percent. In Sioux Falls, South Dakota, the unemployment rate in late 2013 slipped below 3 percent. It should not be surprising that there are signs of noticeable wage pressures in these parts of the District, and there are. But, populationwise, these are small pockets.

More generally in the District, even though the unemployment rate has fallen to under 5 percent, wage pressures remain subdued. Our contacts typically report that current anticipated wage increases lie in the usual tight band between 2 percent and 3 percent. Actually, the conversation that we had yesterday about nominal wage rigidities being responsible for the slow

wage growth—President Williams's remarks yesterday about this—we heard echoed in conversations with our labor contacts earlier this year. They actually came up with this themselves—nothing prompted it. Employers weren't able to lower wages enough during the downturn, so they're waiting before increasing wages on the way out. As I've mentioned before, one possible reason why wage pressures have remained subdued is that, although the unemployment rate is close to historical norms in the District, a large fraction of the labor force is working part time for economic reasons. So, even though the unemployment rate has fallen below 5 percent, the fraction of the labor force that's working part time for economic reasons remains quite high by historical standards.

Recently, my staff conducted some empirical work that validated the importance of this metric in assessing inflationary pressures. As you may recall, a few meetings ago, I described the results of cross-MSA, Phillips-curve estimates obtained by Minneapolis Fed staff. At that time, they had found a stable and plausible relationship between U-3 and inflation. The more recent work has added an additional variable—the fraction of workers who are part time for economic reasons. This variable entered significantly, in both an economic and statistical sense, when they included it in a Phillips-curve regression with the usual unemployment rate, U-3. I think it would be interesting, in terms of President Lacker's description of the work that's being done by Richmond Fed staff, to try to do the same kind of analysis with their new measure of labor market underutilization and determine how well that predicts inflation across MSAs.

Now, I should emphasize the following point: I see these cross-MSA estimates as being more informative about the true relationship between national unemployment and national inflation than aggregate Phillips curve estimates. Why do I say that? Aggregate Phillips-curve estimates are contaminated by the endogenous response of monetary policy to demand shocks.

The cross-MSA results are not contaminated by this response. You have a local demand shock in Minneapolis–St. Paul. The FOMC does not respond to that. Aggregate monetary policy is not responding to MSA-specific shocks. So the cross-MSA estimates are actually cleaner estimates of the aggregate Phillips curve than we can get from aggregate data.

To sum up, like the Tealbook, I continue to expect PCE inflation to remain below target for the next four years. In the Ninth District, wage pressures remain subdued in the face of less than 5 percent unemployment, and Minneapolis Fed empirical work suggests that the high fraction of workers who are part time for economic reasons at the national level will continue to put downward pressure on inflation as the economy improves. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Vice Chairman.

VICE CHAIRMAN DUDLEY. Thank you, Madam Chair. My views on the economic growth outlook, just like everybody else's, haven't changed much since the last meeting. I did expect the first quarter to be weaker for a whole variety of reasons, including the weather, but it did turn out to be even weaker than I'd expected. I'm not very disturbed by that, though, given that the March data set shows a rebound in production and retail sales and the apparent steady trend in payroll employment growth. Nevertheless, to build on Charlie Evans's comments, I do think there is some residual uncertainty. We're clearly going to bounce in the second quarter, but to what level? And then what's the underlying trend after the bounce? It's going to take a little time to get that. I'm with everyone else that the underlying trend is around 3 percent, but I do think there is some uncertainty until we actually see that trend materialize.

When I look at the economy, the key area that I'm focusing on is business fixed investment because that's the area that's been really unusually weak relative to the fundamentals. You have high profit margins, high stock market valuation relative to book value, and healthy

balance sheets. Yet, as we saw in the first quarter, business fixed investment declined. If we're going to get a meaningful pickup in economic growth this year, it seems to me that investment and housing have to be the main sources. The conversations that we've had with smaller businesses do suggest greater optimism with respect to investment, but we'll see if that actually materializes.

My views on inflation haven't changed much, either. On the margin, I am becoming more confident that the year-over-year inflation readings will drift up over the remainder of the year, and I think this might happen even faster than in the Tealbook forecast. Part of this reflects the fact that there were important base effects a year ago in terms of prices for imports excluding petroleum, which were unusually soft last spring and summer. Medical costs were held down by the cut in Medicare disbursements last April, so that will drop out of the year-over-year numbers shortly. But part of it reflects my view that some of the other trends that have held down inflation are reversing, and in that bucket I would put prices for medical goods and services, which were unusually weak for a while, and owners' equivalent rent. We've already seen a flattening out of the core inflation measures on a year-over-year basis. So I expect that the bottom is in and these readings will creep higher, perhaps more rapidly than in the Tealbook forecast.

Finally, I have a few thoughts on the recent debate about what drives compensation trends—short-term unemployment versus long-term unemployment. I've read a bunch of the papers, and where I come out is described by five points. First of all, one has to be very skeptical about the econometric results when you have two variables that are so collinear, and so it's very sensitive to the time period you pick. There's a great deal of skepticism just because of the collinearity.

Second, I think it does depend on why one turns out to be long-term unemployed. I think there are two possibilities. One is, you're long-term unemployed because you don't have the appropriate job skills. This is a case of mismatch. That's very different from the other reason why you might be long-term unemployed: You might have lost your job during the deep recession, and there's a lack of labor demand. So you're long-term unemployed not because you don't have the right skills, but just because there's a lack of labor demand for you. In the first case, you're not very attached to the labor market, but in the second case, you're just unlucky. You're long-term unemployed due to bad timing. In the current situation, I would expect that a greater proportion of those who are currently long-term unemployed are in the unlucky category as opposed to not having the appropriate skills.

A third observation is that the impact of the long-term unemployed on wages presumably depends on whether there's an excess supply of short-term unemployed or not. If there are plenty of short-term unemployed, I think they'll get the opportunities first, because we see that there's a clear bias against people who are long-term unemployed. As long as there are plenty of short-term unemployed, this will show up as the long-term unemployed being relatively unattached. But once the pool of short-term unemployed is depleted, the long-term unemployed will become more relevant in terms of labor market supply. So their impact on the labor market and wages will increase as the labor market tightens. I don't think it's quite as static as some of these reports suggest.

Fourth, as is generally the case, I don't think this is black or white. I can't believe that, if you're unemployed beyond 26 weeks, something happens at that point; I think it's probably a gradient. And I'm pretty comfortable with the idea that, on average, as you become more

unemployed for a longer period of time, you become somewhat less attached to the labor market. But the idea that you're either attached or unattached seems way too simple.

Fifth, it seems obvious to me that labor demand is weak, completely apart from this debate. Some people are acting as though this is the way to measure whether the labor market is weak. And, if you look at the labor market in terms of the transition from unemployment to employment, that's well below the historical average for all durations of unemployment. So you could set this whole story aside, and you would still reach the conclusion that labor market demand is quite weak. I think this whole debate has assumed greater significance than, in fact, it probably deserves. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. I subscribe to the view that many of you have already stated—that we can expect a bounceback in the economy this quarter—but I would also subscribe to the Evans-Dudley gloss that we need to be watching to see whether this actually gets us back to the track that people were expecting.

The only thing I would add to what many of you have said is that I think the major downside risks are now actually external, which, in one sense, is good news, because the U.S. economy, we believe, does have some resilience and is going to have some self-sustaining momentum. On the other hand, we can't do much about the external risks. The two that I'll identify—and this is hardly a surprise—are China, on which views among even the well informed seem to differ considerably right now, and Ukraine–Russia. The latter is obviously geopolitical in origin and just a wildcard that's not susceptible to prediction by businesspeople or a particularly salient response by economic policymakers.

Like many of you—most recently, Bill—I want to return to some of the labor market issues that we've been discussing. Actually, these comments, I think, will complement what Vice Chairman Dudley and President Kocherlakota have been saying. As people will recall, I've been suggesting that we should be pretty cautious about drawing too strong a conclusion with respect to current labor market problems based on expectations or extrapolations from past trends. We have a very different set of circumstances from even the serious recessions of the post–World War II period—most notably, in the persistence of high levels of long-term unemployment. Historically, of course, national rates of short-term unemployment and long-term unemployment pretty much move together, and that has not been the case here. So I continue to be skeptical of arguments such as the one asserting that the detachment of the long-term unemployed from the labor market based on the observation that the Beveridge curve shifts seem to have been driven by long-term unemployment. If you look at a long-term unemployment Beveridge curve from past recessions, it's always shifted more than a short-term unemployment curve. One difference is that in past postwar recessions, we had neither the long-term unemployed nor the persistence of high numbers of long-term unemployed. So the looping back occurred fairly quickly.

Similarly, it seems a little questionable to rely on the relationship between national unemployment and inflation rates as observed prior to the mid-1990s, when core inflation declined significantly and the Phillips curve appeared to flatten. That's why I've thought that we can't really draw much from such observations that would give us a particularly good prediction about what's going to be happening in current circumstances. So I've suggested that we need to be practical in our responses.

Now, since the last meeting, not much has changed in the labor market, for reasons many of you have already stated. What has changed, I think—and we already heard some examples of it yesterday afternoon and this morning—is that we're starting to get some empirical work specifically investigating the question of whether the long-term unemployed constitute an important element of labor market slack in the current, historically atypical circumstance of high levels for an extended period. And I'd just add in passing that I think President Kocherlakota's focus on the part-time employed for economic reasons probably complements this, because there's been a pretty strong correlation between the long-term unemployed and the part-time employed for economic reasons over the past five years or so.

A number of researchers have begun to look at state or metropolitan-area data, thereby moving from a single data set to dozens of data sets with varying levels of unemployment and wage movement. There are at least three examples of this work that I wanted to mention—two from the Board and one external. First, Michael Kiley's working paper "An Evaluation of the Inflationary Pressure Associated with Short- and Long-term Unemployment" examines the historical, cross-city, over-time relationships between CPI inflation and both short- and long-term unemployment rates. And he found that both rates exerted equal pressure on prices.

Second, Christopher Smith has been researching cross-state variations in wages and measures of labor slack and has found similar results for wage inflation—that is, that long-term unemployment and short-term unemployment historically exert the same kinds of influence on wages. Christopher's early results are very robust to a range of wage measures and across various time periods. This work is not yet in a working paper, because poor Christopher has been stuck in Tealbook hell. But it will likely be available in working paper form over the next couple of weeks.

Third, looking at current data, Peter Hooper and his colleagues in the research department at Deutsche Bank have found a negative relationship between long-term unemployment rates and wage growth in states in which short-term unemployment has declined to something close to normal levels. This is consistent with the intuition that Bill was expressing a minute ago. An interesting point about this research is that Hooper and his coauthors do not find such a relationship in states in which a short-term unemployment gap remains. This contrast suggests, again, the intuition Bill just stated—that employers as a group will not move to hire the long-term unemployed in large numbers until the pool of short-term unemployed has become somewhat depleted. The Hooper finding is also congruent with analysis by the Board's staff showing that multiple measures of labor slack, including the share of the workforce employed part time for economic reasons and the share of marginally attached or discouraged workers, move toward their pre-recession levels as a state short-term unemployment rate normalizes. I do want to note in passing that the Hooper finding depends on estimates of unemployment gaps, which are, as everyone in this room can attest, subject to debate.

So these lines of research are obviously not conclusive on the issue of how much labor market slack remains, and there's nothing in them to contradict my intuition that there's been some structural labor market damage. But I do think they provide some empirical support for the position that the long-term unemployed continue to affect labor market conditions, and that there remains considerable labor market slack that could be reduced through higher levels of aggregate demand. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Stein.

MR. STEIN. Thank you, Madam Chair. My outlook, like everybody else's, has not changed much. So, given that, I thought I would just mention a couple of data items that caught my attention recently.

One is the housing market, and a number of you have already spoken about the housing market. Here, the interesting set of facts to be reconciled is that, on the one hand, it seems fair to characterize the data on home sales—both new and existing as well as starts and permits—as being weaker than expected, so quantity measures look soft. At the same time, price measures look stronger. The Tealbook, I think, characterizes CoreLogic and Case-Shiller as actually being a little bit stronger than expected. It's interesting to try to make sense of that. The natural inference to draw is that at least some of the weakness on the quantity side is coming from supply as opposed to demand. President Lockhart mentioned a few of the specific factors, and I think that feels reasonably compelling and worth thinking about. At the same time, it's also good to remember that these price indexes are "baked up," and they tend to have a bit of inertia in them. So, what the quantity data may be telling us is that we've got a little bit of softness in prices yet to come. I think it will be interesting to keep an eye on that.

The other thing—and this is an oddball thing—is that I saw this article in the *Wall Street Journal* last week on the market for catastrophe bonds. If you don't know what catastrophe bonds are, basically, you give your money over, and if no bad disaster happens—no tornado, hurricane, or earthquake—then a year later or three years later, you get all of your money back with interest. If there is one, then it's like a default on your bonds—you lose your principal. This market has seen a very big surge in issuance and a decline in yields, which was the *Wall Street Journal* story. I got interested in this. Now, why in the world would you care about this

market? It's a small market; it's surely not systemic in any sense of the word. It matters only if you're into nerdy identification stuff [laughter].

Think about the inference problem we face when we look at corporate bond spreads narrowing. Corporate bond spreads have been coming down, and we're always saying, "Well, it could be that risk premiums are going down, and returns to investors are going to be lower." But it could be a strengthening economy—right?—with lower defaults in the period ahead. The staff does various things to try to tease these apart—for example, looking at short-term versus long-term credit spreads. And there's some notion that the short-term stuff is more default informative. I think about the beauty of catastrophe bonds. The spreads on those are going to narrow for one of two reasons—either risk appetite, broadly defined, or higher probability of a disaster. But as long as acts of God are not pro-cyclical, they're totally uninformative about the real economy—that you lose money when there's a hurricane or something. Here's the idea: If you saw catastrophe bond yields and junk bond yields moving very closely together, the only thing that these guys intersect on is the demand, the risk sentiment. So a close co-movement of those two would be an interesting clue about something.

So I tried to get the data. Now, there are data, and I didn't do a very good job of finding them. I just found a handful of data points. But, in the little bit that I saw, it was really quite remarkable the extent to which, over the past two years, the yields on these bonds, which have come down several hundred basis points, seem to be coming down very much in tandem with the yields on corporate credit and others. So I think one could get better data and do a little bit of a study. It seems to me that, as we struggle to try to do this identification, this might be a useful little clue. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Powell.

MR. POWELL. Thank you, Madam Chair. I'll make it unanimous and say that my outlook has changed little since the last meeting, and it is, in fact, in line with the Tealbook's. With good intermeeting readings on retail sales, manufacturing, and consumer confidence, I see economic growth rebounding to a level more consistent with the second half of last year. And, for the year, I see growth in the high 2 percent range. In fact, at this point in the cycle, that starts to feel pretty close to the speed limit to me. I think we need consumption to continue to advance at a decent clip just to produce overall economic growth in the high 2s. Nothing that I see points to a sudden acceleration of business or residential investment. I expect them to increase but not sharply. Fiscal headwinds are going to continue to gradually wane, but there is no upside case there lurking anywhere. Net exports seem likely to continue to be roughly neutral overall and, in the meantime, a highly volatile contributor, as we've seen in the past few quarters. So I guess I feel as though the upside case and the base case are in the high 2s, maybe 3 percent, for now.

Housing has become a significant disappointment. Governor Stein and others have laid out the basic narrative of longer-term expectations of a return to normal levels of household formation, but, in the short-term, of weak activity and prices going up a lot, which does, of course, suggest—and it makes sense—that there are somehow supply constraints. I confess that I find this still puzzling and somewhat unsatisfying. And I worry that there are other longer-term trends associated with poor job opportunities for younger people and lack of credit availability for weaker households. I guess I would say that I find the price trend somewhat troubling, as it is continuing in the face of weak demand.

The labor market report for February was in line with expectations of a return to decent economic growth. I would note that the labor force participation rate is now up 04 percentage point since late last year. I know there is some volatility there, but, holding all else equal, that

bigger denominator would slow down progress in reducing headline unemployment but would, nonetheless, be a very welcome development. Along with nearly 3 percent economic growth, I expect we'll continue to see improvement in the labor markets and unemployment declining nearly to 6 percent by year-end. I also expect inflation to move back toward its 2 percent objective.

Risk factors are the same as others have mentioned—principally, global factors concerning China and Ukraine. I would also add that I do see financial conditions as a potential risk down the road. The risk of continued rising froth in fixed-income markets, followed by a correction that could halt progress, is a real one. If this starts to have the feel of a classic credit cycle, then the level of damage when the cycle turns is hard to predict. It can be small, or it can be large. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Well, thank you, everyone, for your comments and observations. At our last meeting, I tried to summarize some of your comments in terms of how they answer a few key questions that bear on our policy decisions, and I thought that, with your indulgence, I would try to do the same thing again today.

It won't surprise you that two of the questions are identical to those from last time, and that's because they pertain to the criteria we have established to continue tapering our asset purchases. First, is the labor market continuing to improve, and does that improvement appear to be sustainable? And, second, is it reasonable to expect that inflation will return to our 2 percent objective over time? Of course, as the labor market continues to improve, we also need to assess how close we have come to our maximum-employment goal. A final policy-relevant question is, what factors could materially alter our forecast of a gradual return of employment and inflation

to mandate-consistent levels, or, put differently, what are some of the notable risks to the outlook?

On the question of labor market improvement, I heard general agreement around the table that the labor market is continuing to improve, and that spending is most likely strong enough to see continued gradual improvement, although certainly a number of people—President Lockhart, Vice Chairman Dudley, President Evans, and Governor Tarullo—all suggested that the jury actually remains out at this point about just how large a pickup we're likely to see in economic growth. That said, almost all of you noted that there's been very little shift in your forecasts, and I interpret them as generally in the same ballpark as the Tealbook's. The March employment report and incoming spending and production data—with the exception of housing, which a number of you commented on—are consistent with a diminished risk that the softer data we saw on employment and spending early this year signal any persistent loss of momentum. A number of you—Presidents Fisher, Lockhart, and Plosser as well as others—commented on seeing firms somewhat more growth-oriented and on improved business optimism.

Certainly, we are seeing payroll growth move up. The three-month averages of total and private payroll gains are now around 180,000 a month, whereas at the time of the February report, they were running around 130,000. And, as many of you noted, other metrics pertaining to the labor market—such as the workweek, labor force participation, and the employment-to-population ratio—also point to continued improvement.

Now, a number of you commented on the issue of how much slack remains in the labor market, and that is an important issue that will bear on our decision of how long we should wait before beginning to tighten policy. I took note of comments by Presidents Fisher and George, for example; you do hear reports of labor shortages in some sectors and occupations. But, as

President Evans and others noted, this is something of a chronic situation—there are areas in which we do persistently see shortages. President Lacker described a very interesting piece of research at the Richmond Fed that, if I'm summarizing it properly, involved creating an index of underutilization of labor, with weights reflecting transition rates into employment. And, as I understood the conclusion of this research, it is that, while in some sense there is more slack in the labor market than would be captured by U-3, the behavior of this broader measure of underutilization relative to U-3 is, nevertheless, very similar to that in past business cycles. Therefore, U-3 remains a good single indicator of the state of the labor market.

A number of you commented on a topic I was going to discuss, and I will now curtail my comments on this, which pertains to work by Krueger and others about long- and short-term unemployment and their effects on inflation. I can't hope to adequately summarize the arguments that Vice Chairman Dudley, Governor Tarullo, and others made about this, but I think the bottom line here is that we should be quite skeptical about jumping to the conclusion that it's only short-term unemployment, which is now down to normal levels, that drives inflation. There are a number of reasons for being skeptical about that conclusion. I also intended to describe some recent Board work that Governor Tarullo did a much better job of describing than I could. But, as President Kocherlakota also emphasized, we can learn a lot from cross-regional and cross-state comparisons. There's been quite a lot of work of that type at the Board—and, obviously, by your staff—and it really casts doubt on that conclusion. In my own comments, I will briefly come back to the policy implications of this. A number of you—President Kocherlakota and Governor Tarullo—noted that part-time employment also seems very high in comparison with U-3, and that it appears to put pressure on wages in the cross-section work that President Kocherlakota described.

I thought President Rosengren also described interesting empirical work that suggests that a lot of individuals out of the labor market, including retirees, are likely to reenter the workforce as the expansion continues. And I think the bottom line of that—I'm not positive—is that there is more slack than what would be captured in U-3. Certainly, if a portion of the decline in labor force participation reflects cyclical factors and that labor force participation is likely to increase, then we may see an outcome in which—and this is similar to what's in the Tealbook—instead of declining further because of ongoing secular trends, labor force participation could just flatten out.

There was also a lot of interesting discussion about wage growth, which most of you see as quite low with very little indication of acceleration. That seems consistent with substantial remaining slack, and I guess the ECI data that we received this morning, which Bill described, are consistent with that. I found President Williams's discussion about downward nominal wage rigidity very interesting. I've been fascinated by the topic for a long time. I think the story here is that nominal wage growth may be currently held down by the fact that while some firms during the downturn cut wages, many were either unwilling or unable to cut wages as much as they would have liked. That may, on the one hand, explain why wage growth and inflation didn't actually fall as much as we might have expected during the downturn, but now it explains why, as the labor market is improving, wage growth isn't picking up as much as we might expect. I believe President Kocherlakota mentioned some anecdotal information that's consistent with that.

Turning to inflation, I think most of you who discussed this topic mentioned that you continue to expect inflation to gradually move up toward our 2 percent objective, and that you saw recent data, particularly the CPI readings, as being consistent with stabilization. President

George and the Vice Chairman mentioned a number of trends in shelter costs, import costs, and medical prices that could push inflation up over time. But there were cautionary comments as well on the topic of inflation—the fact that inflation, as Presidents Evans and Kocherlakota noted, is running at a very low level. And we're not seeing any clear signs at this point that it will move up quickly back to our 2 percent objective.

Turning to the topic of what could throw our forecast off course, many of you mentioned the main risks that concern you as being external—namely, events in Russia and Ukraine; slowing growth in China and potential risks pertaining to shadow banking and housing markets there; and financial-stability risks in that we're seeing evidence of reach-for-yield behavior in fixed-income markets, including leveraged loan markets, in which terms and standards are continuing to deteriorate in spite of our guidance.

I thought Governor Stein's suggestion of looking at catastrophe bonds and the fact that their yields have moved with these spreads might lead us to worry a little bit more than we might have if we thought declines in spreads were reflecting greater health in the corporate sector. This suggests that it is a measure of risk appetite, and we should worry about it because there could come an unwinding at some point or a volatility event that would involve financial-stability risks. In particular, as the time of liftoff draws closer, we could see financial conditions tighten sharply.

Well, I have very little to add. I agree with the consensus I heard around the table: Incoming data on the labor market and spending suggest that the labor market is continuing to improve, and that the improvement is likely to be sustainable. On the related question of just how much slack remains in labor markets, I would say that I have also been spending quite a bit of time thinking about the distinction between long- and short-term unemployment—the work by

Krueger and others that Governor Tarullo and Vice Chairman Dudley discussed in detail—and have been reading with interest recent papers on this topic. I agree with their conclusion that this work really casts doubt on the general conclusion that there is a big difference between short- and long-term unemployment and their effects on inflation. I would note, though, that even if it were the case that long-term unemployment has a notably weaker influence on inflation than short-term unemployment, that doesn't quite settle the question of how long-term unemployment should affect our policy decisions.

The evidence, as I read it, suggests that the long-term unemployed really look no different in terms of their characteristics than the short-term unemployed. They're individuals who want to work. In that sense, they are quite employable, in spite of the fact that employers may have a tendency to pass them over at least until the firms are finding that it's becoming much harder to find qualified applicants. Until they become reemployed, it could be the case that they do exert less pressure on wages and prices, although I am skeptical of that. But, even if they do, it looks as though more rapid expansion of aggregate demand would certainly help the long-term unemployed get jobs, and the potential cost of that might be higher inflation. Well, at this point, inflation is running well below our 2 percent objective. So, in pushing aggregate demand to try to bring them back into the labor force and into jobs, it seems to me that we currently face no tradeoff in terms of our dual mandate. To me, the right policy response is to provide enough accommodation to push down long-term unemployment, along with other manifestations of underutilization, such as the still very low rate of labor force participation and the high share of part-time employment for economic reasons. If we follow a strategy like that, a day may come when, ultimately, we will face a tradeoff between our objectives. If that happens,

that's something we will have to address, I presume, using a balanced approach. But we're not at that point yet.

Let me stop there, and let's turn next to the policy go-round. I think we're going to distribute a slightly revised version of the statement that responds to the data from this morning; there are some small proposed revisions. When that's done, we'll turn to Bill for his briefing.

MR. ENGLISH.[6] As the Chair mentioned, we made some small changes to the alternatives, which are shown in blue in the handout in front of you labeled "Material for Briefing on Monetary Policy Alternatives."

The top panels of your first exhibit provide information from the Desk's April surveys. The left panel shows the median of the dealers' projections for the path of asset purchases, which is unchanged from March. All of the dealers are virtually certain the Committee will reduce the pace of purchases another $10 billion at this meeting, and almost all expect the program to be wound down by the end of October. As shown to the right, the median paths for the federal funds rate from the dealer and buy-side surveys were also little changed from March, at least until 2017, and both surveys point to liftoff in the middle of 2015 as most likely. As Simon mentioned yesterday, the mean of the expected paths from the surveys shifted up a bit.

As noted in the middle panel, the relatively small changes to the policy outlook suggest that market participants did not see the new forward guidance issued in March as indicating a change in the Committee's policy intentions. Even so, the survey respondents remain fairly uncertain about the timing of liftoff as well as the level of the federal funds rate at the end of 2015, consistent with their seeing sizable odds that the Committee would adjust rates more slowly or more quickly, depending on the implications of incoming information for the economic outlook. Indeed, a few of the commentaries over the intermeeting period specifically noted this possibility.

The bottom panels show the median dealer forecasts for real GDP growth and PCE inflation in the March and April surveys. The dealers, like the staff, made only small downward revisions to their outlook for GDP growth this year, consistent with the view that economic activity in the first quarter was held back by transitory factors. And, like the staff, the dealers also made few changes to their inflation forecasts; they continue to see inflation returning to 2 percent by the end of 2016.

If you share these views about the economic outlook, you may believe it's appropriate to reduce the pace of asset purchases by an additional $10 billion and to make no changes to the forward guidance at today's meeting, as in alternative B, on page 6. More broadly, alternative B makes only minimal changes to the March

[6] The materials used by Mr. English are appended to this transcript (appendix 6).

statement. The first paragraph updates the Committee's summary of recent economic developments, noting that economic activity has picked up recently after having slowed sharply during the winter, and that household spending appears to be rising more quickly, but that business fixed investment edged down and the recovery in the housing sector remained slow. The only other changes to the statement are a reduction in the pace of asset purchases, noted in paragraph 3, and, as in all of the alternatives, the removal of the final paragraph included in the March statement. Market expectations appear to be pretty well aligned with a statement such as that in alternative B. Consequently, it's unlikely to generate significant reactions in asset prices or yields.

Alternative C, on page 8, may appeal to policymakers who are confident that first-quarter growth was held down almost entirely by transitory factors and that the underlying pace of economic expansion remains sufficient to eliminate labor market slack relatively quickly, who believe that the remaining degree of slack is relatively small, or who are concerned that continuing to expand the balance sheet and keep rates low poses growing risks to inflation expectations or financial stability. Policymakers may therefore want to taper asset purchases more rapidly and, by doing so, signal that liftoff is likely to occur earlier than markets now seem to expect.

Alternative C begins by noting that the effects of adverse weather and other transitory factors are waning, and that the pace of job growth is solid. The second paragraph emphasizes the Committee's expectation for a rebound in inflation toward 2 percent. The third paragraph announces a larger reduction in the pace of asset purchases, while the fourth suggests there could be similarly large reductions in the future.

A decision to reduce the monthly pace of purchases by $20 billion per month would surprise many investors and would likely lead them to pull forward the expected timing of the first rate hike and might lead them to anticipate a steeper subsequent path of the funds rate. Longer-term interest rates likely would rise, equity prices fall, and the dollar appreciate.

Finally, alternative A, on page 4, may appeal to policymakers who have doubts that transitory factors can explain much of the recent weakness in economic growth, or that inflation will move back toward 2 percent relatively promptly. They may prefer to wait for additional information before deciding whether to reduce the pace of purchases further, and they may also want to sharpen the forward guidance for the federal funds rate by adding an inflation floor.

The first and second paragraphs of alternative A are more tentative about the recent economic news and the outlook for inflation. The third paragraph refers to the Committee's reduced confidence about the economic outlook as justification for its decision to maintain the current pace of purchases until more information on the outlook is available. The fifth paragraph adds to the forward guidance by stating that the Committee expects to keep interest rates low not only "for a considerable time after the asset purchase program ends," but also "at least as long as inflation between

one and two years ahead is projected to be below 2 percent, provided that longer-term inflation expectations remain well anchored."

An announcement along the lines of alternative A would come as a considerable surprise to market participants, who would likely mark up their expectations for total asset purchases, perhaps by a considerable amount, and push back the timing of liftoff. Interest rates would fall, and the dollar could depreciate. Equity prices could rise or fall, depending on the size of the negative signal investors took from the statement about the economic outlook.

Draft directives for these alternatives are presented on pages 11 through 13 of your handout. Thank you, Madam Chair. That completes my prepared remarks.

CHAIR YELLEN. President Evans.

MR. EVANS. If I could ask a question, the anticipated action in alternative B has us stepping down asset purchases to $45 billion a month. I know we're not on a preset course, but if I just project that continuing into the fall and add up what we're going to be purchasing until the termination of the purchase program, it's somewhere around $190 billion, depending on the assumptions that you make about that. Now, it got my attention that our testing of the overnight reverse repo program at its maximum, nonweird month amounts to $180 billion.

MR. POTTER. Right, in a day.

MR. EVANS. Right. So we're about offsetting what we're expected to be adding now. Is that the right or wrong way to think about it?

MR. ENGLISH. I don't think that's the right way to think about it.

MR. EVANS. Okay. So here's my question: Is anybody talking about the effect of what we're sterilizing as a premature tightening or hints of anything like that?

MR. ENGLISH. I haven't heard anything like that in my conversations with market participants, and I think that if it were suggested to me, I'd push back against it because we're basically substituting overnight RPs for reserves when we do the overnight RP exercise. That doesn't change the amount of duration we've taken out of the market. It doesn't change the

amount of prepayment risk we've taken out of the market. So it shouldn't have an effect on the longer-term rates. It shouldn't undo the effects of the asset purchases that we conducted.

MR. LACKER. Madam Chair?

CHAIR YELLEN. President Lacker.

MR. LACKER. This raises the question I've asked before. Some of the data that the Markets Group has provided suggests that the gross amount of triparty repo is unchanged, and so we're displacing some RP financing that would have taken place anyway. The question that raises is, what happens to the stuff that used to be financed that we're now sort of displacing in the RP market? Is that a sensible question?

MR. POTTER. It's an excellent question. We have looked at it. Some of this is the interdealer trading, which I don't think we should be that concerned about.

MR. LACKER. What do you mean? But hold on. I'm not sure I understand you. So this is formerly financed with other dealers that is not being financed now?

MR. POTTER. Yes, it's exchanging more toward the end of the day, when they're trying to line up their funding with the collateral that they have. That interdealer market has come down in volume just a little bit. Some of the activity we see when there's a large takedown in the overnight RRP is due to the primary dealers coming into the overnight RRP facility. I don't view that as having a negative or adverse impact on the broader funding environment. It's something related to how the internal mechanics of the repo market work. More recently, what's happened is the supply of bills has come down. So what you've seen is people investing in the overnight RRP who would have invested in bills. They would have probably invested in other areas. For example, some of the larger banks would have attracted some of that cash over this period of time, and then that would have been reflected in the reserves. Reserves have been

going down in the banking system as the overnight RRP has gone up. Reserves would have gone up at that point.

MR. LACKER. I didn't understand how the first half of what you said was germane. If a certain amount of Treasuries held privately is being financed in the RP market and we're now in the RP market, less of that is being financed. This is just a simple way of thinking about it. Somebody must be holding that or financing it some other way. Now you're telling me their bills might have rolled off.

MR. POTTER. No, because the Fed is financing some of its Treasuries in the repo market.

MR. LACKER. Right. So then the people who used to finance their Treasuries in the RP market aren't financing them there anymore, and I'm asking who's financing them now, or are they holding them outright? I'm asking where do those get financed now? That was the question.

MR. POTTER. We can look at it some more. I'm trying to understand.

MR. LACKER. This gets to President Evans's question, really.

MR. POTTER. We could check whether the holdings of government-only money funds have gone up. That would be one way. There could be flows into those money funds. But we'll look to see if we can determine whether it is displacing funding. I haven't seen any evidence yet that it's displacing funding at this level.

MR. LACKER. Well, yet there was a chart in an earlier paper you circulated that had the triparty Treasury overall volume, including us, kind of flat.

MR. POTTER. That's right.

MR. LACKER. Which is where I got this stylized fact. Maybe that's wrong. Maybe that's too simplistic.

MR. POTTER. The GCF interdealer trading is where most of that would be absorbed.

MR. LACKER. Okay. Do you understand the question?

MR. POTTER. Yes, I understand the question.

CHAIR YELLEN. President Kocherlakota.

MR. KOCHERLAKOTA. Yes—thank you, Madam Chair. I wanted to follow up with Bill on chart 1, "Median Dealer Purchase Expectations." This is on page 1 of 13. This shows that the median dealer expects us to end the purchase program at the October meeting. Could you look at the split among the dealers and you give a little more information? What fraction of the dealers expect us to go to December, and what fraction expect us to end in October?

MR. ENGLISH. I actually forget. Do you remember that, Simon?

MR. POTTER. I think a slight majority of the dealers expect that you'll be at $15 billion and go to zero, but I don't think there's any conviction around that; this is the median.

VICE CHAIRMAN DUDLEY. So the split is something like 14 to 8.

MR. KOCHERLAKOTA. Okay, so it's about two-thirds to one-third.

MR. ENGLISH. It's a little bit more in that direction in the latest survey than in the previous survey.

MR. POTTER. I think we've learned that looking just at the median is probably not the best estimate.

CHAIR YELLEN. President Rosengren.

MR. ROSENGREN. Mine is a very picayune question. We've had two quarters of negative growth in residential investment. In the first paragraph, we're talking about the

recovery slowing. I wonder if it might be more accurate just to say "the housing sector has slowed," which is reflecting the fact that we now have two quarters in a row of negative residential investment.

MR. ENGLISH. I think we wanted to say "the recovery in the housing sector remained slow," the thought being that a broader set of indicators suggested we still had some underlying sense of recovery in the housing sector. Things are better than they were. But you're right. The residential investment number in the NIPA has been negative now for two quarters in a row. Is that right, Bill?

MR. WASCHER. Yes, that's right. One question would be whether you want to look at March or you want to look at the first quarter as a whole. Housing starts did pick up in March. Permits were about flat. So there wasn't a further deterioration in March.

MR. ROSENGREN. It's just that you have quarters that are adding up that are negative. The word "recovery" doesn't seem as consistent as just saying "the housing sector has slowed," —it's a picayune question; it just seems more accurate to say "the housing sector has slowed."

MR. FISHER. But it has been recovering.

MR. ENGLISH. I think it's a close call. We actually did discuss this yesterday and thought there was some value to suggesting that the Committee still thought there's a recovery going on in the housing sector, even though we've seen some weak data. Partly, the first quarter, we think, was weak because of the harsh winter weather. The latest information from March is a little bit more upbeat. So taking out the thought that there is a recovery in the sector seems as though it might send a stronger signal than we wanted to send.

VICE CHAIRMAN DUDLEY. And prices are still going up, which is part of the recovery process.

CHAIR YELLEN. Yes, I agree. Other questions for Bill? President Lacker.

MR. LACKER. I apologize. This is for a different Bill. I totally understand if you blow me off, because this was just released two hours ago, but real disposable personal income at a 1.9 percent rate is 0.8 percentage point below what you had for the first quarter. I'm not going to ask you about the implications, but, looking at the line for real disposable personal income in the Tealbook, you had a big acceleration coming in the second quarter. I know it's too soon to ask you to take on board what the implications are, but what were you thinking about real disposable personal income? For the consumption outlook, this is important.

MR. WASCHER. We were expecting, with the further improvements in the labor market, that we'd get some additional growth in wages and salaries. In addition, some of the drag in the first quarter reflects the expiration of the emergency unemployment insurance compensation program, and so that was a temporary drag in the first quarter that wasn't going to be repeated in the second. We looked briefly at the data this morning. Some of the miss in income in the first quarter was in wages and salaries, but I think the biggest chunk was net interest payments, and there was some in nonfarm proprietors' income as well. I don't know what to take from that, but it wasn't as though the first-quarter wage-income numbers came in a lot lower than we were expecting. So I think we'd still expect the wage and salary numbers in the second quarter to be okay.

MR. LACKER. Okay. Thanks.

CHAIR YELLEN. Any further questions? [No response] Let's begin our go-round with President Fisher.

MR. FISHER. B. Thank you, Madam Chair. That's my "Calvin Coolidge" response.

MR. EVANS. Hear, hear.

MR. FISHER. I support alternative B without amendment. Thank you. I didn't want to take up too much time. [Laughter]

CHAIR YELLEN. Thank you. That sounds fair. President Rosengren.

MR. ROSENGREN. I usually pride myself on being brief, but I can't match that. [Laughter] I support alternative B. We've set a high threshold for altering our slow-taper strategy. The conditions for deviating from that strategy have not been met. Minimizing the changes in the wording of alternative B effectively conveys that we are continuing on the path we started on in December.

If anything, I believe the risks remain on the downside. I worry that geopolitical risks are uncomfortably high, and, if anything, a bad geopolitical outcome may have more serious consequences than modeled in the Tealbook scenario "Escalating Geopolitical Tensions." I also worry that the corroborating evidence that inflation is trending to our 2 percent target is not yet obvious. Finally, our ability to offset negative shocks with monetary or fiscal policy is limited. Given these concerns, we should maintain a highly accommodative stance for monetary policy. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Williams.

MR. WILLIAMS. Thank you, Madam Chair. I support alternative B. The outlook is virtually unchanged since our March meeting, as are financial conditions on balance. Apart from a transitory first-quarter slowdown, caused in part by unusually severe winter weather, I expect the recovery to continue to play out largely as projected when we announced the beginning of the taper. Economic growth is poised to pick back up as the year proceeds, keeping the economy on a path of sustained moderate expansion. Nonetheless, the unemployment rate remains elevated, and inflation is below our longer-run target. These circumstances warrant staying on our current

path for policy. This includes a further measured reduction in the pace of asset purchases, combined with forward guidance that signals a highly accommodative future path for the funds rate. Alternative B delivers that message clearly, with minimal fuss. Thank you.

CHAIR YELLEN. President Lockhart.

MR. LOCKHART. Thank you, Madam Chair. Taking a leaf out of President Fisher's book, I've been wanting to do this for a long time: I support alternative B, and the statement is fine. [Laughter]

CHAIR YELLEN. Great. President Lacker.

MR. LACKER. Thank you, Madam Chair. There isn't much to say about today's policy decision. I support alternative B, except for the portion of the statement I was unable to persuade you all to drop last month. I'll pass on the opportunity to restate my case.

Looking ahead, I think the issue that looms in my mind is how we should respond if markets push up longer-term rates in response to economic news or other developments over the course of the process when we begin normalization. Unlike simulations, in which you control everything, I think we're not going to know the causal driving factors with precise certainty. And it could be difficult to decipher. It would be worthwhile for us to supplement the preparations we're undertaking on the operational front for normalization by spending some time thinking through various scenarios for how longer-term rates play out during this normalization process. My instinct is that we should be cautious about jumping to the conclusion, if rates move pretty sharply, that markets just don't understand how dovish we truly are and start pushing back on longer-term rates. Markets could be telling us something important. I'd point out the box on uncertainty about the longer-term real rate. Others have commented that we don't know if economic growth is going to 3½ percent or is going to muddle through in the high 2s or low 2s.

Those kinds of things can show up in the sensitivity of longer-term rates, and that doesn't even mention expected inflation. I'd just point out that, in one of the most successful periods for monetary policy, the '50s and early '60s, our operational strategy was bills-only, and the underlying motivation was to allow market determination of longer-term rates to provide us with a sensitive signal and feedback about how policy ought to be guided. Those are my thoughts right now. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Bullard.

MR. BULLARD. Thank you, Madam Chair. I also support alternative B for today. The tapering process has, in my judgment, gone well so far, especially considering the volatility that we experienced during the "taper tantrum" of last summer. My judgment is that we should continue to taper at this juncture. This morning's weak GDP report does give me pause, however, as it surprised me to the downside. While I'm willing to accept the judgment that economic growth will pick back up in the second quarter, I do think we need to see tangible evidence that that is actually occurring, as Vice Chairman Dudley referred to earlier.

Because there is nothing to talk about in alternative B, I thought I would talk about alternatives A and C. [Laughter] As currently envisioned, the Committee's strategy is to end the open-ended QE program later in 2014 and, if all goes well, to begin raising the policy rate sometime in 2015. Alternatives A and C are meant to address, at least in part, what the Committee's options may be in the case that the economy performs either better than expected, alternative C, or worse than expected, alternative A. The phrase "performs better or worse than expected" is a judgment made by the Committee. As currently stated, the response to a better-than-expected economy is to increase the pace of the taper. The response to a weaker-than-expected economy is to pause in the tapering process. The response to a stronger-than-expected

economy is to taper at a faster pace and presumably end the purchase program sooner. Given our experience at the June meeting and the September meeting last year, I think that both of these possible policy actions would move expectations of future policy in the desired direction and would have a substantial effect on financial market conditions.

However, conceptually, we are viewing the taper as coming to an end in the second half of 2014—that is, the pace of purchases would hit zero and evidently remain there for a period of time. The size of the balance sheet, given our reinvestment strategy, would remain fixed. Because we are, in essence, approaching a fixed balance sheet, the policy value of choosing A or C is diminishing as we reduce the pace of purchases to smaller and smaller amounts. This may be leaving the Committee without good responses to adverse developments in either direction during the remainder of 2014. A possible fix for this would be that alternative A could envision not just a pause in the tapering process, but also maybe even an increase in the pace of purchases, because we'd be at very low levels of purchases in the remainder of this year. Here, rather than $15 billion, you might envision alternative A going to $25 billion or something like that. And alternative C could envision not just pushing the pace of purchases to zero more quickly, but also, in the event that the economy were actually performing quite robustly, having a so-called negative tapering, or a controlled reduction in the size of the balance sheet. As options about how to respond to developments in either direction, these would be more effective and maybe should be the way we should think about this as we proceed through the rest of 2014 and before we get to the point in 2015 at which we'd actually be thinking about raising the policy rate. The bottom line of my comment is that alternatives A and C, should we need to employ them, may not have a large enough effect as we get to smaller and smaller asset purchase amounts. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. President Evans.

MR. EVANS. Thank you, Madam Chair. I also support alternative B. I do think that the low-inflation environment is a concern, and the low wage data today in the ECI are consistent with that. We say we're monitoring inflation developments, and that's fine for now, but the time is likely to come when we'll need to discuss further the progress on that front. We need to be careful. We need to be accommodative. For today, alternative B is, and I support it. Thank you.

CHAIR YELLEN. Thank you. President Plosser.

MR. PLOSSER. Thank you, Madam Chair. For today, I can support alternative B. The economy continues to improve, consistent with our forecast, and I see no reason to deviate from our path of reducing asset purchases by $10 billion per meeting. I think the description of the labor market in paragraph 1 of alternative C, however, actually aligns better with the data and the comments I heard around the table than the language in alternative B. Rather than saying the labor market data have been mixed—nearly all of the labor market indicators we've kept track of in the past several months have actually improved. So I'm not quite sure why we want to send a signal that it's been mixed. Certainly, we do say "the unemployment rate . . . remains elevated," which is obviously a true statement, but all of the other labor market statistics, I think, have improved. So I would actually be inclined to think more about describing paragraph 1 with alternative C.

I also believe we need to be thinking a little further ahead. At our last meeting, I discussed some of my reservations about paragraph 6. I still have them. Even if our current anticipation is that rates will rise only very gradually, we should make sure we position our communications so that we can move interest rates up more quickly should that be necessary. Notwithstanding the language in paragraph 5 that says that, in determining the time of liftoff, the

Committee is going to assess progress toward meeting our objectives, I'm actually beginning to get concerned that the public is starting to think there will be no change in policy rates until our goals are met. We should be careful, and we need to work on language that will convey more of the concept of our policy reaction function and the factors that determine it as we go forward.

I would also note that, with the exception of the nominal GDP rule, all of the rules reported in the Tealbook, Book B, suggest that we should have liftoff by the third quarter. And that is even recognizing the high unemployment rate and the very low inflation rates. We've not yet agreed on why we want to keep interest rates lower for longer, even after we have reached our inflation and employment goals. That was the conflict, it seems to me, in paragraphs 5 and 6.

The discussion in the Tealbook, Book A, of a lower long-run natural rate of interest was a very interesting one, and I thought they did a nice job with that. An equilibrium real rate—I'll call it r*—that is lower than its longer-run level would be one rationale for anticipating lower nominal interest rates. It doesn't appear, though, from the March SEP that many participants have yet lowered that lower-than-normal long-run funds rate. So I think this is a topic the Committee should continue to discuss, because if we're going to consider allowing r^* to vary over time in the context of our policy rules, this is going to be very hard to communicate, and we're going to have to be very clear about how we put a discipline around making those decisions. What theory and what evidence are we going to use to justify that? The kind of discussion in the Tealbook was a useful beginning to having that discussion. But it's a very complicated issue, and it's a very difficult issue for the Committee to face.

I would not want us to do this or to become a case of the tail wagging the dog. That is, we decide for some reason that we want lower interest rates, and then we take down our estimate

of *r**—that's not the right way to think about this. We need a more consistent, disciplined way of talking and thinking about this. We don't have that yet, and it's likely to be problematic for us unless we begin to address it. My own view is that the bar should be quite high for allowing that free parameter to move around, as I think it'll make our communications quite difficult, because then we'd have to explain why and how and when we change it. So the bar needs to be very high for moving that around.

Finally, I'll reiterate what I said earlier and yesterday as well. I think it would be prudent for us to begin thinking about our balance sheet more directly, particularly in the context of the exit principles that we've talked about before, integrating a discussion of how we're going to go about shrinking the balance sheet in the context of the discussion that we had yesterday. I think those two things are linked. And how we integrate those into our discussion of reducing purchases and then perhaps beginning to reduce reinvestments—maybe that becomes a continuous path. I don't know. But we need to begin thinking about that, so I encourage us to put that on the table for discussion soon. But for today, I can support alternative B and the language. Thank you.

CHAIR YELLEN. Thank you. President Pianalto.

MS. PIANALTO. Thank you, Madam Chair. My final FOMC policy statement will be brief, although not quite as brief as the statement at my first FOMC meeting back in 2003. My first policy statement consisted of six words: "I support your recommendation, Mr. Chairman." [Laughter] Just for the record, I should point out that the statements of most of the Committee participants at that meeting were identical to mine. Of course, times have changed, and now we are in a new equilibrium in which policy statements are expected to be much longer. So I will more than quintuple the length of my initial policy statement. With the economy and labor

markets continuing to recover and with my forecast that inflation will return to 2 percent by the end of 2016, it is entirely appropriate to stay the course laid out in alternative B.

Now, I want to make just a couple of comments. As I said last night, I hope that the challenges facing this Committee are never as difficult as the ones we faced in the past several years. I am counting on all of you to successfully pilot us back to maximum employment and 2 percent inflation, and I am confident that you will do so. Again, it has just been an honor and a privilege to serve on this Committee and to contribute to monetary policy that has been effective and has become ever more transparent. I want to thank all of you for making it an incredibly rewarding experience. Thank you, Madam Chair. [Applause]

CHAIR YELLEN. Thank you. President George.

MS. GEORGE. Thank you, Madam Chair. And all the best to you, President Pianalto.

MS. PIANALTO. Thank you.

MS. GEORGE. I, too, support alternative B in terms of a further reduction in our asset purchases. The economy continues to make meaningful cumulative gains, and inflation is widely expected to gradually move higher after having been held down by a number of temporary factors.

As the economy strengthens, though, I think there are a couple of communication issues worth considering, and both of these happen to be along the lines that President Plosser has already raised—one related to our longer-term forward guidance and the other the reinvestment policy. Notwithstanding my own ongoing concerns about unusually low interest rates for this extended period of time, I do think the effectiveness and credibility of our forward guidance are going to demand some further clarity as the economy strengthens, particularly because paragraph 6 talks about how, "even after employment and inflation are near mandate-consistent

levels," we expect that "economic conditions may, for some time, warrant keeping the target federal funds rate below" its long-run level. This guidance could create some communication challenges.

As President Plosser noted, there have been a range of views as to why a below-normal target might be necessary, and several explanations have emerged around fighting lingering headwinds, following a highly inertial policy rule, or responding to a lower long-term equilibrium funds rate. If persistent headwinds are the reason for low rates, we should try, over time, to be more specific simply to ensure that we know what we are trying to offset by holding rates low. The equity risk premium, a low housing share of GDP, and fiscal headwinds are some factors that have been noted in the past as weighing on the recovery. As these factors move toward more normal levels or not, we can be prepared to reassess the stance of policy. But if these headwinds are, in fact, subsiding and we're instead moving our policy rate with considerable inertia or have a view that the longer-run neutral rate has fallen, we should be prepared to explain these other aspects of the policy to our market participants or risk sending confusing signals.

The second issue that I would just note briefly is one that was referenced yesterday around the reinvestment policy and how we talk about that. I noted from the recent memo that compared the Tealbook assumptions with survey-based measures of market participants that dealer responses varied widely regarding expectations of cessation of reinvestments, from early 2015 to mid-2016. So the signaling aspect of such cessation will likely be strong, and I think our groundwork that we might lay could help coalesce expectations around our intentions as we go forward. Thank you.

CHAIR YELLEN. Thank you. President Kocherlakota.

MR. KOCHERLAKOTA. Thank you, Madam Chair. I'm willing to support alternative B at this meeting. The FOMC adopted a new communications framework in its March statement. I continue to have concerns about this framework, and, as we move forward, I believe that the Committee should strongly consider the kind of forward guidance described by President Rosengren in his recent speeches. However, changing the forward guidance one meeting after adopting a new communications framework would present challenges and raise questions about FOMC credibility. So at this meeting, I'm willing to support alternative B.

In the remainder of my remarks, I'm going to pose three tactical questions about policy that I think would be best for us to attempt to answer in our internal deliberations in the next meeting or two. My first question is, October versus December? In our communication and internal deliberations, we have largely locked down the reduction in asset purchases to be $10 billion per meeting, barring large changes in the outlook. That leaves one last, dangling $5 billion to be the subject of fierce press attention. Do we plan to zero that out in October or wait until December?

My second question is, how do we plan to implement and communicate our current, very slow planned rate of increase for the fed funds rate? The SEP suggested that, over the course of 2016, the federal funds rate will rise by considerably less than 25 basis points per meeting. How, exactly, do you prefer to implement that? Will we raise the fed funds rate target by less than 25 basis points per meeting? Now, of course, we might be changing the federal funds rate target, as we discussed yesterday. The concern I have about that is, even in normal times, having that degree of control over the fed funds rate might be challenging if we were trying to raise it by, say, 10 basis points a meeting. From the conversation we had yesterday, I came away feeling that that might be even more of an issue as we exit this time around. Another approach would be

to be chunky—that is, move at some meetings and not others, let's say at press conference meetings. But that has other challenges associated with it. I'm not saying this is an impossible problem, by any means. It's more that we should be thinking ahead about the choice we prefer so that we can develop appropriate communication plans and, if necessary, enhance our technical ability to move whatever target rate we want in smaller-than-usual increments.

As I suggested yesterday—and I like what President Plosser said here, too—we should also be planning for the contingency—I view this as remote—that we might want to raise our target interest rate very rapidly. Some of the learning by doing might have to be in a very compressed time frame if that turns out to be true.

My third question just follows up on remarks the Vice Chairman made yesterday and Presidents Plosser and George have made today. There remains uncertainty in the markets about our reinvestment policy. I've heard about it as well. So I think it would be useful for us to have a conversation about that and try to achieve that.

The three questions, to go over them again, are as follows: October or December? How are we actually going to achieve our projected slow pace of interest rate increases? And what's going to be our policy about stopping reinvestments? I think that, for all of these questions, there's a temptation to use a "we'll figure it out when we get there" approach, but my experience on the FOMC is that we get better policy outcomes when we plan proactively for the future. For example, I thought, Madam Chair, the process we used to get to the communications framework that was announced in March—while I didn't agree with where we ended up—was exactly the right one. Planning for the future and communicating plans, when we formulate them, to the public help households and businesses form more precise expectations and reduce policy uncertainty, which is a benefit in its own right. So I'd hope we can resolve these uncertainties in

our discussions in the next meeting or two. If we can, then I would recommend we communicate our conclusions to the public as well.

I agree with both President George and President Plosser about *r**. The thinking in markets about how our reaction function works is shaped by a Taylor rule with a fixed intercept. And the more guidance we can provide that we can unite behind in a consensus way in this Committee about why exactly we see that *r** being low would be very helpful for market participants and the public more generally.

I say I'm willing to support alternative B. I do have one minor concern, but I'm willing to let it slide: Alternative B presumes that winter is over. [Laughter] This is not true in all Districts. Thank you, Madam Chair.

CHAIR YELLEN. Thank you, President Kocherlakota. Governor Tarullo.

MR. TARULLO. Thank you, Madam Chair. Like everybody else, I support alternative B. I thought Jay made an interesting and important point a little earlier this morning to the effect that the gap between the baseline scenario and upside risk has actually narrowed a good bit. I noted—and I think a couple of others did as well—that external downside risks probably increased. But it's very hard to quantify what those external downside risks are, and I don't believe it would be particularly productive—it might even be counterproductive—to include anything on either in the statement. So the language should remain as is. Thank you.

CHAIR YELLEN. Thank you. Governor Stein.

MR. STEIN. Thank you, Madam Chair. I support alternative B. I think we're on a good trajectory. I'm comfortable both with where I believe our collective reaction function to be and with the fact that market-implied estimates seem to line up roughly with that reaction function.

The one thing that gives me a bit of pause—this is something that we talked about a little bit yesterday—is not market expectations in a first-moment sense. Rather, it is market expectations in a second-moment sense—that is to say, implied volatility. For example, I think Simon mentioned some of the numbers, but, basically, if you look at long-dated swaptions—say, the 3-month option on a 10-year interest rate—they're pretty close to where they were. They're really just a hair away from where they were a year ago, which is in turn just a shade above the all-time historical lows in May 2007. So implied volatility is very low on long-term rates. And, particularly given all of the subjective uncertainties we've talked about in terms of headwinds and secular stagnation and all of that, that doesn't feel as though it's really naturally justified by the fundamentals. I wouldn't think you'd want to argue that fundamental uncertainty is historically low.

So I wonder a little bit about what's going on and what implications that might have for investor behavior. On the one hand, Madam Chair, I think you struck exactly the right tone in your recent communication. For example, in your press conference, you emphasized that the path of the dots in 2016 is a forecast and it's not a precise statement of where we will be. On the other hand, the volatility numbers make me wonder whether everybody is listening to you or whether, as I think was the case a year ago, there's a set of market players who've taken a different view and think that we've made the world safe for a long period of time. There's nothing to do about it, particularly. It's something to keep an eye on. It doesn't have any implications for the statement. I do think that, as we talk about this or as others talk about the outlook and the forecast, it is useful to make the point that the dots and all of that are not a locked-in path but have some element of forecast. And, in an ideal world, the market comes to

recognize that gradually rather than all in a big chunk at some point. But I think we're in a basically good place. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Governor Powell.

MR. POWELL. Thank you, Madam Chair. I'll support alternative B as well. I think the reduction in asset purchases is on a path that is well understood by the markets and well in keeping with developments in the economy. I also think that the forward guidance has generally been well received, and it's well designed to withstand the evolution of events in the economy. It was, however, necessary after the last meeting to undercut the SEP in order to prevent it from sending a false signal of tighter policy at the last meeting. While I think that has de-risked the SEP for the time being, it does seem as though, in seven weeks, you're going to be standing in front of another set of dots, and there will be a lot of pushback in the form of, "Well, why do you show us these dots?" and that kind of thing. So I wonder whether—this is for the intermeeting period—there is something we can do to either kill it off—I suppose not—or modify it in a way that would make it more credible. I know we've talked about a lot of ideas for doing that, and they haven't had wide support. But, in any case, it's something to think about in the intermeeting period.

Finally, on reinvestment policy, my takeaway from yesterday's colloquy was, there isn't a lot in the decision whether to stop reinvestment at the middle of 2015 or at the end of 2015—except for the signal—because there's just not that much that's maturing. And I guess I think that the liftoff decision is probably going to be very, very fraught. So it would be very wise to take the reinvestment decision off the table in some way now, before we get even close to that. That's probably well understood, but that's what I would do.

And with that, let me conclude by saying I hope that this will be my last meeting as your anchorman. [Laughter]

CHAIR YELLEN. Agreed.

MR. POWELL. Thank you, Madam Chair.

CHAIR YELLEN. Thank you. Vice Chairman.

VICE CHAIRMAN DUDLEY. Thank you, Madam Chair. I support alternative B. Generally, I think the large-scale revisions of the statement that we implemented in March have worked well. The 10-year Treasury yields are little changed over the intermeeting period—maybe a little bit too unchanged over the intermeeting period—and market participants' expectations appear broadly consistent with our own. So minimal changes to the statement are in order for this meeting. That's what alternative B does.

But, like others, I do think that we continue to have a dots problem in terms of our SEP submissions. So we need to do some further work on what could be done to ameliorate that problem. I don't see pulling the dots back as really that practical. If we're preaching transparency, then we have to practice transparency. I guess I'm more inclined to favor even greater transparency, and one thing we could do is to actually mark the dots as Committee members versus nonvoting participants. That would create a bit more clarity about where the weight of the FOMC was in terms of the dots.

I do think another thing we can do, though, is something that the Chair did in her speech at the Economic Club of New York: She emphasized the uncertainties that surround the forecast and therefore the uncertainties about how monetary policy will evolve as the forecast changes. That's a theme that we could provide greater emphasis to, because the fact is, the dots of the SEP have this perverse consequence of overemphasizing the modal forecasts in the markets' minds,

and then it feeds back into very low volatility that actually concerns us. If we can get people away from the modal forecast a little bit so they understand that this is almost certainly not likely to be realized, that would be another way of addressing the dots problem.

As I said yesterday, we've got to get the reinvestments issue on the table and resolve that. I guess I'm generally sympathetic with Governor Powell's view that putting it after the liftoff in terms of short-term rates probably makes the most sense, just because we're going to be quite nervous about what the liftoff itself is going to do with respect to financial conditions. Separating them by some period of time might be best, but I'm open to discussion on that.

Finally, as the Vice Chairman, I want to thank Sandy and Jeremy for all of their work and for being such good colleagues. The word "collegial" is a word that would apply very, very, very well to both of you. It's been a pleasure to work with you both, and I and everyone else on the Committee wish you the best of luck in your new endeavors.

CHAIR YELLEN. Thank you. Okay. Well, I think this has been a very good discussion, and we've heard many valuable suggestions for what we should be doing in coming meetings, particularly in terms of looking at reinvestment policy and how we're going to communicate that along with our plans for normalization; what to do about the dot plot; and other matters, including possible ways to clarify the logic of the guidance in paragraph 6, which many of you have mentioned. We'll keep these in mind and try to put these on the agenda for future meetings. But, with respect to today's decision, I heard widespread support for alternative B as indicated in the statement. Therefore, I think I'd like to put forward for a vote the statement in alternative B, as given by Bill English, according to the handout this morning. Matt.

MR. LUECKE. As the Chair indicated, the vote will cover alternative B, as described on pages 6 and 7 of Bill's handout, and the directive on page 12 of Bill's handout.

Chair Yellen	Yes
Vice Chairman Dudley	Yes
President Fisher	Yes
President Kocherlakota	Yes
President Pianalto	Yes
President Plosser	Yes
Governor Powell	Yes
Governor Stein	Yes
Governor Tarullo	Yes

CHAIR YELLEN. Great. [Laughter]

VICE CHAIRMAN DUDLEY. It's a new record.

CHAIR YELLEN. Isn't it. So, what do I need to tell you? There are two things. The dates of the next meeting are Tuesday and Wednesday, June 17 and 18. Another point is that the FOMC Secretariat had circulated a schedule of meetings for 2015. If you do have any concerns about the dates, please let Matt know immediately.

I can tell you that about six minutes from now, at 11:00, lunch will be served in the anteroom. For those of you who are able to stay, that would be great. And let me join in thanking our colleagues President Pianalto and Governor Stein for your contributions, friendship, and collegiality and say again how much we will miss you.

MR. STEIN. Thank you.

MS. PIANALTO. Thank you.

[Applause]

END OF MEETING